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Staff Education Module for Bar Code Medication Administration

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This is to certify that the doctoral study by

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has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
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Abstract

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MS, New York University, 2001

BS, State University of New York at Buffalo, 1994

Project Study Submitted in Partial Fulfillment

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Doctor of Nursing Practice

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Abstract

Bar Code Medication Administration (BCMA) is a technology-supported nursing tool that has become the standard of practice for medication administration. When used effectively and efficiently, this tool has the potential to reduce medication errors in acute care settings. In a pediatric unit at a major urban hospital in the northeast region of the United States, the absence of a BCMA nursing staff educational module affected the use of this safety tool leading to an increase of medication errors. The purpose of this DNP project was to develop a comprehensive educational module to promote BCMA in the pediatric unit of the hospital. Two theories were used to guide the translation of research into practice. Lewin's theory of planned change was used as a conceptual model to understand human behavior related to change management. Also employed was Benner's novice to expert theory to define the learning process. The research question for this project involved whether a staff education module of BCMA would optimize the medication administration process and prevent medication errors. The research design included an expert panel that used a 5-point Likert scale to evaluate the BCMA education module for clearness, effectiveness, relevance and utilization in practice. Subsequently, the effectiveness of the module was determined through a descriptive analysis. Findings that resulted from the analysis of the evidence revealed 80% percent felt the education module will increase BCMA compliance and all agreed the education module would help identify areas of needed improvement with the current process. The social change of this study will impact nurses to deliver medications safely with the use of BCMA resulting in improved patient outcomes and safe medication administration.

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Dedication

I would like to dedicate this DNP project to my grandparents Gerard M. and Marie-Therese Laurent. Undoubtedly, without their guidance, support, encouragement, and unconditional love, I would not have been able to complete this project.

Acknowledgments

First, I would like to thank God for giving me the Strength and Faith to complete this DNP program despite many challenges. I would also like to thank many individuals who have helped me during this journey. First, my Chairs Dr. Minnick and Dr. Leach for believing in me and encouraging me during this project. My mentor and friend, Dr. Rosemary Ventura for constantly telling me that I could do this and to keep going. My family, especially my sister, Meka, who has been my biggest cheerleader for her words of encouragement and for reminding me to keep my focus.

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Section 1: Nature of the Project

Introduction

Bar Code Medication Administration (BCMA) is a technology- supported nursing tool that has become the standard of practice for medication administration (Poon et al., 2010). It is an integral component of nursing workflow and processes in acute care settings (Harrington, Clyne, Fuchs, Hardison, & Johnson, 2013). BCMA allows nurses to accurately confirm the ten rights of medication administration and identify any incongruence between the patient's wristband and the scanned medication, all at the point of care. When properly implemented, this tool can lead to significant improvements in nursing practice and patient safety, a fact clearly borne out by the literature. For example, according to Gooder (2011), BCMA is the leading system for medication safety, showing consistent success in decreasing medication error rates in various healthcare settings.

BCMA was introduced as a safe and reliable method of administering medications. The BCMA tool could only be effective if used properly and consistently. During the orientation/onboarding period, newly hired nurses are trained and educated on the use and benefits of using BCMA. Unfortunately, based on unit findings and data analysis, there appeared at the study site to be a greater need to further educate nurses on the proper use of BCMA a few months following the orientation period. BCMA usage reports from the information technology department revealed that nurses bypassed the BCMA tool within 3 to 6 months post orientation and subsequently documented directly in the electronic medication record.

The setting for this Doctor of Nursing Practice (DNP) project was a pediatric unit located at a major urban hospital in the Northeast region of the United States. The mission of this hospital is to provide the highest quality patient-centered care by promoting a culture of caring, empathy, safety, and professional nursing development and advancement. As part of the organization's strategic plan, the reduction of medication errors is a top priority. There are many nursing factors for the organization to consider that validate reasons for not maintaining and sustaining the use of BCMA. For example, there has been a significant turnover of the nursing staff, specifically in the pediatric units. As a result, the super users who assisted staff nurses during orientation with the use of BCMA were no longer employed at the institution leaving a gap of knowledge and support related to proper use of the BCMA tool. After meeting with the charge and staff nurses, I identified specific issues that may have directly contributed to the lack of BCMA compliance. Several of the organization's nurses expressed an increased incidence of feeling burnout, stress, and ultimately depression due to work overload, which also may have contributed to BCMA noncompliance.

Medication administration in pediatric unit settings is a critical responsibility of an organization's nurses. The prevalence of nursing medication errors in pediatric hospital units is alarming. According to Voshall, Piscotty, Lawrence, and Targosz (2013), 34 % of all medication errors occur during the administration phase of medication therapy. Preventable medical errors, including those related to medication administration by nurses in acute care settings, are the third leading cause of death in the United States (Makary & Daniel, 2016). In 2007, the Institute of Medicine reported that more than

1,500,000 Americans are injured every year in American hospitals and have experienced at least one medication error each day. Pediatric patients are at a higher risk of medication errors due to factors such as the increased medical vulnerability and decreased communication ability of critically ill children (Neuspiel & Taylor, 2013).

At a quality meeting, evidence in the hospital organization's pediatric unit indicated that BCMA is not always entirely adopted by bedside nurses, possibly leading to higher incidence of medication errors. The barriers related to the underutilization of an evidence-based tool such as BCMA and lack of compliance remain primarily understudied in the literature (Harrington et al., 2013). There is a gap in the literature on how well nurses comply with the appropriate use of BCMA (Harrington et al., 2013). In this DNP project, I sought to address this gap in research by examining the potential impact of a staffing training module on the proper use of the BCMA tool.

The research question for this DNP project was: Can an evidence-based staff education module be developed to guide nurses in the appropriate use of BCMA in a pediatric acute care setting?

Ultimately, this DNP project has the potential to effect social change by providing strategies to improve patient safety and nursing practice during the medication administration process using BCMA in a pediatric unit of a major urban hospital.

Problem Statement

Nursing Practice Problem

The nursing practice problem identified for this DNP project is the lack of a comprehensive nursing staff BCMA educational module in a pediatric unit of a major

urban hospital located in the Northeast region of the United States. The resolution of this nursing practice problem could ensure consistent and safe medication administration practices in the pediatric unit. The absence of a BCMA nursing staff educational module affects the optimal use of the electronic system, which may lead to medication administration errors and contribute to the underutilization of the safety features embedded in BCMA. It is imperative for hospital organizations and their nursing staff to focus on medication safety and implement alert systems to protect patients from medication administration errors. Ku and Smith (2015) confirmed earlier findings that pediatric patients continue to be those most vulnerable population to these errors and the severe adverse drug events that ensue. The development of a BCMA nursing staff education module can help to reduce medication errors by improving nurses' compliance with BCMA use.

Before the implementation of BCMA, the DNP project site's medication error rate was 18%, which is higher than the national average of 5% (Agency for Healthcare Research and Quality, 2017).

At the DNP project site, medication errors increased following the implementation of BCMA. The pediatric unit in the DNP project site reported a medication error rate of 10% of which 2% was directly related to bar code malfunction (NYP Quality Meeting, 2017). This finding was also higher than the national average. Analysis of these findings demonstrated inconsistency with the use of BCMA by the pediatric unit's nursing staff. It is unclear if nursing staff of the pediatric unit received an adequate orientation concerning the hospital's policies and procedures regarding BCMA

usage. It is also not clear if the expectations for use of the BCMA were established by the hospital's nursing executive leadership. To resolve this problem, the use of BCMA needs to be guided by a comprehensive BCMA staff education module based on evidence-based practice in a supportive and collaborative work environment.

Figure 1 demonstrates the DNP project site's pediatric unit's medication error rate as compared to the entire organization pre-and post-BCMA

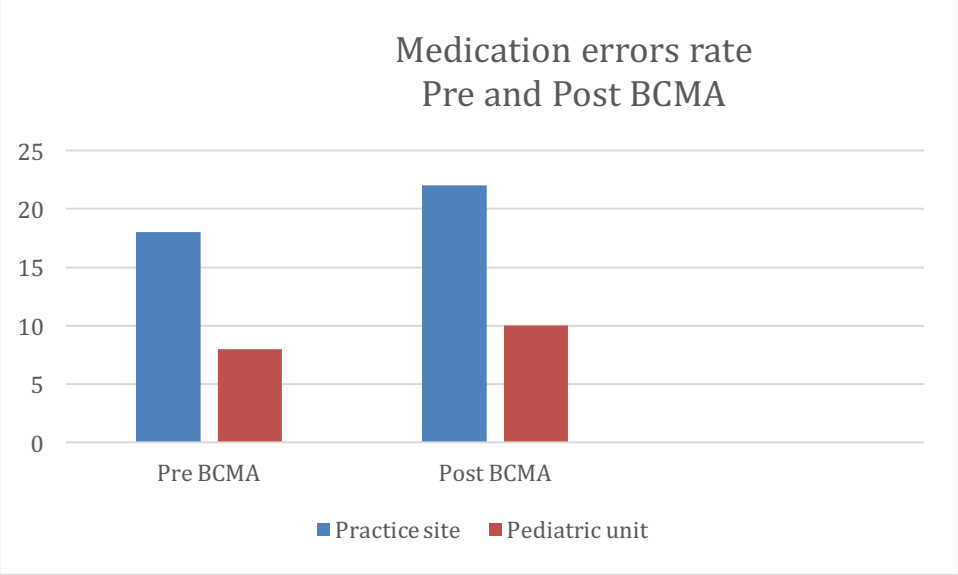

Figure 1. Medication errors rate pre- and post-BMCA.

Local Relevance of the Need

Pediatric unit nurses are responsible for providing oversight and the highest quality of care by appropriately using BCMA. When followed accurately, BCMA can reduce medication errors by 65% to 86% (Patterson, Rogers, Chapman, & Render, 2006). One of the goals for the implementation of a BCMA system in the DNP project site's pediatric unit 2 years ago was the reduction in medication errors. At the DNP project site, medication errors continued to remain above the national average following the

implementation of BCMA. The pediatric unit reported a medication error rate of more than 10% as compared to 8% before BCMA, a rate that continues to be higher than the site's internal benchmark of 5%. (NYP Quality Meeting, 2017). From 2014-2016, there was an overall increase from 5% to 8% in the medication error rate at the DNP project site (NYP Quality Meeting, 2017).

During the Quality Council at the DNP project site, the chief nursing informatics officer reported an overall BCMA scanning compliance rate of 56% for the pediatric unit, which is lower than the average scanning compliance rate of 85% for the rest of the DNP project site (R. Ventura, personal communication, March 23, 2017). Evidence also demonstrated that the pediatric unit nurses use BCMA inconsistently. For example, sometimes the nursing staff would bypass BCMA completely and document directly in the electronic medical record (EMR) instead. It was also noted that the staff unit nurses occasionally failed to check patient identification before medication administration (NYP Quality Meeting, 2017). Some of the pediatric unit nursing staff disputed the effectiveness of bar code verification as well as the value of positive patient identification matching and patient-safety features (NYP Quality Meeting, 2017). The nurses stated examples such as practicing as a nurse for some years without the need for this technology and also expressing challenges with adopting technology in healthcare practice. Such practice can negatively impact patient safety. According to Aboshaiqah (2014), nurses cause more than 64% of medication errors. Medication errors are common in pediatric patients; 5% to 27% of all pediatric medication orders result in a

medication error. Pediatric inpatients may have three times more medication errors than adult inpatients (Rinke et al., 2014).

The DNP project site's pediatric unit nursing staff have not received explicit directives in the form of a comprehensive BCMA education module, which may be a contributing factor in the nurses' lack of understanding concerning medication errors. Today's healthcare system requires strong nursing leadership and promotion of an efficient, consistent, and complete training module to reach their internal benchmarks, increase nursing compliance, and ultimately improve patient safety by decreasing common errors in medication administration practice.

Significance of Nursing Practice

This DNP project holds significance for nursing educational objectives that will establish standards for the training and use of BCMA. To reduce medication administration errors, nurses must demonstrate compliance with BCMA. According to Koppel, Wetterneck, Telles, and Karch (2008), BCMA helps confirm the ten rights of medication administration and reduce medication administration errors. The development of a nursing staff education module for BCMA can lead to improved BCMA compliance and contribute to a decrease in medication errors by nurses. It can positively impact patient care by promoting a safe environment and a culture of accountability within the organization. The newly developed BCMA nursing staff educational module will address issues with missing or unreadable bar codes labels on medication packages that often force nurses to abort the BCMA process.

Purpose

Gap in Nursing Practice

Records from the Quality Council at the DNP project hospital site document the creation of BCMA system workarounds by nurses during the medication administration process (NYP, 2017). Workarounds are often temporary solutions that can jeopardize the delivery of safe and high-quality care. Instead of using BCMA accurately, nurses are entering data directly into the EMR system that is used to track reports and audit trails. Meeting minutes revealed that 56% of DNP project site's pediatric unit nurses compared to 79% at the organizational level use BCMA more than 50% of the time (NYP, 2017). The goal of this DNP project was to develop a comprehensive BCMA nursing staff education module that will help improve the use of BCMA in the pediatric unit of the hospital site. By using BCMA appropriately, the pediatric unit nurses at the DNP project site will optimize the medication administration process and prevent medication errors.

Practice-Focused Question

The guiding practice-focused question was as follows: Can an evidence-based staff education module be developed to guide nurses in the appropriate use of BCMA in a pediatric acute care setting?

Addressing the Gap in Practice

This DNP project can address the gap in nursing practice by developing and introducing a comprehensive nursing BCMA staff education module. A comprehensive BCMA nursing staff education module allows for a standardized orientation process with clear expectations and an ongoing evaluation for BCMA compliance. The newly

developed BCMA nursing staff educational module will serve as a guide for the DNP project site's nurses, who must consistently and appropriately use BCMA within their respective hospital units. By implementing the BCMA nursing staff education module, the DNP project site may increase BCMA compliance and reduce nursing medication errors in the pediatric unit. As a result, the DNP project site will achieve better patient outcomes and improve the overall quality of life for patients (American Nurses Association, 2015).

Nature of the Doctoral Project

Sources of Evidence

Sources to support this DNP project will primarily include current evidence-based literature. Primary sources of evidence from the nursing literature related to the development and delivery of staff education included the following scholarly nursing journals and official websites: National Database of Nursing Quality Indicators, *Online Journal of Issues in Nursing*, National Quality Forum, *American Journal of Evidence-Based Practice*, Agency for Healthcare Research and Quality, *Journal of the American Medical Association*, *Journal of Professional Nursing*, *Journal of Nursing Care Quality* and *The Advanced Practice of Nursing*. Peer-reviewed articles from online sources such as CINAHL, Medline, and PubMed were also accessed, as well as official nursing organization websites and white papers.

According to Saba and McCormick (2015), nurses seeking to improve the safety and quality of care within their organization can often find literature reviews, systematic reviews, or evidence-based tools to address goals that are relevant to specific areas of

practice. The evidence obtained from the sources mentioned above were used to develop a comprehensive curriculum process that ensures understanding of BCMA and creates a formative evaluation process to help sustain positive patient outcomes. This education plan was presented to nursing leadership at the clinical site to optimize the medication administration process.

Summarized Approach

Without the application of current best evidence, nursing practice suffers to the detriment of patient safety. Melnyk and Fineout-Overholt (2015) reported that the most important reasons for implementing evidence based practice are to deliver the highest quality of care and to achieve the best patient outcomes. A summary of the relevant findings from the literature were reviewed to analyze the current state of the evidence on this topic. Appropriate content was selected for final recommendations about the theoretical framework that supports BCMA.

Concise Statements of Anticipated Findings

I anticipate that this newly developed BCMA nursing staff education module can facilitate the prevention and reduction of nurse medication errors at the DNP project site. This newly developed module can also improve scanning compliance in the pediatric unit of the DNP project site. A low BCMA scanning compliance rate can result in a higher incidence of nurse medication errors, which represents the current gap in nursing practice. Nursing medication errors may decrease with the creation of a comprehensive BCMA nursing staff education plan that will foster the correct use of BCMA (Patterson, Rogers, Chapman, & Render, 2006).

Both the evidence in the literature and the evidence-based reports related to the use of BCMA at the DNP project site strongly support the development of a comprehensive BCMA nursing staff education module. The implementation of this DNP project educational module would improve nursing practice by providing consistent comprehensive educational guidance needed for pediatric unit nurses to help ensure patient safety. It would accomplish this by improving the use of BCMA and ultimately reducing medication errors by optimizing the nursing medication administration process.

Significance

Identification of Stakeholders

The identified stakeholders for this DNP project include pediatric unit nurses, pediatric patients, and their families, hospital administration, and physicians. Pediatric unit nurses at the DNP project site will be impacted by the newly developed BCMA nursing education program on a daily basis because it will help them fulfill their responsibility in safely administering medications to their pediatric patients. Nurses' workflow at the pediatric unit at the DNP project site may change as the nursing education program serves as a reference guide for the unit nurses. As a result of this BCMA educational module, pediatric unit nurses will be held accountable for scanning patient ID bands and medication labels at the bedside as opposed to scanning from labels in the patient charts. Pediatric unit nurses will no longer be able to document medication administration directly in the electronic medication record and will need to use the BCMA tool for all functions including the mandatory two RN medication checks. The leadership team will be responsible for developing a plan for the BCMA nursing staff

educational module implementation. The plan and strategy will include module approval, nursing staff communication and training, and monitoring and reporting of nursing staff compliance for the BCMA educational module. The leadership team will also monitor adherence to the process and provide analysis of the impact of the BCMA nursing staff educational module on pediatric unit nurses' medication error rates.

Potential Contributions

According to Terry (2012), evidence-based practice improves nurses' clinical decision-making skills. The BCMA nursing staff education module can also be an effective reference guide that enhances pediatric unit patient safety. The module can provide the tools and evidence-based practice knowledge that pediatric unit nurses need to effectively use BCMA in order to deliver safe and quality care to patients. Equipped with a comprehensive BCMA education and orientation, pediatric unit nurses at the DNP project site may improve their workflow and reduce the risks associated with the improper use of the technology (Terry, 2012). By improving nursing practice, the policy may reduce medication errors during the administration process (American Association of Colleges of Nursing, 2006).

Potential Transferability

The development of a comprehensive BCMA staff education module may provide a framework for similar initiatives in nursing units at other healthcare organizations. Healthcare settings such as outpatient clinics and other pediatric hospital networks may also benefit from the potential transferability of this DNP project. The administration from other healthcare organizations will be able to utilize the DNP project nursing staff

educational module to facilitate the adoption of BCMA in order to ultimately decrease medication administration errors in their own organizations. This BCMA educational module can also create opportunities to redesign nursing workflows specific to the pediatric patient environment, which has several challenges. One example is the need for patient-specific bar codes for every medication dose, which is more operationally taxing for nursing and pharmacy departments. The findings and lessons learned from this DNP project can be used to create similar BCMA training programs to promote professional nursing accountability and patient safety in other institutions**.**

Implications for Positive Social Change

This DNP project has potential implications for positive social change because it has the potential to reduce medication errors, hospital and patient financial burdens, and poor patient outcomes. It also has the potential to impact nursing retention and nursing well-being. After experiencing a major adverse event from a medication error, many nurses suffer posttraumatic stress disorder, blame, self-doubt, guilt, depression (Seys et al. 2012). As a result, they often identify themselves as "secondary victims." Making a medication error has potential implications for the nurse's professional and personal life. These feelings are accentuated in the pediatric population. On a practical level, nurses feel responsible and accountable for patients' outcomes following a medication error. To alleviate this burden and diminish the emotional impact, healthcare organizations must develop resources to support and counsel staff following the occurrence of such medication errors while creating mechanisms to prevent future similar events.

Summary

The literature supports that medication errors continue to occur in hospitals despite the implementation of BCMA. Although BCMA has been available since the early 1990s, a gap still exists in nursing practice; nurses fail to utilize BCMA efficiently and optimally, instead resorting to the creation of workarounds during the medication administration process. Nurses' low BCMA compliance rates result in an increase in medication errors and a decrease in patient safety. With the development of a BCMA nursing staff educational module, nurses will show increased BCMA compliance and patient safety related to medication administration. This DNP project can also be utilized in other healthcare units as a reference guide for nurses during the medication administration process. In Section 2 I described the relevance to nursing practice, provided local background and context, and discussed a rationale for the use of concepts, models, and theories that inform this DNP project.

Section 2: Background and Context

Introduction

In the pediatric unit at the DNP project site, the nursing practice problem identified was a lack of BCMA compliance by pediatric unit nurses. This problem may be a contributing factor to medication errors and be causing adverse drug events during hospitalizations in the pediatric inpatient unit. A comprehensive BCMA nursing staff educational module may serve as a guide to the pediatric unit nurses as well as support to them during the medication administration process. The guiding practice-focused question was as follows: Can an evidence-based staff education module be developed to guide nurses in the appropriate use of BCMA in a pediatric acute care setting?

The purpose of this DNP project was to improve the use of BCMA and optimize the medication administration process by developing a BCMA nursing staffing education module using evidence-based literature. As a result, pediatric unit nurses will be better equipped to understand the safety features of BCMA and use the tool optimally to decrease medication errors.

In this section I describe the different concepts, models, and theories that inform this doctoral project, synthesizing primary writings by key theorists and foundational scholars. In Section 2 I also explain the relevance of the project to nursing practice, the local background and context of the problem, the role of the DNP student, and the role of the project team. This section includes the definitions of locally used terms or operational processes in the clinical setting other than those universally used and applied in nursing practice.

Concept, Models, and Theories

The Model That Informs the Doctoral Project

White, Dudley-Brown, and Terhaar (2016) believed that models of change are useful in the translation of research into practice. These models help nurses to be forward-thinking and aid them with decision-making and planning. In the context of this DNP, I will be using the following theories: Lewin's theory of planned change and Benner's novice to expert model.

Lewin's theory. Lewin's theory has been used by many healthcare organizations to understand human behavior related to change management and resistance to change. According to Mitchell (2013), Lewin (1951) identified three stages through which change agents must proceed before change becomes part of the system:

- Unfreezing (when change is needed): Identify key stakeholders who might be affected by this change and engage them to participate in the project.
- Moving (when change is initiated): Keep all stakeholders actively engaged to achieve the proposed goal while collaborating with various team members to plan and implement stages of the project. Workarounds are often discovered during this stage.
- Refreezing (when equilibrium is initiated): Provide ongoing support of the nurses to sustain change or until change is deemed complete.

Lewin also discussed how certain forces, once identified, can affect change and provide a better understanding of why certain groups behave the way that they do (Mitchell,2013). As Bozak (2003) explained, forces that oppose change are called

"restraining forces" and forces that promote change are referred to "driving changes." This phenomenon is referred to the force-field analysis. According to Bozak (2003), the intention of this model is to identify and strengthen the driving forces to achieve the desired outcomes. In the context of my DNP project, not all nurses are comfortable with the modern advanced BCMA technology and thus may be resistant to the change. Therefore, recognizing the educational needs of various nurses became extremely important. As such, resistance to change may decrease if nurses feel part of the decision-making and implementation processes.

Benner's theory. According to McEwen & Willis (2014), Benner's novice to expert theory is adapted from the Dreyfus model of skill acquisition. Benner (2004) defines skill acquisition as a concept which helps the teacher understand how to assist the learner to advance to the next level. Dr. Benner categorized nursing into five distinct stages, which are:

1. Novice
2. Advanced beginner
3. Competent
4. Proficient
5. Expert

Benner (2004) believed that nurses gain experience while expanding their knowledge and skills through experience and education. The nurse gains experience by learning new things over time. Benner explained that this research was aimed at recognizing clear differences between a novice and an expert.

In the context of this DNP project site, the pediatric unit is composed of new and seasoned nurses ranging from 1-25+ years of nursing experience. This model will guide the newly hired nurse as well as the seasoned nurses who work in the pediatric unit while recognizing their placements on the Dreyfus skill acquisition spectrum.

Relevance to Nursing Practice

A Brief History of the Broader Problem in Nursing Practice

Patient safety and medication errors reduction are fundamental elements in nursing practice. Although different members of the healthcare team, such as physicians and pharmacists, may take an active part in medication therapy, nurses are usually the last safety net in the medication administration process. Considering that nurses are on the frontline when it comes to delivering care and administrating medication to patients, it is not surprising that more than 64% of medication errors are caused by nurses (Cheragi, Manoocheri, Mohammadnejad, & Ehsani, 2013). According to the Institute of Medicine (2006) report, there are many causes of medication errors including:

- Memory lapses.
- System failures.
- Fragmented workflow processes.
- Incomplete patient information.
- Distraction (nurse specific).
- Exhaustion related to long working hours (nurse specific).

Nurses are exhausted after working longer hours and double shifts. As a result, nurses can easily be distracted by medications with similar names; for example, Diazepam and Diltiazem, two medications with very different side effects and outcomes.

BCMA is a tool intended for nurses to use at the point of care during medication administration with a goal to prevent medication errors. The tool entails the use of a scanner to identify incongruences between the patients' wristbands and scanned medications to promote patient safety. Before BCMA, nurses used a paper Kardex to transcribe and track medication orders during their respective shifts; providers issued prescriptions on paper and relied on the nurses' card-filing system to verify medications patients received. With the rise of patient care technology, the general public came to expect that technology would improve the safety and quality of patient care (Powell-Cope, Nelson, & Patterson, 2008). At the same time, it became increasingly complex for nurses to adequately deliver care at the bedside. Young, Slebodnik, and Sands (2010) reported a significant decrease in medication errors post BCMA implementation in many settings. However, despite the fact that BCMA has been available since the 1990s, many sites continue to be inconsistent with its use. Several studies have documented poor compliance and widespread variation with the use of BCMA (Carayon, Anping, & Kianfar, 2013; Sakowski, Newman, & Dozier, 2008). For this reason, medication errors continue to occur in acute care settings. Studies have shown that a positive correlation exists between risks associated with medication therapy and the number of medications nurses administer to patients (Ghenadenik, Rochais, Atkinson, & Bussières, 2012).

At the project site, evidence shows that nurses make inconsistent use of BCMA in the pediatric unit, sometimes bypassing the safety tool altogether. Resulting medication errors cause harm to patients. Nursing staff in these units may not understand the importance of BCMA use nor have the nurses received clear instructions from the nursing executive leadership in using a staff education module as a reference guide to help inform and improve knowledge and skills related to best clinical practice with BCMA use. To remedy the problem, the use of BCMA needs to be guided by a staff education program in a working environment that is supportive and collaborative.

Current State of Nursing Practice and Recommendations

Studies demonstrated that the use of BCMA improves patient safety and reduces medication errors by as much as 86% (Paoletti et al., 2007; Rivish & Modeda, 2010). The current state of nursing practice is that nurses at the project site are not compliant with BCMA, which leads to medication errors and unsafe patient care. During the unit's scanning compliance meeting, the director of nursing informatics reported an overall scanning compliance rate of 56%, which is lower than the average scanning compliance rate of 85% for the rest of the organization (R. Ventura, personal communication, March 23, 2017).

Nurses at the DNP project site do not utilize BCMA optimally; they create workarounds that they perceive more amenable to their practice. At the NYP Quality Council at the project site in March 2017, it was revealed that instead of scanning the patients' wristbands at the point of care, nurses affix the patients' labels to the med carts and scanners, and ultimately document directly into the EMR. There are numerous

reasons why nurses bypass BCMA. The most common reason at the project site were circumstances such as unreadable labels, missing barcodes on medications, or network connectivity issues.

The current state of nursing practice at the DNP project site calls for the development of a BCMA nursing staff educational module that clearly defines resources, expectations, and consequences as they relate to BCMA use and compliance. I will recommend a newly developed BCMA nursing staff educational module based on evidence-based practice that encompasses clear actions to improve the quality and safety of the medication administration process. The module, reviewed and validated by the expert committee, will serve as a comprehensive guide for pediatric unit nurses during orientation and every 6 months thereafter. Every effort should be made to increase pediatric nursing staff BCMA compliance by assessing the current clinical pediatric unit nursing workflow, investigate the technology (BCMA scanners and EMR), and review the process to ensure that all patients have an identification name band with a bar code. The newly developed BCMA nursing staff educational module will include the sequence for proper scanning, alternatives when scanning is not possible, and scanning compliance monitoring for units falling below 95%.

Previous Strategies and Standard Practices

In 2004, the U.S. Food and Drug Administration finalized a rule for bar-code labeling medications and blood components to prevent adverse events and improve patient safety (Wideman, Whittler, & Anderson, 2005). The use of BCMA was later recommended by many health organizations, including the Institute of Medicine (2006),

the National Patient Safety Foundation, the Agency for Healthcare Research and Quality, and the National Alliance for Health Information Technology.

At the DNP project site, a multidisciplinary group that includes the chief nursing officer, the director of nursing informatics, the director of quality, pharmacists, nurse managers, and unit charge nurse will focus on the design of the EMR so that the documentation of the medication administration process could be aimed at delivering quality care to patients. The design of the EMR and the implementation of BCMA at the clinical site provided new insight and understanding for nurses regarding BCMA use and compliance. The overall consensus was that the current BCMA tool and EMR design did not improve nursing practice, and thereby compliance remained low. It also became evident that nurses were not aware of workflow changes when faced with complex scanning scenarios. The fastest solution was to create workarounds bypassing the use of BCMA.

How the Present Doctoral Project Advances Nursing Practice

According to Voshall et al. (2013), BCMA is designed to help prevent medication errors, create a level of safety for patients and advance nursing practice. BCMA encompasses the six elements described by Wisor (2016) as required to improve nursing practice: safety, effectiveness, patient-centered, timeliness, efficiency, and efficacy. This DNP project advances nursing practice by developing a nursing staff education module with the goal to increase the use of BCMA, thereby improving safety and quality of patient care. The DNP project educational module will be effective in enhancing patient

safety while improving nursing practice and outcomes. It will guide the pediatric unit nurses in the use of BCMA and hold them accountable when using unsafe workarounds.

This DNP project will address multiple compliance issues in the following situations: missing patients' wristbands, missing bar code labels on medications, errors when scanning wristbands or medications, and technical issues when scanning leading to overriding the use of BCMA. The continuous monitoring/oversight described in the new BCMA nursing staff education module will provide the opportunity for real-time feedback as well as the identification of any shortcomings in nursing practice, minimizing the risks in future patient care activities. It is important to note that the benefits of using BCMA are dependent on the functionality of the tool and how it is used in the healthcare setting. The functionality of BCMA changes overtime as new features are added, which may potentially affect nursing workflow and process.

Local Background and Context

Summary of Local Evidence on the Relevance of the Problem

This DNP project site is one of the largest urban hospitals in the northeast region of the United States. It has an international reputation for complex surgeries in children. Since 2013, it has been ranked as number 8 among the top 10 children hospitals in the United States as per the best hospital report. Children from all over the globe undergo treatments or surgeries at this DNP project site. It employs over 25 thousand employees making it the largest employer in New York City.

Despite the prestigious reputation and status of this DNP project site, there continues to be higher than average occurrence of medication errors. The DNP project

site has failed to communicate the importance of the use of BCMA to the pediatric unit n staff nurses. The absence of a BCMA nursing staff education module, may have resulted in an inconsistent use of BCMA, causing a lack of BCMA compliance resulting negative consequences to patients. These negative consequences include but are not limited to patients receiving the wrong medications or receiving the proper medications at the wrong time. Meeting minutes at the practice site revealed that 56% of nurses use BCMA less than 50% of the time (NYP, 2017).

The nature of this DNP project is to develop an BCMA nursing staff educational module in order to reduce medication errors, improve BCMA nursing compliance resulting in improved patient safety and quality of care. The newly developed BCMA nursing staff educational module will serve also as a safe medication administration educational guide and reference for pediatric unit nurses to administer medications to patients safely while improving care and nursing practice as well as streamline nursing workflow.

Institutional Context

The DNP project site consist of over 200 pediatric beds, including 75 neonatal and 45 pediatric ICU beds. All health professional staff at this site are dedicated to caring pediatric patients. The pediatric unit where this DNP project will be conducted is a general medicine/surgical pediatric unit with a total of 24 beds. The patient population is comprised of general medicine and surgery with chronic conditions such as asthma, Type 1 diabetes, and upper respiratory conditions. The mission of this DNP project site is to provide the highest quality patient care to children by promoting a culture of caring,

empathy, and safety; educating patients and their families with evidence-based practice medicine, and promoting professional nursing practice. The strategic vision of this site is to use research, education, and service to be the leader in nursing practice of excellence by delivering safe and quality care to its pediatric patients.

State and/or Federal Context

In 2009, Congress signed into law the American Recovery and Reinvestment Act (ARRA), which allocated $19 billion for Health Information Technology (HIT). The Health Information Technology for Economic and Clinical Health (HITECH) Act, enacted as part of the ARRA, promoted the adoption and meaningful use of Health Information Technology. Funds were later awarded to several agencies in order to improve the delivery of safe and quality care to patients. These agencies include the Agency for Healthcare Research and Quality, the Centers for Medicare and Medicaid (CMS), and the Centers for Disease Control (CDC) to name a few.

Health institutions that do not reach the 10% target set for BCMA compliance bring scrutiny from state and federal agencies, not only because of the potential harm to patients, but also because medication errors result in tremendous financial costs of approximately $16.4 billion per year nationwide (Andel, Davidow, Hollander, & Moreno, 2012).

Role of the Doctor of Nursing Practice Student

Professional Context and Relationship to Doctoral Project

My interest in HIT expanded upon completing a master's degree in Nursing Informatics. I realized that this technology plays a vital role in the transformation of

healthcare and the improvement of health outcomes; it assists providers in making informed decisions when caring for patients. As a nurse informaticist, I quickly learned how to best integrate nursing science with information sciences in order to identify and manage data, information, and knowledge, in nursing practice (Darvish, Bahramnezhad, keyhavian, & navidhamidi, 2014). Currently, I work as a senior IT consultant with the goal of effectively using HIT systems to improve patient outcomes. In my capacity, I have had the opportunity to work with nursing leaders on IT various projects, including the implementation of a secure mobile communication platform meant to improve communication among healthcare professionals. This particular project led me to think about the importance of BCMA. The experience gained while completing the DNP will contribute towards bridging the gap between safe clinical practice and HIT systems. Although I am not considered to be an employee of the project site, I am very familiar with the clinical setting.

Role in the Doctoral Project

My role in this DNP project was to analyze the need and establish criteria for the BCMA nursing staff education module for the pediatric unit at the DNP project site. Evidence-based literature will be used to develop the BCMA educational module. This newly developed module will also be used by pediatric unit nurses as a reference guide during medication administration. Guided by experience as a clinical nurse in Healthcare IT, I will contribute to the improvement of evidenced-based nursing practice and the quality and safety of patient care. Medication errors present great danger to patients and can even be fatal. Therefore, every effort should be made to prevent medication errors.

This DNP project provides attempts to provide an evidence-based education foundation as I develop into my DNP role. At the end of this DNP project, my goal is to gain an extensive evidence-based knowledge and develop an ability to translate this knowledge quickly and effectively to other clinical health practitioners. I hope to become a transformational leader and change agent to support the adoption of HIT systems in other clinical areas outside of her clinical area.

Motivations

One of the motivations for this DNP project stems from the values that my grandfather instilled in her during childhood. As a leader in his field, he inspired me to seek ways to make things and people better. He also taught me that continuous learning was an essential component of life. I embraced a nursing career, which suited my caring nature and was one of the best decisions in my life. The second-best decision, was to obtain my degree in Nursing Informatics and learn to bridge the gap between the clinical and technology worlds. I found out how to transform healthcare with the use of information technology systems. Now, as a seasoned nurse informaticist and a DNP candidate, I believe my role is to be the mentor of clinical nurses to effectively use and translate evidence based practice to improve patient care and safety.

Potential Biases and Ways of Addressing Them

At any point during any project, there is the potential for bias. The type of bias varies with the study's design. Every clinician needs to be aware of the different sources of bias and carefully examine the factors that influence the extent of potential bias in a

study (Melnyk & Fineout-Overholt, 2015). I will carefully differentiate between the facts and the opinions of stakeholders about the project.

Role of the Project Team

The Use of a Project Team

For this DNP project, the project team will consist of nurses, executive nursing leaders, physicians, and myself. The responsibility of the project team is to disseminate useful information to the rest of the clinical team. It is essential for the core team to present the issue and future plans on how to address the problem accordingly at the local site. I will be given the opportunity to apply concepts, methods, models and theories in practice. Overall, this DNP project will reflect a high level of conceptual understanding and make a meaningful evidenced-based practice contribution to nursing practice.

Presenting Information to the Expert Team Members

This BCMA nursing staff educational module will be presented to the identified expert team members chosen by me. They will consist of 5 local identified experts within the DNP project site. The expert DNP project site team members will include executive nursing leaders, quality, and pediatric unit's nurse manager. The expert team members will be introduced to the DNP project using a power point presentation so that the information is clear, concise, and accurate. I will send meeting invites using e-mail and schedule several meetings with the expert team members.

Opportunities for Expert Team Members to Share Expertise and Insight

A general meeting (max 2) will be scheduled to provide opportunities for expert team members to share expertise and insight regarding the BCMA nursing staff education

module. The meetings will be scheduled at the beginning and towards the end of the DNP project. During the meetings, there will be an opportunity to obtain feedback from the expert team members after they have thoroughly reviewed the newly developed BCMA nursing staff educational module. As an effort to minimize distractions, there will be a quiet designated area for the expert team to review the module and to complete the Likert-scale questionnaire to evaluate the BCMA nursing staff educational module. I will incorporate feedback and input into the final proposed project.

Timeline to Review and Provide Feedback on Doctoral Project Results

The evaluation forum that I propose allows for the expert project team to provide quick feedback during the first meeting. I will be sure to address all questions and concerns that the expert team may have. All identified expert team members will review and compete an evaluation survey.

Summary

There is substantial evidence that the implementation of BCMA nursing staff educational module can potentially reduce the occurrence of medication errors in acute care settings. Despite these findings, however, medication errors continue to be the third leading cause of death in the United States (Makary & Daniel, 2016). During a quality meeting at the DNP project site, it was reported that the pediatric unit (where I will be conducting my DNP project) has a 10% incident rate of medication errors, which is greater than the site's internal benchmark of 5% (NYP Quality Meeting, 2017). These results represent the consequences of an underutilization of the safety features embedded in BCMA due to nurses' tendencies to bypass the BCMA tool altogether and create

workarounds during the medication administration process. The aim of this DNP project is to address the gap in practice by developing a BCMA nursing staff education module for the pediatric unit at the identified DNP project site. It will guide pediatric unit nurses in using the BCMA tool more effectively. Section 3 will clearly identify the sources of evidence that will be used to create the BCMA nursing staff educational module

Section 3: Collection and Analysis of Evidence

Introduction

The medication administration process is an essential yet daunting task for nursing practice. According to Institute of Medicine (2006), medication errors occur on a daily basis causing harm or even death in patients. The aim of this DNP project was to address the gap in practice by developing a BCMA nursing staff education module for the pediatric unit at the identified DNP project site. It will guide pediatric unit nurses in using the BCMA tool more effectively and improve knowledge and increase compliance with the use of BCMA. Medication errors continue to occur despite the use of BCMA. The problem at the DNP project site is that pediatric unit nurses are not consistent and compliant with the use of BCMA, causing unsafe medication administration practices. Nursing staff at the DNP project site may lack this understanding because they have not received clear directives for what to do following medication errors. With the consistent use of BCMA, patients' outcomes and satisfaction may improve at the DNP project site. Pediatric unit nurses will be better equipped to understand the benefits of BCMA and increase their compliance rate. In section 3, I state the practice-focused question, identify the sources of evidence, state how collection and analysis of this evidence will provide the appropriate way to address the practice-focused question, and provide a step-by-step description of how evidence will be collected.

Clarification of the Purpose

The purpose of this DNP project was to improve the use of BCMA and optimize the medication administration process by developing a BCMA nursing staff education

program. As a result, pediatric unit nurses will be better equipped to understand the safety features of BCMA and use the tool optimally in an effort to decrease medication errors. This approach aligns with the practice-focused question as a new detailed BCMA nursing staff education module was created with regard to proper workflows for pediatric unit nurses. The BCMA educational module was developed for pediatric unit nurses to follow during medication administration practice. It included policy concerning scanner use, downtime procedures, missing medication bar codes, and missing patients' identification.

Relationship of the evidence to the purpose.

A comprehensive literature research was performed from current evidence that was applied when developing this module. The evidence found in the literature search was used to identify relevant teaching materials or content that would address the program's goals and objectives.

Collection and analysis of this evidence to address the practice-focused question.

In order to address the practice-focused question, I conducted a literature review for this staff education project. Based on the findings from the literature search, I developed the BCMA nursing staff educational module which included the content and the delivery strategy using theoretical frameworks and theories. I also developed a five question Likert-scale questionnaire for five local experts to review and validate the training module before implementation. The DNP project site will oversee the education program during the implementation process.

Scope of this Review

I performed a comprehensive literature search for current evidence that could be applied to staff education programs when using BCMA. The literature search included articles with publication dates from years 2007-2017. The articles selected addressed the effectiveness of staff education programs practice related to BCMA, BCMA compliance, nursing practice, and medication errors. The articles were excluded if they were not relevant to nursing practice, staffing education, or BCMA or were not evidence-based.

Search Exhaustive and Comprehensive

I conducted a comprehensive and exhaustive review of the literature using various primary sources including but not limited to CINAHL, Journal of Nursing Quality, and Google Scholar. The literature search included key terms relevant to the purpose and practice question of this DNP project.

Institutional Review

Walden University requires for an application to be submitted to the Institutional Review Board (IRB) to protect the rights and welfare of human subjects. The IRB approval number was 12-18-17-0626214. I used the DNP manual titled *Staff Education Project* to guide the formation of this DNP project.

Analysis and Synthesis

I used the data obtained from the evidence to develop a BCMA nursing staff educational module for pediatric unit nurses in order to increase BCMA compliance and decrease medication errors. I developed a Likert-scale questionnaire for the local identified experts to evaluate the new educational module. A team of 5 experts revised

the staff education plan and completed the questionnaire sitting in a quiet conference room located in the administration suite of the hospital. The experts included the chief nursing officer, director of quality, director of education, chief nursing informatics officer, and pediatric unit charge nurse.

The questionnaire was used as a guide to validate the content of the BCMA nursing staff education program. The experts used five-point scale tool to guide their scoring of the module. The Likert-scale tool (see Appendix A) is both valid and reliable and consisted of the following choices:

- Strongly Agree.
- Agree.
- Neither Agree nor Disagree.
- Disagree.
- Strongly Disagree.
- Comment field for recommendations.

As per the Walden DNP manual *Staff Education Project* (2017), I included a synthesis of the findings using a descriptive analysis approach. The results obtained from the questionnaire provided a summary of the data collected by the experts. As such, the results were easier to understand and interpret.

Procedures

I used a procedure similar to Harrington et al. (2013) in this DNP project to develop the BCMA nursing staff education module. The steps I followed were:

1. Review and identify needs and establish criteria for the staff education program for BCMA using data from the institution.
2. Discuss needs with organizational leadership.
3. Verify the staff education program with organizational leadership/experts via iterative review.
4. Revise plan based on expert evaluation.
5. Finalize the development of the staff education program.
6. Prepare a report to share findings using a descriptive analysis.

Summary

Despite the findings in the literature that BCMA improves the safety of patients by reducing medication errors, there continues to be a lack of compliance with the use of BCMA. The purpose of this DNP project was to improve the use of BCMA and optimize the medication administration process by developing a staff education module for BCMA. The module will serve as a reference guide for nurses when using BCMA during medication administration. The next section will include the findings and implications that resulted from the analysis and synthesis of the evidence collected from the comprehensive literature search.

Section 4: Findings and Recommendations

Introduction

Nurses in the pediatric unit at a major hospital in the Northeast region are not compliant with the use of BCMA and thus are not using it optimally. The purpose of this DNP project was to develop a comprehensive BCMA educational module for nurses to use as a reference guide to increase BCMA compliance and reduce medication errors within the pediatric unit. The practice-focused question used to facilitate this DNP project is as follows: Can an evidence-based staff education module be developed to guide nurses in the appropriate use of BCMA in a pediatric acute care setting?

Findings from this DNP project supported the creation of an evidence-based practice relevant to the use of BCMA, which will improve patient safety and compliance with the use of BCMA. This DNP project is relevant for nursing practice and has the potential to expand the current BCMA practice to other acute care settings.

Findings and Implications

According to Saba and McCormick (2015), nurses seeking to improve the safety and quality of care in their organization can often find literature reviews, systematic reviews, or evidence-based tools to address goals that are relevant to specific areas of practice. Harrington et al. (2013) reported that there is substantial evidence to demonstrate that BCMA improves patient safety and reduces medication errors and adverse events with patients during medication administration. I used the evidence obtained from the sources mentioned above to develop a comprehensive curriculum that ensures understanding of BCMA and creates a formative evaluation process to help

sustain positive patient outcomes. This education plan will be presented to nursing leadership at the practice site to optimize the medication administration process**.**

The newly developed staff educational module includes strategies on how to:

- identify and review the benefits of BCMA;
- identify the proper procedure to scan medications;
- address mandatory/hard stops alerts to drive best practice and limit workarounds;
- include mandatory/hard stop alerts to prevent workarounds;
- attach barcode labels on all medications including multi dose medications;
- document medications that do not meet a positive readable scan as per hospital policy;
- review policy changes related to BCMA including
    - review of acceptable overrides,
    - review of downtime procedures for medication documentation, and
    - policy to standardize labels for all medications including intravenous fluids;
- track BCMA issues and solutions including basic troubleshooting on how to reach IT support;
- promote a positive safety culture and supportive working environment;
- practice standardization strategies for providers, nurses, and pharmacists (Dickinson et al., 2012) to
    - determine the correct doses if a drug using a single source of truth

- establish alerts for high risk drugs and similar drug names, and
- apply standard concentrations for continuous infusion drugs (e.g., dopamine, insulin);

- prepare single unit dose for medications using syringes (specific to pediatrics); and
- govern medication safety group focus on issues unique to the pediatric population.

A team of five experts reviewed and evaluated the educational module using a five-point Likert scale questionnaire (see Appendix A). The results presented are shown in Tables 1 and 2.

Table 1

Baseline Questions

	Likert Scale		
Baseline Questions	Not very comfortable	Moderately comfortable	Very comfortable
How comfortable are you with the BCMA process?	5	0	0
	Not very familiar	Moderately familiar	Very familiar
How familiar are you with the Hospital's BCMA policy?	5	0	0

Table 2

Expert Panel Questionnaire

	Likert scale				
Expert panel questionnaire	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. The educational module is clear and easy to follow?	**4**	**1**	**0**	**0**	**0**
2. The educational module is relevant to my current clinical nursing practice	3	2	0	0	0
3. The educational module content is adequate and appropriate to current nursing practice	5	0	0	0	0
4. Nurses will be able to complete the educational module realistically on day of orientation, 3 months, 6 months, and 9 months post orientation period	3	1	1	0	0
5. The educational module, if followed consistently, will increase BCMA compliance	4	1	0	0	0
6. The educational module helps identify areas in need of improvement with the current BCMA process	5	0	0	0	0
7. The amount of material covered in the educational module is appropriate	3	2	0	0	0
8. The length of time to complete the module is appropriate	2	2	1	0	0
9. From your perspective, list 3 reasons for nurses to create BCMA workarounds	-Time constraints -Lack of knowledge of policy -Space constraints	-Easier -Faster -Timely	- Faster to scan using pt labels -Easier -Lack of knowledge when meds don't scan	- Due to busy nature of unit, it is easier - Lack of equipment availability -Easier	- Too much time wasting when meds don't scan -IV fluids don't always scan -no bar codes on multi dose meds
10. Overall, I am satisfied with the quality of the BCMA Educational module	3	2	0	0	0

In order for nurses to use BCMA consistently, the findings identified that training must be initiated early in the process and throughout the new hire orientation process. Optimally, additional training would be provided at 3 and 6 months intervals following initial orientation for practice and process reinforcement.

Clinical leaders also recognized the importance of ensuring the availability of functioning equipment on nursing units for nurses to use. As nurses gain more experience, they become more comfortable with the use of the technology. The learnings gained from this DNP project have been invaluable. It was crucial to understand how adult learners learn best and incorporate these strategies in this project.

Limitations/Potential Impact on Findings

A majority of articles reviewed to evaluate the effectiveness of BCMA for reducing medication errors did not report any conclusive statements. This lack of conclusiveness was attributed to several factors: various demographic areas, various acute care settings, rapid changes in information technology, and fast turnover in knowledge (Harrington et al., 2013). Other unidentified factors to consider were the acuity level of patients, lack of information technology equipment to enable the use of BCMA, and space constraints. Several findings from the literature indicated that although BCMA has a potential to reduce medication errors, it does not completely eliminate errors (Young et al., 2010). The benefits of BCMA are dependent on the functionality of the technology tool and how it is used in clinical practice (Harrington et al., 2013). It is also worth noting that unlike research, findings from such a DNP project

are not generalizable but can be used by healthcare organizations to improve nursing practice

Implications for Social Change

This DNP project has the potential to effect social change by providing strategies to improve patient safety and nursing practice during the medication administration process in acute care settings. The potential implications for positive social change include strategies to reduce medication errors, hospital and patient financial burdens, poor outcomes and complications, and nurse resignations and to increase nursing emotional well-being. Most nurses after experiencing a major adverse reaction from a medication error suffer posttraumatic stress disorder, blame, self-doubt, guilt, and depression, and as a result, often identify themselves as secondary victims (Seys et al. 2012). Making a medication error has potential adverse implications for the nurse's professional and personal life. These implications are accentuated for nurses working with the pediatric population.

Recommendations

Studies demonstrated that the use of BCMA improves patient safety and reduces medication errors by as much as 86% (Paoletti et al., 2007; Rivish & Modeda, 2010). The current state of nursing practice is such that nurses at the project site are not compliant with BCMA, which leads to medication errors and unsafe patient care. I will recommend an educational training module that encompasses clear actions to improve the quality and safety of the medication administration process. The module, reviewed and validated by the expert committee, will serve as a comprehensive guide for nurses during

orientation and 3 and 6 months post orientation onboarding process. Every effort should be made to increase staff compliance by assessing the current clinical nursing workflow, investigate the technology (BCMA scanners and EMR), and review the process to ensure that all patients have an identification name band with a bar code. The newly developed module includes the sequence for proper scanning, alternatives when scanning is not possible, and support for appropriate clinical decision making.

Plan to Expand Project Beyond the Doctor of Nursing Practice Doctoral Project

The plan to extend this DNP project beyond the DNP doctoral phase will be conducted in collaboration with the project site team. The ultimate goal is to possibly implement the BCMA educational staff module on other acute care settings including adult settings. Post pilot phase, I foresee full implementation for this project 9 months to 1 year out due to the project's sensitivity and complexity.

Strengths and Limitations of Doctoral Project

This DNP project provided an excellent opportunity for expert team members and site leadership to share their expertise and insight for the betterment of patient safety. Another strength of this type of DNP project is to provide insights as to how technology is used in acute health care settings. Additionally, nurses must understand the importance of demonstrating how to transform healthcare and expand nursing practice using information technology in any given clinical setting. Undoubtedly, the key to this project is to recognize how a technology-supported tool, when used effectively and efficiently, can support or detract from patient care and safety. It is crucial to find the right educational approach for the appropriate audience at the appropriate time. In summary,

this project indicates that leadership, collaboration and governance are essential to improving medication safety and clinical practice. Such improvements require efforts from the clinical leadership team as well as the frontline clinical staff.

Future Project Recommendations

Based on the analysis and synthesis of this DNP Project, BCMA practice holds the promise of further recommendations for future projects. Several studies demonstrated the lack of evidence in pediatric medication management. This review revealed the demand for more research to be done on this topic and specific population. The results of the review showed that the adoption of evidence-based practice guidelines leads to positive patient outcomes as well as improving nursing practice. Further research is needed in this area because the review produced a lack of comprehensive guidelines in the pediatric population. Additionally, there is also limited research on systematic reviews that support the effectiveness of evidence-based findings for BCMA. According to a systematic review study to determine the impact of BCMA on medication errors, authors Shah, Lo, Babich, Tsao, and Bansback (2016) concluded that BCMA has the potential to reduce medication errors; however, more studies are required to capture data on life threatening errors that are attributed to the lack of BCMA compliance. The authors also suggested that further research is needed to focus on the economic impact of BCMA to further facilitate the use of BCMA.

Section 5: Dissemination Plan

The results of the evaluation of the BCMA educational module were presented during a scheduled meeting. Several members of the leadership team attended including the chief nursing information officer, director of quality, nursing director, nurse manager, and charge nurse of the pediatric unit. Approximately twenty nurses also attended the meeting. The results, suggestions for improvement, and strategies to improve nursing practice were also discussed and materials distributed to the participants.

Audiences for Dissemination

The primary audience for this DNP project dissemination is the clinical nursing staff at the intended pediatric care unit. The expert clinical team selected to review and validate the educational module included the chief nursing information officer, director of quality, pediatric unit charge nurse, director of nursing education, and pediatric nurse manager. The evaluation of the BCMA educational module will be used to improve practice guidelines while also improving BCMA compliance and reducing medication errors. The implementation of this module will assist clinical nurses to provide safe, patient-centered quality care to patients. To disseminate the project findings effectively and efficiently to the intended audience, a final oral PowerPoint presentation will be presented. The findings of this project may provide insights about the BCMA educational module that can facilitate and guide change in nursing practice.

Analysis of Self

Challenges/Solutions/Insights Gained

The journey to obtain my doctoral degree began in the summer 2015. It has been a challenging yet very exciting and fulfilling experience. The decision stemmed from my grandfather's drive for continued education. As a doctoral graduate, I have become equipped with the necessary tools to expand nursing practice and to grow personally and professionally. My hope is to become a mentor to my nursing colleagues and share lessons learned from creating a culture of safety during the medication administration process. In the context of this project, it was important to share knowledge while promoting change. I quickly realized that gaining the support from the site's leadership team was crucial to the success of this project. Undertaking this DNP program has indicated that everything is possible with patience and perseverance.

I obtained my Master's in Nursing in Nursing Informatics in 2001. My professional role in nursing is as a nurse informaticist to indirectly provide quality care to patients using information technology. I began my nursing career in the neuro-surgical unit and worked for over 7 years in the surgical intensive care unit. After obtaining my master's degree, I worked as a healthcare consultant at various healthcare institutions where I gained substantial experience working as an independent contractor. Each of these roles equipped me with the tools required to be an effective leader including developing skills for critical thinking, problem solving, decision making, and effective communication. High impact leaders thrive to make a difference in the lives of people. My goal throughout this DNP program was to step up to this challenge and promote a

change in practice with the use of information technology. Due to the complexity of healthcare, such transformational nursing leadership is a central element to improving patient outcomes and nursing satisfaction and engagement. Challenges that I foresee throughout this journey are the resistance to change that nurses might face if they don't feel like participants in the decision-making and implementation processes. During the practicum experience of this DNP program, I have learned strategies to address the barriers of resistance to change. During this DNP program, my DNP instructors and mentors have taught me to inspire, transform, facilitate, and engage nurses regardless of place of practice. As a DNP graduate, my role is to be transparent with the clinical team and translate evidence-based practice successfully into nursing and healthcare.

Summary

Improving medication safety and reducing medication errors require efforts from nurses and the executive leadership team. BCMA is a technology tool designed to support nurses during the medication administration process. BCMA has become an integral part of nursing workflow and practice. In the context of this DNP project, a comprehensive educational module for BCMA was developed for nurses to use as a guide and reference during the medication administration process. This module can help to reduce medication errors by improving nurses' compliance with BCMA use. A group of five expert panel members were selected to evaluate the module and provide feedback on the newly developed module. The aim of this DNP project was to guide pediatric unit nurses in using the BCMA tool more effectively. I used the staff education project

manual provided by Walden University as a guide to successfully plan and evaluate this project.

As a result of this module, nurses will be better equipped to understand the safety features of BCMA and use the tool optimally in an effort to decrease medication errors. According to the Walden DNP manual *Staff Education Project* (2017), the DNP project site will oversee the education program during the implementation process. The results obtained from the questionnaire will provide a summary of the data collected by the expert team. Despite the evidence that BCMA can potentially reduce the occurrence of medication errors, nurses continue creating workarounds during the medication administration process. The development of a BCMA educational module for the pediatric unit will guide pediatric nurses in using the BCMA tool more effectively. When discussing medication errors, it is important to note the contributing factors and potential implications for nursing and social change as a result of this DNP project. Nurses will need to alter their practice and behavior while using this newly developed educational module as a guide to enhance nursing practice, reduce medication errors, and promote patient safety. The findings from this DNP project may stimulate positive social change in other similar health care settings.

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Appendix A: Education Module Evaluation Form

The purpose of this form is to evaluate and determine the effectiveness of the BCMA educational module and present the results through a descriptive analysis.

Baseline Data:

1. How comfortable are you with the BCMA Process?
    a. Not very comfortable
    b. Moderately comfortable
    c. Very comfortable
2. How familiar are you with the Hospital's BCMA policy?
    a. Not very familiar
    b. Moderately familiar
    c. Very familiar

Evaluation of BCMA educational module:

1. The educational module is clear and easy to follow
    a. Strongly agree
    b. Agree
    c. Neutral
    d. Disagree
    e. Strongly Disagree
2. The educational module content is relevant to my current clinical nursing practice
    a. Strongly agree
    b. Agree

   c. Neutral
   d. Disagree
   e. Strongly Disagree

3. The educational module content is adequate and appropriate to current nursing practice
   a. Strongly agree
   b. Agree
   c. Neutral
   d. Disagree
   e. Strongly Disagree
4. Nurses will be able to complete the educational module realistically on day of orientation, 3 months, 6 months, and 9 months post orientation period
   a. Strongly agree
   b. Agree
   c. Neutral
   d. Disagree
   e. Strongly Disagree
5. The educational module, if followed consistently, will increase BCMA compliance
   a. Strongly agree
   b. Agree
   c. Neutral

   d. Disagree
   e. Strongly Disagree

6. The educational module helps identified areas in need of improvement with the current BCMA process
   a. Strongly agree
   b. Agree
   c. Neutral
   d. Disagree
   e. Strongly Disagree
7. The amount of material covered in the educational module is appropriate
   a. Strongly agree
   b. Agree
   c. Neutral
   d. Disagree
   e. Strongly Disagree
8. The length of time to complete the module is appropriate
   a. Strongly agree
   b. Agree
   c. Neutral
   d. Disagree
   e. Strongly Disagree
9. From your perspective, list 3 reasons for nurses to create BCMA workarounds:

a. (Free text)

10. Overall, I am satisfied with the quality of the BCMA Educational module

    a. Strongly agree

    b. Agree

    c. Neutral

    d. Disagree

    e. Strongly Disagree