

Bachelors of Science in Nursing Students and a Qualitative Analysis of their Medication Administration Experiences

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Abstract

Lack of medication knowledge and skills is detrimental to the safety and welfare of patients. Lack of pharmacology knowledge and skills is detrimental to the safety and welfare of patients. In a southern baccalaureate nursing program, students demonstrated deficiencies in their medication knowledge and skill proficiency. This qualitative study discusses nursing students' knowledge, training, and clinical instruction while administering medications. Results revealed that students had knowledge gaps regarding the complexity of the medication administration process, knowledge regarding medications, and fear of making a medication error without the support of their faculty. Educational strategies to improve the overall education of student nurses that enhance clinical medication safety will better improve patient safety outcomes.

Keywords: Nursing Students, Medication Administration Process, Medication Safety

1. Introduction

In the field of nursing, the ability to safely administer medications is a key skill in promoting positive outcomes for patients (18). The medication administration process is complex and requires competency in many areas, including the knowledge of dosage calculation, pharmacology, and medication route techniques; complex dispensing systems and protocols; and understanding adverse drug reactions, safety guidelines, and procedures for respecting the medication rights of patients. (1) According to the Institute of Medicine (IOM) (2) medication errors are responsible for approximately 98,000 deaths in United States hospitals. The IOM and other governing bodies such as the National Council of State Boards of Nursing (NCSBN), the American Nurses Association (ANA), and the National League for Nursing (NLN) have focused on ways to enhance patient safety and quality by decreasing the number of medication errors by nurses in U.S. hospitals over the last several decades (2-5). Such efforts have led to the Transition to Practice initiative started by the NCSBN and position statements regarding quality and safety in nursing education from the ANA and IOM. (2,4)

Studies have evaluated nursing students' perceptions of their clinical experiences including their fear of medication errors, issues regarding death and dying, and relationships with faculty and nurse preceptors. (6-10) Nurses promote patient safety and improve health care outcomes, so it is essential that students learn the basic principles of medication administration starting early in the program and continuing from simple concepts to advanced medication concepts as they progress through the curriculum. The focus of this qualitative study was on students' perceptions of their knowledge, skill proficiency, and safety during medication administration in the simulation lab and in the patient care setting. Understanding student perceptions of knowledge and proficiency during the medication administration process (MAP) can guide faculty in enhancing the safety and skill proficiency of students.

1.1 Background

Students from a south-central baccalaureate program were demonstrating substandard performance in pharmacology and math indicators and lack of skill in return demonstration of the MAP during their first year of study (19). Faculty provided instruction pertaining to the MAP in the classroom, simulation lab, and the patient care areas of the hospital. Students had three chances to successfully pass a medication math test each semester prior to administering any medications to patients. The students were also required to pass two semesters of pharmacology with a passing grade of at least 75%. In addition, they had to demonstrate proficiency by using a simulated medication administration process (SMAP) which included using Electronic Health Records (EHR), a medication dispensing system, and return demonstration at the bedside.

A literature review uncovered four major areas of concern regarding students' perceptions of the MAP: self-knowledge of the medication administration process, feelings of stress while in the clinical area, complexity of the MAP, and perceived faculty/nurse support while giving medications. Self-knowledge concerns related to limited number of opportunities students had to give medications in the clinical area due to policy issues or lack of clinical sites, faculty-to-student ratios versus the amount of medications that were required by each patient assigned, and lack of critical thinking skills relating to the link of medication theory to practice. (11,12) Stress

exhibited by students in the clinical area was a major concern. The literature has provided sufficient research targeting student stress while caring for complex patients in the clinical setting and the effects that it has on student ability to administer medications. (13-15) Gibbons and colleagues (16) described clinical stress, according to students, arising from taking care of dying patients, role ambiguity, feelings of clinical incompetence, interpersonal problems, and patient care overload.

A retrospective review of medication errors made and reported by a 4-year baccalaureate nursing program revealed a number of contributing factors associated with medication errors made by students: 1) not following the rights of medication administration, 2) system process errors, 3) distractions while giving medications, and 4) the students' lack of knowledge and understanding of the pharmacology or administration process. These factors made nursing faculty question the way in which medication administration is taught in nursing programs. It also raised the question as to how this information guides nursing practice and the practice of educators in the clinical setting. (17)

The following research questions were developed based on the literature review:

1. What are nursing students' perceptions of required knowledge needed to safely administer medications to patients?
2. What are nursing students' perceptions of skill proficiency when administering medications to patients?
3. How do nursing students perceive their faculty's instruction of the medication administration process during their nursing courses?

1.2 Methods

A qualitative case study design was selected to develop research-based understanding of the embedded knowledge and decision-making that occurs with nursing students' administering medications in the clinical setting. Institutional Review Board (IRB) approval was obtained from the university institution to conduct the study. Inclusion criteria were:

1. Enrolled as a full-time student in the first year of foundational courses.
2. Be in good academic standing according to the definition of the college.
3. At least 21 years of age or older.

One hundred seven junior-level students were invited to participate via email; participants were selected on a first-come, first-serve basis. The first 10 volunteers who responded, as indicated by time-stamped e-mail, and met the inclusion criteria were chosen to participate. Seven participants were women; three were men. Five were Caucasian and five were African American. Five participants were between the ages of 21 and 25, four were between the ages of 26 and 40, and one participant was over 40 years of age.

1.3 Data Collection

All participants agreed to participate in the study by signing a consent form. They all agreed to be interviewed and allowed each interview to be audiotaped.

1.31 Interviews

Data collection began by conducting personal interviews with participants regarding their perceptions of knowledge, skill proficiency, and patient safety before, during, and after the medication administration process. Each interview lasted an average of 20 minutes. An interview guide was followed; the researcher documented verbal or nonverbal behavioral cues that occurred while the participant was answering the questions.

1.32 Data Coding

Each interview script was transcribed from the audiotape and given a number for confidentiality purposes. The number on the interview transcript was used to identify each participant during data analysis. Within approximately 5-7 days after each interview, the interview script was transcribed. Data segments were entered into Ethnograph® software so that codes could be assigned. Lean coding was used, which limits the amount of codes to broaden themes rather than work with an unruly amount of codes. Once all the codes were listed for each question, the codes were reviewed once again to narrow them down into sizable chunks of data. The last process of coding involved selecting the final list of codes and attaching these codes to the student data retrieved from each interview. At the end of the analysis, 12 major codes were identified, with seven major themes linked back to the guiding research questions.

1.33 Study Validity

The participant review of the interview transcript was completed an average of 2 weeks following the interview to ensure interview data were captured as accurately as possible. During the review of the transcript, the participant verified and clarified any information documented for accuracy.

1.4 Results

1.41 Research Question 1

Three of the seven major themes emerged to address research question 1, which focused on perceptions of required knowledge: 1) pre-clinical preparation, 2) complexity of patients, and 3) complexity of the medication administration process. The students felt that preparing and understanding drug calculations, drug compatibility, and safe dosage were key elements, but they also needed to be able to relate their pharmacy theory knowledge from the didactic class to their preparation for administering medications to patients in the clinical phase. There was also stress related to the complexity of the medication administration dispensing system. This included the EHR, where orders are reviewed and checked against the medications in the dispensing system from the pharmacy. Students voiced concerns regarding how stressful it was to take care of very sick, complex patients, and the large numbers of medications each patient was prescribed each day. Students also commented that it takes a lot of time to prepare the medications before administering them to the patient. They observed that if they get distracted by another patient issue or emergency, they may be at risk for violating the steps of the MAP and making a potential or actual medication error.

Table 1

Student Feedback on Knowledge Needed for Administering Medications

Importance of student preparation	Complexity of the medication administration process	Complexity of the patient
“Knowing the math. Understanding the dose (mgs) and how they are broken down. From there, understanding how it's going to affect the patient. The math, I think more so than anything.”	“Making sure it's the right patient, the right drug, right dose, right time, so on and so forth. So to me that's the most important, just being the proficiency of it and to make sure you are giving the right drug to the right person.”	“It was overwhelming...The patient was crying because he could not hardly swallow them and it was so much work.”
“So the next time, which was the very next week, I had already gone through and read about the medications and was better prepared.”	“It's a big deal. I never really realized how important the six rights are until you actually get in there and you have all these meds in front of you and 30 patients on one floor.”	“A stressful element during, you could have a patient that is not being compliant and hard to manage and they need this medication. They are not refusing it, but they are being very difficult. That could be a stressor.”

1.42 Research Question 2

Research question 2 related to the students' perceptions of their skill proficiency when administering medications to patients. The next three major themes that relate to this question were: 1) emotions/responsibility when giving medications, 2) fear of medication errors, and 3) responsibility for medication error reporting. Some of the emotions expressed in their comments were stress, anxiety, lack of confidence, excitement, and feeling professional. Many of the students expressed concern regarding their fear of making a *near miss* or *actual* medication error while giving medications. Some expressed that the complexity of their patients, distractions, and the complexity of the MAP contributed to the possibility of making an error.

1.43 Research Question 3

Research question 3 pertained to how the students perceived their faculty instruction while in the clinical areas while administering medications. The seventh major theme was faculty/RN reliance; three minor subthemes were associated with this theme. Most of the students in the study had a very positive experience with their clinical instructors and their nurse preceptors in the clinical area. The three subthemes revolved around the reliability of the instructor or preceptor for assisting with medication administration, feeling as if the instructor provided a safety net, and explaining how each instructor had certain expectations on how the student should be prepared to administer medication and follow the MAP and be knowledgeable about their patients' medications. Another issue noted was the students' lack of confidence and feelings of insecurity when the patient or family asked questions about the medications prescribed. Tables 1-3 provide narratives for each major theme as collected in student interviews.

Table 2
Student Feedback on Perceived Skill Proficiency

Emotional experience of the MAP	Fear of making error	Responsibility of med error reporting
“I felt accomplished afterwards.”	““I mean, I am in there pulling the MAR and making sure that the list of drugs matches the orders and I have my papers side by side to make every drug is matching up. I am looking at it like 5 times.”	“Sometimes, it's not reported. So, see I don't know..... (Big Hesitation)...No one has really talked about it, I just know stories that I have heard from different people.”
“It was very scary... It was only p.o. meds... It was like exciting and anxious because I was going to be dealing with a real person with a beating heart.”	“You have to do all the steps. So any time you just miss a step in the process. I'm sure it happens a lot because so many floors are busy, but anytime you just miss a step whether the outcome is OK or not, that is an error.”	“Reporting is important because if something is wrong, the physician needs to know, because that is the patient's life and they could definitely be in danger.”
“Oh, [pause]...If your patient has a side effect. I have not had that happen, but you have to anticipate that something might happen. So, it's like a stressor...knowing what to do if it happens...”	“For the most part, I remembered just about everything, though I did forget to check the patient's I.D. bracelet, but I ended up checking it right before I gave the medication.”	I think it should be reported. Because if it affects that patient negatively and it does something to their body and they can't recover, it should definitely be reported.”

Table 3
Student Feedback on their instruction on the MAP

Instructor reliance/availability	Instructor expectations	Instructor as safety net
“Sometimes your instructor is going between floors and they are spread apart and you may not have your instructor there to hold your hand.”	“She will come up to you and say “Ok, what is your patient taking? Ok, Why are they taking it? You just have to know why...You have to know pharmacologically what is happening to the body.”	“Of course, I was very nervous doing it on the first time, but my clinical instructor was very patient with me.”
“My instructor was there. I did not want my instructor to know that I didn't have the confidence that I should have had with the medications.”	“They are very helpful. Before we even walk into the room, they are like 'What are we giving?' and “Why are you giving it?”	“She walked me through the steps before we walked into the room, as we were checking the medication one more time she was telling me that I could do this...No big deal...”
	“They just want us to understand how important it is to get the right med to the right person and so each one of them have the same process.”	

1.5 Discussion

The complexity of the MAP involves many steps that the student has to remember in order to avoid making a medication error. One of the key steps in the process that was mentioned by students many times was knowing the six patient rights to giving medications. They felt that any violation in this process would put them at risk for a potential or actual medication error. There are a total of three safety checks during the process of giving medications to patients, and many students felt stressed with having to remember and be responsible for all these steps. The students must be prepared prior to their clinical day regarding their patient's condition and the medications prescribed. They have to not only know each medication, why the patient is receiving the medication, the potential adverse events, and the dosage calculation, but they have to be able to teach the patient about the medications when the patient or family member asks questions. For first-year nursing students, this can be a very large task.

Many students expressed emotional responses when describing the medication administration process. There was a strong sense of anxiety and stress with giving injections for the first time. One student described her hands as shaking so hard that the instructor had to help her hold the syringe while giving the injection. Most of the anxiety of giving injections had to do with giving them to *live* patients, not the manikins they checked off on in the lab prior to going to the hospital. The complexity of the patients' medical conditions was also overwhelming to the students. Students understood that they were responsible to report any medication errors, but were not clear on the process of reporting. Students were concerned that their instructor covered two floors during the clinical day and might not be available at the time the students needed to give medications. The students would have to rely on the staff nurse to help them administer medications if they received the instructor's permission. If not, they missed the opportunity to administer their patients' medications, and they would only be able to watch the nurse give the scheduled medications at that time point. This was frustrating from the students' point of view and may be a problem that can be addressed with faculty.

Students often had to rely on the instructor or staff nurse to step in and help teach the patient or family member. The students also described situations where they almost made a medication error, but the instructor was there to catch the *near miss* error. In terms of instructor presence, the participants voiced concern about performing the skill in front of their instructor or preceptor nurse, which added to their level of stress. However, overall, the students felt that their instructors were very competent in their teaching and they knew each instructor's expectations for each clinical day.

1.6 Limitations/Future Research

The study was limited to students from one BSN program. To find out if there is generalizability among students in BSN programs within the same region, other regions of the United States, and globally, future studies are indicated. It would also be of great benefit to continue this study as a longitudinal study with each new class of entering BSN students, to evaluate educational shifts and improvement in medication administration teaching strategies in the curriculum. Replication of the study in other colleges from different states would be recommended to compare and contrast student perceptions, as well as gaps in knowledge. Future directions on research regarding nursing students' administering medications could be tailored to evaluating the various faculty teaching styles, focus on the distractions and barriers that put students at risk while administering medications in the clinical setting and more knowledge regarding the culture and instruction of nurse preceptors in the clinical areas that work directly with students while administering patient medications.

1.7 Conclusion

The gaps in knowledge identified in this study were mainly attributed to pharmacology content in didactic courses, the need for more practice administering medications in the clinical setting, and a better understanding of the multiple processes of medication administration, hospital equipment, and pharmacy dispensing systems. There was also the need for more information leading to medication error reporting. Based on these knowledge gaps and a second review of the literature evaluating teaching strategies to address these deficits, a number of recommendations can be made. First, it is important to add more medication administration hours that focus on the simulation of the medication administration process, with strategies to better address safety and competency, EHRs, and medication dispensing systems. Second, it is important to find ways to allow students to administer more medications in the clinical setting. This could be accomplished by having additional faculty making rounds to the various units while students are in clinical during times of the day when most medications are administered.

It is also recommended that programs offer additional elective medication administration courses that focus on medication safety, critical thinking, and connecting theory to practice. Taking additional hours to master medication administration competency would be beneficial for students who are weak in medication skills. Another important strategy for faculty would be to implement better ways to monitor stressful events such as distractions during medication administration, and the complexity of assigned patients. Providing students with additional educational strategies, resources, and instruction on medication administration will enhance their knowledge, skill, and proficiency. It will enable students to have more confidence in administering medications not only during their senior year of the nursing program but and after they graduate and transition into the workforce. This confidence, knowledge, and skill proficiency will have a direct impact on patient safety and will aid in the decrease of medication errors in clinical practice.

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