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Clinical Instructors' Cultivation of Pre-Licensure Nursing Students' Pharmacology KSAs

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CLINICAL INSTRUCTORS' CULTIVATION OF PRE-LICENSURE NURSING STUDENTS'

PHARMACOLOGY KSAs

By

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ABSTRACT

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). To acquire these abilities, they must not only receive pharmacology content as part of their educational preparation, but also translate what they have learned during student clinical experiences. This is important in bridging the gap between what is learned in the classroom and clinical practice.

The Quality and Safety Education for Nurses (QSEN) project initiated six competencies to help improve nursing education (Cronenwett et al., 2007). However, since the inception of the QSEN competencies, little knowledge has been generated about their integration into nursing programs' pharmacology education. The purposes of this study were to explore how nursing instructors cultivate and evaluate student pharmacology KSAs in the clinical setting and explore how QSEN competencies are integrated into clinical pharmacology education.

This study utilized a multiple case study approach. A convenience sample of six clinical nursing instructors from three different nursing programs in the southwest United States were interviewed, and their course materials pertaining to pharmacology were reviewed. Data were analyzed via a cross-case analytic technique and by utilizing the Complementary Analysis Research Matrix Application (CARMA). The CARMA tool allows the investigator to compare what is expected in clinical pharmacology education to what actually happens. This juxtaposition allows the investigator to explore whether evidenced practices are congruent or divergent from expected practices.

The findings of this study indicated that, in some cases, pharmacology was not purposefully included in clinical course curricula. However, clinical instructors use a variety of teaching and evaluation methods to cultivate students' pharmacology KSAs, with questioning being the most commonly utilized teaching and evaluating technique. Regarding the alignment of QSEN competencies to pharmacology, instructors did not explicitly incorporate QSEN into their course documents or language with students. Additionally, each instructor chose which competencies to focus on and how to implement them into their teaching.

The implications of the inconsistent manner in which students are taught pharmacology KSAs in the clinical setting may include inadequate medication administration abilities, as described in the literature. The recommendations include pedagogical training for all clinical nursing instructors, the implementation of evidence-based clinical teaching and evaluation strategies, and increased education about the incorporation of QSEN competencies into clinical pharmacology KSAs. The initiation of these recommendations is one way to answer the call to improve nursing education and practice, and, thus, patient outcomes.

Keywords: QSEN competencies, pharmacology KSAs, nursing, clinical setting

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DEDICATION

I dedicate this project to Bradley Jack Child. Dad, you were always my biggest supporter in pursuing higher education, and I know you would be immensely proud of me. I am hopeful this project will be a first step to improving nursing pharmacology abilities so other daughters do not have to lose their fathers. I know you have been with me in spirit as I have pursued my doctoral degree, and I know you will be there with me to celebrate its completion.

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CHAPTER 1: INTRODUCTION

Pharmacology education is certainly crucial to a competent nurse's practice. Studies show 19-29.1% of a nurse's time is spent on medication administration activities (Keohane et al., 2008; Westbrook, Duffield, Li, & Creswick, 2011). However, this figure is not necessarily proportional to the amount of pharmacology education in nursing programs. Pharmacology education is commonly described as inadequate in nursing programs (Cleary-Holdforth & Leufer, 2013; Honey & Lim, 2008; King, 2004; Manias, 2009), which is alarming when one considers the potential impact this could have on patients.

This study is inspired by the distressing inadequacy of pharmacology education; furthermore, the investigator is compelled to address the need for improvement in nursing programs' medication administration competencies, and, thus, nursing practice. This chapter discusses the following: 1) background and significance, 2) problem statement, 3) purpose of the study, 4) significance, 5) research questions, 6) study method, and 7) definition of terms.

Background and Significance

The last person between the patient and a medication error is the nurse. Nurses are often considered the last line of defense in medication safety for patients (Choo, Hutchinson, & Bucknall, 2010). Pharmacology knowledge, skills, and attitudes (KSAs) related to safe and effective medication administration are essential for every practicing nurse. This is why the National Council of State Boards of Nursing (NCSBN) ensures 12-18% of the licensure examination, which all nursing graduates must pass before entering practice, is focused on "Pharmacological and Parenteral Therapies" (National Council of State Boards of Nursing, 2016, p. 5). It is the second largest subcategory of questions on the examination (NCSBN, 2016). Considering the licensure examination's emphasis on pharmacology KSAs, it would stand to reason that pharmacology KSAs would similarly be emphasized in pre-licensure nursing

programs, and that national nursing agencies would guide nursing education with recommended pharmacology-related competencies.

The improvement of nursing education has been of concern for many years. In 2000, the Institute of Medicine (IOM) published a landmark report entitled *To Err is Human* (Institute of Medicine, 2000), which addressed discrepancies in the quality of healthcare Americans expect and receive. The IOM followed up with recommendations for changes in healthcare in the report *Crossing the Quality Chasm: A New Health System for the 21st Century* (IOM, 2001). Then, in 2003, the IOM published *Health Professions Education: A Bridge to Quality* (IOM, 2003) which called for the transformation of health professions' education as a change necessary to improving healthcare. From the IOM's recommendations, the Quality and Safety Education for Nurses (QSEN) project, an initiative funded by the Robert Wood Johnson Foundation, was created (Cronenwett et al., 2007). The QSEN initiative outlines six core competencies (see Appendix A) that should be included in nursing curricula to prepare safe and competent nurses (Cronenwett et al., 2007). Although these competencies are important for preparing nurses, national agencies do not require nursing educational programs to implement them in their curricula.

In addition to an absence of national pharmacology education guidelines, there is a paucity of literature about the development of pharmacology KSAs in clinical nursing education. Little is known about how clinical nursing instructors develop critical pharmacology KSAs in their students, how they evaluate if pharmacology KSAs exist within the students, and how instructors relate pharmacology KSAs to QSEN competencies. The study of the development of pharmacology KSAs in the clinical setting is important because this is where theory becomes practice, where learning becomes abilities. This study elucidates how pharmacology education is implemented in the clinical setting. This is an important first step to improving nursing

pharmacology education, and may provide a foundation for national guidelines for pharmacology education in nursing.

Problem Statement

It is largely unknown how pharmacology education is being implemented in the clinical setting and how pharmacology KSAs are being cultivated in nursing students. There is a consensus in the literature that pharmacology education is inadequate (Cleary-Holdforth & Leufer, 2013; Glaister, 2005; Grandell-Niemi, Hupli, Leino-Kipli, & Puukka, 2005; Honey & Lim, 2008; King, 2004; Latter, Rycroft-Malone, Yerrell, & Shaw, 2001; Manias, 2009; Page & McKinney, 2007). However, what is unclear is how and why pharmacology education is inadequate, especially in the clinical setting. No studies were found examining how and what nursing instructors teach in the clinical setting to prepare students' pharmacology KSAs. In order to improve students' pharmacology preparation, the current state of clinical pharmacology education must first be determined.

Furthermore, there are no national standards to guide nursing instructors in the formation of curricula designed to prepare students' pharmacology KSAs. Pharmacology is often taught in the didactic setting, but it can vary greatly, from being a standalone course to being integrated throughout other nursing courses. In addition, pharmacology may not be taught didactically at all, and may be integrated in the lab or clinical settings. Without national guidelines, nursing instructors are left to their own devices to create and implement pharmacology education curricula that may not lead to adequate pharmacology KSAs in their students, which may ultimately affect patient care. Although QSEN competencies provide a helpful structure for teaching pharmacology KSAs in the clinical setting, their integration or implementation is not obligatory; it is largely unknown whether instructors actively apply QSEN concepts to

pharmacology education and, if so, how this looks in practice. This study addresses the lack of research regarding the preparation of pharmacology KSAs in clinical nursing education and the lack of national standards for the teaching of pharmacology KSAs in clinical nursing education.

Purpose of the Study

The purpose of this exploratory qualitative study is twofold. The first purpose is derived from the lack of available research related to the development of pre-licensure nursing students' pharmacology abilities in clinical nursing education and aims 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 second purpose stems from the lack of national standards for pharmacology education in nursing programs and aims to investigate how the development of pharmacology KSAs in clinical nursing education aligns with QSEN competencies. This study juxtaposes intended QSEN competencies with evident educational practice in preparing nursing students' pharmacology KSAs by employing the Complementary Analysis Research Matrix Application (CARMA), a qualitative method of collecting and analyzing data for the purpose of comparing and contrasting what is intended and what is evidenced in practice.

The overarching purpose of this study is to add to the existing knowledge on clinical education practices for cultivating nursing students' pharmacology KSAs and the alignment of these educational practices with QSEN competencies. This 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.

Significance

Despite the NCLEX-RN's heavy emphasis on pharmacology KSAs, no national nursing agencies have developed recommended guidelines for education concerning pharmacology KSAs. None of the three major national nursing program accreditation agencies--the Accreditation Commission for Education in Nursing (ACEN), the Commission on Collegiate Nursing Education (CCNE), nor the National League for Nursing Commission for Nursing Education Accreditation (NLN CNEA)--include any explicit pharmacology or medication curriculum requirements for pre-licensure/undergraduate programs in their documented accreditation standards (Accreditation Commission for Education in Nursing, *n.d.*; Commission on Collegiate Nursing Education, 2013; National League for Nursing Commission for Nursing Education Accreditation; 2016). The American Association of Colleges of Nursing (AACN) expects pharmacology education to be included in program curricula, but does not give specific guidelines as to how it should be included or what content or concepts should be covered (American Association of Colleges of Nursing, 2008).

This lack of national standards is problematic since it leaves individual nursing programs and instructors with the responsibility of “deciding what information is essential to nursing students and how to present this information” (Pattillo, 2006, p. 149). Individual nursing instructors choose what KSAs are paramount for nursing practice. As a result, the preparation of pharmacology KSAs may not always be adequate or consistent. This is especially concerning in the clinical arena of nursing education as it is considered the link between classroom learning and the development of competent pharmacology KSAs.

The lack of competent pharmacology KSAs in nurses can detrimentally affect patient care. The Centers for Disease Control and Prevention (CDC) report adverse drug events are

responsible for 120,000 hospitalizations, and cost \$3.5 billion, each year (Centers for Disease Control and Prevention, 2012). The Agency for Healthcare Research and Quality (AHRQ) reports adverse drug events affect up to 5% of patients, half of which are preventable occurrences caused by medication errors (Agency for Healthcare Research and Quality, 2015). The AHRQ explains medication errors can occur anywhere along the path from prescription to administration, and that nurses are mainly responsible for the administration of medications in the healthcare setting (AHRQ, 2015). In addition, nurses are the last link in the medication chain and, therefore, bear the onus of responsibility for catching errors in previous steps of the medication process (Page & McKinney, 2007). For example, nurses are expected to intervene in inappropriate medication orders and dispensing errors, such as a drug ordered for a patient who is allergic, or a drug dispensed to an incorrect place in the medication cart. Since nurses carry much of the responsibility for preventing drug errors, they have the power to greatly improve patient safety and healthcare costs by acquiring and implementing competent pharmacology KSAs.

Several authors have noted the connection between nurses' lack of pharmacology abilities and medication errors. Brady, Malone, and Fleming (2009) explained that nurses' lack of pharmacology KSAs, namely lack of experience with drugs, confusion of drug names, and dosage miscalculations, was a main contributing factor to medication errors. Choo, Hutchinson, and Bucknall (2010) reported nurses had inadequate knowledge of drugs requiring dilution, quantities for drug dilution, and types of fluids for oral administration. Although Choo et al. (2010) attributed medication errors to system problems, rather than individual mistakes, it is clear that individual nurse pharmacology KSAs contribute to errors.

Some experts may argue that the link between nurse pharmacology KSA competence and nursing education is unclear; however, the literature begins to illuminate that link. Johansson-Pajala, Martin, Fastbom, and Blomgren (2015) surmised from their study that a dedicated pharmacovigilance/pharmacotherapy course improved nurses' self-reported medication competence when controlling for previous educational experience. They asserted undergraduate pharmacology educational experience did not contribute to medication competence, but rather the post-licensure pharmacovigilance course did. Simonsen, Daehlin, Johansson, and Farup (2014) studied medication competence in both graduating nursing students and working nurses, and proclaimed a need for more undergraduate education. They inferred the majority of nurses' medication knowledge developed during their first year of practice, rather than during their pre-licensure training. The implications of this research for nursing education include dedicating more program time to pharmacology KSAs to parallel the amount of time nurses spend on medication-related activities in their work, increasing cooperation between nursing programs and clinical sites, and including drug calculation teaching throughout the entirety of nursing programs (Simonsen et al., 2014). Finally, in their integrative literature review, Sulosaari, Suhonen, and Leino-Kilpi (2010) devised a comprehensive definition of nursing medication competence. Sulosaari et al. (2010) emphasized that, immediately upon graduation, nurses are expected to be able to administer medications safely and competently; therefore, the burden of preparing nurses to have the "complex combination of knowledge, skills, performance, values and attitudes... visible in the medication process in different clinical contexts" (p. 466) lies explicitly with nursing education programs. Sulosaari et al. (2010) recommend a critical evaluation of nursing programs to determine whether they are adequately preparing nurses' pharmacology KSAs.

To summarize, the current study is significant to nursing because it elucidates how pharmacology education is currently implemented in the clinical setting and may serve as a first step in the improvement of patient safety regarding medication administration. The findings of this study may bolster clinical nursing instructors, nursing program administrators, and national leaders in the future preparation of nurses. The preparation of nurses with competent pharmacology KSAs prevents medication errors, therefore mitigating suffering and cost.

Research Questions

This study is guided by three research questions: (1) How do clinical nursing instructors cultivate pharmacology KSAs in their students? (2) How do clinical nursing instructors evaluate if pharmacology KSAs exist within their students? and (3) How does the preparation of nursing students' pharmacology KSAs by clinical nursing instructors align with QSEN competencies? This research study aims to elucidate what is happening in clinical education to prepare nursing students' pharmacology KSAs for practice.

Study Method

In order to best answer the research questions and provide robust empirical data, an exploratory qualitative multiple case study approach was utilized. A case consists of an individual clinical instructor. A purposeful selection of clinical instructors allows the investigator to either confirm or confound the phenomenon in question, namely, the implementation of pharmacology education in the clinical setting. Data collection was comprised of semi-structured interviews and clinical course materials. Data was analyzed in a two-step process in order to address the twofold purpose of the study. 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. The second step of analysis included the utilization of CARMA. Using

CARMA allowed the investigator to juxtapose expected QSEN competencies with collected data. This juxtaposition and analysis enabled the investigator to identify congruence or incongruence between QSEN competencies and actual teaching practice. Following the cross-case analysis method, each case was first analyzed using CARMA, then cases were compared to identify patterns and trends.

Definition of Terms

- **Pharmacology education.** This is defined as formal nursing education that focuses on pharmacology and medication administration. This education consists of the science of pharmacologic principles as well as the nurse's roles and responsibilities related to medication administration. Pharmacology education may be delivered as standalone content or integrated with other nursing content (Grandell-Niemi, Hupli, Leino-Kilpi, & Puukka, 2005; King, 2004; Manias, 2009; Sulosaari et al., 2014).
- **Pharmacology KSAs.** This is defined as nurses' knowledge, skills, and attitudes regarding pharmacology required for safe and competent medication administration. These include, but are not limited to, knowing therapeutic uses of medications, calculating appropriate drug dosages, anticipating side effects of medications, implementing assessment and evaluation skills, knowing precautions and contraindications, and performing patient education (King, 2004).
- **Clinical nursing education.** This is defined as nursing education that takes place in a healthcare setting, rather than in a classroom setting. Students are taught and evaluated by nursing instructors and/or staff nurses. Students learn and practice the skills necessary for safe and effective patient care (Flott & Lindon, 2016).

- **Traditional clinical education model.** This is defined as a model of clinical nursing education where one nursing instructor is assigned to approximately eight to ten students in a healthcare setting. The nursing instructor is primarily responsible for the direct supervision and evaluation of student performance. Students participate in patient care with varying support from staff nurses, and may work with a different staff nurse each clinical shift (Hendricks, Wallace, Narwold, Guy, & Wallace, 2013; Nishioka, Coe, Hanita, & Moscato, 2014). The traditional clinical educational model is in contrast with alternative models, such as those that utilize dedicated education units (DEUs) (Mulready-Shick, Flanagan, Banister, Mylott, & Curtin, 2013).
- **QSEN competencies.** These are defined as six competencies necessary for safe and effective nursing practice according to the Quality and Safety Education for Nurses initiative. These six competencies include patient-centered care, teamwork and collaboration, evidence-based practice, quality improvement, safety, and informatics. These competencies are further defined by various knowledge, skills, and attitudes (see Appendix A) (Cronenwett et al., 2007).
- **The theory-practice gap.** This is defined as a widely-accepted concept describing the discrepancy and disconnect between theoretical knowledge and actual clinical practice (Corlett, Palfreyman, Staines, & Marr, 2003; Monaghan, 2015; Scully, 2011). An example is when students learn an ideal theoretical principle in patient care, but do not witness the principle carried out in the clinical setting.

Summary

Fourteen years ago, the Institute of Medicine extended a call to transform healthcare education to improve the quality of healthcare (IOM, 2003); yet, the nursing education literature

continues to label pharmacology education inadequate. Inadequate pharmacology KSAs are linked to nurse incompetence, and potentially poor patient outcomes. This study is an important first step in the improvement of nursing education, specifically in the area of pharmacology, in that it elucidates how nursing student pharmacology KSAs are currently developed by clinical instructors in the clinical setting. The analysis of the current state of clinical pharmacology education serves to support nursing instructors, nursing program administrators, and national agencies in the creation of future pharmacology guidelines and curricula.

The first chapter of this dissertation has provided an introduction to the problem of inadequate pharmacology education in nursing and the significance of this study. The second chapter provides an overview of relevant literature related to pharmacology education in nursing and the application of QSEN competencies to pharmacology education in nursing. The third chapter presents the two conceptual frameworks that underpin this study, and the fourth chapter describes the methodology of the study. The fifth chapter explicates the findings of the study, and the sixth chapter provides a discussion of the implications of the findings, including recommendations for the improvement of clinical pharmacology education in nursing and for future research.

CHAPTER 2: LITERATURE REVIEW

This chapter provides a review of the state of the literature related to pharmacology education in nursing, as well as the application of QSEN competencies to pharmacology education. To provide a broad context for current pharmacology education in nursing, all nursing education settings were explored. This chapter explores pharmacology education in each setting: didactic, laboratory/simulation, and clinical. The chapter also describes a separate literature review conducted on pharmacology education and QSEN competencies. Finally, the chapter summary provides a critique of the literature by discussing study limitations.

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. Generally, the studies reviewed suffered from similar types of limitations; therefore, the limitations are discussed in the chapter summary.

Didactic Pharmacology Education in Nursing

The vast majority of literature for pharmacology education in nursing can be categorized as didactic. Since the literature on pharmacology education in the clinical setting is sparse, all avenues of pharmacology education were explored. In addition, it is important to review didactic pharmacology education to explore the theory-practice gap in clinical pharmacology education.

Teaching and learning strategies. One major focus in didactic nursing pharmacology education literature is teaching and learning strategies. Many authors have studied various strategies that improve pharmacology learning in the classroom such as games, problem-based learning, case studies, flash cards, computer-assisted instruction, and flipped classrooms (Alton, 2016; Anderson, Page, & Wendorf, 2013; Croteau, Howe, Timmons, Nilson, & Parker, 2011; Geist, Larimore, Rawiszer, & Sager, 2015; Lancaster, 2014; Thomas & Schuessler, 2016). Thomas and Schuessler (2016) replaced standard lectures with innovative teaching strategies such as games, group case studies, and humor in a baccalaureate nursing pharmacology course. As a result of the change in teaching strategies, Thomas and Schuessler (2016) reported improved learning outcomes such as an improvement in students' ability to meet the benchmark score of a standardized specialty pharmacology exam, increased course grades, and improved student satisfaction as indicated by improved course evaluation scores. Geist et al. (2015) implemented a teaching strategy called the flipped classroom in a nursing pharmacology course and discovered it was more successful in teaching students difficult content than the traditional lecture method. Geist et al. (2015) reported three unit exams had significantly higher scores for the flipped students than the traditional lecture students. Alton (2016) also studied learning strategies and found that, after implementing several meta-learning strategies such as creating compare/contrast charts, chunking information on flash cards, and constructing creative projects,

students reported increased ability to learn pharmacology information. In addition, after implementing these learning strategies, the average test score rose from 67% to 74.3%. 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 these studies address improved student learning of pharmacology principles, they do not address the translation of improved knowledge into the clinical setting.

Another area of study is whether innovative teaching and learning strategies have the ability to help students apply theoretical information to real practice. Some authors have studied teaching strategies that attempt to increase the application of theoretical content in the practice setting. Croteau et al. (2011) studied the implementation of a teaching strategy called “The Village,” a computer-based strategy that encourages students to make decisions based on hypothetical clients and situations. Croteau et al. (2011) found students who used “The Village” had significantly higher test scores, and therefore asserted active learning strategies that utilize case studies and problem-based learning are better for student learning and the application of that learning to real patient care. Lancaster (2014) implemented a teaching strategy called the serious game simulation in her classroom to help students improve their critical thinking skills related to opioid analgesics and their nursing considerations. Lancaster (2014) found students had a significantly higher post-test score after the game. In addition, her students reported the classroom intervention helped them develop skills needed in the clinical setting. Anderson et al. (2013) also implemented an innovative teaching strategy that used avatar-assisted case studies. Anderson et al. (2013) stated 92% of their students reported the avatar helped them apply pharmacology content to real patient situations by improving their communication and patient teaching skills, developing their critical thinking skills, and enhancing students’ professional

socialization into the role of the nurse. Studies such as these are helpful to develop an evidence base for teaching pharmacology in ways that promote application to practice.

Mathematical and dosage calculation skills. One extremely important aspect of pharmacology education is mathematical and dosage calculation skills. Much of the literature focuses on students' mathematical skills for dosage calculations due to their direct impact on patient safety (Cinar, Akuduran, & Dogan, 2006; Dilles, Stichele, Van Bortel, & Elseviers, 2011; Glaister, 2005; Maag, 2004; Middleton, 2008; Weeks, Clochesy, Hutton, & Moseley, 2013).

Several researchers asserted nursing students have weak dosage calculation skills. Harne-Britner et al. (2006) noted 41.6% of their sample could not calculate intravenous medication dosages or flow rates with 90% accuracy. Likewise, Cinar, Akuduran, and Dogan (2006) assessed students with a 25-item medication skills test. Eleven of the items tested general mathematical principles, and 14 items tested dosage calculation skills. Nursing students' scores ranged from 26.9% to 98.6%. In addition, 72.5% of the nursing students indicated they sometimes or always have problems with dosage calculation in clinical practice. Dilles, Stichele, Van Bortel, and Elseviers (2011) corroborated the findings of Cinar et al. (2006). Dilles et al. (2011) studied graduating nursing students and found that, on a 25-item medication knowledge and calculations test, the average scores on the dosage calculation portion were 66% for bachelor's students and 53% for diploma students. These studies indicate students' dosage calculation skills should be of great concern to nursing instructors.

In light of this alarming inadequacy in student dosage calculation skills, several authors have studied various strategies to improve these skills. Glaister (2005) compared three types of teaching approaches: integrative learning, computerized learning, and a combination of the two. Glaister (2005) evaluated the effects of the type of instruction on both knowledge acquisition and

the transference of learning to a clinical scenario. Glaister (2005) found the type of instruction had no significant effect on transfer learning. Maag (2004) compared four different teaching strategies: text only, text and images, multimedia (text and images on a computer), and interactive multimedia. Like Glaister (2005), Maag (2004) found no significant differences between the four treatment groups on three criterion-based dosage and IV calculations tests. Lastly, Middleton (2008) implemented a teaching strategy called dimensional analysis. Middleton (2008) reported that, with continued implementation of the strategy, fewer students needed remediation in dosage calculation skills. Middleton (2008) also studied the effects of the strategy on direct patient care by evaluating the number of student medication errors in the clinical setting, but found there were too few medication errors reported to determine a significant effect.

Although the aforementioned researchers did not discover significant results when comparing varying teaching strategies, some studies have shown promise in improving students' medication calculation skills. Harne-Britner et al. (2006) implemented two interventions, classroom education and classroom education plus self-study, in a group of 31 senior baccalaureate students. They discovered a significant improvement in the average post-test score compared to the average pre-test score. Although there was no significant difference between intervention groups, both groups showed improvement. Weeks, Clochesy, Hutton, and Moseley (2013) found differences between two learning strategies. Weeks et al. (2013) compared traditional lecture environments with an authentic environment consisting of an interactive computer program that included realistic images of medication charts, labels, containers, and types. On a 30-point dosage calculation assessment, the authentic students made significantly fewer errors than the traditional lecture students did. The findings of Weeks et al. (2013)

contribute to the concept of narrowing the theory-practice gap by providing students with authentic learning experiences to improve their skills.

Physiologic aspects of pharmacology. Aside from math skills, some authors have focused more on student learning of physiologic pharmacology such as pharmacokinetics, pharmacodynamics, therapeutic effects, adverse effects, and mechanisms of action (Athanasakis, 2012; Bullock & Manias, 2002; Grandell-Niemi, Hupli, Leino-Kilpi, & Puukka, 2005; Latter, Rycroft, Malone, Yerrell, & Shaw, 2001). Latter, Rycroft, Malone, Yerrell, and Shaw (2001) discovered the applications of pathophysiology to pharmacology, pharmacokinetics, and pharmacodynamics are common topics in pharmacology education. Bullock and Manias (2002) explained that, within pharmacology education, “content includes theoretical and practical aspects of pharmacodynamics, pharmacokinetics, actions of common drug families, drug interactions, adverse effects, drug administration, clinical decision-making and patient education” (p. 8). Quinn (2016) described an innovative, yet low-tech method of teaching about half-lives of drugs by using cookies. Quinn (2016) reported anecdotally that students appreciated the teaching method, and all students were able to correctly answer a test item on drug half-life. Athanasakis (2012) described strategies to decrease medication errors from a review of the literature, and asserted that nursing education should increase teaching of pharmacokinetics and pharmacodynamics. Grandell-Niemi, Hupli, Leino-Kilpi, and Puukka (2005) studied nursing students’ knowledge and self-perceptions of their pharmacology skills and labeled understanding of pharmacokinetics and pharmacodynamics as high-level skills. Of the different levels of pharmacology knowledge skills, pharmacokinetics and pharmacodynamics were the least well-known, and Grandell-Niemi et al. (2005) stated students showed inadequate pharmacology knowledge. The literature highlighting the physiologic aspects of pharmacology indicates topics

such as pharmacokinetics and pharmacodynamics are important for practice and commonplace in pharmacology education, yet students do not show competency in these areas.

Nursing considerations of pharmacology. While some researchers focus on the physiologic components of pharmacology education, other researchers have highlighted the nursing and patient care aspects of pharmacology, including patient assessing, evaluating, monitoring, and teaching (King, 2004; Polen, Clauson, Thomson, Zapantis, & Lou, 2009; Sulosaari et al., 2014). King's (2004) qualitative study of nurses' perceptions of their pharmacology educational needs found that, in addition to knowledge of pharmacokinetics and pharmacodynamics, nurses also indicated a need for education on patient teaching as well as patient assessment and evaluation. In their descriptive study, Polen, Clausen, Thomson, Zapantis, and Lou (2009) analyzed the completeness and accuracy of several personal digital assistant nursing drug databases. Polen et al. (2009) included the categories of administration, adverse reaction/event, patient assessment/monitoring, patient/family education, contraindications, dosing, compatibility/stability, indications, evaluating outcomes/responses, and drug interactions, citing these as important to nursing medication administration practice. The majority of the database analysis consisted of the nursing considerations categories. Polen et al. (2009) found the majority of databases were incomplete, and all databases had errors in the nursing considerations categories. These types of errors within databases are not only concerning to practicing nurses, but also to students who use them in their didactic and clinical learning.

Laboratory and Simulation Pharmacology Education in Nursing

Some of the literature focuses on teaching students KSAs in the laboratory or simulation settings. Several authors describe using laboratory or simulation experiences to teach students skills such as implementing the five rights (right patient, right medication, right dosage, right

route, right time), documentation, dosage calculations, choosing injection sites, pouring medications, and paying special attention to high-alert medications like insulin and anticoagulants (Bourbonnais & Caswell, 2014; Bryant, 2011; Perry & Koharchik, 2014).

Other authors have researched pharmacology KSA competence in laboratory and simulation settings. Krautscheid, Orton, Chorpenning, and Ryerson (2011) discovered in their qualitative study that the laboratory setting is important for cultivating competence in students by teaching them how to find drug information, question inappropriate orders, and give injections. However, students also recognized their laboratory experiences did not prepare them well for real-world experiences such as working with Pyxis machines, using decision support technology, and managing distractions (Krautscheid et al., 2011). Ferguson, Delaney, and Hardy (2014) found practice in the laboratory with a medication dispensing system improved students' perception of their abilities, and 98% of students reported they would be less likely to make a medication error due to their laboratory practice. More importantly, Sears, Goldsworthy, and Goodman (2010) learned that students who were exposed to simulation scenarios made significantly fewer medication errors in clinical settings than those who had not. According to the developing research in the area of laboratory and simulation pharmacology education, the lab setting may not be able to exactly reflect the clinical setting, but the lab setting shows promise in improving student confidence in medication administration activities and, more importantly, improving the application of pharmacology concepts and, thus, increasing patient safety.

Clinical Pharmacology Education in Nursing

The didactic and laboratory literature highlight 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. Wolf, Hicks, and Serembus (2006) studied student medication errors, and stressed the importance of clinical faculty guidance, communication with nurses, and more practical experience in curricula to help students avoid medication errors in the clinical setting. Honey and Lim (2008) asked nursing students to describe situations when they had used their pharmacology knowledge and what barriers prevented them from using their knowledge in the clinical setting. Students reported they were able to calculate pediatric drug dosages, knew when it was safe to crush medications, performed patient teaching, monitored patients, and knew the mechanism of action of drugs. Despite this, they also reported lack of time and resources, poor nurse preceptors, and lack of confidence as barriers to using their pharmacology knowledge in the clinical setting (Honey & Lim, 2008). Bullock and Manias (2002) discovered from their survey study of nursing instructors that students had difficulty integrating pharmacology theory into practice; however, instructors reported clinical experiences were important for assessing competence, learning drug calculations, and practicing patient education communication skills. The present research study adds to the literature by investigating how didactic knowledge is translated into practice by asking nursing instructors how they develop students' pharmacology KSAs in the clinical setting.

Pharmacology Education and QSEN Competencies

In addition to discovering how nursing instructors facilitate the translation of students' didactic pharmacology knowledge into the clinical setting, this study also investigates how nursing instructors incorporate the use of QSEN competencies into pharmacology education in the clinical setting. The use of QSEN competencies in the clinical setting is an important step in narrowing the theory-practice gap within nursing pharmacology education and practice.

The search for literature in the application of QSEN competencies to pharmacology education included the following databases: Academic Search Premier, CINAHL, Education Full Text (H.W. Wilson), ERIC, Health Source: Nursing/Academic Edition, PsycINFO, and PubMed. Due to the paucity of literature found, a Google search was also performed. The following search terms were used: “QSEN and pharmacology” and “QSEN and medication.”

Although the application of QSEN competencies to pharmacology education would seem paramount to developing appropriate KSAs in nursing students, there is a paucity of literature on the subject. Only one nursing pharmacology textbook was found that incorporated QSEN competencies (Lilley, Collins, & Snyder, 2017). Another reference book for nursing instructors compiled by Sherwood and Barnsteiner (2012) provides detailed explanations of each competency, as well as various strategies to incorporate the competencies into nursing curricula. Despite this, the book only contains two examples that incorporate QSEN competencies into pharmacology specifically. The QSEN competencies applied to pharmacology in Sherwood and Barnsteiner’s (2012) book are quality improvement and safety. For quality improvement, Sherwood and Barnsteiner (2012) recommend exposing students to simulated errors such as an incorrect intravenous pump setting or a severe allergic reaction to a medication. For safety, they suggest simulating the use of medications with black box warnings, medications with similar names or packaging, and medications that require blood level monitoring (Sherwood & Barnsteiner, 2012).

The QSEN website (QSEN.org) offers very little in the way of specific guidance for incorporating QSEN competencies into pharmacology education. One helpful link on the website leads to an instructor-sharing site where teaching plans for activities are posted. The postings

include medication simulation and testing activities that incorporate safety, patient-centered care, quality improvement, as well as teamwork and collaboration.

In the nursing education literature, few authors have anecdotally described the application of QSEN competencies to pharmacology KSAs, and even fewer have studied them. Sherwood and Zomordi (2014) described applying QSEN competencies in the practice setting and suggest using patients as “safety allies” (p. 17) when a patient reports an unusual medication or dose to exhibit patient-centered care. Patient-centered care KSAs also include pain management, providing education about medications, and accommodating patient preferences such as non-pharmacologic pain relief (Sherwood & Zomordi, 2014). Brady (2011) described a course revision that incorporated QSEN competencies. Teamwork and collaboration were exhibited by having students role-play the reporting of a medication error, safety was demonstrated by having students recognize adverse effects of insulin administration, and evidence-based practice was shown by having students research medications to provide discharge teaching (Brady, 2011). Durham and Sherwood (2008) described a case study approach to teach students safety by expecting students to complete a medication history, medication reconciliation, and using the five rights. One study on QSEN competencies and pharmacology KSAs was done by Pauly-O’Neill and Cooper (2013). They measured the amount of time students spent on each QSEN competency in the clinical setting. They found students spent very little time on quality improvement, evidence-based practice, and informatics (Pauly-O’Neill & Cooper, 2013). Based on the results, Pauly-O’Neill and Cooper (2013) created assignments to strengthen the weak competencies; more specifically, one assignment involved students completing medication near-miss reports to demonstrate quality improvement. It is clear the literature focusing on the application of QSEN competencies to pharmacology education is lacking. This study adds to the

literature by discovering how clinical nursing instructors use QSEN competencies in their clinical pharmacology education.

Summary

The literature on pharmacology education research commonly displays one of three limitations: lack of instrument validity/reliability, small sample size, and only measuring student/instructor/nurse perceptions. By far, the most common limitation was lack of reliability and validity of instruments used in research studies, which may limit the usefulness of results (Alton, 2016; Cinar, Akuduran, & Dogan, 2006; Devi, Mayya, Bairy, George, & Mohan, 2013; Farrell & Rose, 2008; Grandell-Niemi et al., 2005; Lancaster, 2014; Simonsen et al., 2014; Tarnow & Werst, 2000; Vana et al., 2011). Furthermore, many studies had small sample sizes or only used participants from one school, which limits the generalizability of findings (Meechan, Mason, & Catling, 2011; Strayer & Beitz, 2010; Weeks et al., 2013). Lastly, several researchers focused on participant perceptions, which does not reflect meaningful results such as actual patient outcomes (Anderson et al., 2013; Bullock & Manias, 2002; Ferguson, Delaney, & Hardy, 2014; Hanson, 2016; Hemingway, Stephenson, & Allmark, 2011; King, 2004; Mathibe, 2007; Mettiainen, Luojus, Salminen, & Koivula, 2014). In summary, the major limitation in nursing pharmacology education literature is the inability to show a connection between didactic learning and competent clinical practice.

Most of the literature on integrating QSEN competencies with pharmacology KSAs is anecdotal and focuses on teaching strategies such as case studies and simulations rather than the alignment of pharmacology to QSEN competencies. Moreover, the literature most often aligns QSEN competencies with all general nursing care, and not pharmacology KSAs specifically. Lastly, no studies were found examining how clinical instructors align QSEN competencies with

pharmacology KSAs in the clinical setting. The current study addresses a significant gap in the literature by evaluating how pharmacology education is implemented in the clinical setting and how current clinical pharmacology education aligns with QSEN competencies. This is an important first step in addressing the theory-practice gap in nursing pharmacology education.

CHAPTER 3: CONCEPTUAL FRAMEWORK

The twofold purpose of this study is to 1) elucidate how nursing instructors cultivate pharmacology KSAs in pre-licensure nursing students in the clinical setting and 2) to explore how current clinical pharmacology education aligns with QSEN competencies. Since the clinical setting is an important bridge between nursing theory and nursing practice, the theory-practice gap is used as a conceptual framework. QSEN competencies are also important concepts for this study because they are a set of nationally-recognized standards by which nursing education should be measured. Underpinning this study with the concepts of theory-practice gap and QSEN competencies enables the investigator to explore whether current clinical pharmacology education is promoting the cultivation of safe and competent nurses.

This chapter focuses on this study's two conceptual frameworks. First, the theory-practice gap and its relation to nursing education are covered. An explanation of QSEN competencies follows. Lastly, this chapter discusses the meshing of theory-practice gap and QSEN competencies and, finally, presents the Holman Nursing Pharmacology Competence Bridge model.

The Theory-Practice Gap

The theory-practice gap serves as a conceptual framework for this study due to its application on two levels. First, 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 through which nursing instructors encourage the application of didactic pharmacology knowledge to clinical practice. Monaghan (2015) suggests the theory-practice gap is most obvious in clinical skills. In addition, Honey and Lim (2008) stress the importance of bridging the gap between classroom teaching and clinical experiences, specifically for

pharmacology and medication administration education. The second way theory-practice gap underpins this study is in its exploration of how clinical nursing instructors apply theoretical QSEN competencies to their teaching of practical pharmacology KSAs.

The concept of the theory-practice gap has been present in nursing literature since 1943 (Higginson, 2004). Several authors have posited definitions in nursing literature. Baxter (2007) defines the theory-practice gap as “the lack of congruence between the theory that is taught in the classroom and the practice that students see and engage in once they enter the clinical setting” (p. 104), and implies it is a difficult task for nursing instructors to consistently teach what is relevant to clinical practice. Other authors have used words such as “discrepancy” (Corlett, Palfreyman, Staines, & Marr, 2003, p. 183) and “dissonance” (Gallagher, 2004, p. 264) in the definition of the theory-practice gap. Hatlevik (2012) explains that, ideally, classroom theory should provide a foundation for clinical experiences, and clinical experiences should increase the understanding of theoretical concepts. This study explores this connection by identifying how clinical nursing instructors are teaching and evaluating pharmacology KSAs in the clinical setting.

Several authors have provided explanations for why the theory-practice gap exists, and others have offered suggestions for how to bridge or close the gap. Most authors agree the theory-practice gap originated when nursing education moved out of hospitals and into universities (Baxter, 2007; Cheraghi, Salsali, & Safari, 2010; Sullivan, 2010), and is exacerbated by theorists leaving practice (Rolfe, 1993). Higginson (2004) explains “academics working in ivory towers” (p. 1168) perform research to create theoretical evidence-based practice, but they fail to ensure the dissemination of theory to practicing nurses. Other factors that contribute to the theory-practice gap are irrelevant theoretical concepts and ineffective clinical nursing instruction (Corlett et al., 2003; Rolfe, 1993). 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 (Corlett et al., 2003; Hatlevik, 2012; Honey & Lim, 2008; Scully, 2011). Sullivan (2010) argues that the incorporation of QSEN competencies into clinical education curricula is a significant strategy for bridging the theory-practice gap. This study contributes to the closure of the theory-practice gap by providing empirical data on teaching strategies used for cultivating pharmacology KSAs in the clinical setting and on how nursing instructors incorporate QSEN competencies into their clinical teaching of pharmacology.

QSEN Competencies

QSEN competencies additionally serve as an important conceptual framework for this study. The competencies were chosen to underpin this study because they can be applied to any curriculum in any pre-licensure nursing program. In the United States, pre-licensure nursing is offered through diploma, associate, and bachelor degree programs; however, all pre-licensure students are expected to graduate from their respective programs with the required skills for competent practice. QSEN competencies provide a nationally-recognized set of standards by which nursing education, at any level, should be measured.

The QSEN competencies were developed as an answer to the call of the Institute of Medicine to transform healthcare education in order to improve the quality and safety of healthcare provided in the United States. The QSEN initiative, which was funded by the Robert Wood Johnson Foundation, consisted of leaders in medicine and nursing coming together to identify and describe competencies necessary for all registered nurses. The contributors reviewed relevant literature and adapted the Institute of Medicine's original five competencies to create

and define the six QSEN competencies and their accompanying knowledge, skills, and attitudes (Cronenwett et al., 2007).

This study explores how clinical nursing instructors integrate QSEN competencies in teaching pharmacology KSAs. The six QSEN competencies are 1) patient-centered care, 2) teamwork and collaboration, 3) quality improvement, 4) evidence-based practice, 5) safety, and 6) informatics. See Appendix A for the full list of QSEN competencies and their accompanying definitions. In addition to listing the competencies and their definitions, Cronenwett et al. (2007) identify accompanying KSAs associated with each competency. Some examples of KSAs include “[explaining] the role of evidence in determining best clinical practice” (p. 126), “[identifying] gaps between local and best practice” (p. 127), and “[valuing one’s] own role in preventing errors” (p. 128). Although the KSAs outlined by Cronenwett et al. (2007) are general recommendations for all aspects of nursing practice, they can easily be applied to clinical pharmacology education.

Pharmacology KSAs tend to be associated with safety (Sherwood & Barnsteiner, 2012; Barnsteiner, 2010), but certainly all six competencies can be integrated into pharmacology education in the clinical setting. This study provides rich data on whether clinical nursing instructors incorporate QSEN competencies into pharmacology KSA instruction and, if so, how this is actually done. Sherwood and Barnsteiner (2012) explain how integrating QSEN competencies and using innovative teaching strategies answers the call of the IOM to transform nursing education in order to ultimately improve healthcare. The results of this study provide context on how clinical nursing instructors currently incorporate QSEN competencies in clinical pharmacology education and potentially answer the IOM’s call.

Summary

This chapter has provided a discussion of the two conceptual frameworks used in this study. It should be noted that QSEN competencies and the theory-practice gap mesh well to provide a robust conceptual foundation for the current study. Some authors have studied the application of QSEN competencies in nursing curricula specifically as a method for bridging the theory-practice gap (Lewis, Stephens, & Ciak, 2016; Pauly-O'Neill & Cooper, 2013). Sullivan (2010) states the incorporation of QSEN competencies into nursing curricula has “great potential for helping bridge the nursing education-practice gap” (p. 42). Sullivan (2010) cites several strategies for decreasing the theory-practice gap; these include designing nursing curricula around QSEN competencies, ensuring that clinical experiences focus on the practice of QSEN competencies, and improving faculty’s expertise in teaching and evaluating QSEN competencies. This study provides an initial step in exploring the use of these strategies as they specifically apply to nursing pharmacology education within the clinical setting. The Holman Nursing Pharmacology Competence Bridge model of nursing pharmacology education was created to provide a visual representation of the integration of the theory-practice gap and QSEN competencies (see Figure 1) as they pertain to this study.

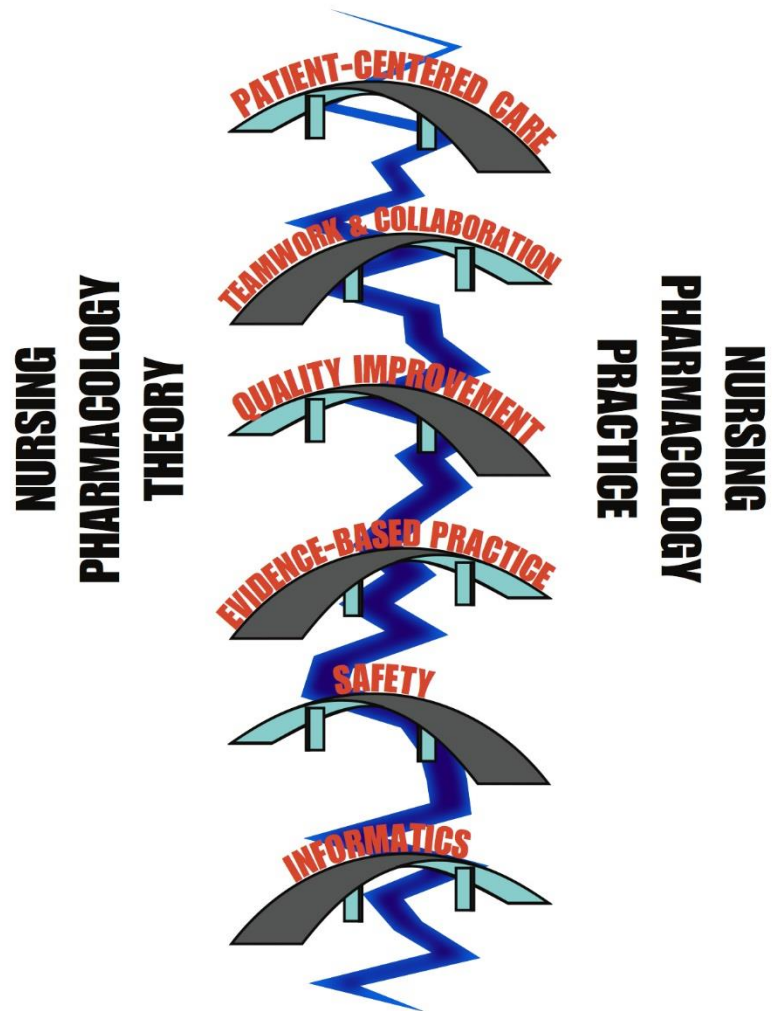


Figure 1. The Holman nursing pharmacology competence bridge model. The Holman nursing pharmacology competence bridge model of QSEN competencies bridges the gap between nursing pharmacology theory and practice.

CHAPTER 4: METHODOLOGY

This chapter presents the research methodology of the proposed study. The research design was chosen to best answer the research questions and provide empirical data that contributes to the literature about the execution of nursing pharmacology education in the clinical setting. This chapter includes the following: (1) research questions, (2) study design, (3) case definition, (4) study sample, (5) data collection methods, (6) data analysis, (7) ethical considerations, and (8) study limitations.

Research Questions

The twofold purpose of the study is to explore how clinical nursing instructors teach and evaluate pharmacology KSAs, and discover how clinical nursing instructors align their pharmacology educational practices with QSEN competencies. The research methodology was chosen to answer this study's three research questions: (1) How do clinical nursing instructors cultivate pharmacology KSAs in their students? (2) How do clinical nursing instructors evaluate if pharmacology KSAs exist within their students? and (3) How does the preparation of nursing students' pharmacology KSAs by clinical nursing instructors align with QSEN competencies?

Study Design

To best answer the research questions, this study employs a qualitative multiple case study design. Qualitative methods can be exploratory, explanatory, or descriptive (Yin, 2014). This study is exploratory because very little is known about how pharmacology KSAs are cultivated, evaluated, and align with QSEN competencies, and the proposed research questions explore these issues.

The three proposed research questions focus on *how* nursing instructors cultivate pharmacology KSAs in students, *how* nursing instructors evaluate if those KSAs exist, and *how*

the development of pharmacology KSAs in nursing education aligns with QSEN competencies. Yin (2014) explains the case study method is appropriate for research questions that ask “how” and aim to explore contemporary events in a real-world context in which the researcher does not exert control over the conditions being studied. In the present study, the investigator aims to elucidate *how* pharmacology KSAs are currently cultivated and evaluated and *how* pharmacology education relates to QSEN competencies in the clinical setting. Additionally, the investigator has no control over the conditions, but rather wants to explore conditions as they are and integrate the context (clinical nursing education) with the phenomenon (cultivating pharmacology KSAs). Because of these factors, the case study method is the most appropriate design to answer the proposed research questions.

The multiple case study method was chosen over the single case study method due to the concept of replication logic. Yin (2014) explains 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. In this study, using CARMA to analyze data from multiple cases either confirms or confounds the question of how pharmacology KSAs are taught in relation to QSEN competencies. Anderson, Leahy, DelValle, Sherman, and Tansey (2014) explain another benefit of examining multiple cases is increased understanding of the phenomenon under study because it allows data collection to be replicated at multiple sites. Creswell, Hanson, Clark, and Morales (2007) state multiple cases are purposely chosen by the researcher to explore various perspectives on the issue. Since very little is known about how pharmacology KSAs are taught in clinical nursing education, the investigator uses multiple cases at multiple sites to discover various perspectives and provide rich data on the subject.

Case Definition

One of the decisions a researcher must make when conducting case study research is the definition of the case. In the present study, the research questions focus on how nursing instructors, rather than nursing programs, cultivate pharmacology KSAs in students. It is assumed individual instructors are the point of execution for a program's curriculum; thus, for the present study, clinical instructors are the ones who implement the QSEN competencies-based curricula of their programs. For these reasons, individual clinical nursing instructors, instead of entire programs, were determined as the case unit.

In addition to defining the case, the researcher must employ binding criteria. Baxter and Jack (2008) recommend binding cases to keep a study manageable. The binding criteria of the cases for the present study include the following: (1) nursing instructors who hold at least a master's degree and are currently teaching a clinical course or have taught a clinical course within the last year, (2) instructors who are experienced (have taught at least one clinical course within their program), (3) instructors who teach a clinical course within a traditional clinical model (accompanies and directly supervises students at a clinical facility, and not in a dedicated educational unit), (4) instructors who teach a clinical course during the term just prior to the term of graduation, (5) instructors who teach in nationally-accredited nursing programs, and (6) instructors whose programs integrate QSEN competencies into curricula.

Clinical instructors were chosen because clinical education can be considered the connection between theory and practice (Lewis, Stephens, & Ciak, 2016). 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. Many programs use a capstone experience for the final term before graduation, and

clinical instructors often do not have close contact with or direct supervision of students during their final term. In addition, it is assumed students who are in the term just prior to the term of graduation have had exposure to pharmacology concepts in the classroom and previous student clinical experiences; therefore, these students have gained pharmacology KSAs that nursing instructors can cultivate and evaluate. Choosing clinical instructors who have frequent interactions with experienced students provides appropriate data to address the research questions of this study. Choosing instructors who teach in accredited programs ensures a desired level of quality in nursing education, and choosing instructors who teach in programs that use QSEN competencies addresses the third research question. Experienced clinical instructors are familiar with their programs' curricula and coursework, and are able to provide data to address the research questions. In the investigator's professional role as program clinical coordinator, it has been observed that faculty are comfortable with the program's curriculum, course content, student learning outcomes, and student evaluation methods after one semester of teaching.

Description of Study Sample

Generalization to a population is not a goal of case study research; therefore, sample selection is not based on sample size requirements (Yin, 2014). Yin (2014) does not recommend a specific number of cases for multiple case study research, but recommends keeping the number of cases manageable. Creswell et al. (2007) warn that, the more cases are included, fewer details can be gathered on each case. Hence, fewer cases are preferable in order to provide a rich, detailed understanding of each case. Anderson et al. (2014) warn that multiple case studies require a great deal of resources and time; thus, due to time and resource constraints, six cases were chosen.

A purposive, convenience sampling method was utilized. Yin (2014) explains purposive sampling is necessary for multiple case study methodology because of replication logic. Cases should be chosen based on their ability to replicate each other and to provide stronger evidence that either confounds or confirms the phenomenon in question (Yin, 2014).

Prior to any participant recruitment and data collection, university Institutional Review Board (IRB) approval was obtained (See Appendices B & C). Recruitment occurred through contact with pre-licensure nursing program directors. Program directors were contacted via email to inquire about the use of QSEN competencies in their curricula, and to gauge interest in participating in the study. Program directors' email contacts were found on each program's public website. Three nationally-accredited pre-licensure nursing programs that expressed interest in participating were chosen for the recruitment of participants. All three nursing programs reported implementing QSEN competencies within their curricula as confirmed by each program's director. In order to recruit participants, the program directors of each pre-licensure program were contacted via email (see Appendix D).

Program directors identified instructors who met the inclusion criteria and forwarded the recruitment email to those instructors. If no participants responded within one week, a reminder recruitment email was sent (see Appendix E) to the program director. The first two instructors from each program who indicated interest were chosen in order to gain added perspective and implement literal replication as suggested by Yin (2014). In addition, the inclusion of two instructors from each school provides a type of data triangulation, which enhances the construct validity of the study (Yin, 2014).

Each participating instructor was sent a copy of the informed consent form (Appendix F) and a copy of sample interview questions (Appendix G) along with a request to schedule a 60-

minute audio-recorded interview. The rationale behind sending a copy of sample questions prior to the interview was to allow the participants time to generate thoughtful responses and rich interview data, while simultaneously making the most effective use of the allotted interview time. Included sample questions were carefully considered to avoid introducing response bias. Questions about the use of QSEN competencies were purposefully omitted from the sample questions in order to obtain the truest data possible from each participant.

As depicted in Table 1, the convenience sample demographics included two nursing instructors from three different pre-licensure nursing programs in two southwestern states, for a total of six participants. The participants taught in different types of clinical settings but common

Table 1. Demographic Characteristics of Study Participants

| Pseudonym Age, Gender | Educational preparation | Years of experience in nursing academia | Number of semesters teaching nursing clinicals | Areas of clinical teaching |
|--------------------------|--|--|---|----------------------------------|
| “Emma” 40 y.o. F | MSN, Doctoral candidate for Doctorate in health science | 6 | 17 | Med- Surg |
| “Olivia” 52 y.o. F | MSN in nursing education, 1 year of PhD program | 2.5 | 7 | Med- Surg |
| “Sophia” 37 y.o. F | MSN, NP, post-Master’s certificate in nursing education, in DNP program | 7 | 21 | Peds |
| “Ava” 56 y.o. F | WHNP, DNP in women’s health | 11 | 33 | Ob/Gyn |
| “Isabella” 60 y.o. F | BSN, MS in counseling and psychology | 17 | 16 or 17 | Psych |
| “Mia” 30 y.o. F | BS in human growth and development, BSN, MSN in nursing education, in DNP program | 5 | >10 | Psych |

Note. PhD = Doctor of Philosophy; DNP = Doctor of Nursing Practice; WHNP = Women’s Health Nurse Practitioner; MS = Master of Science; MSN = Master of Science in Nursing; NP = Nurse Practitioner; BS = Bachelor of Science; BSN = Bachelor of Science in Nursing.

to all is the need for pharmacology knowledge and skills in order to safely and correctly administer medications. Each of the six nursing instructors was assigned a predetermined pseudonym in order to protect their anonymity.

Data Collection Methods

Once IRB approval was received, participants were identified, and participants agreed to study inclusion, data collection commenced. Creswell et al. (2007) provide recommendations for types of appropriate case study data, such as interviews and documents. Yin (2014) stresses the importance of utilizing multiple sources of data to provide convergence of evidence. Data from multiple sources were collected to increase the study's validity.

For this study, data were derived from semi-structured interviews and clinical course documents used in teaching each clinical instructor's course. Interview questions were created based on the research questions and QSEN competencies. Interview questions (see Appendix H) focused on how clinical instructors cultivate and evaluate students' pharmacology KSAs in the clinical setting, and how instructors align their teaching with QSEN competencies. Course documents included syllabi, course information materials, student evaluation tools, course assignment directions, and sample course assignments. Course documents were included because they provide empirical data regarding student learning outcomes, teaching strategies, and evaluation methods, which can then be used as data to address the research questions.

Participants were notified via email or phone to set up a 60-minute interview. Interviews were conducted either in-person or via phone. Three interviews were conducted in-person, three were conducted over the phone, and all were audio-recorded. Participants were informed of their assigned pseudonym, and verbal consent was recorded at the beginning of each interview as part of the interview transcript. Interviews were semi-structured in that each interview consisted of

the planned interview questions as well as follow-up questions for clarity and open-ended questions for additional data. For example, when asked about how QSEN competencies, as applied to pharmacology, are implemented in their program's curriculum, several participants simply explained how they applied QSEN competencies to their teaching, or how QSEN competencies are applied to their program in general, but not specifically how QSEN competencies are applied to pharmacology within their curricula. In these instances, more probing questions were needed to collect the intended data. At the conclusion of each interview, participants were asked if they had any follow-up information they would like to add. In some of the cases, participants contributed additional information, which was recorded and added to their transcripts.

All interviews were audio-recorded and transcribed verbatim by a professional transcriptionist. Verbatim transcripts were verified for accuracy by the investigator and were edited for use as denatured transcripts. Denatured transcripts were sent to participants for verification of accuracy, and were then used for data analysis.

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). Data triangulation improves the validity of the results (Yin, 2014). For example, if a participant reported no pharmacology outcomes specific to QSEN competencies in their course, the data found in the course syllabus were able to corroborate the participant's statement.

In summary, the collection of data for this study closely followed Yin's (2014) four principles of case study data collection. The first principle is to use multiple sources of data. This study utilized data from participant interviews and clinical course documents. In addition, two instructors from each program participated. These strategies provide data triangulation, which enhances the validity and reliability of the study.

The second principle is to create a study database. Yin (2014) explains that case study databases enhance a study's reliability. This was done to store and organize all collected data. To store the data, an online, password-protected digital repository was used. Each case was named and numbered to create a digital case file. Within each case file, sub-files were created such as "interview transcripts" and "course documents." The interview transcripts sub-file contains the verbatim transcripts, the denatured transcripts, and the analyzed transcripts. The course documents sub-file contains all the course documents provided by each participant. Additionally, each case file contains its analyzed word table and the analyzed CARMA worksheets. All study data is stored digitally in an online data storage system that is password-protected and accessible to only the investigator.

The creation and use of the online database also lends itself to Yin's (2014) third principle of maintaining a chain of evidence. An outside observer would be able to connect the research questions with the raw data, then to the analysis and, finally, to the conclusions, or case study report. Yin's (2014) fourth principle of exercising caution with data from electronic sources is not applicable since this study did not utilize such resources as websites or social media sites. The careful observance of these four principles greatly enhances the construct validity and reliability of the study.

Data Analysis

Prior to data analysis, denatured text transcripts were sent to participants to check for accuracy and completeness. In addition, participants were given the opportunity to change, add, or delete any of the data. Data analysis occurred in two steps to address the twofold purpose of the study. The first step utilized the cross-case analysis technique, which involves first analyzing and creating a detailed description of each separate case, then conducting a thematic analysis to help understand the complexity of the cases, and, finally, summarizing lessons learned from all the cases (Creswell, 2007). Each case was treated as a separate study when analyzing the data for how clinical instructors cultivate and evaluate students' pharmacology KSAs and how instructors align their strategies with QSEN competencies. Yin (2014) recommends utilizing word tables; thus, word tables were created for each case. Within the word tables, data was coded into categories. Glesne (2011) states that coding is an important first step to thematic analysis. Once patterns and categories were organized, the aggregate findings from all cases were compared to find patterns of commonality and uniqueness amongst the cases.

The second step involved the utilization of CARMA. CARMA was utilized because it guides the second purpose of the study and aligns with the concept of the theory-practice gap. CARMA is an adaptation of the Critical Action Research Matrix Application (Putney, Wink, & Perkins, 2006), which was created to provide teachers with a tool to analyze and improve their educational practice. Since the current study is not action research, the adapted Complementary Applied Research Matrix Application is used. CARMA allows researchers to compare different perspectives on the effectiveness of a program or, in the case of the current study, the effectiveness of clinical nursing instructors' implementation of QSEN competencies in pharmacology education in the clinical setting.

CARMA can be described as a series of worksheets that enable the investigator to systematically collect and analyze data (see Appendix I). The first step is called notetaking, and consists of identifying and documenting expectations for the program. For this study, the first step was to identify QSEN competencies as they relate to pharmacology KSAs and identify expected student learning outcomes from course syllabi and assignments. In addition, participant interview questions were designed to uncover what instructors believe are important pharmacology KSAs for practice (what is expected of practicing nurses). The second step is also called notetaking and involves collecting data on what is evident in practice. This study examined clinical course documents and interview data to surmise what is actually happening in clinical pharmacology education.

The third step is called notemaking, and involves juxtaposing the expected data with the evidenced data to interpret whether there is congruence or divergence between the two. This is the step wherein the investigator identifies whether QSEN competencies are actually being integrated into clinical pharmacology education or not. The fourth step is also called notemaking, and transitions to drawing conclusions about the data. For this study, the context of each case was analyzed for understanding as to how and why QSEN competencies are integrated or not into nursing instructors' teaching of pharmacology KSAs. Lastly, the fifth step is called note remaking, and allows the investigator to explore implications for the participants in the study and possibly the program under investigation. Since this study is not focused on overall nursing program effectiveness, this step is applied in the discussion and implications chapter, rather than to each individual case study.

The collected data was juxtaposed with QSEN competencies. Analysis consisted of comparing and contrasting what is actually evidenced in clinical nursing education with what is

expected regarding QSEN competencies. Data analysis indicates congruence or incongruence of clinical instructors' teaching methods with QSEN competencies. These data analysis techniques allow the investigator to identify patterns in methods clinical instructors use to cultivate and analyze students' pharmacology KSAs; these data analysis techniques further allow the investigator to determine how clinical instructors align their teaching with QSEN competencies. CARMA is a necessary tool in answering the third research question.

Trustworthiness

Trustworthiness and credibility in qualitative research are the counterparts of rigor and validity in quantitative research (Cope, 2014). Cope describes four criteria of trustworthiness as established by Lincoln and Guba (1985). The criteria are: credibility, dependability, confirmability, and transferability. Qualitative researchers must pay careful attention to these four criteria to establish a rigorous study and, thus, credible results.

Each of the four criteria is addressed in this study. Cope (2014) describes credibility as the truthfulness of the data provided by the participants, and the researcher's description and interpretation of the data. This study employed two methods to enhance credibility as described by Streubert and Carpenter (2011): member checking and peer debriefing. Participants were asked to review their denatured manuscripts as well as a summary of the findings. This process ensures that the participants recognize and agree with the data they provided. In addition, the investigator participated in a data analysis session with the committee expert researchers to validate emerging themes and patterns in the data.

Dependability is described as "the constancy of the data over similar conditions" (Cope, 2014, p. 89). Cope explains dependability is enhanced by having multiple researchers agree with decisions made throughout the research process. By having the expert committee review the data

and analysis, this criterion was met. In addition, Streubert and Carpenter (2011) recommend triangulation of data to support the dependability of the study. This study included two participants from each school, as well as course data materials to provide triangulation.

Cope (2014) explains confirmability is the ability of the researcher to show “the data represent the participants’ responses and not the researcher’s biases or viewpoints” (p. 89). Cope (2014) suggests including participant quotes in the research report to illustrate each theme. The investigator included rich quotes to demonstrate the analysis' conclusions. In addition, Streubert and Carpenter (2011) explain how an audit trail can enhance confirmability. The collected data, the analysis documents, and the reports were dated and kept to provide an audit trail.

Lastly, transferability means the findings can be applied to other situations (Cope, 2014). Transferability was addressed in this study by providing thick descriptions of the case studies. This promotes readers to recognize themselves and commonalities of their situations in those of the reported cases.

Ethical Considerations

In order to comply with the highest ethical standards, IRB approval was sought from the University of Nevada, Las Vegas prior to any study recruitment. In addition, IRB approval and approval to utilize course documents was also sought from participating universities, if necessary, prior to data collection. Informed consent was collected from each participant prior to data collection (interviews or document collection) via audio recording prior to each interview. Informed consent included: an explanation of the study's purpose and nature, an agreement to audio recording, and a description of voluntary participation.

Participants were protected from any harm (no harm was anticipated from participating in this study), and participants’ privacy and confidentiality were protected. To protect participant

privacy, audio recordings are stored on audio-recording devices kept in the investigator's locked office. Audio recordings will be deleted after three years. Digital files are kept in an online storage site that is password-protected and accessible by only the investigator. All digital files (interview transcripts and course materials) will be deleted three years after data analysis is completed. To protect confidentiality, participants were assigned a predetermined pseudonym for data collection, data organization, and case study reporting in order to ensure confidentiality. Data are reported in aggregate form with participant statements to enhance validity. Denatured statements are identified by participants' pseudonyms.

Study Limitations and Delimitations

Researchers have an obligation to discuss the limitations of a study that may threaten internal validity. The main threat to establishing internal validity in case study research is making inferences. Any collected data that is not directly observed is subject to inference (Yin, 2014). The limitations of the present study are mainly concerned with the types and collection of data. One limitation is the reliance on participant truthfulness and frankness. Interview data collected from participants is subjective and at-risk for response bias. Efforts were made to ensure anonymity, which encourages truthful responses and, therefore, valid findings.

Another way that response bias served as a threat was that two instructors were from the same program as the investigator, and may have provided inaccurate or embellished responses. Lastly, another limitation is the inexperience of the investigator. Because the investigator is a novice researcher, all data review and analysis took place in conjunction with expert qualitative members of the committee. Despite these limitations and due to the lack of literature addressing how clinical pharmacology education is currently implemented, this study explores how six

nursing instructors teach, cultivate, and evaluate pharmacology KSAs, offering a starting point for the discovery of contemporary clinical pharmacology education in nursing.

The delimitations of this study allowed for a manageable project by limiting its scope and context. Although the current study is a multi-site study, it is delimited to a purposeful sampling of clinical nursing instructors who teach at public institutions in nationally-accredited nursing programs. Another delimitation is the method of data analysis. While there are other methods that may offer varying results, the CARMA method was chosen to best address the research question of how current clinical pharmacology education aligns with QSEN competencies.

Summary

A qualitative multiple case study design was used in order to best answer the three research questions: 1) How do clinical nursing instructors cultivate pharmacology KSAs in their students? 2) How do clinical nursing instructors evaluate if pharmacology KSAs exist within their students? and 3) How does the preparation of nursing students' pharmacology KSAs by clinical nursing instructors align with QSEN competencies? Data analysis included categorical thematic analysis as well as the utilization of CARMA to address the third research question and compare current practice with recommended QSEN competencies in nursing pharmacology clinical education. Study limitations and delimitations are identified, and the highest ethical standards were maintained throughout the study.

CHAPTER 5: FINDINGS

This chapter presents the data analysis procedures and the study findings related to the research questions: specifically, how clinical nursing instructors cultivate and evaluate students' pharmacology KSAs, and how the teaching of those KSAs aligns with QSEN competencies. This chapter includes a description of the six case studies, which addresses how each participant cultivates and evaluates students' pharmacology KSAs. Following the case study results is a description of the major categories and a cross-case analysis, including a componential analysis table (Appendix J). Next, the findings of the CARMA analysis, which addresses the third research question of how the teaching and evaluating of pharmacology KSAs align with QSEN competencies, is presented, including a cross-case componential analysis of QSEN competencies-related data (Appendix K). This chapter concludes with a discussion of the overarching conceptual theme that was derived: inconsistency in clinical pharmacology KSA education in nursing.

Data Analysis Procedures

Research questions one and two were answered by analyzing data describing clinical instructors' teaching and evaluation methods of students' pharmacology KSAs. Collected data consisted of course documents provided by each participant and interview responses to six questions (see Appendix H) related to the research questions. Data analysis occurred in two steps in order to answer the research questions. A multiple case study cross-case analysis technique and CARMA were both used to analyze the data. Data analysis began with an initial reading of each transcript for general meaning and editing. Once the transcripts were edited, a second reading was done to separate the data into categories. Categories closely paralleled the interview question topics since the questions were targeted to capture certain data. After several readings

of the transcripts, the data were clustered into nine categories. These nine categories were further refined into subcategories to compare elements within each category.

Once the transcripts were analyzed, word tables were created for each case. Yin (2014) explains word tables are a useful starting point for cross-case analysis and a convenient method of displaying the data for each case. For each case, a word table was created that contained the nine categories. Then, each transcript was re-read, and the data were transferred into the appropriate categories within the word table. Participant verbiage was used as much as possible to maintain the original meaning of the data. In addition to participant interview content, data from the provided course documents were also included in the word tables.

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. For example, when asked about expected student pharmacology KSAs in clinical, participant 1 included *have an attitude that medications are dangerous, know when to ask for help, and know how to find medication information, including drug guides and facility resources*, which were all combined into the subcategory of “Have a healthy respect for the potential danger of inappropriate med administration.” Upon reflecting on the data, one category was found to contain data similar to two other categories. The category labeled “Interactions with students in clinical regarding pharmacology” was therefore collapsed into “Teaching methods for cultivating pharmacology KSAs in clinical” and “Evaluation methods of pharmacology KSAs in clinical” to create eight categories for the componential analysis. Each case was listed side-by-side and checked for the presence of data from each subcategory. In this componential analysis (Spradley, 1980) format, similarities and differences between cases can easily be recognized and noted as patterns.

For research question three, the word tables from each case were also used to complete the CARMA analysis worksheets, which allowed the investigator to compare what is expected against what is evident. This analysis is applicable to the theory-practice gap as it juxtaposes theoretical expectations of the QSEN competencies and evidenced clinical nursing instructor practices to determine if pharmacology KSAs are being cultivated and evaluated in alignment with QSEN competencies. Expected student pharmacology KSAs and QSEN competencies were entered into the expectations section of the CARMA worksheets, and information from participant interviews and course documents was entered into the evident implementation section of the CARMA worksheets; then, the two were compared for congruence or divergence.

Comparative Results Across Cases

KSA cultivation resulted from participants discussing their expectations of students with regard to pharmacology knowledge, skills, and attitudes. 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. Instructors next articulated their teaching strategies in regard to individual and group practices. All instructors reported using questioning, 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. What follows is a description of each individual case. Table 2 shows the content organization for each case.

Table 2. Organization of Individual Case Content

| |
|---|
| <ul style="list-style-type: none">• Cultivation<ul style="list-style-type: none">○ Expectations<ul style="list-style-type: none">▪ Knowledge▪ Skills▪ Attitudes○ Teaching Strategies<ul style="list-style-type: none">▪ One-to-one▪ Group• Evaluation<ul style="list-style-type: none">○ Formative○ Summative |
|---|

The structure of this analysis is the basis for the following cases, which illustrates the individual participants' contributions to the comparative analysis.

Individual Case Study Results

Six nursing faculty from three nursing programs participated in this study. The cases provided rich data about how students' pharmacology KSAs were cultivated and evaluated in the clinical setting. What follows is a description of each case, specifically addressing their cultivation and evaluation methods, in the order of their participation. At the end of each case, a summary statement is provided that illustrates the essence of their experience as nursing faculty.

Case 1: Emma. “Emma” is a 40-year-old female with a master’s degree in nursing and a current doctoral candidate in health science. She has six years of teaching experience in academia and has taught clinical courses for seventeen semesters. Her background is in intensive care nursing, and she teaches a medical/surgical clinical course.

Cultivation. Emma’s methods of cultivating her students’ pharmacology KSAs revolved around increasing students’ abilities to apply medication knowledge to their clinical practice. Her main focus was to get students to constantly think about why nurses do what they do.

Expectations. It was clear Emma's expectations of her students guided her cultivation methods. The expectations she had for her students all had the underlying theme of application to future practice: "The next thing that I expect of my students, and this may be a very high and mighty thing considering I was shocking as a student myself, but it's I need to be able to apply that information." An important thing to note is that, although Emma has certain expectations of her students, the course documents she provided did not indicate any pharmacology expectations explicitly in that there were no pharmacology-related student outcomes or course objectives in the syllabus, nor pharmacology-related criteria in the evaluation tool.

Knowledge. Emma indicated oftentimes advanced students do not understand important pharmacological concepts, but she expects her students to have a basic understanding of commonly-used medications including indications, therapeutic effects, side effects, and drug interactions. Emma also expects her students to be familiar with and follow facility policies and procedures. Although Emma has high expectations of information application, which was a unique expectation among the participants, she admitted she assumes students have knowledge because of their previous didactic courses.

Skills. The skills Emma focused on for her students were those relating to finding drug information, particularly using facility and other resources. She explained: "While our nurse's drug guides and things like that are very beneficial, we also need to match up with the organization." She realized her students would not know everything about every drug, but they would need to know how to find and use reliable resources.

Attitudes. The most striking expectation Emma had of her students regarding attitudes was that of a healthy attitude considering the potential dangers of medication administration. She stressed students need to be aware of their own limitations: "You know what you know and you

have no idea what you don't know, so go as far as you know and then ask, ask, ask, ask, ask, ask." She noted students are often fearful and "freak out" about medication administration because they realize their heavy responsibility for patient safety.

Teaching strategies. Emma cultivates her students' pharmacology KSAs by using many different teaching strategies and having a medication-related interaction with her students every time she sees them throughout the clinical day. Although no QSEN-specific pharmacology-related outcomes appear in the course syllabus, Emma stresses the QSEN competencies of patient-centered care, evidence-based practice, and safety in her teaching. Emma focuses on these three competencies by teaching students to recognize the patient as an individual, to research unknown medications using reliable resources, and to implement the five rights of medications.

One-to-one. In the one-to-one setting, Emma heavily uses questioning, discussion, and journaling. She constantly asks students probing questions about the care they give, why nurses do what they do, what to anticipate, how to problem-solve, and how to think beyond the textbook. She adds discussion to questioning to challenge her students and teach them about different aspects of medications such as indications, effects, interactions, assessments, holding medications, polypharmacy, and needed changes in medications. She also uses discussion as a means to teach students application of didactic knowledge. In addition to describing her use of questioning and discussion, Emma shared a memorable story about a student journal entry; Emma used the journal feedback as an opportunity to impress upon the student the importance of facility policies and procedures regarding medication administration.

Group. The two main teaching strategies Emma uses in the group setting are case studies and debriefing. Case studies highlight drug-related issues from actual patient situations students

encounter. Students are able to share their patient experiences with each other, and Emma uses their experiences to teach pharmacology KSAs to the group. The group setting also allows Emma the opportunity to use debriefing. She leverages varying clinical experiences to debrief the group on using standards of care, best practices of looking up unknown medications, and using facility policies and procedures.

It should be noted all the teaching strategies to cultivate pharmacology KSAs have been implemented by Emma independently as there were no course documents that indicated any teaching strategies specific to pharmacology. In fact, the journaling assignment mentioned above was included in Emma's interview data, but the associated course document indicated students are not obligated to include medication-related experiences in their journals.

Evaluation. In addition to discussing many teaching strategies, Emma also described several methods she uses to evaluate students' pharmacology KSAs. However, all the evaluation methods Emma described were formative methods.

Formative. Emma reported using questioning, reviewing journal entries, and student presentations as evaluation methods. The most prevalent method she discussed is formative quizzing or questioning to evaluate the application of pharmacology knowledge to appropriate nursing care. Another way she evaluates students' pharmacology KSAs is by reviewing their weekly reflective journals. However, as mentioned previously, students are not required to journal about medication administration experiences, so this is not a reliable way to evaluate pharmacology KSAs. The third evaluation method Emma mentioned was student presentations about their patients, including their patients' medications. She encourages students to apply pharmacology knowledge by having them discuss why their patients receive the medications they do and how medications affect patients.

Summative. An interesting finding is that no formal evaluations of pharmacology KSAs were included in the clinical course Emma teaches. She stated there “is nothing formalized in our evaluations to match-up with strict pharmacology.” Upon review of the clinical evaluation tool and the other course documents, it was confirmed there were no summative methods of evaluating students’ pharmacology KSAs. Emma explained the lack of formal pharmacology KSA evaluations in this program is consistent with clinical courses she has taught in other programs, and she expressed concern about the expectation that students apply pharmacology knowledge and safely administer medications without a method for evaluating them doing so. She also expressed concern about pharmacology KSAs only being evaluated in the didactic setting and not in the clinical setting.

Case summary. The essence of Emma’s case is the applied nature of student pharmacology KSAs in the clinical setting. Emma’s expectations, teaching strategies, and evaluation methods all converge to cultivate students’ abilities to turn didactic knowledge into competent clinical practice.

Case 2: Olivia. Case 2 is “Olivia,” a 52-year-old female with a master’s degree in education who is one year into a PhD program. She has two and a half years of nursing academia experience and has taught clinical courses for seven semesters. She teaches a medical/surgical clinical course in the same nursing program as participant 1, and she teaches a didactic pharmacology course to students in the same semester as her clinical students.

Cultivation. Olivia’s cultivation of students’ pharmacology KSAs strongly centered on teaching students how to find information and utilize current technology to provide safe medication administration. She believes her experience as a didactic pharmacology teacher influences her teaching of pharmacology KSAs in her clinical course.

Expectations. Olivia's expectations were interesting due to her experience as a didactic pharmacology teacher. It might seem likely that she would have very high expectations of her students regarding pharmacology KSAs, but rather she explained she does not expect her clinical students to have a "deep understanding of all the medications" but more of a "foundation of understanding principles of safe medication administration."

Knowledge. Olivia was the only instructor to neglect to mention the expectation of basic medication knowledge such as indications and effects. Her view was there is too much information to know, and it is better for students to know how and where to find it.

Skills. Olivia was the first participant to mention safe psychomotor skills such as hanging intravenous piggyback medications, pushing intravenous medications, and bolusing intravenous medications. Another skill Olivia emphasized was that her students know how to use technology and reliable resources to find information quickly about safe medication administration, and to be able to provide effective patient teaching.

Attitudes. Olivia was mostly concerned with her students' attitudes about their own self-awareness of their lack of knowledge, and illustrated this by saying, "you know, admitting what medications you're not familiar with and seeking that information, I think, is a really important part. And that should transfer over to their practice." Like Emma, Olivia also expected her students to have an attitude of respect for the potential danger of medications: "So knowing a little bit of a healthy fear of, and respect for, medications and how impactful they are, how serious they can be."

Teaching strategies. Olivia described several teaching strategies she uses to cultivate students' pharmacology KSAs and, like Emma, all her strategies were formative. She highlighted the QSEN competencies of safety and informatics to teach students the important skill of using

digital resources to find unknown information, and gave examples of ways she teaches about all the other competencies with the exception of quality improvement.

One-to-one. When working one-to-one with her students, Olivia emphasized her use of discussion and questioning. Olivia mentioned using discussion heavily in the one-to-one setting, where she covers topics such as “incorrect or unsafe pharmacology,” patient diagnoses and medications, and medication side effects. Along with discussion, she uses questioning, and asks probing questions, such as “what medications are they on, why are they on those medications, what are you watching with those medications?” In addition to Olivia’s reported teaching strategies, it was found in the course documents that students are expected to journal on their clinical experience. However, like Emma, there were no specific requirements for including pharmacology KSAs. This may explain why Olivia neglected to mention journaling as a teaching strategy for pharmacology KSAs.

Group. Olivia’s group teaching strategies highlighted peer-teaching, group activities, and demonstration. Olivia leverages the varying experiences of her students by having them present about patient medications and, thus, teach each other. She illustrated the benefits of this strategy by saying, “and so I tell them that I want them to teach each other as much as they can about those experiences and the medications that are given in those floors, in those areas, just so that everyone can learn from what they’re experiencing.” In addition to peer-teaching, Olivia described implementing pharmacology-related activities during her clinical rotations and using demonstration and return demonstration. One activity she described helps students put together the “big picture” of their patients and involves a type of concept mapping and patient information integration. Another mid-day conference activity is a medication classification activity where students list and categorize the medications they have worked with throughout the

day. Finally, the last strategy Olivia mentioned is demonstration and return demonstration. Olivia models the use of technology for accessing information about medications and expects her students to demonstrate these same behaviors.

Evaluation. Olivia did not expound deeply on her evaluation methods. Like Emma, Olivia's evaluation methods only included formative types.

Formative. Regarding the interview question about evaluation methods, Olivia said, "boy, that's probably going to be the same list," referencing the list of teaching strategies. She did specifically mention questioning and quizzing, but she emphasized these methods were used formatively.

Summative. When asked about evaluation methods, Olivia reported no formal or summative evaluation of pharmacology KSAs, including any type of evaluation tools specific to pharmacology KSAs in the clinical setting, nor any type of testing. She explained she believes creating a summative method of evaluating students' pharmacology KSAs would be "challenging" due to the varied student exposure to medications and opportunities to give medications.

Case summary. The combination of Olivia's didactic pharmacology teaching experience and emphasis on informatics makes her acutely aware of the enormous amount of pharmacology information students need to know and how they can best access it. To summarize, Olivia does not expect her students to know all pharmacology-related information themselves, yet still expects safe and competent practice that can be aided by electronic resources.

Case 3: Sophia. "Sophia" is participant 3 and came from a different program than the first two participants. She is a 37-year-old female with a master's degree as a pediatric nurse practitioner and a post-master's certificate in nursing education. She reported currently being in a

doctorate of nursing practice (DNP) program. She has seven years of experience in nursing academia, has taught clinical courses for 21 semesters, and teaches a pediatric clinical course.

Cultivation. Sophia's cultivation of her students' pharmacology KSAs is heavily influenced by the clinical setting in which she teaches. She uses a wide variety of teaching strategies to cultivate safe medication administration skills, including dosage calculation, in the pediatric setting.

Expectations. Like the previous two cases, Sophia was asked about pharmacology expectations for her students in clinical settings. Unlike Olivia, Sophia expects her students to know a significant amount about the medications they administer. She also expects a high degree of safety from her students in both knowledge and psychomotor abilities.

Knowledge. Sophia expects her students to know basic medication information such as rationales, actions, therapeutic uses, side effects, interactions, and the associated nursing considerations. Inspection of the course documents corroborated several of Sophia's expectations. Her clinical syllabus requires students to "understand the purpose, safe dosage, and administration of ALL medications ordered for the patient." The course syllabus also includes the expectation that students know medication indications, therapeutic uses, safe dosages, and appropriate administration for every medication they give.

Skills. Since Sophia specializes in pediatrics, she heavily emphasizes strong dosage calculation skills and requires students to pass a dosage calculation quiz with 100% within three attempts. She explains,

Because, you know, when pediatrics we do everything based off of safe doses and based off of their weight versus the adult world everything is kind of standardized dosing and so when they come to me in peds that's where I see a lot of the disconnect...

In addition to having strong dosage calculation skills, she expects her students to have effective communication skills with other nurses and healthcare professionals such as pharmacists and doctors.

Attitudes. Sophia's expectations are similar to the other participants regarding student pharmacology attitudes in that she wants students to have a healthy respect for the potential danger of medications. She also expects students to develop confidence and manage their fear of administering medications to pediatric patients.

Teaching strategies. Sophia was the one participant who had a combined clinician and nurse educator background, and she reported using the largest number and widest variety of teaching strategies. Her strategies varied from demonstration to PowerPoint presentations. The consistent themes throughout her teaching were the QSEN competencies of safety and patient-centered care, again lending themselves to the specific patient population with which she works.

One-to-one. Sophia described many teaching strategies she uses to cultivate pharmacology KSAs in her students. The first strategy she mentioned is Socratic questioning, explaining this method allows students to verbalize information they have already learned. She expounded on two important aspects of questioning: cueing and allowing silence because allowing “awkward moments” and “uncomfortable silence” gives students time to process and think. She also uses cueing for psychomotor skills when she helps students perform medication administration tasks. Another teaching strategy Sophia uses is demonstration and return demonstration, all while incorporating scaffolding. She illustrated this strategy when she said,

I'll go through the whole process with the first one and then have them actually do it after me and then the next one I'll kind of back off a little bit more and so that return

demonstration and just you know let's go over this again... I tend to start backing off more so that they can have that sense of autonomy even though I'm standing right there.

Return demonstration of all types of pharmacology skills also helps students improve their confidence and mitigate their fear of working in the clinical setting. She explained, "I love making them call pharmacy. You know they're so nervous to talk to other people about anything." In addition to demonstration and return demonstration, Sophia expressed she frequently models behaviors for her students such as using pharmacology resources, implementing effective communication skills, and implementing effective work patterns. Finally, Sophia described two strategies that were not mentioned by the other participants and were aimed at students' dosage calculation abilities. Again stressing the importance of accurate dosages, Sophia provides a PowerPoint presentation to teach students how to calculate correct dosages according to patient weight, and a practice dosage calculation exam with the answer key for students to practice dosage calculation questions.

In addition to the teaching strategies Sophia mentioned in the interview, the course documents described two other strategies. The clinical syllabus requires clinical reading about "medication administration and safety for infants and children." The syllabus also describes weekly written assignments that specifically address patient medications, and requires students to include "med, route, dose, frequency, prn reason, five rights only, brand name, generic name, med action & rationale, medication calculation, is the dose safe?"

Group. Sophia mentioned discussion as a teaching method used mostly in the group setting. She facilitates discussions about patients, clinical situations, and patient medications during the group post-conference so all students can learn from each other's experiences. This is a useful strategy because, like the previous two participants, she explained that every student has

a different experience in clinical depending on the patients and situations, and discussion allows students to leverage each other's experiences. She also uses hands-on activities during post-conference for developing students' psychomotor pharmacology skills. One group teaching strategy Sophia uses not mentioned by the previous two participants was simulation. She explained that, in her program, simulations are used to teach students to calculate correct dosages, verify appropriate indications, and perform the psychomotor task of administering medications correctly.

Evaluation. Sophia was the first participant to discuss summative evaluation methods in addition to formative ones. She explicated a variety of methods to evaluate students' pharmacology KSAs.

Formative. Sophia did not expound heavily on formative evaluation methods. She indicated she uses her subjective judgment of asking, "is the student progressing?" and "are they getting better?" Sophia also reported using questioning, quizzing, and return demonstration to formatively evaluate students' pharmacology KSAs.

Summative. Sophia indicated her course utilizes an objective rubric to evaluate students' pharmacology KSAs. Inspection of the course documents corroborated the existence of a "Daily Evaluation of Clinical Performance/Care Plan" document, which evaluates students' "Medication Administration-Knowledge of Pediatric medications including action and side effects, safe dose calculations." Sophia explained the evaluation tool is used summatively at midterm and final evaluations, and provides an objective assessment of student progress, includes clear feedback for student improvement, and indicates a rationale for student failure or need to put a student on clinical contract. Another summative method Sophia uses is written assignments to determine student pharmacology KSAs such as correct dosage calculations and

inclusion of necessary information about medications. The last summative method Sophia mentioned was the medication calculation test that students must pass with 100% accuracy in order to pass the clinical course. The exam is not associated with a grade in the course, but it is required in order for the students to show they are safe administering medications in the clinical setting.

A striking ancillary finding regarding Sophia's case was related to the discrepancy between didactic and clinical dosage calculation skills. Sophia explained students must pass the dosage calculation exam in the clinical course with 100%, yet they rarely get math questions correct on tests in the associated didactic course. Another interesting point Sophia mentioned regarding clinical vs didactic pharmacology is that sometimes students do well in the didactic course but still struggle in the clinical setting, regardless of how much time and effort the instructor invests.

Case summary. The essence of Sophia's case is safe practice and accurate dosage calculations through student-centered instructional methods. In addition, she uses many teaching and evaluation methods to help students transition into working with a specialty patient population.

Case 4: Ava. Participant 4, "Ava," is a 56-year-old female with eleven years of teaching experience in nursing academia. She has taught clinical courses for 33 semesters and specializes in women's health and maternity nursing. She has a doctorate of nursing practice in women's health, and teaches a maternity/newborn clinical course.

Cultivation. Like Sophia, Ava was also focused on cultivating student pharmacology KSAs within a specialty patient population. Ava's heavy clinician background was evident throughout her cultivation strategies.

Expectations. Ava's expectations of students mainly involved knowledge. She expressed more traditional expectations for students: demonstrating their knowledge through clinical paperwork and demonstrating their skills through return demonstration.

Knowledge. Ava expressed high expectations for her students regarding pharmacology knowledge. She wants students to know what medications they give, the indications, the therapeutic effects, the side effects, and the routes of administration. She feels students need to develop a familiarity with medications so that they administer them safely. She illustrated this point by saying, "I tell them over and over and over it's so important to know what you're giving and not to give something that you don't know." Ava's expectations of pharmacology knowledge were manifested in the course documents, as well. She provided clinical paperwork students are expected to complete that details common medications seen in her clinical area.

Skills. Ava did not expound upon expected pharmacology skills in her clinical setting. The only skill she mentioned was the implementation of the five rights. Although students are required to perform psychomotor pharmacology skills in the clinical setting, she did not indicate competent psychomotor skills as an expectation.

Attitudes. Ava was another participant who stressed the importance of her students having a healthy respect for the seriousness of the medications they administer. When explaining the importance of her students knowing the medications they give, she added, "you know, if a doctor tells you to give, and you don't know what it is and you're unfamiliar, you don't feel safe, don't do it." Ava spoke about students being apprehensive initially, but she hopes as students learn from their experiences in giving medications during her clinical course, they will become confident in their abilities.

Teaching strategies. Ava reported several teaching strategies she uses to cultivate her students' pharmacology KSAs, help them mitigate their fears, and help them remember skills learned in previous semesters. She also incorporates several QSEN competencies into her teaching, namely safety, evidence-based practice, and patient-centered care. The first competency she mentioned was safety: "Well certainly safety is kind of the key thing. I mean I think that that is so essential."

One-to-one. Ava's strong clinician background and lack of nursing education background were apparent in her traditional teaching strategies. Ava, like the other participants, mentioned questioning, but it was not her main focus. The teaching strategies she put strong emphasis on were clinical paperwork and activities that sounded like student coaching. Ava's main teaching strategy is weekly written assignments. The assignments each include three commonly-used medications in various maternity/newborn settings and require students to research medication dosages, indications, and classifications prior to attending clinical. Ava explained this is also a way of reinforcing the knowledge of medications taught in the didactic course. Upon inspection of the course documents, no specific teaching methods were outlined in the clinical syllabus. However, Ava provided copies of the student clinical paperwork and, per the written medication assignments, students are to complete the worksheets, which include medication, brand name, generic name, classification, indications, dose, frequency, route, and side effects.

The other one-to-one teaching strategy Ava highlighted reminded the investigator of coaching. She stated she does not demonstrate skills in the clinical setting, but rather has students perform a skill, then coaches them as they perform it. She explained, "I'm not someone who will do something first and then have them do it after. I kind of make them do, and I kind of talk them

through it.” To illustrate her traditional method of coaching during student demonstration, she said,

I just feel like, you know, I just make them do it right off. I don't, you know, some nurses will say, oh watch me do it, you know. I mean that's what simulation lab is for. And then I'm like, ok you're doing it, and I talk them through it. And I, you know, just help them, you know, physically with the procedure or whatever. So I just think that that's just the best way to learn and not be afraid. I mean that's kind of how I was taught.

Group. The first group teaching strategy Ava mentioned was simulation, which is used to teach students psychomotor skills within the safety of a simulated environment. In addition to giving the students practice, Ava explains the simulation experience also helps alleviate students' fears. Ava noted that, although she does not use demonstration in the clinical setting, she does in the simulation experience to show students how to perform skills.

Evaluation. Regarding evaluation of pharmacology KSAs, and similar to participant 2, Ava described several evaluation methods that were the same as her teaching methods. However, she reported using summative evaluation methods, as well. It is also interesting to note that Ava's evaluation strategies were listed in the didactic syllabus, but not in the clinical syllabus.

Formative. The written assignments used in clinical are not only a teaching method, but also a formative evaluation method that assesses students' knowledge of maternity/newborn medications. Another formative method Ava uses to evaluate students' didactic pharmacology knowledge is questioning by asking what medications their patients are on, why the medications are being used, and what the medications' side effects are. Ava also mentioned simulation as another formative method of evaluating students' pharmacology KSAs in that the simulation experience is in lieu of a clinical day and is not graded.

Summative. Students are not only evaluated formatively on their pharmacology KSAs in Ava's clinical course, but also summatively. Ava shared the clinical evaluation tool she uses in her course, and it addresses pharmacology KSAs. The clinical evaluation tool is a daily evaluation sheet that includes medication administration and the criteria of exhibiting knowledge of maternal/newborn medications including their actions and side effects. The students are evaluated as being not safe, safe, or independent on the medication administration criteria.

Case summary. Ava's main concern for the cultivation and evaluation of student pharmacology KSAs is clinically-based and evidenced by her traditional teaching and evaluation methods. Overall, her main goals are to assist students in attaining competent psychomotor skills and ensure students demonstrate enough knowledge for safe medication administration practice through the use of written assignments and coaching.

Case 5: Isabella. The fifth participant, "Isabella," is a 60-year-old female with a nursing degree and a master's of science in counselling and psychology. She has seventeen years of nursing education experience, has taught clinical courses for sixteen or seventeen semesters, and her clinical specialty is mental health nursing.

Cultivation. Isabella is similar to Ava in that they both have a strong clinical background without a nursing education background, and they are the two oldest participants. Isabella's clinician background was further exhibited in her methods of cultivating student pharmacology KSAs.

Expectations. Isabella teaches a mental health clinical course and has pharmacology expectations similar to those of the other participants. The majority of her expectations fell in the knowledge category, especially in regards to knowing side effects of psychoactive medications.

Knowledge. Isabella expects her students to have knowledge about medications including adverse and side effects, issues and problems, mechanism of action, unlabeled uses, classifications, and contraindications. Likewise, knowing nursing considerations of psychiatric medications such as when to report dangerous side effects, the need to monitor and report blood levels, and what medications are involved in electric convulsive therapy, is as equally important.

Skills. Again similar to Ava, Isabella did not highlight expectations of pharmacology skills. She did discuss the importance of monitoring lab work with certain medications, but she stated she does not expect her students to perform those skills currently, but rather in their future practice.

Attitudes. Alongside drug knowledge, Isabella expects her students to have certain attitudes about medications used in mental health. She expressed a desire for her students to have an appreciation for the role of medication in psychiatric therapy as well as an appreciation for non-pharmacologic treatments. She hopes students will understand medications are important for severely psychotic patients, but medication is only one tool used to reach behavioral goals.

Teaching strategies. Isabella uses several different types of teaching strategies to help her students cultivate pharmacology KSAs. She works with students in both the group and in one-on-one settings. When asked about which QSEN competencies she incorporates into her teaching of pharmacology KSAs, the only one she mentioned was safety. She gave several examples of how she teaches about safety and psychotropic medications, such as being aware of dangerous medication interactions and knowing which medications require blood level monitoring. Despite Isabella's focus on the QSEN competency of safety, she indicated she does not feel she needs to prompt students on safety since they are third-semester students and are very “well-versed” in safety from their first two semesters.

One-to-one. Isabella explained she does a lot of one-to-one time as needed, and her main one-to-one teaching methods include questioning and individual discussion. She reported asking students probing questions such as: “Name 3 SSRIs, what are their indications, what is the mechanism of action?” In addition, she discusses medications several times a day with each student as she converses with them through the course of each clinical day. Finally, an interesting finding is that Isabella did not mention journaling as a teaching method, but it was found in the course documents as a clinical requirement; however, like participants 1 and 2, students are not obligated to journal about pharmacology KSAs.

Group. Although Isabella reported she spends a lot of one-on-one time with her students, she mostly discussed group learning. She described meeting as a clinical group twice a day, once during a working lunch where medications are discussed, and once during a post-conference where students discuss their patients as case studies, including the patients’ medications, mechanisms of action, side effects, and any problems with the medications. Group time also includes such teaching methods as games, crossword puzzles, and the top-five drugs of the day. The course documents provided by Isabella corroborated some of the teaching methods she described, such as small group conferences and presentations. The “Case Study Presentation Guidelines” state,

Explain which medications are typically indicated for the diagnosis. Are these different than what your patient is prescribed? What medications is the patient on and are they experiencing any side effects at this time? What have they tried in the past? Talk about MOA, side effects (especially those that your patient might or has experienced), dose range and what your patient is taking, teaching that is indicated.

These guidelines ensure students give a comprehensive presentation about their patients' medications to their clinical group.

Evaluation. Evaluation is another area where Isabella's strong clinician background emerged in that she was not well-versed in formative evaluation methods. She struggled to identify her evaluation methods and did not recognize discussion and questioning as evaluation because they are not graded.

Formative. Isabella uses formative quizzing and questioning by asking her students what they know. She said, "we are always evaluating, as an instructor you are always evaluating their knowledge and where they are lacking." She also uses formative quizzing during the working lunch by asking students about pharmacology information such as medications related to certain treatments and medication contraindications.

Summative. Like other previous participants, Isabella reported there is no formal or summative evaluation of pharmacology KSAs in her clinical course. She explained important medications are identified and evaluated in the didactic portion: "In the clinical setting I do not grade them on their medication knowledge. It is done, but not in the clinical setting." Although Isabella reported no formal methods of evaluating pharmacology KSAs, data found in the course documents indicated the contrary. A "Clinical Performance Evaluation Tool" contained several references to pharmacology KSAs such as reviewing medications for dosages, side effects and complications, calculating safe dosages, administering medications properly and in a timely manner, documenting medication administration, and participating in medication reconciliation.

Case summary. The main theme of Isabella's case is her desire that students appreciate the overall picture of mental health nursing and the role medications play. Regarding

psychotropic pharmacology KSAs, Isabella highlighted student knowledge about side effects and medication interactions since they can have serious implications for patients.

Case 6: Mia. “Mia,” the final and sixth participant, is a 30-year-old female with two bachelor’s degrees: nursing, and human growth and development. She has a master’s degree in nursing education and is currently in a doctorate of nursing practice (DNP) program. She has five years of nursing education experience, has taught clinical courses for more than ten semesters, and is currently teaching a mental health nursing course.

Cultivation. Mia’s strong nursing education background and youthful educational philosophies were apparent in her methods to cultivate pharmacology KSAs in her students. She was the only participant to highlight the importance of having an approachable, relaxed teaching style while implementing her preferred teaching strategies. In addition, she considers it the instructors’ responsibility to help the students apply didactic content to the clinical setting. She explained, “our job is to mesh up what they do know to clinical practice.”

Expectations. Mia listed many pharmacology KSA expectations she has for her students. She expressed that her students are sometimes ill-prepared concerning their pharmacology skills in the clinical setting because they have not had the didactic content yet and sometimes give medications without knowing the indications. In addition to being ill-prepared, Mia indicated students are often fearful of pharmacology and show nervousness and panic when asked about drugs. Despite these potential problems, she expects students to be inquisitive about psychopharmacology and use her as a trusted resource.

Knowledge. Like the other participants, Mia mentioned the expectation of having a general knowledge of drugs used in her field including classifications, mechanisms of action, side effects, indications, therapeutic uses, and unlabeled uses. She highlighted the expectation

that students understand the physiology of how psychotropic medications work in the brain and, therefore, the therapeutic and adverse effects.

Skills. The skills Mia expects her students to cultivate involve safety protocols, practicing the five rights, using personal protective equipment, and evaluating patients for medication effects. She also promotes strong interpersonal skills through her emphasis on teamwork.

Attitudes. Mia has expectations for her students' developing attitudes, as well as their skills and knowledge. She expects her students to become familiar with medications so they do not fear them and develop the confidence to apply their skills in their future practice. She illustrated this by stating, "I don't want them to see a drug and just panic." Like other participants in the study, she also expects her students to have realistic self-awareness of their own weaknesses and knowledge deficits, and to ask for help and use resources when needed.

Teaching strategies. Mia centers her teaching strategies on making psychopharmacology interesting and applicable and uses several methods to cultivate pharmacology KSAs in her students during one-to-one and group interactions. In her teaching, Mia reported focusing on three QSEN competencies the most: teamwork and collaboration, evidence-based practice, and patient-centered care. She emphasized teamwork, stating, "I can't say specifically what the other instructors do, but what I implement for sure, I am a big person of teamwork and collaboration."

One-to-one. Mia's one-to-one teaching methods include questioning and demonstration. When she meets with each student every morning, she asks questions and quizzes students without putting them "on the spot" by providing a relaxed, calm atmosphere. To enhance students' psychomotor skills, she uses return demonstration and assists students with their skills.

Group. Mia focuses on teamwork by using group games and activities and encouraging students to work as teams. She strives to keep her students interested and engaged by using

hands-on methods, case studies, student presentations, and group projects. Mia's course documents also described teaching methods such as the post-conference presentation. The "Post-conference Presentation Guidelines" require students to present common medications used to treat their patients' disorders, recommended doses and routes of administration, common side effects, and patient and family teaching about the medication. The student presentations provide Mia a way to discuss medications with the group at the end of each clinical day.

Evaluation. In addition to using several methods to teach students, Mia also uses several different methods to evaluate students' pharmacology KSAs. She stressed the importance of evaluating students in a non-threatening way.

Formative. Mia formatively evaluates students by assessing their knowledge on the first day of clinical, asking probing questions, having discussions, implementing written assignments, participating in games, and having them participate in presentations. Throughout each day, she constantly assesses what the students know about medications and keeps notes so she can further discuss and clarify any misconceptions or misunderstandings at the end of the day, during the group post-conference with all students.

Summative. Mia also uses summative methods to evaluate her students, one being simulation. During the graded simulation activity, students are expected to assess a patient, review their mental status exam, draw up and administer medications, and know medication actions and side effects. The course also has a "Clinical Performance Evaluation Tool" that includes the evaluation of pharmacology KSAs. The tool, which is used as a rubric at midterm and final evaluations, requires students to "Review(s) medications for appropriate dosage, side effects and complications," "Accurately and safely calculate(s) dosage and administer(s) medications per facility protocol with appropriate documentation," and "Understand(s) the

process of medication reconciliation.” Mia reported students rarely meet the criteria at mid-term, but usually meet the criteria by the final evaluation.

Case summary. The essence of Mia's case is that she wants to be approachable and fun so her students will be interested in and not fearful of psychotropic medications. She wants to be able to cultivate as many pharmacology KSAs in her students as possible without creating anxiety for them. The KSAs she desires to cultivate are students’ abilities to understand the physiology of medications and to work as a team within the clinical setting.

Categories and Cross-case Componential Analysis Results

Categories. The qualitative analysis involved the creation of categories and performing a cross-case analysis of those categories. Initially, nine categories emerged, and after further analysis, one category was consolidated into two others, leaving a final eight categories. The following organizational chart (Figure 2) illustrates the complexity of the categories and their relationships to each other and to the overall topic of pharmacology KSAs.

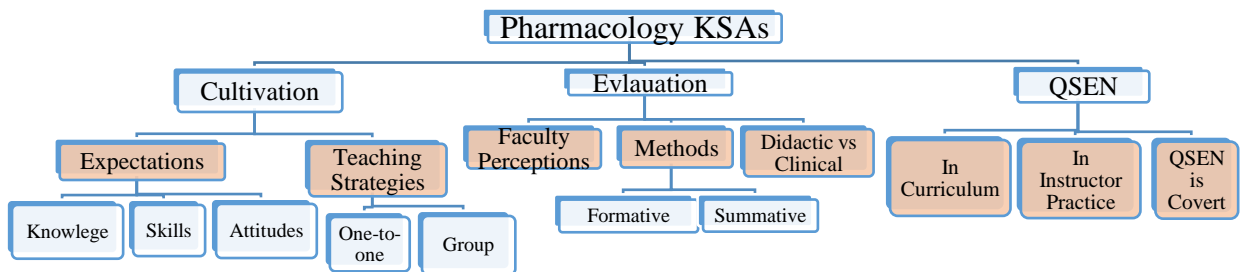


Figure 2. Organizational structure of the eight categories and their relationships to the research questions and subcategories.

Expected pharmacology KSAs in clinical. Participants were asked, “In clinical, what knowledge, skills, and attitudes should students have about pharmacology?” This question was

asked to elicit instructor expectations for students' pharmacology KSAs. Some participants focused on skills, while others focused on attitudes. Course documents rarely stated any type of expected pharmacology KSAs in the clinical courses. The data were constructed as subcategories, which included varying types of knowledge, psychomotor skills, and attitudes.

Two of the subcategories within the expectations category were similar to those found in the nursing pharmacology education literature: basic physiologic aspects of medications and nursing considerations. The physiologic aspects of medications consisted of such content as drug names, classifications, mechanisms of action, and side effects, and was illustrated by such comments as, "So, knowledge-wise, I think that they should understand and know the med action and rationale" (Sophia), and "I just want them to work through what is it doing in the body, and I think they can work though everything then" (Mia).

The subcategory of nursing considerations contained concepts such as evaluating patients after receiving medications, having effective communication skills with other healthcare providers, and providing patient and family education, and was illustrated by Isabella's comment about "the tardive dyskinesias [sic] that may come up, it's important to identify those and know when to call a physician." All but one of the cases emphasized the subcategory of safe practice, which included the five rights, knowing policies and procedures about medication administration, and ensuring appropriate dosages. It is interesting to note that not all cases emphasized safe practice concerning pharmacology KSAs. Along with safe practice, five of the six participants expected their students to develop a healthy respect for their medication administration responsibilities, which included recognizing the need to ask for help and look up medications using evidence-based resources.

Teaching methods for cultivating pharmacology KSAs in clinical. Participants were queried about the teaching methods they use to cultivate students' pharmacology KSAs, and the only teaching method common among all participants was questioning. All participants either reported or gave an example of how they use questioning or quizzing as a teaching strategy. Other common teaching methods were group work (conference setting), discussion/lecture/debriefing, student presentations, case studies, games/activities/puzzles, instructor demonstration/modeling, and written assignments. Sophia reported the widest variety of teaching methods, and Ava reported the least variety. Some instructors used innovative teaching methods, and some more traditional. It is interesting to note that the two participants with clinician backgrounds and no formal nursing education backgrounds reported using the fewest teaching strategies, while the participant with the most combined clinician and nursing education background reported using the most.

Faculty perceptions of students. Several instructors expressed their perceptions of students in regards to their pharmacology KSAs in the clinical setting. Four of the six participants indicated students are fearful or nervous about their pharmacology KSAs in the clinical setting. Emma said, "It's like oh my, I'm particularly worried now because I can kill my patients." One participant indicated students are not interested in pharmacology, and half of the participants alluded to students not having adequate pharmacology KSAs, which is consistent with the nursing literature. Two of the participants who were from the same program both mentioned they perceived students to be well-trained in safety regarding pharmacology from previous semesters, but they did not give any specific examples.

Evaluation methods of pharmacology KSAs in clinical. Participants were asked, "In clinical, what method(s) do you use to evaluate if students have knowledge, skills, and attitudes

about pharmacology?” Again, the only method common to all participants was questioning/quizzing. Most of the other evaluation methods mentioned by the participants, such as written assignments, discussion, and games/activities/puzzles, were formative. Contrastingly, four of the six cases had formal, summative evaluation tools that evaluated pharmacology KSAs. Two of the participants indicated they do not know how it would be feasible to summatively evaluate students’ pharmacology KSAs because students’ experiences with medications in the clinical setting are so varied and unpredictable. An interesting finding is the oldest participant with the most years of experience in nursing academia reported using the fewest evaluation methods.

Didactic pharmacology versus clinical pharmacology. Several participants expressed observations about the differences between didactic pharmacology and clinical pharmacology education. Five of the six participants indicated pharmacology is predominantly taught and evaluated in didactic courses, rather than in clinical courses. Additionally, there were noted discrepancies within course documents for those that had combined didactic and clinical syllabi. One interesting observation made by Sophia is that students can do well in the didactic pharmacology course, but not necessarily do well on pharmacology KSAs in the clinical course. Another notable finding expressed by three participants is that students are assumed to have pharmacology KSAs in the clinical setting from their didactic courses. Emma explained, “It’s scary how we, for me, we use assumed knowledge.” When further probed she said, “Yeah, in that I assume that you know your pharmacology because you’re either doing it or you’ve passed it.”

QSEN competencies and pharmacology KSAs in curricula. Participants were asked about the presence of QSEN competencies-related pharmacology in their clinical courses. The

data naturally broke into seven subcategories. Essentially, there are three levels of QSEN competencies-related pharmacology KSAs present in a course, and they can be applied to both outcomes and evaluations, thereby creating six subcategories. One level is whether or not QSEN competencies themselves are present. For example, in some cases, the course documents showed a clear alignment of student outcomes to QSEN competencies, while others did not. Another example is that QSEN competencies were present in the evaluation tools of all six cases. The second level is whether pharmacology KSAs are addressed in a course. Two cases did not address pharmacology KSAs in course syllabi outcomes or objectives, nor in evaluation tools. Pharmacology was present in other course documents, such as a supplemental syllabus, but pharmacology KSAs were not clearly written into the curriculum. The third level is the combination of both QSEN competencies and pharmacology KSAs. In all cases, QSEN competencies-related pharmacology KSAs were not intentionally or explicitly written into the courses; however, those that did include pharmacology KSAs could often be aligned to one of the QSEN competencies. The seventh subcategory was related to individual instructors deciding how to implement or integrate QSEN competencies into the pharmacology clinical curriculum. Four participants indicated individual instructors decide which QSEN competencies to implement and how to incorporate them.

QSEN competencies and pharmacology KSAs in instructors' practice. This study provides empirical data that indicates individual instructors highlight various QSEN competencies, especially in relation to their particular clinical setting. None of the QSEN competencies were emphasized by all participants, although five participants reported focusing on safety and patient-centered care, and four focused on evidence-based practice. Two participants reported focusing on teamwork and collaboration, and only one reported focusing on

informatics. The last significant finding in this category is that not one participant reported focusing on quality improvement in relation to pharmacology KSAs, and several did not even mention it.

QSEN competencies in pharmacology are covert. All participants reported QSEN competencies are not explicitly related to pharmacology in their courses, and this was confirmed by the course documents provided by participants. One participant stated she felt negligent for not including pharmacology-related QSEN competencies in her course, and another expressed the desire to improve her course by including pharmacology- and QSEN competencies-related outcomes in her syllabus. Three participants expressed the belief that students do not recognize the connection between pharmacology and QSEN competencies because the language instructors use is inconsistent. Olivia stated, “And then we talked about informatics, but we didn’t talk about it with the name of informatics.” Two participants alluded to the idea that instructors either do not know how to consciously incorporate QSEN competencies into pharmacology KSAs education, or they do incorporate QSEN competencies into pharmacology education without realizing it. To illustrate this, Sophia said, “We link in so much and I think instructors don’t recognize that we’re doing a lot of these things. We just don’t I guess highlight them or make them kind of a huge overt stand-out thing to the students.”

Componential analysis results. Each of the eight categories contain subcategories that were created by consolidating common data from within each category. The subcategories were used to create a cross-case componential analysis (Spradley, 1980) table (see Appendix J) that addresses research questions one and two. The table provides a clear visual representation of the similarities and differences between the cases. The QSEN-related data that addresses research question three were included in a separate cross-case componential analysis (Appendix K) that

also visibly contrasts the cases. The QSEN competencies-related componential analysis and the CARMA analysis were confirming as a type of data triangulation.

CARMA Analysis Results

To complete the CARMA worksheets (see Appendix I), the word tables from each case were analyzed for data applicable to each section of the CARMA worksheets. In the first section, “Note taking data spreadsheet-Expectations,” the information about how participants (students) are to be served includes the methods clinical instructors are expected to use to teach and evaluate students’ pharmacology KSAs in the clinical setting. Data consists of expectations expressed as student outcomes, assignment objectives, or methods of evaluation as depicted in course documents. The subsection of expectations for what will be produced by participants (students) is comprised of the QSEN competencies. Data includes information from the participant interviews on expected student pharmacology KSAs and course documents. The data were analyzed and categorized into the most appropriate QSEN competencies. For example, for one participant, the QSEN competency of teamwork and collaboration had no data from any course documents addressing teamwork and collaboration in relation to pharmacology KSAs. Despite this, one of the expectations expressed by that participant during the interview was that students should know when to ask for help. In this instance, asking for help can be applied to soliciting help from other members of the healthcare team, therefore relating to teamwork and collaboration.

The second section of the CARMA worksheets is “Note taking data spreadsheet-Evident Implementation.” In the subsection addressing who the evident participants are, the question was asked if all students are taught and evaluated equally. Data in this section was derived from participant interviews and course documents. For example, some participants discussed varied

one-to-one teaching time with students and varied student experiences, which alludes to inconsistent teaching and learning among students. Contrastingly, some cases' course documents included a structured rubric. A rubric provides evidence that all students are evaluated consistently. The subsection of evident implementation of how participants (students) are served addresses the methods instructors use to teach and evaluate students' pharmacology KSAs. The data were mostly derived from participant interviews alongside course documents. The evident implementation of what was produced by participants in the program addresses how instructors evaluate if students have QSEN competencies-specific pharmacology KSAs. Data included information from interviews as well as course documents and were categorized into the QSEN competencies that best fit the data.

The third section of the CARMA worksheets is called, "Note making data spreadsheet-Degree of fit." This section is where the data from the expected section are compared and contrasted to the data from the evident section. The main two subsections within the degree of fit section considers the degree of congruence or divergence in how participants (students) are served, and what has been produced/what are the outcomes. This section takes a contrastive approach by identifying what was intended and what was actually evident in the clinical setting. For example, in the subsection about how participants are served, one observation was made that one course document, the supplemental syllabus, addressed various aspects of student medication administration, but it is not outlined in QSEN competencies-format. The QSEN competencies related to pharmacology addressed in the supplemental syllabus are safety, evidence-based practice, and informatics. The items in the supplemental syllabus are not reflected in the evaluation tool. An observation made in the subsection of what has been produced/what are the outcomes is that there is congruence between what is expected and what is

produced in that students are not required (per the curriculum) to display pharmacology KSAs in the clinical setting and are not formally evaluated on them. Table 3 provides a summary of the CARMA analysis results, including the expectations, evident implementation, and degree of fit: congruence vs divergence.

Table 3. CARMA Summary Table

| Program/Course Expectations | Evident Implementation | Degree of Fit: Congruence vs Divergence | Implications & Recommendations |
|---|---|---|--------------------------------|
| QSEN competencies alignment in course and program mapping | QSEN competencies present in 5/6 syllabi and all evaluation tools | Mostly Congruent | Discussed in Chapter 6 |
| Addresses pharmacology KSAs | Pharm KSAs addressed in 4/6 cases | Mostly Congruent | Discussed in Chapter 6 |
| Combining QSEN competencies and pharmacology KSAs | QSEN competencies-related pharm KSAs in 0 syllabi, QSEN competencies-related pharm not explicit in evaluation tools | Divergent | Discussed in Chapter 6 |
| Alignment is visible in language used by instructors | QSEN competencies language not used by instructors | Divergent | Discussed in Chapter 6 |

The fourth and fifth sections of the CARMA worksheets consider implications and recommendations, respectively. The fourth section discusses the implications of whether there is congruence or divergence between what is expected and what is evidenced, and the fifth section provides recommendations for maintaining or modifying the program due to the implications.

The results of these CARMA sections will be addressed in Chapter 6: Discussion, Implications, and Recommendations. A sample of a finished CARMA worksheet, including all completed sections, is included as Appendix L.

Conceptual Theme: Inconsistency

All the data converged into one major theme: inconsistency. Indeed, the title of this project could be changed to, “Clinical Instructors’ *Inconsistent* Cultivation of Pre-licensure Nursing Students’ Pharmacology KSAs.” Although the participants teach in different programs and clinical focus types, the use of medications with patients is common to them all. However, inconsistency can be found in almost every aspect of this study’s data. In a general sense, whether or not clinical nursing instructors teach pharmacology KSAs is inconsistent. Some instructors focus on pharmacology in clinical, while others do not. Some clinical instructors address pharmacology with every student interaction, while others do not. The KSAs expected of students are inconsistent.

While a comprehensive list of KSAs can be created from the input of all participants, not one category of expected pharmacology KSAs was consistent among all cases. The interactions instructors have with students regarding pharmacology, the strategies instructors use to teach pharmacology, and the methods instructors use to evaluate pharmacology are all inconsistent, even among instructors who teach the same course at the same school. Inconsistency even occurs between what pharmacology outcomes are expected and what pharmacology outcomes are evaluated. The expectations and outcomes of didactic pharmacology and clinical pharmacology are also inconsistent, and the application of QSEN competencies to pharmacology is inconsistent and individually-determined. Even the language instructors use regarding QSEN competencies and pharmacology KSAs is admittedly inconsistent.

Summary

The findings of this study have shown that individual clinical nursing instructors use varying methods for cultivating and evaluating students' pharmacology KSAs, and the common method among all instructors was questioning. In addition, instructors do not align their clinical pharmacology pedagogy with QSEN competencies and do not make QSEN competencies explicit in their teaching. Overall, pharmacology education in the clinical setting is inconsistent. With medication errors being such a significant threat to patient safety, it would seem it is time to bring some consistency to clinical pharmacology education in nursing. This consistency needs to be applied at two levels: the program and curriculum level, and the individual instructor level. The following chapter will address these recommendations.

CHAPTER 6: DISCUSSION, IMPLICATIONS AND RECOMMENDATIONS

The purpose of this study was to explore how clinical nursing instructors cultivate and evaluate students' pharmacology KSAs and how clinical instructors' teaching of pharmacology aligns with QSEN competencies. A multiple case study design was used to answer three research questions related to the teaching, evaluating, and aligning of pharmacology KSAs. This chapter includes a discussion of the findings, limitations of the study, implications for nursing education, and finally, recommendations for nursing education practice and future study. The discussion, implications, and recommendations sections each address the topics of the three research questions related to clinical pharmacology education: cultivation, evaluation, and alignment to QSEN competencies. Moreover, the study findings have led to an original model that depicts a method of curriculum design for aligning QSEN competencies-related pharmacology to outcomes/objectives and evaluation methods, and a proposed table of modified QSEN competencies adapted specifically for pharmacology, both of which are presented in this chapter.

Discussion of Findings

At this study's completion, a new literature search was conducted, but yielded no new studies about how pharmacology is taught in the clinical setting, nor how the teaching of clinical pharmacology aligns with QSEN competencies. This study's findings begin to address an important gap in the literature related to understanding how pharmacology KSAs are cultivated and evaluated in the clinical setting. This study also provides empirical data showing how clinical nursing instructors align the teaching of pharmacology KSAs with QSEN competencies. Since a large bulk of the literature regarding nursing pharmacology education was created ten to fifteen years ago, this study may help revitalize the research conducted in this area by filling a longstanding gap and providing a starting point for future inquiry.

Sample. The sample included six clinical nursing instructors from three nursing programs in two southwestern states. The participants specialized and taught in a variety of nursing areas. All participants had a minimum of a master's degree, and one had a DNP. Four of the six participants indicated they had formal nursing education backgrounds, which is impressive since Suplee, Gardner, and Jerome-D'Emilia (2014) reported only 38% of their participants had formal clinical education preparation. All participants were female and ranged in age from 30 to 60: three were between the ages of 30 and 40, and the other three were between the ages of 52 and 60. This sample of nursing instructors was notable because it only included female instructors and was skewed to show a younger demographic than what is currently reported in the United States. According to the NLN, 6% of full-time nursing instructors are male, and 70% of full-time nursing instructors are over the age of 45 (NLN, 2016).

Findings and the theory-practice gap. The findings of this study confirm the persistence of the theory-practice gap in nursing education. One of the categories constructed from the data indicated discrepancies between pharmacology education in the didactic and clinical settings. For example, according to course syllabi and evaluation documents, QSEN competencies-related pharmacology is taught in didactic courses, but not in clinical courses. The CARMA analysis also exposed a discrepancy between the expectation of incorporating QSEN competencies into clinical pharmacology education and the evidenced practice of instructors who do not explicitly include QSEN competencies. The aforementioned examples fit the classic definition of the theory-practice gap (Baxter, 2007; Corlett et al., 2003) and illustrate Higginson's (2004) notion that academics create theoretical ideals, such as QSEN competencies, but the ideals may not translate into clinical educational practice. One explanation for this may be clinical nursing instructors who have so many demands put on them (Corlett et al., 2003) may

not have time for faculty development that highlights current educational practice, such as incorporating QSEN competencies.

Nursing instructors' cultivation of students' pharmacology KSAs. There is no literature available to support or refute the findings specifically related to how clinical instructors cultivate pharmacology KSAs in the clinical setting; however, Wolf et al. (2006) emphasized the important role of clinical instructor guidance to help students avoid making medication errors. Instructor guidance may include one-to-one interactions, which all participants reported having. Meaningful one-to-one interactions that include such teaching strategies as questioning, coaching, and return demonstration are useful for strengthening students' clinical skills (Davoudi & Sadeghi, 2015; Oermann, Muckler, & Morgan, 2016) and can be adapted to strengthen pharmacology KSAs as well. One teaching method common to all participants that was either mentioned or found in the course documents was the use of written clinical assignments, and four of the six specifically used journaling. Despite this, only one participant reported a student journaling experience related to pharmacology KSAs. Journaling assignment descriptions in all cases did not require students to journal about pharmacology KSAs, which is unfortunate because Hatlevik (2012) asserted student reflective skills are important for closing the theory-practice gap, and Bussard (2015) found reflective journaling to be an effective method of improving many aspects of students' clinical practice.

In conjunction with one-to-one strategies, all participants reported using some type of group strategy, as well, many of which were evidence-based and supported by the literature. All participants mentioned teaching students during post-conference meetings, and several mentioned using peer-teaching, which is an effective method for improving students' clinical skills and self-confidence (Carey, Kent, & Latour, 2016; Palsson, Martensson, Swenne, Adel, &

Engstrom, 2017). Interestingly, only two participants mentioned simulation as a teaching method. This is surprising because, as clinical placements become more difficult to acquire and the unpredictability of clinical experiences becomes more pronounced, more nursing programs are resorting to the utilization of simulation as a clinical experience (Richardson, Goldsamt, Simmons, Gilmartin, & Jeffries, 2014). In addition, Khalaila (2014) found simulation to be an effective method of helping students learn clinical skills and mitigate their anxieties, while Hayes, Power, Davidson, Daly, and Jackson (2015) used simulation to teach students to function in a realistic medication administration experience and reinforce safe pharmacology KSAs.

Lastly, one notable finding of this study is not as applicable to teaching methods as much as teaching style. One participant, the youngest, made a point to describe her efforts to provide a safe, approachable style to enhance her students' learning. She was the only participant to describe having a learner-centered approach. This finding is also unfortunate because the nursing education literature recommends creating a safe, comfortable learning environment, even in the clinical setting (Koharchik, 2016) to heighten student learning.

Nursing instructors' evaluation of students' pharmacology KSAs. The findings of this study discovered the majority of evaluation methods were formative methods similar to the reported teaching strategies, with two exceptions: the clinical evaluation tool, and the dosage calculation exam. All six participants used a clinical evaluation tool, but only four of the six had pharmacology KSA criteria on their tool. One interesting finding is that one of the participants reported in the interview that pharmacology KSAs were not formally or summatively evaluated, yet the clinical evaluation tool she provided indicated the evaluation of pharmacology KSAs. The use of a clinical evaluation tool is consistent with the literature to provide consistency in evaluating students' clinical skills and ensure their competent practice (Bourbonnais, Langford,

& Giannantonio, 2008; Skuladottir & Svavarsdottir, 2016; Wu, Enskar, Lee, & Wang, 2015). In addition to the use of summative clinical evaluation tools, one other summative method of evaluation was discovered, however only one participant reported using it. It is notable that only one of six participants indicated the use of a dosage calculation test required to pass the clinical course because dosage calculation skills are so heavily discussed in the literature (Dilles, Stichele, Van Bortel, & Elseviers, 2011; Middleton, 2008; Weeks, Clochesy, Hutton, & Moseley, 2013). The lack of participant report may not indicate dosage calculation skills are not being evaluated, however. It was noted in several course documents that safe dosage calculations were included in other ways. Also, calculations may be occurring in real time in clinical settings and may be included in the one-to-one teaching time reported by instructors. Moreover, in the investigator's experience, dosage calculation skills may be evaluated in the didactic or lab settings, and so would not be reported as being evaluated in the clinical setting.

Nursing instructors' alignment of clinical pharmacology education with QSEN competencies. It was not surprising to find instructors do not align clinical pharmacology education with QSEN competencies as literature on the subject remains scarce, and there remains no studies on how instructors incorporate QSEN competencies into their teaching of pharmacology in the clinical setting. Altmiller and Armstrong (2017) identified several barriers to the integration of QSEN competencies in nursing education: namely, the need to learn how to use QSEN competencies effectively. The present study yielded similar results. Instructors indicated they did not know how to integrate QSEN competencies and pharmacology into their curricula. Also consistent with the literature, this study demonstrated instructors choose how and which QSEN competencies to implement into their teaching (Altmiller & Armstrong, 2017). Altmiller and Armstrong (2017) described the amount of integration of QSEN competencies in

different types of nursing courses but failed to mention the integration of QSEN competencies in pharmacology or clinical courses, possibly indicating a significant oversight on the part of nursing instructors to include QSEN competencies in the important subjects of pharmacology and clinical practice. Another finding consistent with the literature is QSEN competencies such as safety, teamwork and collaboration, and patient-centered care, are generally incorporated into clinical education, but informatics and quality improvement are often neglected (Pauly-O'Neill & Cooper, 2013; Pauly-O'Neill, Cooper, & Prion, 2016). Finally, an ancillary yet poignant finding is that QSEN competencies are covert. This study provided empirical data showing instructors do not make QSEN competencies obvious to students in either their course documents or the language they use in teaching clinical concepts. These findings were corroborated by Nygardh, Sherwood, Sandberg, Rehn, and Knutsson (2017) who used quantitative methods to discover QSEN competencies were not “visible to a very large extent” (p. 113) in clinical evaluation tools, and that informatics had particularly low visibility.

Study limitations. The findings of this study may not be representative of all nursing clinical pharmacology education in the United States since the sample included six nursing instructors from three programs in two southwestern states. However, the methodology is not designed to draw inferences, but rather to compare cases for consistency or divergence.

One limitation is response bias, which may be affected in a variety of ways. One is the respondents may not have remembered to report all the ways they teach, evaluate, and use QSEN competencies, which causes the data to misrepresent what is actually happening in the clinical setting. This was addressed in two ways. The first was to send a copy of sample questions to the participants prior to the interview so they had the opportunity to think about their teaching and evaluation methods to elicit comprehensive responses. The second way this issue was addressed

was by sending each respondent a copy of their interview transcript and asking for additional information. No respondents added any additional information.

In addition to leaving out important data, respondents may have felt uncomfortable answering some of the questions, such as feeling inadequate at not including QSEN competencies in their clinical pharmacology teaching. This may have resulted in the respondents including information they believe should be included, but is not a realistic representation of their actual teaching practice. Respondents were assured that they could choose to not answer any questions and that their responses would be kept anonymous.

A third way response bias may be affected is the respondents may not have provided current or every document used to teach their clinical courses. This may have limited the accuracy of the data used to analyze curricula implications. Lastly, two of the respondents were from the same program as the investigator. This may have also injected response bias in that the participants' responses may have been influenced by the presence of a colleague.

Another limitation of this study is the inexperience of the investigator, and the creation of inaccurate inferences from the data. These issues were addressed in several ways. One was to confer with expert committee members on the data collection, analysis, and conclusions. Another way was to ensure data triangulation and maintain a chain of evidence as recommended by Yin (2014).

Implications for Nursing Education

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 as described in the literature (Cleary-Holdforth & Leufer, 2013; Honey & Lim, 2008; King, 2004; Manias, 2009).

Nursing instructors' cultivation of students' pharmacology KSAs. The findings of this study illustrated that clinical nursing instructors have a wide variety of expectations and teaching strategies they use for pharmacology KSAs. One surprising finding is not all the participants stressed the expectation of competent dosage calculation skills. The literature indicates students have weak math skills (Cinar, Akuduran, & Dogan, 2006; Dilles, Stichele, Van Bortel, & Elseviers, 2011). A lack of reinforcement of dosage calculation skills in the clinical setting, as illustrated in this study, does not promote skill development. Oermann et al. (2016) explain repeated practice of a skill allows students to develop expertise. Due to the heavy emphasis on safe and competent math skills in the literature, it is alarming that math skills were not prevalent in the study's data. The continuation of students leaving nursing programs with weak dosage calculation skills is very concerning for patient safety.

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 connect and 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. In summary, the combination of low pharmacology KSAs expectations and a lack of evidence-based, effective teaching strategies has implications for the deficiency in learned pharmacology abilities in the clinical setting.

Nursing instructors' evaluation of students' pharmacology KSAs. Similar to having a variety of teaching strategies, the participants of this study indicated a variety of evaluation methods, as well. The varying evaluation methods have several implications for student outcomes. The most common evaluation method used was questioning. Although questioning is useful as a formative method for instructors to assess students' knowledge in the moment, it may not be a reliable method to evaluate the comprehensive pharmacology KSAs needed for safe, competent practice. The lack of deep, rigorous questioning could mean students leave their educational programs with little to no understanding of safe medication administration practice; moreover, questioning does not provide documentation of their acquired skills.

Two summative evaluation methods constructed from the data, clinical evaluation tools and a dosage calculation test, may be useful in assessing student abilities, but not all participants used them. It is concerning that two cases indicated they did not summatively evaluate pharmacology KSAs in their clinical courses. Students may not focus on pharmacology KSAs, or they may be confused about what is expected of them in the clinical setting because pharmacology KSAs are not indicated in evaluation tools, or because the outcomes and evaluations do not align. This situation leads to the potential of graduating students with undocumented and incompetent pharmacology KSAs.

Similarly, the neglect of evaluating dosage calculation skills in the clinical setting is very concerning because students who do not develop solid, accurate math skills may make medication errors that can harm or even kill patients. To summarize, the lack of consistent,

rigorous, and thorough evaluation methods of pharmacology KSAs in the clinical setting makes it unclear if students are graduating with safe and competent pharmacology abilities.

Nursing instructors' alignment of clinical pharmacology education and QSEN competencies. The use of the CARMA tool in this study allowed the investigator to identify a lack of alignment between QSEN competencies and pharmacology KSAs. This lack of alignment has several implications for students and student outcomes. Students may be unaware of the application of QSEN competencies to pharmacology KSAs in the clinical setting due to the lack of explicit QSEN competencies-related language in course documents as well as the lack of QSEN competencies-related language used by clinical instructors with students. Because QSEN competencies are not highly visible in clinical courses, students may not learn to build their future practice on the six competencies.

Furthermore, students within the same program may not get consistent pharmacology KSA teaching or evaluation because of varied implementation of QSEN competencies per instructor due to lack of clear guidance within the curriculum. Students may have no idea how QSEN competencies such as informatics and quality improvement relate to pharmacology KSAs because instructors do not implement them into their teaching. Since the implementation of QSEN competencies is designed to foster safe, competent practice, the overall result of the misalignment of QSEN competencies to pharmacology is that students may not have safe, competent pharmacology KSAs in the clinical setting, which may carry into their practice as nurses.

Recommendations

The use of ineffective, non-evidence-based teaching strategies and lack of comprehensive, rigorous evaluation methods may help explain students' inadequate

pharmacology KSAs as noted in the literature. These problems compounded with the absence of QSEN competencies alignment in clinical pharmacology education may result in nurses with incompetent medication administration abilities, which may lead to poor patient outcomes. It is possible and necessary to change nursing education to improve these outcomes. This section provides recommendations based on the study findings and implications, presents an original model for curriculum design and an adapted table of QSEN competencies-related pharmacology competencies, and provides recommended directions for future research.

Nursing instructors' cultivation of students' pharmacology KSAs. 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. Since there are no studies on the effectiveness of clinical pharmacology teaching strategies, evidence-based strategies from other areas of nursing education practice can be adapted, and current practices can be improved upon. The most common teaching strategy used by instructors was questioning. Davoudi and Sadeghi (2015) found higher level questioning necessary for developing students' critical thinking skills. 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. Three sample questions instructors could ask are: 1) How is

your patient's nurse functioning in the team to provide safe medication administration? 2) How are you using evidence-based resources to provide safe medication administration for your patients? and 3) What patient teaching needs to be done with your patient about the medications you are giving them? Encouraging students to integrate pharmacology KSAs as a holistic part of patient care, rather than simply asking them to recall basic medication information, could be an important step to improving clinical pharmacology abilities and, therefore, patient outcomes.

Instructors could also improve their teaching practice by limiting the use of teaching strategies that have little theoretical or evidence-based backing, such as clinical medication worksheets. Rather, instructors should utilize strategies that are based in theory, such as simulation (Hayes, Power, Davidson, Daly, & Jackson, 2015) and those that are evidence-based, such as peer teaching (Carey, Kent, & Latour, 2016; Palsson, Martensson, Swenne, Adel, & Engstrom, 2017), concept mapping (Kaddoura, VanDyke, & Shea-Foisy, 2016), and journaling (Bussard, 2015). Kaddoura et al. (2016) also discuss the impact of concept mapping on students' clinical judgement skills. Concept maps can be used to link the patient to their medications, including the therapeutic and adverse effects, and help students make meaningful connections and develop deeper levels of thought.

Students' clinical judgement regarding pharmacology KSAs, as Bussard (2015) suggests, could be improved by asking students to journal about the following: 1) Explain how patient safety was addressed in your clinical area when working with medications, or 2) Describe a quality improvement project happening on the unit you attended related to patient medications, and the implications the project has for patients. If there were no quality improvement projects being implemented, identify a potential project related to patient medications the unit could initiate. The implementation of teaching strategies based on theory and evidence that promote

deep thinking in students are ways of closing the theory-practice gap and potentially improving nursing students' pharmacology KSAs.

A final recommendation is for clinical nursing instructors to receive formalized training and continued faculty development on curriculum design and evidence-based teaching. McAllistair and Flynn (2016) indicated teaching knowledge and practice is a necessary capability of nursing instructors. In addition, Booth, Emerson, Hackney, and Souter (2016) noted that clinical expertise is not equivalent to teaching expertise and, to be effective educators, nurses must be trained in curriculum development and teaching strategies. 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.

Nursing instructors' evaluation of students' pharmacology KSAs. Formal nursing instructor education and training can also improve evaluation methods to ensure students are acquiring and maintaining competent, safe pharmacology KSAs. To ensure fair, objective, consistent evaluation of student pharmacology KSAs, clinical evaluation tools must be used (Bourbonnais et al., 2008). Wu et al. (2015) recognize the need for valid and reliable clinical evaluation tools that are developed with input from clinical partners. Certainly this is true for the application of pharmacology KSAs, and the collaboration between academia and clinical partners is a noted way to reduce the theory-practice gap (Hatlevik, 2012). Clinical nursing instructors can develop evaluation tools using the process described by Skuladottir and Svavarsdottir (2016) or use their own as a template for integrating pharmacology criteria.

Another type of documented assessment of pharmacology abilities is used in Finland. Sulosaari et al. (2014) describe medication education requirements for nurses in Finland that

include a minimum amount of medication education credits and a “Medication Passport” (p. 328) which documents a student nurse’s pharmacology KSA competency. This documentation is used to ensure consistent pharmacology KSA education for all nurses on a national level. Given the dire consequences of inadequate nursing pharmacology abilities, creating a set of national pharmacology standards that all nursing students are evaluated by may help to ensure strong pharmacology KSAs in all nurses.

Finally, dosage calculation competency must be evaluated and documented throughout a student’s entire nursing education. Nursing instructors should use teaching and evaluation methods shown to improve students’ dosage calculation skills (Weeks et al., 2013). Ensuring strong dosage calculation skills is a major step in improving patient medication safety.

Nursing instructors’ alignment of clinical pharmacology education with QSEN competencies. This study found clinical pharmacology education was not aligned with QSEN competencies. Sullivan (2010) explains the incorporation of QSEN competencies into nursing curricula is important for bridging the nursing education theory-practice gap. Sullivan also states two strategies for minimizing the theory-practice gap are purposefully designing nursing curricula on QSEN competencies, and ensuring clinical experiences emphasize the practice of QSEN competencies.

An obvious recommendation is to ensure the purposeful, overt alignment of pharmacology KSAs with QSEN competencies in all levels and settings of nursing programs. This alignment must take place at two levels: the individual instructor level and the curricular level. Altmiller and Armstrong (2017) identified several barriers to implementing QSEN competencies, and one was instructor lack of QSEN competencies-related knowledge and ability to integrate it into their teaching. One recommendation for individual instructors would be to

educate themselves on QSEN competencies and associated KSAs. Lewis et al. (2016) explained how instructors were educated prior to implementing a curricular change to integrate QSEN competencies. In addition, Altmiller and Armstrong (2017) suggest several ways of educating faculty such as the QSEN website, conferences, and webinars. Educating instructors and exposing them to resources could greatly improve the consistency of using all the QSEN competencies in clinical pharmacology education.

In addition to individual instructor training, program administrators must ensure the implementation of QSEN competencies-related pharmacology KSAs through curriculum design. Administrators should support a three-part model of clinical pharmacology curriculum development (see Figure 3). This original model illustrates how QSEN competencies-related pharmacology KSAs must be evident in program or course objectives/student learning outcomes, and aligned with evaluation methods. This alignment would be evidenced in course documents such syllabi, assignment directions, and clinical evaluation tools, and be expressed in explicit QSEN competencies verbiage as learning outcomes, course mapping, and clinical evaluation criteria. Additionally, student outcomes/course objectives and evaluation methods should align with each other to provide consistency within the curriculum. This added consistency within curricula may be an essential step in ensuring students leave a program with safe, competent pharmacology KSAs.

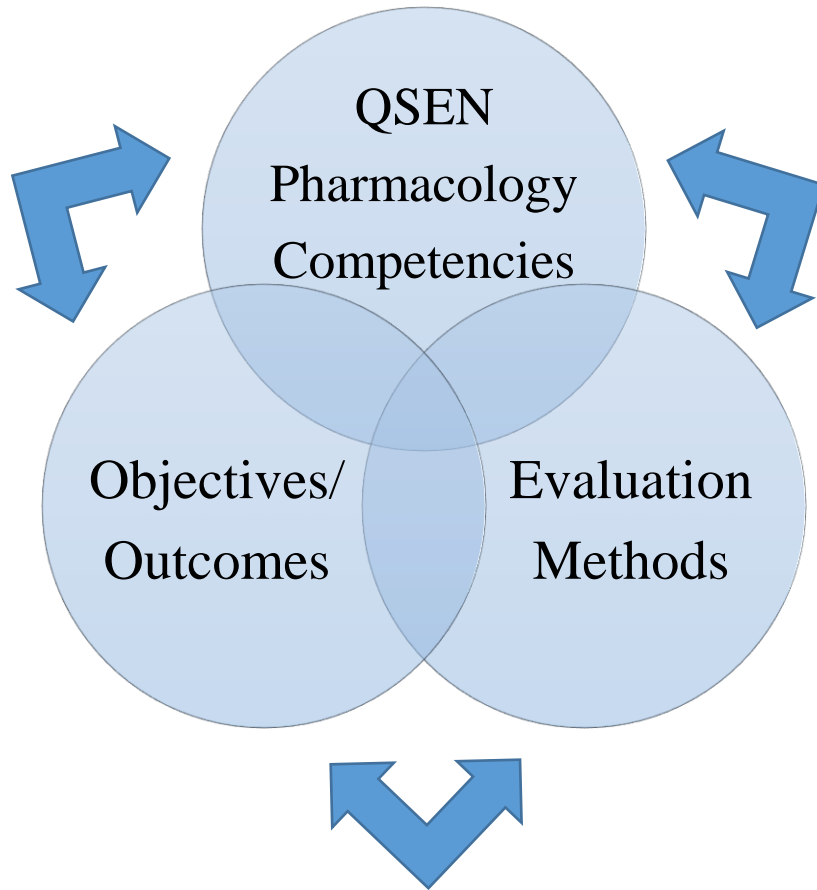


Figure 3. The three-part model of clinical pharmacology education curriculum development. In this model, each piece must align with the others.

A second recommendation for curriculum design that would ensure the incorporation of QSEN competencies with pharmacology KSAs is the use of specific pharmacology outcomes written in QSEN competencies verbiage. Pharmacology KSA competencies such as those listed in Table 4 could be used to ensure pharmacology KSAs are addressed in a program and appropriately align with QSEN competencies.

Table 4. QSEN Pharmacology Competency Definitions

| QSEN Competency | Definition | QSEN Pharmacology Competency |
|-------------------------------|---|---|
| 1. Patient-centered care | 1. Recognize the patient or designee as the source of control and full partner in providing compassionate and coordinated care based on respect for patient's preferences, values, and needs. | 1. Recognize the patient or designee as the source of control in their medication and treatment regime and ensure patient education on all pharmacologic and non-pharmacologic therapies. |
| 2. Teamwork and collaboration | 2. Function effectively within nursing and inter-professional teams, fostering open communication, mutual respect, and shared decision-making to achieve quality patient care. | 2. Function effectively with other nurses and inter-professional team members to assure competent and safe medication management. |
| 3. Evidence-based practice | 3. Integrate best current evidence with clinical expertise and patient/family preferences and values for delivery of optimal healthcare. | 3. Integrate the use of current, reliable resources and clinical expertise into medication management activities and patient education. |
| 4. Quality improvement | 4. Use data to monitor the outcomes of care processes and use improvement methods to design and test changes to continuously improve the quality and safety of healthcare systems. | 4. Use data and improvement methods to improve the quality and safety of medication management processes and activities. |
| 5. Safety | 5. Minimize risk of harm to patients and providers through both system effectiveness and individual performance. | 5. Minimize harm to patients from medication errors by utilizing system safety measures and ensuring competent individual abilities. |
| 6. Informatics | 6. Use information and technology to communicate, manage knowledge, mitigate error, and support decision-making. | 6. Use information and technology to ensure safe medication management activities and minimize medication errors. |

Recommendations for future research. This study has provided long-needed research on how clinical pharmacology KSAs are taught and evaluated in the clinical setting, as well as how they are aligned with QSEN competencies. With medication errors presenting a serious problem for patient safety, it is imperative that nursing instructors find ways to improve pharmacology KSAs in students. Since this study does not address how clinical pharmacology education is being conducted nationwide, conducting a national survey on the teaching strategies, evaluation methods, and alignment of pharmacology KSAs that emerged from this study with QSEN competencies is recommended. It would be prudent to pattern a national survey after that of Altmiller and Armstrong (2017), but focus on pharmacology education and QSEN competencies, especially in the clinical setting. It would also be useful to compare results within varied demographic categories of nursing instructors such as those who also teach didactic pharmacology courses, those who have completed QSEN modules, and those who are specifically nursing education prepared. In addition, it would be helpful to study interventions that show direct relationships with patient safety, such as those that influence student medication errors. Studying teaching strategies, evaluation methods, and QSEN competencies integration techniques that show a significant decrease in student medication errors and an improvement in student pharmacology KSAs would be most useful in improving clinical pharmacology education. It is also important to study how nursing programs support instructors in their implementation of QSEN, how QSEN is integrated into nursing curricula, and how it is operationalized by the instructors who teach it. Lastly, longitudinal studies on the effects of QSEN competencies integration and evidence-based teaching and evaluation methods on the pharmacology abilities students take into practice would be an important step in answering the

call of the IOM to improve this nation's healthcare. These studies are long overdue as the necessary steps for creating a safer healthcare environment for all.

Summary

The findings of this study may provide an explanation for the inadequate pharmacology KSAs described in the literature. The implications of inconsistent cultivation and evaluation of nursing students' pharmacology KSAs combined with the lack of aligning clinical pharmacology education with QSEN competencies are that students may not gain or demonstrate safe and competent medication administration skills. The recommendations for improving clinical pharmacology education include faculty development, improved curriculum design, and the use of specific pharmacology-related QSEN competencies. These recommendations may help improve student pharmacology KSAs, thereby improving nursing medication administration practice, and ensuring better patient outcomes.

Appendix A: QSEN Competencies and Accompanying Definitions

| Competency | Definition |
|-------------------------------|---|
| 1. Patient-centered care | 1. Recognize the patient or designee as the source of control and full partner in providing compassionate and coordinated care based on respect for patient's preferences, values, and needs. |
| 2. Teamwork and collaboration | 2. Function effectively within nursing and inter-professional teams, fostering open communication, mutual respect, and shared decision-making to achieve quality patient care. |
| 3. Evidence-based practice | 3. Integrate best current evidence with clinical expertise and patient/family preferences and values for delivery of optimal healthcare. |
| 4. Quality improvement | 4. Use data to monitor the outcomes of care processes and use improvement methods to design and test changes to continuously improve the quality and safety of healthcare systems. |
| 5. Safety | 5. Minimize risk of harm to patients and providers through both system effectiveness and individual performance. |
| 6. Informatics | 6. Use information and technology to communicate, manage knowledge, mitigate error, and support decision-making. |

Reference: Cronenwett, L., Sherwood, G., Barnsteiner, J., Disch, J., Johnson, J., Mitchell, P., ... Warren, J. (2007). Quality and safety education for nurses. *Nursing Outlook*, 55(3), 122-131. doi:10.1016/j.outlook.2007.02.006

Appendix B: UNLV Biomedical IRB - Exempt Review



**UNLV Biomedical IRB - Exempt Review
Exempt Notice**

DATE: September 19, 2017

TO: Lori Candela, EdD

FROM: Office of Research Integrity - Human Subjects

PROTOCOL TITLE: [1115677-1] Clinical Instructors' Cultivation of Pre-licensure Nursing Students' Pharmacology Knowledge, Skills, Attitudes (KSAs)

ACTION: DETERMINATION OF EXEMPT STATUS

EXEMPT DATE: September 18, 2017

REVIEW CATEGORY: Exemption category # 2

Thank you for your submission of New Project materials for this protocol. This memorandum is notification that the protocol referenced above has been reviewed as indicated in Federal regulatory statutes 45CFR46.101(b) and deemed exempt.

We will retain a copy of this correspondence with our records.

PLEASE NOTE:

Upon final determination of exempt status, the research team is responsible for conducting the research as stated in the exempt application reviewed by the ORI - HS and/or the IRB which shall include using the most recently submitted Informed Consent/Assent Forms (Information Sheet) and recruitment materials.

If your project involves paying research participants, it is recommended to contact Carisa Shaffer, ORI Program Coordinator at (702) 895-2794 to ensure compliance with the Policy for Incentives for Human Research Subjects.

Any changes to the application may cause this protocol to require a different level of IRB review. Should any changes need to be made, please submit a **Modification Form**. When the above-referenced protocol has been completed, please submit a **Continuing Review/Progress Completion report** to notify ORI - HS of its closure.

If you have questions, please contact the Office of Research Integrity - Human Subjects at IRB@unlv.edu or call 702-895-2794. Please include your protocol title and IRBNet ID in all correspondence.

Office of Research Integrity - Human Subjects
4505 Maryland Parkway . Box 451047 . Las Vegas, Nevada 89154-1047
(702) 895-2794 . FAX: (702) 895-0805 . IRB@unlv.edu

Appendix C: Weber State University IRB Approval



WEBER STATE UNIVERSITY

INSTITUTIONAL REVIEW BOARD (IRB)

September 18, 2017
Rieneke Holman, MS, RN
Assistant Professor
School of Nursing
3875 Stadium Way Dept 3903
Ogden, UT 84408-3903

Dear Mrs. Holman,

Your project entitled "*Clinical Instructors' Cultivation of Pre-licensure Nursing Students' Pharmacology Knowledge, Skills, and Attitudes (KSAs)*" has been reviewed and is approved as written. The project was reviewed as "exempt" and low risk.

Subjects are considered adults and written or electronic signatures are required. They may choose not to participate. You have one year to complete the study. Anonymity and confidentiality are addressed appropriately, and the type of information gathered could not "reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation" (Code of Federal Regulations 45 CFR 46, Subpart D).

We wish you good luck; you may proceed at this time. Please remember that any anticipated changes to the project and approved procedures must be submitted to the IRB prior to implementation. Any unanticipated problems that arise during any stage of the project require a written report to the IRB and possible suspension of the project.

A final copy of your application will remain on file with the IRB records. If you need further assistance or have any questions, call me at ext. 6101 or e-mail me at matthewnicholaou@weber.edu

Sincerely,

A handwritten signature in black ink, appearing to read 'M. Nicholaou', written over a horizontal line.

Matthew Nicholaou, DrPH, MT (ASCP)
DCHP Subcommittee Chair
Institutional Review Board

INSTITUTIONAL REVIEW BOARD

WEBER STATE UNIVERSITY 1027 UNIVERSITY CIRCLE OGDEN UT 84408-1027



Title of Project: *Clinical Instructors' Cultivation of Pre-licensure Nursing Students' Pharmacology Knowledge, Skills, and Attitudes (KSAs)*
Primary Investigator(s): Rieneke Holman
Approval Number: 18_HP_002
Reviewer: Matthew Nicholaou, DrPH, MT(ASCP) - DCHP IRB Subcommittee Chair
Date: September 18, 2017

COMMITTEE ACTION

Your proposal (project) and consent documents have been received and classified by the Human Subjects in Research Committee

AS:

High Risk Moderate Risk Low Risk

BY THE FOLLOWING PROCESS:

Full board review Expedited review Exemption

The project has been:

Approved Not Approved

COMMENTS: See Attached Approval Letter

HUMAN SUBJECTS IN RESEARCH REVIEWER

REVIEW DATE

INVESTIGATOR'S RESPONSIBILITY AFTER COMMITTEE ACTION

The federal regulations provide that after the committee has approved your study, you **may not** make any changes without **prior** committee approval except where necessary to eliminate apparent immediate hazards to the subjects. Further, you must report to the committee any changes that you make and any unanticipated problems involving risks to subjects or others that arise.

Appendix D: Recruitment Email

Dear Pre-licensure Nursing Program Director,

I am a PhD nursing student at the University of Nevada, Las Vegas, conducting a research study to explore how clinical nursing instructors are implementing pharmacology education in the clinical setting and how they are aligning the teaching of pharmacology in the clinical setting with QSEN competencies. This is important because there is very little research on how pharmacology education is being implemented in the clinical setting. Since the clinical setting is the bridge between theory and practice, it is important to determine how pharmacology education is currently being implemented in order to improve it. Pharmacology education is crucial to the development of competent nurses and therefore, safe patients.

I would like to include participants from accredited pre-licensure nursing programs in Utah and Nevada that incorporate QSEN competencies in their programs. I am asking your assistance to identify nursing instructors who meet the following criteria: (1) current nursing instructor who holds at least a master's degree in nursing; (2) instructor who is experienced (have taught at least one clinical course within the program); (3) instructor who teaches or has taught within the past year, a clinical course within a traditional clinical model (accompanies and directly supervises students at a clinical facility, and not in a dedicated educational unit); (4) instructor who teaches or has taught within the past year, a clinical course during the term just prior to the term of graduation; (5) instructor who teaches in a nationally accredited nursing program; (6) instructor whose program integrates QSEN competencies into its curriculum.

Would you please forward this email to any instructors who qualify to participate, and reply to this email within two weeks of doing so?

Participation in this study would involve an audio-recorded interview either by phone or in-person lasting approximately one hour, review of the interview transcript for accuracy, and review of the study summary. The interview would be conducted at a time and place of the instructor's choice. The instructor would also be asked to share all documents associated with the clinical course the instructor teaches. The first two instructors who volunteer for this study will be selected to participate. No other instructors will be needed once the completion of interviews with the first two instructors are complete. The identity of the University and the instructors will be kept confidential in the study results. Please find attached a copy of the informed consent document for the review of any potential instructors.

My study has been approved by the Institutional Review Board at the University of Nevada, Las Vegas. For further information about the study or to volunteer to participate, interested nursing instructors should contact me via email at holmar1@unlv.nevada.edu within the next two weeks. Questions may also be directed to my dissertation chair, Dr. Lori Candela at lori.candela@unlv.edu, Principal Investigator for this study. I hope to have all interviews completed within two months.

I would be happy to address any questions or concerns regarding the study. I hope to be able to include your instructors' clinical pharmacology teaching practices in this multi-state study.

Sincerely,

Rieneke Holman, RN, PhD(c)
Email: holmar1@unlv.nevada.edu
Phone: 801-721-1134

Appendix E: Recruitment Email Reminder

Dear Pre-licensure Nursing Program Director,

I am following up on an e-mail I sent you two weeks ago regarding my doctoral research study, entitled Clinical Instructors' Cultivation of Pre-licensure Nursing Students' Pharmacology Knowledge, Skills, and Attitudes (KSAs). If you have already forwarded that e-mail to your faculty, I thank you and you can just disregard this one. If you have not forwarded it, I am asking that you please do so now.

I am a PhD nursing student at the University of Nevada, Las Vegas, conducting a research study to explore how clinical nursing instructors are implementing pharmacology education in the clinical setting and how they are aligning the teaching of pharmacology in the clinical setting with QSEN competencies. This is important because there is very little research on how pharmacology education is being implemented in the clinical setting. Since the clinical setting is the bridge between theory and practice, it is important to determine how pharmacology education is currently being implemented in order to improve it. Pharmacology education is crucial to the development of competent nurses and therefore, safe patients.

I would like to include participants from accredited pre-licensure nursing programs in Utah and Nevada that incorporate QSEN competencies in their programs. I am asking your assistance to identify nursing instructors who meet the following criteria: (1) current nursing instructor who holds at least a master's degree in nursing; (2) instructor who is experienced (have taught at least one clinical course within the program); (3) instructor who teaches or has taught within the past year, a clinical course within a traditional clinical model (accompanies and directly supervises students at a clinical facility, and not in a dedicated educational unit); (4) instructor who teaches or has taught within the past year, a clinical course during the term just prior to the term of graduation; (5) instructor who teaches in a nationally accredited nursing program; (6) instructor whose program integrates QSEN competencies into its curriculum.

Would you please forward this email to any instructors who qualify to participate, and reply to this email within two weeks of doing so?

Participation in this study would involve an audio-recorded interview either by phone or in-person lasting approximately one hour, review of the interview transcript for accuracy, and review of the study summary. The interview would be conducted at a time and place of the instructor's choice. The instructor would also be asked to share all documents associated with the clinical course the instructor teaches. The first two instructors who volunteer for this study will be selected to participate. No other instructors will be needed once the completion of interviews with the first two instructors are complete. The identity of the University and the instructors will be kept confidential in the study results. Please find attached a copy of the informed consent document for the review of any potential instructors.

My study has been approved by the Institutional Review Board at the University of Nevada, Las Vegas. For further information about the study or to volunteer to participate, interested nursing instructors should contact me via email at holmar1@unlv.nevada.edu within the next two weeks. Questions may also be directed to my dissertation chair, Dr. Lori Candela at lori.candela@unlv.edu, Principal Investigator for this study. I hope to have all interviews completed within two months.

I would be happy to address any questions or concerns regarding the study. I hope to be able to include your instructors' clinical pharmacology teaching practices in this multi-state study.

Sincerely,

Rieneke Holman, RN, PhD(c)
Email: holmar1@unlv.nevada.edu
Phone: 801-721-1134

Appendix F: Informed Consent



INFORMED CONSENT

Department of Nursing

TITLE OF STUDY: Clinical Instructors' Cultivation of Pre-licensure Nursing Students' Pharmacology Knowledge, Skills, Attitudes (KSAs)

INVESTIGATOR(S): Principal Investigator: Lori Candela, EdD, RN, FNP-BC, FNP, CNE; Student Investigator: Rieneke Holman, MS, RN

For questions or concerns about the study, you may contact **Rieneke Holman at 801-721-1134 or Lori Candela at 702-895-2443.**

For questions regarding the rights of research subjects, any complaints or comments regarding the manner in which the study is being conducted, contact **the UNLV Office of Research Integrity – Human Subjects at 702-895-2794, toll free at 877-895-2794 or via email at IRB@unlv.edu.**

Purpose of the Study

You are invited to participate in a research study. The purpose of this study is twofold. The first purpose is to explore how nursing instructors teach, cultivate, and evaluate pharmacology knowledge, skills, and attitudes in pre-licensure nursing students. The second purpose is to explore how the development of pharmacology knowledge, skills, and attitudes in clinical nursing education aligns with QSEN competencies.

Participants

You are being asked to participate in the study because you fit this criteria: (1) current nursing instructor who holds at least a master's degree in nursing; (2) instructor who is experienced (have taught at least one clinical course within the program); (3) instructor who teaches or has taught within the past year, a clinical course within a traditional clinical model (accompanies and directly supervises students at a clinical facility, and not in a dedicated educational unit); (4) instructor who teaches or has taught within the past year, a clinical course during the term just prior to the term of graduation; (5) instructor who teaches in a nationally accredited nursing program; (6) instructor whose program integrates QSEN competencies into its curriculum.

Procedures

If you volunteer to participate in this study, you will be asked to do the following: (1) participate in a 60 minute, audio-recorded interview, (2) review a transcript of the interview, (3) review study findings, (4) send all course documents (either in digital or hard-copy) to the Student Investigator for review.

Benefits of Participation

There may not be direct benefits to you as a participant in this study. However, we hope to learn how clinical pharmacology education in nursing is being implemented in order to improve it and help prevent future patient harm from medication errors.

Risks of Participation

There are risks involved in all research studies. This study may include only minimal risks. It is possible that you may experience transient discomfort or anxiety when answering one or more of the questions. However, you may choose to not answer any of the questions, or withdraw from the study at any time without consequence.

Cost /Compensation

There may not be financial cost to you to participate in this study. The study will take approximately 100 minutes of your time (60 minute interview; 15 minutes to review a transcript of the interview, 15 minutes to review study summary, and 10 minutes to collect and send related course materials). You will not be compensated for your time.

Confidentiality

All information gathered in this study will be kept as confidential as possible. No reference will be made in written or oral materials that could link you to this study. All records will be stored in a password-protected digital repository that is only accessible to the student investigator and the principal investigator for 3 years after completion of the study. After the storage time, the information gathered will be deleted.

Voluntary Participation

Your participation in this study is voluntary. You may refuse to participate in this study or in any part of this study. You may withdraw at any time without prejudice to your relations with UNLV. You are encouraged to ask questions about this study at the beginning or any time during the research study.

Participant Consent:

I have read the above information and agree to participate in this study. I have been able to ask questions about the research study. I am at least 18 years of age. A copy of this form has been given to me.

Appendix G: Sample Interview Questions

1. How many years of nursing education experience?
2. How many semesters have you taught clinical courses?
3. How often, over the course of a typical clinical day, would you say you interact with students on something that relates to pharmacology?
4. In clinical, what knowledge, skills, and attitudes should students have about pharmacology?
5. In clinical, what method(s) do you use to teach and cultivate students' knowledge, skills, and attitudes related to pharmacology?
6. In clinical, what method(s) do you use to evaluate if students have knowledge, skills, and attitudes about pharmacology?

Appendix H: Semi-structured Interview Questions

Demographic Questions

1. Age?
2. Gender?
3. What is your level of education, and what type of program (i.e., Master's in education, nurse practitioner, DNP, PhD)?
4. How many years of nursing education experience?
5. How many semesters have you taught clinical courses?

Main Interview Questions

6. How often, over the course of a typical clinical day, would you say you interact with students on something that relates to pharmacology?
7. How are QSEN competencies (related to pharmacology) integrated into your curriculum?
8. In clinical, what knowledge, skills, and attitudes should students have about pharmacology?
9. In clinical, what method(s) do you use to teach and cultivate students' knowledge, skills, and attitudes related to pharmacology?
10. In clinical, what method(s) do you use to evaluate if students have knowledge, skills, and attitudes about pharmacology?
11. How do you incorporate QSEN competencies (patient-centered care, safety, quality improvement, evidence-based practice, teamwork/collaboration, and informatics) into clinical pharmacology education?

Appendix I: Model of CARMA Tool to be Used for Data Collection and Analysis

Note taking data spreadsheet-Expectations

| Program Expectations | Note Taking Describe what is intended: Describe QSEN competencies |
|---|--|
| Identify Clinical Faculty | |
| Who is intended to be served? | <i>Third semester/level three students. (Students enrolled in the semester just prior to the semester of graduation [semester prior to capstone or preceptorship semester])</i> |
| How are participants to be served? | What methods are clinical instructors expected to use to teach and evaluate students' pharm in clinicals? *Syllabus/course documents |
| What will be produced by participants in the program? | <p><i>Syllabus/course documents and <u>Instructor interview</u></i> QSEN competencies:</p> <p><u>Patient-centered care</u>: “Recognize the patient or designee as the source of control and full partner in providing compassionate and coordinated care based on respect for patient’s preferences, values, and needs.”</p> <p><u>Teamwork and Collaboration</u>: “Function effectively within nursing and inter-professional teams, fostering open communication, mutual respect, and shared decision-making to achieve quality patient care.”</p> <p><u>Evidence-based Practice</u>: “Integrate best current evidence with clinical expertise and patient/family preferences and values for delivery of optimal health care.”</p> <p><u>Quality Improvement</u>: “Use data to monitor the outcomes of care processes and use improvement methods to design and test changes to continuously improve the quality and safety of health care systems.”</p> <p><u>Safety</u>: “Minimizes risk of harm to patients and providers through both system effectiveness and individual performance.”</p> <p><u>Informatics</u>: “Use information and technology to communicate, manage knowledge, mitigate error, and support decision making.”</p> |

Note taking data spreadsheet-Evident Implementation

| Evident Implementation | Note Taking Describe what is evidently happening in the clinical setting |
|---|---|
| Identify the demographics of the students | <i>Third semester/level three students. (Students enrolled in the semester just prior to the semester of graduation [semester prior to capstone or preceptorship semester])</i> |
| Who are the evident participants? | Do all students get taught/evaluated equally? |
| How are participants being served? | What methods are clinical instructors using to teach and evaluate students' pharm in the clinical setting? |
| What was produced by participants in the program? | <p>How do students demonstrate KSAs of the QSEN competencies? How do instructors know students have obtained the QSEN KSAs related to pharmacology?</p> <p><u>Patient-centered care</u>: “Recognize the patient or designee as the source of control and full partner in providing compassionate and coordinated care based on respect for patient’s preferences, values, and needs.”</p> <p><u>Teamwork and Collaboration</u>: “Function effectively within nursing and inter-professional teams, fostering open communication, mutual respect, and shared decision-making to achieve quality patient care.”</p> <p><u>Evidence-based Practice</u>: “Integrate best current evidence with clinical expertise and patient/family preferences and values for delivery of optimal health care.”</p> <p><u>Quality Improvement</u>: “Use data to monitor the outcomes of care processes and use improvement methods to design and test changes to continuously improve the quality and safety of health care systems.”</p> <p><u>Safety</u>: “Minimizes risk of harm to patients and providers through both system effectiveness and individual performance.”</p> <p><u>Informatics</u>: “Use information and technology to communicate, manage knowledge, mitigate error, and support decision making.”</p> |

Note making data spreadsheet-Degree of fit

| Results | Note Making Compare/Contrast Expectations with Evident Implementation |
|----------------|--|
|----------------|--|

| | |
|---|---|
| Degree of congruence or divergence | |
| Who are participants? | <i>Third semester/level three students. (Students enrolled in the semester just prior to the semester of graduation [semester prior to capstone or preceptorship semester])</i> |
| How are participants served? | |
| What has been produced/What are the outcomes? | |

Note making data spreadsheet-Implications

| | |
|--|--|
| Conclusions Evaluator Interpretations | Note Making Implications for Participants |
| What are the implications for participants? | |
| What are the implications for how participants are being served? | |
| What are the implications for the outcomes? | |

Note remaking data spreadsheet-Recommendations (to be used in Implications chapter)

| | |
|---|---|
| Recommendations Evaluator and/or stakeholder | Note Remaking Maintain or modify program? In what way? |
| Maintain or modify the program in terms of who is being served? | |
| Maintain or modify the program in terms of how participants are being served? | |
| Maintain or modify the program in terms of outcomes being produced? | |

Appendix J: Cross-case Componential Analysis

| | Program A | | Program B | | Program C | |
|---|-----------|--------|-----------|--------|-----------|--------|
| | Case 1 | Case 2 | Case 3 | Case 4 | Case 5 | Case 6 |
| Expected Pharm KSAs in clinical | | | | | | |
| • Know basic info about common meds | X | | X | X | X | X |
| • Have a healthy respect for the potential danger of med administration | X | X | X | X | | X |
| • Safe practice | X | X | X | X | | X |
| • Apply knowledge and skills to practice | X | | X | X | | X |
| • Nursing care associated with meds | X | X | X | | X | X |
| • Have confidence in their practice | | | | X | | X |
| Faculty perceptions of students | | | | | | |
| • Students are fearful/nervous/doubting about pharm in clinical | X | | X | X | | X |
| • Students are not interested in pharm | | | | | | X |
| • Students do not have adequate pharm KSAs | X | | | X | | X |
| • Students are well-versed in safety from prior semesters | | | | | X | X |
| Teaching methods for cultivating pharm KSAs in clinical | | | | | | |
| • Pharm is addressed with every interaction | X | | | X | | X |
| • Questioning/quizzing | X | X | X | X | X | X |
| • Hands on/return demonstration | X | | X | X | | X |
| • One-to-one time | X | X | X | X | X | X |

| | | | | | | |
|---|---|---|---|---|---|---|
| • Group work (post conference, group projects) | X | X | X | X | X | X |
| • Discussion/lecture/debriefing | X | X | X | | X | X |
| • Games/activities/puzzles | | X | X | | X | X |
| • Case studies | X | X | | | X | X |
| • Student presentations/peer teaching | X | X | X | | X | X |
| • Simulation | | | X | X | | |
| • Instructor demonstration/modeling | X | X | X | | | X |
| • Teaching style is relaxed, calm, approachable | | | | | | X |
| • Written assignments (journaling, papers, care plans) | X | | X | X | X | |
| • Concept mapping | | X | | | | |
| • Student clinical experiences vary | X | X | X | | | |
| • Scaffolding | | | X | | | |
| • Voice over power point | | | X | | | |
| • Dosage calculation practice | | | X | | | |
| • Coaching/cueing | | | X | X | | |
| Evaluation methods of pharm KSAs in clinical | | | | | | |
| • Questioning/quizzing (formative) | X | X | X | X | X | X |
| • Discussion (formative) | | | | | X | X |
| • Evaluation tool that evaluates pharm KSAs (summative) | | | X | X | X | X |
| • Simulation (formative and/or summative) | | | X | X | | X |
| • Games/activities/puzzles (formative and/or summative) | | X | | | | X |

| | | | | | | |
|--|---|---|---|---|---|---|
| • Student presentations (formative and/or summative) | X | X | | | | X |
| • Written assignments (formative) | X | X | X | X | | |
| • Dosage calculation exam (summative) | | | X | | | |
| • Return demonstration (formative) | | | X | X | | |
| • Doesn't know how to <i>formally</i> evaluate pharm KSAs in clinical | X | X | | | | |
| • No <i>formal</i> way to evaluate pharm KSAs in clinical course | X | X | | | | |
| Didactic pharm vs clinical pharm | | | | | | |
| • Pharm is predominantly in didactic course, rather than clinical course | X | | X | X | X | X |
| • Didactic and clinical syllabi are combined; didactic and clinical pharm outcomes/evals are not clearly delineated between the two settings | | | | X | X | X |
| • Instructor tries to apply didactic pharm to clinical experiences | | X | | X | | X |
| • Students can do well in didactic, but not in clinical, or vice versa | | | X | | | |
| • QSEN pharm is apparent in didactic course, but not in associated clinical course | | | | X | | |
| • Students are assumed/expected to have pharm KSAs from didactic course | X | | | X | X | |

Appendix K: QSEN Competencies-related Cross-case Componential Analysis

| | | | | | | |
|--|---|---|---|---|---|---|
| QSEN Pharm KSA in curriculum | | | | | | |
| • Pharm KSAs addressed in student outcomes/objectives | | | X | X | X | X |
| • QSEN addressed in student outcomes/objectives | X | X | X | | X | X |
| • Pharm QSEN addressed in student outcomes/objectives | | | | | | |
| • Pharm KSA's formally evaluated | | | X | X | X | X |
| • QSEN formally evaluated | X | X | X | X | X | X |
| • Pharm QSEN present in formal evaluation methods | | | X | X | X | X |
| • Individual instructors decide how to implement/integrate QSEN into clinical curriculum regarding pharm | X | X | X | X | | |
| QSEN Pharm KSA in instructor's practice | | | | | | |
| • Focuses on Safety | X | X | X | X | X | |
| • Focuses on Patient-centered Care | X | X | X | X | | X |
| • Focuses on Teamwork and Collaboration | | X | | | | X |
| • Focuses on Evidence-based Practice | X | X | | X | | X |
| • Focuses on Quality Improvement | | | | | | |
| • Focuses on Informatics | | X | | | | |
| Pharmacology QSEN is covert | | | | | | |
| • QSEN is not explicitly related to pharm in the course | X | X | X | X | X | X |
| • Students don't recognize pharm QSEN in clinical, instructors don't use consistent language | X | X | X | | | |

| | | | | | | |
|---|--|--|---|---|--|--|
| <ul style="list-style-type: none"> Instructors don't know how to include pharm QSEN in clinical or are unaware they are doing it | | | X | X | | |
|---|--|--|---|---|--|--|

Appendix L: Sample Completed CARMA Tool

Model of CARMA tool to be used for data collection and analysis

Note taking data spreadsheet-Expectations

| Program Expectations | Note Taking Describe what is intended: Describe QSEN competencies |
|------------------------------------|---|
| Identify Clinical Faculty | Participant ... |
| Who is intended to be served? | Third semester/level three students. (Students enrolled in the semester just prior to the semester of graduation [semester prior to capstone or preceptorship semester]) |
| How are participants to be served? | <p>What methods are clinical instructors expected to use to teach and evaluate students' pharm in clinicals? *Syllabus/course documents</p> <ul style="list-style-type: none"> • QSEN is evident in the course outcomes as indicated in the course syllabus, but not specifically related to pharm KSAs • QSEN is evident in the evaluation tool, but not specifically related to pharm KSAs • Pharmacology KSAs are not addressed in the syllabus of the clinical course. However the following was found in other course documents: <ul style="list-style-type: none"> • <i>Plan to update charting as care is given per hospital protocol with student charting. Keep a running total of I/Os, medications, IVs, treatments and procedures. (per "Clinical Conduct Rules and Guidelines-Supplemental Syllabus"-course document #1)</i> • Administering Medications: <ul style="list-style-type: none"> ○ <i>All medications must be checked with the RN or clinical instructor before being administered. All medications must be scanned per hospital protocol. You may or may not be given rights to scan patient medications.</i> ○ <i>All medications unfamiliar to the student must be researched by the student prior to administration.</i> |

| | |
|--|---|
| | <ul style="list-style-type: none"> ○ <i>For specifics related to high risk medications and interventions please refer to your instructor for specific facility guidelines. (per “Clinical Conduct Rules and Guidelines-Supplemental Syllabus”- course document #1)</i> ● <i>From course syllabus:</i> <ul style="list-style-type: none"> ○ TEACHING STRATEGIES: <ul style="list-style-type: none"> • <i>Selected Readings</i> • <i>Focused Discussions</i> • <i>Written Assignments</i> • <i>Collaborative Learning Activities</i> • <i>Web Sites and Web-Accessible Learning Tools</i> • <i>Case Presentations</i> • <i>Scenario/Simulation-based Learning</i> ○ METHODS OF EVALUATION: <ul style="list-style-type: none"> • <i>Lab Participation</i> • <i>Skill Performance</i> • <i>Simulation Activities</i> • <i>Clinical Written Work</i> • <i>Faculty Evaluation of Clinical Performance</i> • <i>Student Self-evaluation</i> |
| <p>What will be produced by participants in the program?</p> | <p><u>Syllabus/course documents and Instructor interview</u></p> <p>QSEN competencies:</p> <p><u>Patient-centered care:</u> “Recognize the patient or designee as the source of control and full partner in providing compassionate and coordinated care based on respect for patient’s preferences, values, and needs.”</p> |

- *1.3 Identifies and develops a plan of care based on all available patient information; including information such as laboratory data, diagnostic testing, vital signs, and administered medications. (per “CLINICAL-PERFORMANCE EVALUATION TOOL”-course document #2)*
- Application of pharm knowledge-why meds are given, how they are used, how they affect the client
- Expected to use patient-centered care, evidence-based practice, and safety
- Nurses need to incorporate non-pharm treatments and not just “fixate” on what doctor or nurse practitioner order

Teamwork and Collaboration: “Function effectively within nursing and inter-professional teams, fostering open communication, mutual respect, and shared decision-making to achieve quality patient care.”

- *No clinical documents addressed Teamwork and Collaboration for Pharm KSAs*
- Know when to ask for help

Evidence-based Practice: “Integrate best current evidence with clinical expertise and patient/family preferences and values for delivery of optimal healthcare.”

- *All medications unfamiliar to the student must be researched by the student prior to administration. (per “Clinical Conduct Rules and Guidelines-Supplemental Syllabus”-course document #1)*
- How to find medication information-drug guides and facility/organization resources
- Application of pharm knowledge-why meds are given, how they are used, how they affect the client
- Basic understanding of common drugs: anti-hypertensives, diuretics, beta-blockers
- Expected to use patient-centered care, evidence-based practice, and safety

Quality Improvement: “Use data to monitor the outcomes of care processes and use improvement methods to design and test changes to continuously improve the quality and safety of healthcare systems.”

- *No clinical documents addressed Quality Improvement for Pharm KSAs*
- Know policies and procedures for meds

Safety: “Minimizes risk of harm to patients and providers through both system effectiveness and individual performance.”

- *All medications must be checked with the RN or clinical instructor before being administered.* (per “Clinical Conduct Rules and Guidelines-Supplemental Syllabus”-course document #1)
- *All medications unfamiliar to the student must be researched by the student prior to administration.* (per “Clinical Conduct Rules and Guidelines-Supplemental Syllabus”-course document #1)
- *For specifics related to **high risk medications** and interventions please refer to your instructor for specific facility guidelines.* (per “Clinical Conduct Rules and Guidelines-Supplemental Syllabus”-course document #1)
- Application of pharm knowledge-why meds are given, how they are used, how they affect the client, how they interact with each other
- Basic understanding of common drugs: anti-hypertensives, diuretics, beta-blockers
- Attitude that medications are dangerous
- Know when to ask for help
- Expected to use patient-centered care, evidence-based practice, and safety

Informatics: “Use information and technology to communicate, manage knowledge, mitigate error, and support decision making.”

- *Plan to update charting as care is given per hospital protocol with student charting. Keep a running total of I/Os, medications, IVs, treatments and procedures.* (per “Clinical Conduct Rules and Guidelines-Supplemental Syllabus”-course document #1)

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| | <ul style="list-style-type: none"> • <i>All medications must be scanned per hospital protocol. You may or may not be given rights to scan patient medications.</i> (per “Clinical Conduct Rules and Guidelines-Supplemental Syllabus”-course document #1) |
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Note taking data spreadsheet-Evident Implementation

| Evident Implementation | Note Taking Describe what is evidently happening in the clinical setting |
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| Identify the demographics of the students | Third semester/level three students. (Students enrolled in the semester just prior to the semester of graduation [semester prior to capstone or preceptorship semester]) |
| Who are the evident participants? | <p>Do all students get taught/evaluated equally?</p> <ul style="list-style-type: none"> • Students get both one-on-one time and group time with the instructor. Unclear if each student gets the same one-on-one time. • Students’ experiences vary • Rubric is used to evaluate all students in the course • Different instructors focus on different things. |
| How are participants being served? | <p>What methods are clinical instructors using to teach and evaluate students’ pharm in the clinical setting?</p> <p>Teaching methods:</p> <ul style="list-style-type: none"> • Helps students “appreciate and understand the hows and the whys” of nursing care/giving meds • Doesn’t push students on “things that they have never seen before” (doesn’t expect students to be familiar with meds they’ve never been exposed to) • Teaches students to have a respect for the dangerousness of meds • Uses student clinical experiences to teach best practice and standards of care (looking up meds they don’t know and looking up policies and procedures on meds) • Gives extensive comments on student weekly reflective journals about med administration • Encourages students to ask questions about meds they don’t know • Discusses real patients and patient situations with students to apply pharm knowledge |

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| | <ul style="list-style-type: none"> • Discusses nursing considerations of meds with students (indications, assessments, holding meds in certain situations, med effects, individual patient differences with meds) • Discusses top 5 meds on the units and why they're given • Uses probing questions, goes beyond "textbook answers", ie., asks why patients are on antihypertensives when their BP is already low, and asks about multiple med interactions • Discusses polypharmacy with students, including medication interactions • Uses case studies • She, herself, has learned about many different meds in many different specialties by being exposed to different clinical situations with students • Uses peer discussion/peer teaching-students teach each other about the meds on their units • Teaches students one-on-one on the units • Teaches students in a group-conference setting • "See one, do one, teach one" • Acts as a facilitator to concentrate on patient-centered care • Helps students to recognize "patient as the individual", team manage and coordinate with other healthcare providers (docs & pharmacists), safety with med administration • Adjusts teaching strategies to fit student needs: helps students who are "exceptional theory students" apply knowledge to real patients, and helps students who are good with patients research and apply "book" information • Uses debriefing a lot: in a group setting, discusses patient situations with the students; in a one-on-one setting, asking students about their patients and challenging them • Questions students about the whys of nursing care, and what to anticipate, and how to solve problems • Discusses changes in medications and reasons for changes of prescriptions/orders • Teaches students to look at non-pharm treatments and incorporate patient-centered care <p>Evaluation methods:</p> <ul style="list-style-type: none"> • Quizzing (formative): why are we giving the drugs we're giving? |
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| | <ul style="list-style-type: none">• Probing questions (formative) about patients and patient situations to evaluate knowledge and application of knowledge (how do meds affect the client?)• Asks students about nursing considerations with meds, ie., what to be aware of with a patient on an anticoagulant, how to protect them from injury• Evaluates student weekly reflective journals• *No formal evaluations/tools of pharm in clinical (no summative eval of pharm in clinical course)• Has students present about their patients and meds to the other students• Has students present about application of meds (why we give them and how they affect the client) to the other students• *Has never taught a clinical course that has a formalized way of evaluating pharm KSAs in clinical• Doesn't know how to integrate pharm into formal evaluation in clinical• In previous courses, has had to be “creative” in evaluating student integrated pharm skills in clinical in the past. Student outcome too vague• Previously, some instructors only looked at dosage calculations as evaluating clinical pharm skills• In previous courses, evaluation tools did not match expectations according to the syllabus• Students continued to fail units due to not passing dosage calculations• As instructors, we expect the students to apply pharm knowledge and be safe and competent with meds, but have no way of evaluating them• Instructors don't know how to apply pharm in a clinical environment |
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| | <ul style="list-style-type: none"> • We don't have an "evaluation tool or a competency tool" that can measure both pharm clinical skills and theoretical knowledge in the clinical setting • Instructors' evaluation language does not match QSEN language • <i>1.3 Identifies and develops a plan of care based on all available patient information; including information such as laboratory data, diagnostic testing, vital signs, and administered medications.</i> (per "CLINICAL-PERFORMANCE EVALUATION TOOL"-course document #2) |
| <p>What was produced by participants in the program?</p> | <p>How do students demonstrate KSAs of the QSEN competencies? How do instructors know students have obtained the QSEN KSAs related to pharmacology?</p> <ul style="list-style-type: none"> • We don't have an "evaluation tool or a competency tool" that can measure both pharm clinical skills and theoretical knowledge in the clinical setting • There are no summative ways to evaluate if students demonstrate pharm KSAs in the clinical setting • *Instructors assume students have pharm skills due to having taken/currently taking a didactic/theory pharm class. • Students participate in discussions • Students present about meds to their classmates. Students are usually prepared when presenting to their classmates. <p><u>Patient-centered care:</u> "Recognize the patient or designee as the source of control and full partner in providing compassionate and coordinated care based on respect for patient's preferences, values, and needs."</p> <ul style="list-style-type: none"> • Students answer questions. Students often don't know indications of meds, nursing assessments related to meds, or med interactions. <p><u>Teamwork and Collaboration:</u> "Function effectively within nursing and inter-professional teams, fostering open communication, mutual respect, and shared decision-making to achieve quality patient care."</p> |

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| | <p><u>Evidence-based Practice</u>: “Integrate best current evidence with clinical expertise and patient/family preferences and values for delivery of optimal healthcare.”</p> <ul style="list-style-type: none"> • Students write in weekly reflective journals (not necessarily always about meds). Students have indicated major errors relating to safety and evidence-based practice in their journals. <p><u>Quality Improvement</u>: “Use data to monitor the outcomes of care processes and use improvement methods to design and test changes to continuously improve the quality and safety of healthcare systems.”</p> <p><u>Safety</u>: “Minimizes risk of harm to patients and providers through both system effectiveness and individual performance.”</p> <ul style="list-style-type: none"> • Students write in weekly reflective journals (not necessarily always about meds). Students have indicated major errors relating to safety and evidence-based practice in their journals. • Students often express fear of the responsibility and danger of medication administration. • Students struggle with dosage calculations. • Students answer questions. Students often don’t know indications of meds, nursing assessments related to meds, or med interactions. <p><u>Informatics</u>: “Use information and technology to communicate, manage knowledge, mitigate error, and support decision making.”</p> |
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Note making data spreadsheet-Degree of fit

| Results Degree of congruence or divergence | Note Making Compare/Contrast Expectations with Evident Implementation |
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| Who are participants? | Third semester/level three students. (Students enrolled in the semester just prior to the semester of graduation [semester prior to capstone or preceptorship semester]) |
| How are participants served? | The clinical course syllabus includes QSEN in the course student outcomes as well as on the clinical evaluation tool. There is only one reference to pharmacology KSAs on the clinical evaluation tool, and no references in the syllabus. The syllabus and evaluation tools |

are congruent in that they both address QSEN, but not specifically related to pharmacology, nor do they address pharm KSA's.

One course document, the supplemental syllabus, addresses various aspects of student medication administration, but it is not outlined in QSEN format. The QSEN competencies addressed in the supplemental syllabus are safety, evidence-based practice, and informatics. The items in the supplemental syllabus are not reflected in the evaluation tool.

Students are taught pharm KSAs in a variety of ways including probing questions, discussion, peer teaching, case studies, and debriefing. These methods are congruent with some of the teaching methods outlined on the course syllabus.

Students' pharm KSA's are evaluated in a variety of ways, including quizzing, discussions, peer teaching, and weekly reflective journals. These methods are all formative methods, with the exception of the journals. However, students are not obligated to address pharm KSAs in their journal entries. The above methods are congruent with some of the methods listed in the syllabus. The only reference to Pharm KSAs/medications in a summative format is on the clinical evaluation tool in the patient-centered care section:

*1.3 Identifies and develops a plan of care based on all available patient information; including information such as laboratory data, diagnostic testing, vital signs, and **administered medications**.* (per "CLINICAL-PERFORMANCE EVALUATION TOOL"-course document #2)

QSEN competencies are not obvious to the students as the language is not consistent in course documents. There is significant divergence between the use of QSEN language in the course documents and the language the instructors use.

Student pharm KSAs are assumed to be present by clinical instructors due to students attending pharm didactic/theory classes.

Clinical instructors don't know how to incorporate pharm KSAs into the clinical setting.

Instructors are not consistent as to how they apply pharm outcomes in the clinical setting (some view dosage calculation as the only required pharm KSA in clinical, as opposed to the application of pharm theory knowledge in clinical).

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| | <p>We don't have an evaluation tool to address both clinician skills and theoretical application.</p> <p>Within the course, itself, there is convergence between expectations and evidenced in that there are no QSEN pharm KSA outcomes, and there are no evaluations of QSEN pharm KSAs.</p> <p>There is convergence in the general sense of applying QSEN within the course as evidenced by the course outcomes and clinical evaluation tool.</p> <p>In relation to pharm KSAs, there is divergence from QSEN as there is very sparse evidence within course documents to indicate the application of QSEN to pharm KSAs within the curriculum. In addition, the instructor decides which QSEN competencies to focus on regarding the teaching and evaluating of pharm KSAs, rather than address all QSEN competencies in some fashion.</p> <p>The instructor focuses on safety, evidence-based practice, and patient-centered care in relation to pharm KSAs. She teaches about all QSEN competencies related to pharm EXCEPT quality improvement. There is divergence in that all QSEN competencies are expected to be taught in the course, but only 5 are taught in relation to pharm KSAs. There is also divergence between which QSEN pharm KSAs are being taught, and which ones are being evaluated.</p> |
| <p>What has been produced/What are the outcomes?</p> | <p>There is no documentation of what is produced in that there is no summative way of evaluating student pharm KSAs.</p> <p>There is congruence between what is expected and what is produced in that students are not required (per the curriculum) to display pharm KSAs in the clinical setting and are not formally evaluated on them.</p> <p>There is divergence between QSEN competencies and pharm KSAs in that there is no documented application of QSEN to pharm KSAs in the clinical course. QSEN competencies are expected to be applied to all aspects of nursing care, but there is no evidence of QSEN application to pharm KSAs in either student outcomes or evaluation tools per the course documents. The instructor focuses on a few QSEN competencies to apply to pharm KSAs.</p> <p>There is divergence between what is expected of students from instructors and what is produced by students in that instructors expect students to be able to apply pharm KSAs in the clinical setting, but there is no formal or summative way to evaluate it. In</p> |

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| | <p>addition, student pharm KSAs are assumed to exist in students because they have taken/are taking didactic/theory pharm classes, but are not evaluated if they exist in the clinical setting.</p> <p>There is also divergence in that some of the course documents (the supplemental syllabus) indicates some pharm KSA expectations, but they are not evaluated.</p> <p>3rd semester students don't understand polypharm (evaluated formatively by the instructor)</p> <p>Students start realizing the responsibility and potential danger inherent in medication administration by the nurse (evaluated formatively by the instructor).</p> <p>Do we want students to become “skilled clinician nurses” or “very good...theoretical nurses” or a “blend between the two?”</p> <p>Students struggle with dosage calculations.</p> |
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Note making data spreadsheet-Implications

| Conclusions Evaluator Interpretations | Note Making Implications for Participants |
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| <p>What are the implications for participants?</p> | <p>Students are unaware of the application of QSEN to pharm KSAs in the clinical setting due to inconsistent language.</p> <p>Students may not focus on pharm KSAs in the clinical setting since they are not described in course outcomes, addressed on clinical evaluation tools, nor verbalized in QSEN language by clinical instructors.</p> <p>Students understand the responsibility and potential danger of medication administration by nurses, but have little to no formal training on or evaluation of pharm KSAs.</p> |
| <p>What are the implications for how participants are being served?</p> | <p>Instructors have expectations of what KSAs students should obtain in the clinical setting, but do not formally teach them or evaluate them on those KSAs.</p> <p>The lack of explicit pharm KSA outcomes in the clinical setting leaves students ignorant to what pharm KSAs are expected of them and how QSEN applies to those KSAs.</p> |

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| | <p>Students within the same course but taught by different clinical instructors may be taught varying QSEN competencies related to pharm KSAs, depending on what the instructor deems valuable and focuses on since there is no formal guidance via course documents/evaluation tools.</p> <p>Students get taught in one-on-one settings as well as the group setting. One-on-one time may vary from student to student. Students may not all get consistent pharm KSA teaching or evaluation since it is not indicated in the course outcomes or evaluation tools.</p> <p>Students get varied experiences and opportunities with medications.</p> |
| <p>What are the implications for the outcomes?</p> | <p>Students are assumed to be safe and competent in pharm KSAs because of didactic/theory courses.</p> <p>What formative evaluations are done on student pharm KSAs in the clinical setting are done subjectively and inconsistently, and vary between instructors.</p> <p>Since students are not formally or summatively evaluated on pharm KSAs in the clinical setting, it is unclear if they have safe, competent pharm KSAs.</p> <p>Students may not have safe or competent pharm KSAs in the clinical setting, which may carry into their practice as nurses.</p> |

Note remaking data spreadsheet-Recommendations (to be used in Implications chapter)

| <p>Recommendations Evaluator and/or stakeholder</p> | <p>Note Remaking Maintain or modify program? In what way?</p> |
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| <p>Maintain or modify the program in terms of who is being served?</p> | <p>Maintain the program in assuring QSEN KSAs are taught and evaluated in the clinical setting to all 3rd semester students.</p> <p>The main recommended modification would be to institute QSEN related pharm KSAs in all levels of clinical nursing education. In addition, create specific QSEN pharm KSA student outcomes and evaluation tools so that all students are taught and evaluated consistently.</p> |
| <p>Maintain or modify the program in terms of how participants are being served?</p> | <p>Modify the program to include explicit QSEN related pharm KSAs in the clinical course as indicated by course/unit/assignment outcomes and clinical evaluation tools. Ensure the incorporation of all QSEN competencies.</p> |

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| | <p>Modify the program to ensure QSEN language is consistent throughout all course documents as well as the language used by instructors.</p> <p>Modify the program to include specific teaching strategies focused on clinical pharm KSAs within all QSEN competencies.</p> <p>Modify the program to include formal evaluation of students' pharm KSAs within all QSEN competencies in the clinical setting.</p> |
| <p>Maintain or modify the program in terms of outcomes being produced?</p> | <p>Modify the program to ensure the formative evaluation methods are rigorous enough to promote safe and competent pharm KSAs. Modify the program such that all students are taught and evaluated on QSEN-based pharm KSAs in the clinical setting to ensure safe and competent medication administration practice among nurses.</p> <p>Modify the program to include documented summative evaluations of safe, competent student pharm KSAs within all QSEN competencies.</p> |

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