



Perspectives From Academic and Practice Leaders on Nursing Student's Education and Role in Medication Reconciliation

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ABSTRACT

Background: Medication reconciliation is a complex process that occurs during hospitalization at admission, transfer and discharge and at each outpatient clinic visit. Despite numerous quality improvement initiatives implemented by healthcare facilities nationwide to refine the process, medication errors still occur. Medication reconciliation processes are institution specific and undergo constant refinement. Few reports are available on the nursing student's role in this contemporary safety process.

Purpose: The purpose of this study was to assess the nursing student's education and role in the medication reconciliation process from the perspective of academic faculty and hospital nursing leadership.

Methods: Electronic surveys were sent to 90 nurse academic and 160 nurse practice leaders in Ohio during the first quarter of 2015. Surveys were completed by 47% of the academic leaders (42/90) and 23% of the practice leaders (42/160). Survey questions focused on the nursing curriculum regarding medication reconciliation and the student nurse's role in the process during clinical experiences.

Results: Faculty from 75% of the schools of nursing reported that the medication reconciliation curriculum was mostly taught in the classroom. Only 24.4% of the schools taught medication reconciliation in an inter-disciplinary context with pharmacy students. During clinical time, 33% of faculty reported that students had direct involvement and 33% had the opportunity to observe the process of medication reconciliation. The majority (80%) of practice nurse leaders reported that their facility does not permit nursing students to perform medication reconciliation. Although medication reconciliation processes are specific to each organization, only 52.8% of the practice leaders reported that they provide faculty or nursing students' formal training on their hospital's medication reconciliation policy or site-specific process.

Conclusion: Students are not receiving adequate education or opportunity to practice medication reconciliation during clinicals. Future alignment of academia, and practice efforts on medication reconciliation are needed.

Introduction

Medication errors cause at least one death every day and injure approximately 1.3 million people annually in the United States (FDA, 2016). The Institute for Healthcare Improvement (2017) states that preventing harm from medications, or adverse drug events (ADEs), remains a top patient safety priority not only in hospitals but also across the continuum of care for patients. The Joint Commission includes

medication reconciliation within the 2017 National Patient Safety Goals (NPSG). The rationale for NPSG.03.05.01 states:

“Medication reconciliation is intended to identify and resolve discrepancies - it is a process of comparing the medications a patient is taking (and should be taking) with newly ordered medications. The comparison addresses duplications, omissions, and interactions, and the need to continue current medications. The types of information that clinicians use to reconcile medications include medication

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name, dose, frequency, route and purpose. Organizations should identify the information that needs to be collected to reconcile current and newly ordered medications and to safely prescribe medications in the future.”

(CAMH Update 2, January 2017, NPSG-9)

Nursing students in the clinical learning environment are immersed in the care of the patients, yet it is not known how involved they are with the medication reconciliation process at the clinical practice site. The work by [Adhikari, Tocher, Smith, Corcoran, and MacArthur \(2014\)](#) noted that final year nursing students and newly qualified nurses were not fully prepared to appreciate the importance of medication reconciliation and team work. [Adhikari et al. \(2014\)](#) recognized that the “five rights” are absolutely fundamental guidelines for medication administration safety; however, these five rights do not cover the whole spectrum of medication safety. The complexity and the high-risk nature of medication safety leads to the need to understand how medication reconciliation is taught in nursing school and how the process is coordinated in the clinical learning environment. [Grimes et al. \(2011\)](#) found that incomplete or erroneous communication and documentation of medication details in discharge medication lists is common and may contribute to patient harm or unplanned re-admission to the hospital. [The Joint Commission \(2017\)](#) explains that when it is difficult to obtain a complete list of current medications that a good faith effort should occur to obtain information from the patient and/or other sources. There are at least three disciplines involved in the medication reconciliation process (medicine, pharmacy, and nursing) and there is little agreement on each profession's role and responsibility within the process. Therefore, each institution implements tailored steps to achieve accurate medication reconciliation.

The Institute for Healthcare Improvement (IHI, 2017) defines medication reconciliation as “a process of identifying the most accurate list of all medications a patient is taking - including name, dosage, frequency, and route - and using this list to provide correct medications for the patient anywhere within the health care system. Reconciliation involves comparing the patient's current list of medications against the physician's admission, transfer, and/or discharge orders” (IHI, 2017). According to [IHI \(2017\)](#) each time a patient moves from one setting to another where orders change or must be renewed, all clinicians must review previous medication orders with the new medication orders and reconcile any differences. The process of medication reconciliation, when completed correctly, helps reduce the incidence of adverse medication events and potential harm to patients.

Leaders from northeast Ohio hospitals, Case Western Reserve University (CWRU), the Ohio Hospital Association (OHA), the Ohio Center for Health Affairs, the Northeast Ohio Nursing Initiative (NEONI), and the Ohio Organization for Nurse Executives (OONE), gathered around the topic of medication reconciliation challenges. The leaders were all volunteers on the quality and safety division of NEONI. NEONI is an initiative of the Center for Health Affairs and is a collaborative membership of nursing leaders from both academia and practice across the northeast region of the state of Ohio. The NEONI Division of Quality and Safety explores activities to address clinical practice and educational issues to better support nursing leaders, practicing nurses, and student nurses. There was no funding for this project and no conflict of interest reported for any of the members on the team. [Table 1](#) displays a description of the participating organizations.

The NEONI PERQS Quality and Safety division began a medication reconciliation project in 2014. The overarching aim of the project was to improve patient safety and quality and explore the medication reconciliation process in the clinical learning environment. The work of this Quality and Safety division aligned with the Quality and Safety

Table 1

Collaborative Ohio organizations for medication reconciliation project.

Collaborative organizations
<p>The Ohio Hospital Association (OHA), represents 220 hospitals and 13 health systems throughout Ohio. Guided by a mission for collaboration with member hospitals and health systems to ensure a healthy Ohio, the work of OHA centers on three strategic initiatives: advocacy, economic sustainability and patient safety and quality (OHA, 2017).</p> <p>The Center for Health Affairs, the leading advocate for Northeast Ohio hospitals, strives to provide its members the vital services and resources aimed at enhancing the region's healthcare community.</p> <p>The Northeast Ohio Nursing Initiative (NEONI), is an initiative of the Center for Health Affairs and is a collaborative membership of nursing leaders from both academia and practice across the northeast region of the state of Ohio.</p> <p>The Practice, Education, Research and Quality/Safety (PERQS) Center, a division within the NEONI at the Center for Health Affairs explores a variety of activities to address clinical practice and educational issues to better support nursing leaders, practicing nurses, and student nurses.</p> <p>The Ohio Organization of Nurse Executives (OONE), is a state organization for nursing leadership. The membership of OONE consists of over 1100 nursing leaders.</p>

Education for Nurses (QSEN) Institute's overall goal. This overall QSEN goal is to address the challenge of preparing future nurses with the knowledge, skills, and attitudes necessary to continuously improve the quality and safety of the healthcare systems in which they work ([QSEN, 2014](#)). As medication reconciliation is a major threat to high quality safe care, it was chosen as a focus for the current study.

Methods

Purpose

The overall purpose of this project was to assess the student's role and education in the medication reconciliation process from the perspective of academic faculty and practice leaders.

Design

The study used a descriptive study design and a survey to understand the perspective of the medication reconciliation process from academic faculty and practice leaders.

Sample

Emails were sent out to nursing leaders in 90 Ohio schools of nursing and 160 Ohio nurse executives. They were invited to participate in the survey during the first quarter of 2015. Surveys were completed by 47% of the academic leaders (42/90) and 23% of the practice leaders (42/160).

Inclusion criteria

Inclusion criteria for the project comprised nurse leaders from 90 schools of nursing in Ohio and 160 health systems affiliated with OONE.

Protection of human subjects

The Case Western Reserve University Institutional Review Board approval was obtained and the protocol was determined to be exempt. No harm was anticipated to the survey respondents.

Survey Questions	
Academic Institutions:	
1)	In orientation to a new facility, are clinical faculty trained on the medication reconciliation (MR) policies and procedures?
2)	How do you teach medication reconciliation?
3)	How are student nurses involved in MR during clinical rotations?
4)	What is your school's definition of medication reconciliation?
Health Care Institutions:	
1)	Does your organization provide student nurses with formal training related to the medication reconciliation process?
2)	If your organization provides student nurses with formal training related to medication reconciliation process, please indicate method?
3)	Do student nurses perform medication reconciliation at your facility?
4)	What staff are used during the medication reconciliation process?

Fig. 1. Survey questions.

Instrument

The survey for academia consisted of 4-items assessing education and clinical exposure of nursing students to the medication reconciliation process. The survey for practice consisted of 4-items related to medication reconciliation process assessing information provided to clinical faculty and nursing students in the practice setting. The survey was developed by the members of the Quality and Safety division of the NEONI PERQS Center. The survey was piloted by eight pharmacy and nursing content experts and underwent four revisions to enhance clarity and content. The survey questions for academia focused on questions relating to what was being taught about the medication reconciliation process in the nursing schools and the student's role in the process of medication reconciliation in the clinical learning environments. The survey questions for practice focused on formal medication reconciliation training, the purpose of medication reconciliation, who is involved in the process, and whether or not student nurses perform medication reconciliation at the practice facility. Both the practice sites and the academic institutions were asked to define medication reconciliation. The survey was sent via email to the CNOs of Ohio health systems in the OONE roster and the deans/directors at the academic institutions statewide. The survey questions are listed in Fig. 1. The responses to the survey questions included multiple choice options and free text.

Procedures for data collection and analysis

An invitation to participate in the study, study description, and RedCap survey link was sent to nursing leaders in 160 healthcare

Table 2
Type of nursing program.

Degree	N (%)
Associate Degree Nursing	14 (33)
Bachelor of Science in Nursing	27 (64)
Diploma Nursing	3 (1)
Post-licensure Bachelor of Science in Nursing	6 (13)

Note: Responses do not equal 42 as schools could have more than 1 type of program.

Table 3
Mode of medication reconciliation teaching in the academic setting (N = 42).

Setting	Method	%	N ^a
Clinical-setting	In-person education	76%	31
Classroom	Online	12%	5
Classroom	Simulation	15%	6
Classroom	Other	22%	9
Classroom	Interdisciplinary education	24%	10

^a Respondents could respond to more than one answer.

institutions and 90 academic institutions in the State of Ohio. Survey data were downloaded into the Statistical Package for the Social Sciences (SPSS). Data were analyzed using descriptive statistics (frequencies, percentages, means and standard deviations).

Results

Academic survey result

The types of academic nursing programs included in the sample are listed in Table 2.

Regarding clinical faculty receiving site-specific medication reconciliation education on the policy and process, academic faculty reported that 33% received education, 24% did not receive, and 38% were not sure. The definition of medication reconciliation varied widely by the respondents from “We don't have one.” and “The nursing students are not responsible for medication reconciliation.” to “Comparing the patient's list of medications with healthcare orders at each transition.” The modes of teaching students in academic settings are listed in Table 3.

In the clinical setting, 33% of the academic programs reported that students were directly involved in the medication reconciliation process, 33% of the programs reported that student nurses were only permitted to observe the medication reconciliation process, and 17% reported no involvement at all. A few programs were unsure what happened in the clinical setting with regard to student involvement in the medication reconciliation process.

Practice setting results

Of the 36 hospitals who responded, 16 (51.6%) reported Magnet recognition and two (6.5%) reported having achieved Pathways to Excellence designation. The survey questions for the practice settings focused on whether the organization provided student nurses and faculty with formal education on site specific medication reconciliation processes and whether student nurses performed medication reconciliation in the clinical practice site. In more than half of the practice sites (52%) clinical faculty and nursing students were provided with formal training on the medication reconciliation process, however students were usually not permitted to

perform medication reconciliation in nearly 80% of the practice settings.

In the practice sites, the healthcare team members involved in the medication reconciliation process were physicians (75%), nurses (75%), pharmacists (50%) and pharmacy technicians (50%). In 50% of the practice sites, pharmacy played a partial or complete role in the medication reconciliation process on admission to the facility. In 28% of the practice sites the pharmacy played a partial role and in 11% of the practice sites, the pharmacy had a complete role in the discharge medication reconciliation process. The practice surveys describe a wide variation in how they defined medication reconciliation.

Discussion

The purpose of this study was to assess the student's role and education provided in the medication reconciliation process from the perspective of academic faculty and hospital nursing leadership. Medication reconciliation is important as it addresses the issue of medication safety when patients move in and out of the hospital as this is a vulnerable time for error (Grimes et al., 2011). When nursing students and nurses obtain a comprehensive picture of the patients' medical and medication history, there is a reduction in medication errors (Adhikari et al., 2014). Our findings point to a need to improve nursing education of the medication reconciliation process by working with leaders in the practice settings. Several key considerations were revealed to support efforts for practice settings to clarify the roles and responsibilities surrounding medication reconciliation.

The responses from the academic leaders pointed to gaps in students' education and role related to medication reconciliation. One gap was the miss-alignment of academia and practice as few academic leaders were aware of the practice site's specific medication reconciliation policies. In addition, students did not consistently receive education on medication reconciliation in the classroom or the clinical setting. The process of medication reconciliation is an excellent opportunity to highlight the interprofessional collaboration needed in a complex healthcare environment and yet only 24% of the academic leaders were taking advantage of this opportunity. Overall, our data suggest that the majority of nursing schools were missing the opportunity to use the clinical practicum as a place for students to learn about the role of the nurse in medication reconciliation.

Practice leaders reported gaps in the alignment of nursing students' education and role in medication reconciliation. In the majority of hospitals, students were not allowed to participate in the medication reconciliation process. In addition, as medication reconciliation processes are tailored to clinical units, only half of the practice leaders reported a formal process for training clinical faculty and students on the specific process.

Response of the NEONI PERQS Center

The NEONI Quality and Safety Division embarked on this important medication reconciliation work and responded to the findings. The NEONI project team developed the "Detangling Medication Reconciliation Tool" (Appendix A) to help academic and practice leaders align efforts to educate and clarify the nursing role in medication reconciliation. Application of the Detangling Medication Tool in practice facilitates the documentation of the medication reconciliation process on a specific nursing division and serves as reference material for the staff to share with clinical faculty. In academic settings, the tool can be used as a worksheet for nursing and pharmacy students to complete to help them understand the process on their unit. Lastly, the tool can be used to help identify areas of

opportunity for improvement in the medication reconciliation process for a specific unit.

Recommendations

Our survey results on medication reconciliation process from the academia and clinical faculty and leaders' perspectives point to multiple opportunities where academic and clinical partners can strengthen their collaboration for teaching medication reconciliation. There is a clear need for clinical faculty to be trained on the full medication reconciliation policy and process at the clinical sites. Recommendations for academic leadership are to clearly understand the medication reconciliation process for each clinical setting, and to ensure that processes of medication reconciliation are covered in the didactic portion of the curriculum.

Other educational strategies can be used to strengthen the education of nursing students on medication reconciliation. Using simulation techniques developed for teaching medical reconciliation processes for medical residents and pharmacy students are beneficial for training nurses (Karpa, 2012; Komperda & Lempicki, 2018; Lindquist, Gleason, McDaniel, Doeksen, & Liss, 2008; Sarfati et al., 2018). Additionally, there are Teaching Strategies addressing medication reconciliation posted on the QSEN.org website:

1. Medication reconciliation for nursing student-teaching strategy <http://qsen.org/medication-reconciliation-2/>
2. Interprofessional education on medicine administration - nursing and pharmacy students <http://qsen.org/medication-education-collaboration-learning-activity/>

Recommendations for practice leadership are to clearly define and communicate the roles and responsibilities of the professionals that are working with medication reconciliation. This clear communication will aid nurse educators to teach the unit specific processes to their nursing students. Practice leaders should consider allowing nursing students to participate in the medication reconciliation process by gathering the medication history and updating the medication list with the supervision of clinical faculty or nurses.

Limitations

The limitations of this work include the low response rates. In addition, as this was a survey-based descriptive study, this was a first step in understanding the magnitude of the issues in academic and clinical partnerships in medication reconciliation. Future work is needed by schools of nursing and hospital institutions to ensure that efforts for nursing student education are aligned with the role of the nurse in the process of medication reconciliation. This alignment of both staff and student efforts may lead to improvements in the medication reconciliation process and a decrease in patient medication errors.

Conclusion

Alignment of academic and practice education on medication reconciliation is needed for students to appreciate this complex safety intervention. The responsibility for medication reconciliation is shared amongst healthcare providers along with patients and families. When nursing students understand the medication reconciliation roles and responsibilities of all team members they are better prepared to contribute to the process when they are practicing registered nurses.

Appendix A

Detangling medication reconciliation at _____ (name of facility) _____ (unit).
Directions: Interview healthcare professional and describe the specific roles held in Medication Reconciliation for each discipline. If the discipline has no role, place N/A in the section. Indicate in the last column the opportunities for improvement.

Category	Patient and family's role	Physician/ordering provider's role	Pharmacist/pharmacy's role	Nurse's role	Opportunity for improvement
<p>Home medication list Who obtains a medication history upon admission? Describe the process: Who is asked to provide a home list? (Patient, Family, Nursing Home/ECF, Primary Care Provider, Pharmacy, other?) What information is obtained? (Dose, Frequency, Route, Last Dose Taken, Preferred Pharmacy?)</p> <p>Admission medication reconciliation Who compares (reconciles) medication orders to the Home Med List? Describe the process: Who identifies which discrepancies between the home list and the list of inpatient orders require clarification? What is done if discrepancy found?</p> <p>Intrafacility transfer Who performs med rec upon transfer in level of care? Describe the process: Who identifies which discrepancies between the sending unit and the list from the receiving unit orders require clarification? What is done if a discrepancy is found?</p> <p>Discharge medication list and reconciliation Who performs discharge med rec? Describe the process: When does this occur? How is the list documented? What happens if a discrepancy is found?</p> <p>Medication education Who educates the patient on medications? Describe the process: How is it documented? Describe the handoff process for education for each discipline. When is it done?</p>					

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