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Effective Communication and Teamwork Improve Patient Safety

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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,
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Abstract

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MSN, Western Governors University, 2011

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Project Submitted in Partial Fulfillment

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Abstract

Work environment influences the effectiveness of care for patients in any healthcare setting. It is even more important in settings such as the neonatal ICU (NICU) where this project took place. When the environment is not healthy, communication may suffer and result in poor patient outcomes and, family, patient, and staff dissatisfaction. The purpose of this quality improvement project was to understand how the implementation of the TeamSTEPPS program, for nurses in the NICU, could impact the safety culture as measured by the AACN Healthy Work Environment (HWE) tool. Lewin's professional practice change theory and the AHRQ change model were used to guide the project. The previously validated HWE survey, made up of 6 standards including communication, and leadership was provided to 71 NICU nurses with only 41 completing the baseline survey and 4 weeks later, 31 completing the post intervention survey after the TeamSTEPPS training. An independent *t* test was used to examine baseline and post TeamSTEPPS intervention HWE results against the HWE benchmark. Results indicated that post intervention scores met the benchmark although scores did not meet the benchmark prior to the intervention. Data were also analyzed with a paired *t* test to determine the significance of the improvement in the pre to post intervention results. Three of the 6 HWE standards, skilled communication ($p = .004$), adequate staffing ($p = .002$), and authentic leadership ($p < .001$) reached significant levels post TeamSTEPPS training compared to the pre TeamSTEPPS scores. Through the use of TeamSTEPPS training communication improved and the potential for improvement in patient safety promotes positive social change.

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Dedication

To my sister, Ellen, who is the essence of grace and courage.

Acknowledgments

I want to thank, Dr. Linda Matheson, whose guidance and ongoing support has been invaluable. My mentor, Dr. Lisa Halvorsen, who has encouraged and guided me with compassion. I would also like to acknowledge Jennifer Burrows and my colleagues who have supported me along the way. Lastly, I would like to acknowledge the love and support of my husband, son, and family. I am humbled by their generosity of spirit.

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Section 1: Effective Communication and Teamwork Improve Patient Safety

Introduction

Effective teamwork and communication is vital to patient safety. The Institute of Medicine (IOM) published their seminal piece, *To Err is Human*, in 2000, and since then, organizations have been looking at practice methods, team dynamics, and attributes needed to improve quality outcomes. Health care has also explored and adopted many safety practices from the aviation industry (Falter & Read, 2013; Skinner, Tripp, Scouler, & Pechacek, 2015), in particular, crew resource management, which focuses on effective communication and team dynamics (Brady, Battles, & Ricciardi, 2015; Sax et al., 2009). Effective teamwork and communication in healthcare, like aviation, is essential to achieve best safety practices and optimal clinical outcomes. Nurses, as key members of interprofessional teams, influence safety practices when they communicate respectfully, operate reliably as a team, and model these behaviors for others on the team (Agnew & Flin, 2014; Armstrong, Laschinger, & Wong, 2009; Dahinten et al., 2014; Dinndorf-Hogenson, 2015; Hamric & Mohrmann, 2015; MacPhee et al., 2014).

Problem Statement

The project site neonatal intensive care unit (NICU) staff in a large metropolitan center in the Pacific Northwest practices in a high stress and complex environment. Teamwork and communication are adversely impacted when inadequate or poor peer-to-peer interactions occur. Observations of and reports from the NICU staff reflected oppositional team dynamics and an absence of nurse empowerment, which prevented

staff from speaking up to one another when practice concerns arose. Perhaps the most important problem in this practice setting was the risk of staff being silenced due to fear of retaliation when clinical and or practice issues arise, and thereby, adversely impacting the culture of safety, clinical outcomes, mortality, and morbidity (see Brennan &Keohane, 2016). A critical asset of highly effective teams is their ability to speak up for safety despite any social or hierarchical influences (Morrow, Gustavson, & Jones, 2016).

Safety huddles are an evidence-based practice standard that allow teams to exchange safety information, build empowerment, and create a sense of community, which together form a culture of collaboration and collegiality that increases the collective awareness for eliminating patient harm (Goldenhar, Brady, Sutcliffe, & Muething, 2013). Although daily safety huddles are well established in the NICU, effective and reliable communication continues to be an issue. Given that the NICU provides intensive care services that require effective team dynamics to optimize patient safety, improving communication needed to be addressed and is foundational to the safety culture. The NICU has experienced the failure to operate as a team, which led to safety concerns not being reported, escalated, or addressed during the daily unit safety huddles. There was a lack of safety event reporting or good catches of safety practices during safety huddles as well. Furthermore, in the review of serious safety events in the NICU, the quality management team identified blaming and team dysfunction as one of the root causes in the cases reviewed. These poor team dynamic conditions have resulted in the delay of treatment and interventions that directly affected patient outcomes.

Purpose and Objectives

The purpose of this project was to improve the culture of safety in the NICU by using the TeamSTEPPS curriculum (see Agency for Healthcare Research and Quality [AHRQ], 2016). The TeamSTEPPS program provided the structure and content to teach staff the effective tools and behaviors necessary to improve communication. Prior to the training, I conducted a baseline measurement of the work environment using the American Association of Critical Care Nurses' (AACN) Healthy Work Environment (HWE) tool. Establishing a baseline provided a foundation from which the improvement work was measured against. Once the training and interventions were completed, the next step was a resurvey of the staff using the HWE survey tool (see AACN, 2016).

I intended the identification of the barriers to effective communication and the reliable use of the TeamSTEPPS behaviors to improve communication in the NICU, and thereby, improve patient outcomes. The TeamSTEPPS program and curriculum have demonstrated an improvement in team dynamics, communication, and decreased serious safety events in organizations who have utilized this content (AHRQ, 2016). I designed the objectives of this project to improve the culture of safety, improve good-catch reporting, and raise awareness to the number of safety concerns at the daily safety huddle by implementing the TeamSTEPPS program by June 30, 2017. My anticipated outcome for the project was to see an improvement over the baseline as measured by the HWE tool, with the expected goal or target being a 15% increase over baseline for the HWE

survey tool. This value and target increase was determined in consultation between me, the NICU leadership team, and the AACN administrators of the HWE tool.

Significance of Project to Practice

The foundation of nursing is predicated on the professional obligation to patient safety which began in the 19th century with Florence Nightingale's work on protecting patients from harm (Kangasniemi, Vaismoradi, Jasper, & Turunen, 2013). The modern day translation in regards to patient safety is guided by the nursing code of ethics as well as the professional obligation to patient advocacy (American Nursing Association [ANA], 2014; Arries, 2014). The significance of this evidence-based quality improvement project lied in the development of an assurance that nurses acted in a manner that promoted patient advocacy by effective communication and teamwork to prevent patient harm.

In addition to the professional imperative, the other significance of this project to practice emerged from the federal government through the Patient Protection and Affordable Care Act (2010). This law has established performance measures for hospitals and providers and has established performance based outcomes that are tied to reimbursement based on the quality of care provided. Selected nursing measures, known as nurse sensitive indicators, address the practice of nursing as they relate to patient outcomes (Centers for Medicare and Medicaid Services [CMS], 2014 .

More specifically, the Hospital Consumer Assessment of Health Care Providers and Systems (HCAHPS) publicly reported patient satisfaction data that is intended to improve the quality of care and as a service to the public (CMS, 2014). The

organization's Press Ganey results year-to-date for the safety question, *the staff worked together to care for you,* was in the 44th percentile. The *likelihood to recommend* top box score from the results, which represents to satisfaction with the overall care, was 68.90 compared to a goal of 72.42. In addition, this practice improvement project supported the alignment of the nursing strategic plan and the organization's pursuit to become a high reliability organization, which includes having a preoccupation with safety and the interpersonal and cultural behaviors that obstruct it.

Project Question

With this project, I sought to answer the question: For nurses in a NICU, how does the implementation of the TeamSTEPPS program impact the safety culture as measured by the HWE tool and the number of good catches at the daily safety huddle?

Evidence-Based Significance of the Project

This DNP project took place in the NICU of a hospital in a large metropolitan city in the Pacific Northwest. The TeamSTEPPS (AHRQ, 2016) program and supportive literature demonstrated that when communication amongst team members is improved so are patient outcomes (Agnew & Flin, 2014; Armstrong et al., 2009; Beitlich, 2015; Dahinten et al., 2014; Dinndorf-Hogenson, 2015; Hamric, Arras, & Mohrmann, 2015). The evidence-based significance of this project was related to the correlation between ineffective communication and adverse patient outcomes. Improving the communication skills and behaviors for nurses in the NICU has positively impacted patient care and the associated outcomes.

Implications for Social Change in Practice

One of the essential roles of the DNP is to gain the skills and knowledge necessary to positively impact social change by analyzing the influencing factors of practice to lead change (see Read, Pino, Betancourt, & Morrison, 2016). In this case, the implications for social change are twofold First was the expectation that the parents and patients had of the nursing staff to prevent harm and receive high quality care. Second was the mandate to uphold the standard of the nursing profession to train, leverage, and uphold the social contract with the public (see Read, Pino, Betancourt, & Morrison, 2016).

Social change theory is a sociologically-described process that addresses the notion of social progress (Shirey, 2013). Kurt Lewin is considered the founder of social change theory (Shirey, 2013). Lewin's change model, in conjunction with Hildegard Peplau's interpersonal relationship theory, as applied to the climate of health care today provided the framework that guided this project (see D'Antonio, Beeber, Sills, & Naegle, 2014). Given the professional standards, theory, and the implications to practice, this intervention had significant impact on social change and social justice in that it upholds the patients' rights, professional standards, and the cornerstone of nursing care, which is patient advocacy. The results and additional impact on practice is that the results of this project have contributed to the growing body of nursing knowledge and science that advances the profession and practice standards.

Definition of Terms

Communication: The process by which information is exchanged between individuals, departments, and or organizations (AHRQ, 2016).

Culture of safety: The product of individual and group values, attitudes, perceptions, competencies, and patterns of behavior that determine the commitment to, style, and proficiency of an organization's health and management of safety practices (Brennan &Keohane, 2016).

Healthy work environment (HWE): An environment that is safe, empowering, and satisfying. A place of physical, mental, and social well-being, supporting optimal health and safety (AACN, 2016).

High reliability organization: An organization with collective mindfulness in which all workers look for and report small problems or unsafe conditions before they pose a substantial risk to the patient (Fore & Sculli, 2013).

Power distance: The way in which power is distributed and the extent to which the less powerful accept that power is distributed unequally (Sitterding, Broome, Everett, & Ebright 2012).

Situational awareness: The ability to identify, process, and comprehend the critical elements of information about what is happening to the team with regards to the environment of care (Sitterding, Broome, Everett, & Ebright 2012).

Speak up for safety: Doing what must be done, regardless of risk, to assure the environment and patients are protected from harm (AHRQ, 2016).

TeamSTEPPS: An evidence-based framework to optimize team performance across the healthcare delivery system created and supported by the AHRQ (2016).

Teamwork: The work done by people who work together as a team to do something (AACN, 2016; AHRQ, 2016).

Assumptions and Limitations

The main assumption I made in this DNP quality improvement project was that the use of the TeamSTEPPS program along with the HWE measurement tool would increase the knowledge and abilities of the nursing staff to communicate clearly, and thereby, improve safety practices and outcomes (see Beitlich, 2015). The other key assumption I held was that leadership (formal and informal) would actively participate and support the process. One limitation of the project was the potential lack of adoption, which I mitigated with the use of collaborative and effective leadership planning.

Summary

The TeamSTEPPS curriculum, HWE tool, and both sociological and nursing theories guided this project. I used the sources of evidence, findings, and improvements to address the practice question of: For nurses in a NICU, how does the implementation of the TeamSTEPPS tools impact the safety culture as measured by the HWE tool? The results demonstrated a 12% increase on the HWE assessment with a target of 15% and an 800% increase in the good catch weekly reporting. These findings supported the

interventions for the NICU team in improving the safety of the environment through effective communication. In Section 2, I will summarize the review of scholarly evidence, the conceptual models, and the role of the DNP in transforming the clinical practice environment.

Section 2: Review of the Evidence

Introduction

In this section, I will review the literature related to the practice question: For nurses in a NICU, how does the implementation of the TeamSTEPPS program impact communication and the culture of safety as measured by the HWE tool? The purpose of this literature review was to explore and discern the evidence that would validate the practice problem, understand the research and the application to practice, and explore tools that have been used to address the barriers that impair communication and prevent effective teamwork. Teamwork is an essential element to patient safety.

The DNP specialty is focused on improvements designed to innovate and transform the clinical setting and enhancing the knowledge of nursing practice which results in improved clinical outcomes (American Association of Colleges of Nursing,[AACN] (2006). The DNP student is expected to explore and review the evidence to ascertain if similar findings have been reported in the literature (AACN, 2006). It is also essential for the DNP student to discern the practice or quality improvement strategies that have been reported in the literature and to create a plan for the practice environment they are focused on improving (AACN, 2006), in the case of this project, the project site NICU.

Once I completed the comprehensive discovery, the next steps I took were to describe in specific details the intended outcome measures, team members, interventions, and timeline to achieve improvements. This could have been expressed in terms of a project plan, Gantt chart, (logic) model, or other visual representation that can also be

used as a communication tool. My identification of this practice problem emerged from my observations during the clinical practicum experience and validated by the direct reporting of the nurses in the NICU as well as their leadership team.

In this section, I will provide the supportive nursing literature that focuses on communication and empowerment behaviors and how they relate to patient safety and/or patient outcomes. In addition, I will discuss team dynamics as they relate to effective communication as well as the change models needed to facilitate the process and improve the culture of safety that results in improved patient outcomes.

Search Methodology

To locate extant literature for this project, I used a Boolean search, limited to English language, with the following terms, key words, and phrases: *situational awareness, safety, culture, and nursing, events of harm, serious safety events, moral courage and empowerment, speaking up for safety,* and *nurse sensitive outcomes*. The literature search time window was for sources published from 2000 to now. The databases queried I included the Cumulative Index of Nursing and Allied Health Literature, OVID, EBSCO, PubMed, Up to Date, Cochrane, and the Walden University Libraries. I then rated the literature and only included a V or VI based on the AACN's grading system. More than 60 articles were retrieved in the first phase of my literature query. Once my review of each article was completed, 24 remained.

Seminal Evidence and Key Themes

The seminal piece of evidence was the IOM report (IOM; 2000), *To Err is Human*. In it, the IOM highlighted the safety issues that are related to human errors

which result in system failures and adverse patient outcomes. They found that understanding and applying the human patterning that exists in this dysfunctional environment to the new methods of improving communication and teamwork can improve the interactions amongst the staff and their environment. Team dynamics, as they relate to effective communication as reported by the IOM, emerged as the central theme of discovery that guided me in this literature review.

The literature revealed the effective safety behaviors and communication strategies to improve teamwork and the quality of care. It also provided other attributes of both the individual and leadership team that are essential to both implement and sustain positive changes. Interestingly, the original research and literature I found was more prevalent across the United Kingdom, Australia, New Zealand and Asia. The key themes that emerged from the literature were: effective communication and teamwork, leadership influences, high reliability and the culture of safety, moral courage and empowerment, patient safety and quality, interpersonal relationships, and other cultural influences and regulations.

Effective Communication and Teamwork

A persistent and well-substantiated theme I found in the literature was the direct correlation between effective communication, teamwork, and patient safety (Brennan & Keohane, 2016; Dinndorf-Hogenson, 2015; Morrow, Gustavson, & Jones, 2016; Okuyama, Wagner, & Bijnen, 2014). Nurses who are more likely to demonstrate effective communication behaviors, such as listening to understand and with intent, repeating and validating the information received, and seeking to understand, are more

likely to foster teamwork (Dinndorf-Hogenson, 2015). Additionally, communication and teamwork can be improved when staff demonstrate acceptance of another voice at the sacrifice of any one staff dominating the dialogue (Okuyama, Wagner, & Bijnen, 2014. Teamwork was a critical concept for units to possess in order to have a highly reliable and safe environment of care (Yee-Shui Law & Chan, 2015). Cote´ et al. (2014) identified that nurses are more likely to integrate or adopt research findings in practice more successfully when they believe that people around them would approve their actions. This finding is additional evidence that supports the importance of teamwork and collaboration. The nursing evidence was clear that when communication is improved, there are less adverse patient safety events (Agnew & Flin, 2014; Dinndorf-Hogenson, 2015; Hamric & Mohrmann, 2015).

Leadership Influences

In the literature, researchers found that multiple elements contributed to and/or inhibited the effective communication patterns of a team. The elements were often related to the dynamics of the team and the leadership behaviors which serve as modeling influences (Gazarian, 2013). Leaders who had a high degree of confidence and integrated effective team behaviors saw improved results in higher quality outcomes (Cote´ et al., 2014). Leaders who modeled and upheld the safety behaviors, while reinforcing them without punitive consequences, were also noted to have fewer and less adverse safety events (Okuyama et al., 2014).

Leadership influences the tone and establishes the expectation of performance. An effective leader who valued the contributions of all staff regardless of years of experience

or tenure is able to hear all staff voices equally. Leaders, both formal and informal, also influenced the peer and social norms of the team that promoted safety and quality as a high value targets (Agnew & Fin, 2014). When leaders had an affirmative correlation with safety practices, the effectiveness of the team was demonstrated by improved patient outcomes, a reduction of serious safety events, and improved staff engagement occurred (Agnew & Fin, 2014; Gazarian, 2014; Yee-Shui Law & Chan, 2015).

High Reliability and the Culture of Safety

The literature on high reliability and best safety practices emerged from the science of high reliability and the nuclear power and aviation industries. High reliability is a mindfulness where all workers look for and report small problems or unsafe conditions before they pose a substantial risk to the patient (Riley, 2009). High reliability theory has established the actions, behaviors, and improvements in the safety culture that will only occur when there are tangible improvements in team performance occurring at both micro- and macrolevels of an organization (AHRQ, 2016). The tools and behaviors that I found in my review of the literature specific to highly reliably behaviors were situational awareness, use of situation, background, assessment, and recommendation (SBAR), closed-loop communication, and a shared team mental model, which were also foundational to the content in the TeamSTEPPS program (AHRQ, 2016; Miller, Riley, & Davis, 2009).

Additional context from the high reliability literature emerged as the power distance or gradient and situational awareness. Power distance or gradient refers to the way in which power is distributed and the extent to which the less powerful accept

that power is distributed unequally (Sitterding, Broome, Everett, & Ebright 2012). The features of situational awareness include the perception, comprehension, and projection of the appropriate actions based on the clinical findings which are how the behavioral factors influence communication, teamwork, and the culture of safety (Fore & Sculli, 2013; Morath, 2011; Sitterding, Broome, Everett, & Ebright 2012). The connection between high reliability and effective teamwork to improve safety outcomes was well described in the literature.

Moral Courage and Empowerment

Moral courage is the expression of a belief or opinion without the fear of reprisal (Hamric et al., 2015). Moral courage was more often associated or as a corollary to moral distress in the literature review. The significance of moral courage as an element to improving communication or speaking up for safety is that moral courage informs how fear, previous experience, peer support, and the institutional culture that results in the practice of courage or what is also described as empowerment (Cote´ et al., 2014). Additionally, moral courage is seen as a related influence in the literature when communication barriers and teamwork are being studied (Cote´ et al., 2014).

Nurse empowerment was the key characteristic described in speaking up on behalf of patient safety or advocacy (Dahinten et. al 2014). The two critical elements I found in the literature to improve on this practice problem were empowerment and skill acquisition. Laschinger, a nurse scientist, has conducted extensive research on nurse empowerment and the link to improved patient outcomes. Laschinger described powerless nurses are ineffective nurses, and the consequences of nurses' lack of power as

less satisfied with their jobs and more susceptible to burnout and depersonalization. The lack of nursing power may also contribute to poorer patient outcomes (Armstrong et al., 2009). When nurses are empowered to speak up for patient safety, patients have better outcomes and the quality of care is improved (Dahinten et. al 2014; MacPhee, 2014).

Other Influences and Regulations

Researchers from other disciplines, primarily the nuclear power, engineering, and aviation industries, have well described the impact of both the positive and negative attributes associated with team dynamics and communication. These findings have been studied over time and more recently applied to health care. Deming, an engineer, quality expert, and researcher, is also known as the father of quality (Castellano, Roehm, & Shaw, 2016). Deming's contributions, research, and theories on communication and team dynamics have influenced safety programs across high intensity settings (AHRQ, 2016).. Deming is foundational to programs like TeamSTEPPS as well as having establishing The Deming Institute at the Institute of Healthcare Improvement, which is focused on program design that creates workflows or patterns that foster best safety practices which make it difficult to do the wrong thing (AHRQ, 2016).

Additionally, regulatory requirements have been based on improving patient outcomes as evidenced by the CMS and The Joint Commission. These programs have proven that the culture of safety and patient outcomes were related to effective communication and team dynamics (AHRQ, 2016; Castellano, Roehm& Shaw, 2016; CMS, 2016; Deming, 1983; Institute of Healthcare Improvement, 2016; The Joint Commission, 2016). The public reporting of this data has also impacted how health care

consumers make decisions about where to receive and impacts how insurance contracts are made (CMS, 2016). These measures have had significant benefits to an organization's vitality and can adversely impact the standing in the marketplace given the landscape of health care reform (Institute of Healthcare Improvement, 2016).

In addition to exploring the nursing literature, I also carried out an extensive review of safety practices from other industries. As I mentioned previously, the original evidence that appeared in the nursing literature emerged from the nuclear power, human factors engineering, and the aviation industries, in particular around situational awareness and team dynamics, which in aviation is referred to as crew resource management. These safety practices focused on highly effective and reliable team dynamics (Barnes et al., 2016; Sax et al., 2009). Other theoretical perspectives from the fields of ethics, sociology, and psychology amplify the theoretical perspective from nursing and guide the adoption of empowerment practices in communication (McEwan & Wills, 2014). Understanding common causes, barriers, and attributes of team dynamics from other disciplines offered me insights to improve the result in the health care setting. My compressive analysis also identified the common attributes across the diverse literature spectrum (see Okuyama et al., 2014).

These common themes provided me with the context and evidence to address the practice problem that was related to unsafe communication practices and their impact on both quality and safety in the NICU. Evidence from the nursing disciplines, industries with high intensity and risk atmospheres, and the regulatory agencies provided me with clarity on the critical relationship of communication and teamwork. The other prevailing

theme is that of the role of the leader in influencing the cultural aspects of improved communication.

Conceptual Models and Theoretical Frameworks

The conceptual model used for this evidence based quality improvement project is the nursing professional practice model (PPM) (Figure 1). The PPM is an operational framework designed to improve the safety, quality, and engagement by improving every relationship within an organization. The PPM is grounded in the Magnet model and is designed to both inspire and solicit nurse input into practice (Blakeman Hodge, Campbell, & Tobar, 2016). The PPM has five elements of which each must be addressed when exploring practice improvements or changes. They are: safety, quality and excellence in nursing care, professional development and advancement, interprofessional collaboration, evidence-based practices, shared leadership and empowerment. The PPM served as a guide to assure that all elements were considered with this practice improvement project. Other conceptual influences emerged from the American Association of Colleges of Nursing (2006) and the scope and standards of the American Nurses Association (ANA, 2010) in guiding the practice obligation of the nursing profession. Using the professional standards to uphold the approach and amplify the voice of the nurse as a scientist is imperative for the role of the DNP to model in any improvement or social policy work.

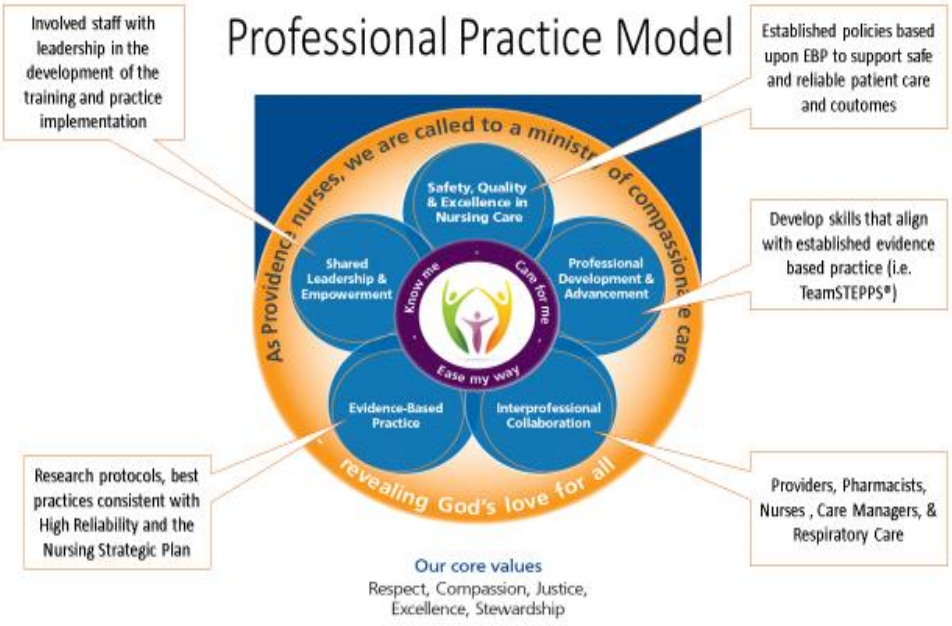


Figure 1. Professional practice model.

In addition to the nursing PPM, Lewin's change model (Lewin, 1947; Shirey, 2013) and the AHRQ process model (Figures 2 and 3) were also used to guide the improvement work. Lewin's steps of *change*, *unfreeze*, and *refreeze* were used as a guide to plan and incorporate the actions when working with the team in the NICU. Lewin's change model and the evidence-based PPM provides the organization assurance of the planning activities, alignment to the organizational strategies, and mission. The AHRQ model is unique to the TeamSTEPPS program and provided as a guide to the trainers using the content. The AHRQ model has three distinct phases that complement the PPM and Lewin's change model. The first was assessment; the second was planning; training; implementation; the third and final phase was sustainment. The use of the PPM with the

validated methods of Lewin's change model and the AHRQ process model are complimentary to foster the adoption of new skills, incorporate new behaviors and in achieving excellent patient outcomes in a highly reliable manner.

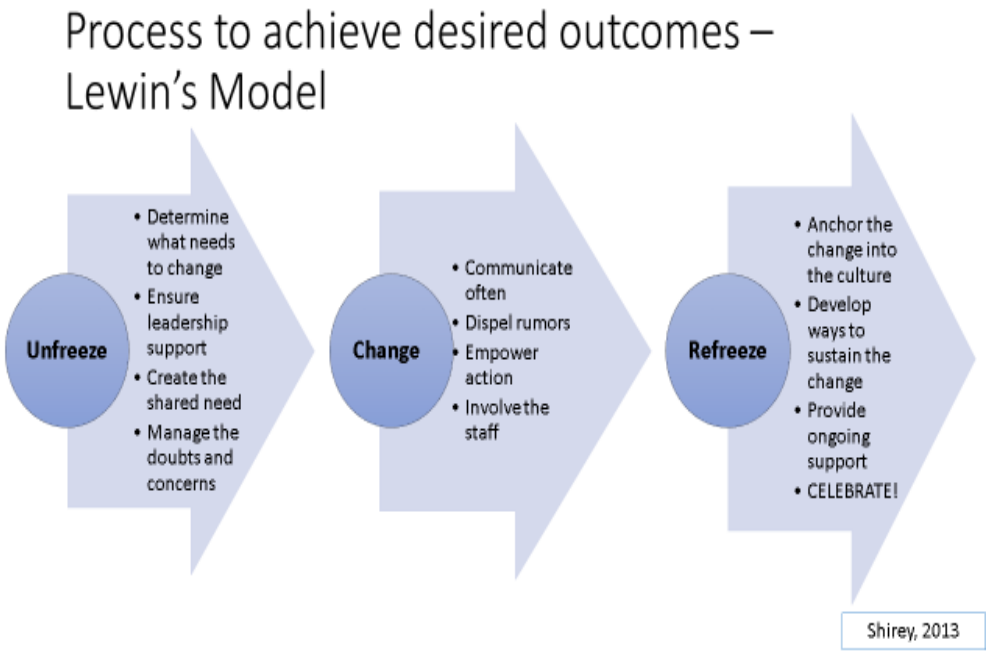


Figure 2. Lewin's change model.

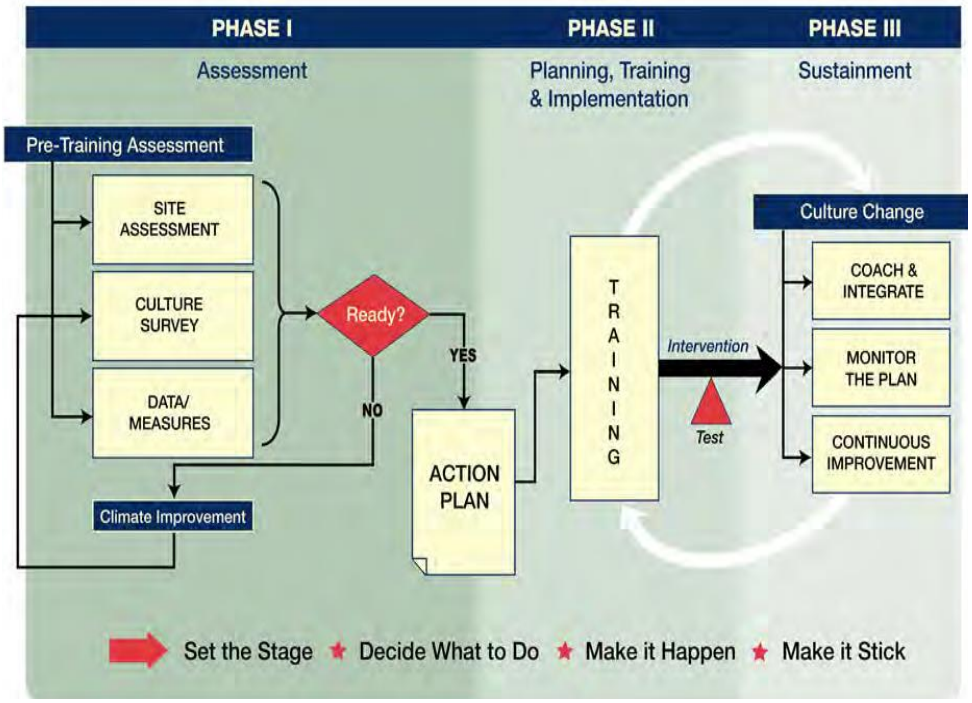


Figure 3. AHRQ change model.

Summary

The influence of empiricism on quantitative research methodology stemmed from the belief that the experience, perceptions and knowledge could be verified through a scientific method, or research methodology. Evidence-based practice is based on the principles of empiricism and as such can be subject to the same criticism. Therefore, the applicability of quantitative research, which applies a systematic process to the questions that originates in practice (empirical), was the method that supported the evidence based research to improve patient care and outcomes for this project.

The evidence was clear from nursing and other professional disciplines that effective communication amongst empowered staff resulted in both high quality care and

outcomes. The literature supported the evidence based quality improvement plan to improve the culture of safety by improving the staff's communication practices in the NICU. Nurses played a critical role in providing vigilance in health care and what they do or fail to do has a direct impact on patient outcomes. The history and purpose of my research question is to find the relationships between knowledge, application to practice problem and the precursors to decision making that would eliminate serious safety events. The TeamSTEPPS program provided the tools to improve the teamwork, communication, and peer accountability. Effective communication and teamwork have a direct correlation to the nurse's confidence and ability when speaking up for patient safety. Improving the quality, outcomes, and environment of care was the primary driver of this DNP project (American Association of Colleges of Nursing, 2016). Section three will discuss the collection and analysis of evidence.

Section 3: Collection and Analysis of Evidence

Introduction

In the previous sections, I identified the practice problem, specified the role of the DNP, and discussed how the literature reviewed addressed the practice question: For nurses in a NICU, how does the implementation of the TeamSTEPPS program impact the safety culture as measured by the HWE tool? When conducting the quality improvement project, it was essential for me to have a clearly-defined problem statement, evidence-based interventions, and the methods to describe the outcomes. In this section, I will describe both the project design and techniques used to achieve the improved outcomes as well as the organizational processes such as the institutional review board (IRB), intervention, and data collection methods.

I based the design of this quality improvement project on the TeamSTEPPS program. TeamSTEPPS is designed to optimize patient care outcomes by improving communication and teamwork skills (CITE). TeamSTEPPS practices have resulted in improved communication by eliminating the barriers to safety that occur amongst teams (CITE), or in the case of this project, the communication barriers that existed in the NICU.

Project Design and Methods

In this performance improvement project, I utilized the TeamSTEPPS content and measured the success by using the HWE tool while monitoring adverse patient outcomes and good catches at the daily safety huddle. The project design was based on a specific sequence of events and methods used to achieve improvement. The five-step project was

initiated after I received both organizational and Walden University IRB approval. My first step was conducting a baseline assessment of the NICU nurses' work environment using the HWE tool (AACN, 2016) to assess the culture of safety (see Table 1). After the baseline survey was completed, I provided the TeamSTEPPS curriculum as the intervention in June. Thirdly, I validated the nurses' understanding of the training with leader rounding, and between the third and fourth step, the leaders concentrated on the reinforcement of the behaviors and tools from the TeamSTEPPS program with the staff. The HWE survey was then repeated following the intervention in July. My final step was to evaluate the findings and share back the results with the staff and leadership at the July staff meetings.

The HWE tool measured the NICU's work environment against the benchmarked report from the AACN's (2016) "Standards for Establishing and Sustaining a Healthy Work Environments." In this project, the AACN created the HWE web-based survey portal link for the staff to complete their surveys. The link between healthy work environments and patient safety is irrefutable and was used to monitor the initial improvements as well as inform the quality improvement sustainment activities (see AACN, 2016; Kirwan, Matthews, & Scott, 2013). Not all 71 NICU nurses participated in the survey; 41 completed the baseline survey and 31 completed the postintervention survey.

After I obtained the completed baseline survey data, the TeamSTEPPS curriculum was delivered to the NICU staff focusing on the communication tactics, strategies, and simulation exercises. This was done in conjunction with the unit partnership council

whose purpose was to address practice and quality issues in the NICU. The NICU team had established this council to address and resolve all issues relating to the quality of care and outcomes of their patients as well as for staff engagement. Additionally, these presentations were used to reinforce the principles of a just culture to promote the staff questioning the process rather than the individual.

It was critical to validate and verify the knowledge of the NICU staff relative to the content from the TeamSTEPPS program. Identifying remediation or additional reinforcement through leader rounding was the most critical step I took in assuring the staff knew how and what to do when applying their new skills and knowledge. The staff was resurveyed in the fourth phase of the project using the HWE tool, which occurred 4 weeks after the baseline measurement and after the intervention was completed. This window allowed sufficient time from the intervention for the incorporation of the new skills and behaviors to be reliably evident in the nurses' practice.

My final step was to evaluate the findings of the baseline and postintervention HWE survey and share them with the staff the second week of July. This was also the time for the team to determine what ongoing monitoring and intervals were needed to assess the effectiveness of the new skills so they can continue to operate effectively as a team. The creation of a sustainability and spread plan was determined by the leadership team consisting of the manager, nursing director, nurse educator and myself as the right course of action after the evaluation and sharing the results with the staff and leadership.

I shared all data from the onset of the project through completion with the staff in the NICU as well as other key leaders in the organization. Another tactic considered as

part of the sustainment plan was how to recognize the small wins that support staff engagement in the process such as the inspiration of improved reporting at change of shift safety huddles. Lastly, to support sustainability the team had agreed to continue using the HWE survey to meausure the improvements of their commitment to continuting the improvement work.

Population and Sampling

Nurses in the NICU and their leadership team were the focus population of this DNP project. I trained them using the TeamSTEPPS curriculum and focusing on effective communication. The leadership team consisted of the director of nursing, the NICU manager, the NICU professional development specialist, the charge nurses, and the NICU medical director. In preparation for this intervention and as part of the companion clinical field experience, I completed the master training certification in order to provide the optimal experience for the participants. Lastly, the TeamSTEPPS curriculum, tools, and materials were available to the public and did not require permission to use.

Data Collection

The data collection instruments I used in this project assured the protection of the human subjects consistent with the standards of the organization and Walden University IRB. The IRB approval 05-16-17-0645663 assured that the all human subject research being conducted was in accordance with all of the federal, institutional, and ethical guidelines. I created a standard consent form for participation in the training and the date collection, intervention materials, and postintervention data. All results were presented to the team in the NICU and their leadership in their July unit practice council meetings.

Data Analysis

The TeamSTEPPS and HWE tools were both reliable and validated evidence based tools. The established validity of the TeamSTEPPS instruments as measured by Cronbach's $\alpha = 0.978$ and the reliability of the tool has an internal consistency of .93, while the HWE tool has a Cronbach's $\alpha = 0.977$ and a content validity index score of 96.63 (AACN, 2016; AHRQ, 2016; Castner, 2012; Miller et al., 2009; Riley, 2009). The HWE assessment was completed by the participants on a web-based link the AACN provided. The analytical techniques I used in this project included a *t* test comparing the results of the HWE against the HWE benchmark, and a paired *t* test comparing the means of the pre intervention and post intervention groups. Demographic information, including certification, years of service, and degree preparation influenced the work environment and were also summarized. I used a statistical expert to validate and verify my analysis; the software program I used for statistical analysis was the IBM SPSS, Version 22.

Sustainability

TeamSTEPPS is aimed at creating and sustaining a culture of safety (AHRQ, 2016). Sustaining this quality improvement required the nurse participants' adherence to the new routines, behaviors, and their ongoing quality monitoring along with persistent vigilance of the staff and leadership. I built the sustainability controls into the implementation plan by identifying the front line staff roles required to do the ongoing monitoring that included, but were not limited to, the daily safety huddle reporting of events or good catches, a peer review validation method to reinforce or correct the new

communication behaviors, and leader rounding to positively reinforce or recognize effective communication behaviors. The methods to sustaining the improvements require leadership vigilance to nurture the behaviors until they are fully assimilated amongst the staff (Shirey, 2013). The unit practice council's ownership of the behaviors that promote a HWE and the action plan they have created to amplify the foundational work of this DNP project will frame their way forward.As a master TeamSTEPPS trainer, my expertise was utilized with the AHRQ Change Plan (see Figure 3) in partnership with the NICU staff and leaders in coaching and integrating the behaviors as they occurred, using the controls to monitor and reinforce the new behaviors, and creating the feedback loop to elicit staff input to continually improve the process. I established a robust monitoring plan to assure there was no regression to the prior, ineffective communication and teamwork behaviors.

Summary

I aligned the TeamSTEPPS and HWE programs to support this quality improvement project in the NICU to promote effective communication and improve the culture of safety. The literature describes effective communication techniques positively improved the safety outcomes and are clearly evident in the literature. The program and evaluative HWE tool aligned with the nursing strategic plan and organizational goal to become a highly reliable organization. In Section 4, I will provide the data collection and analysis methods.

Section 4: Findings and Recommendations

Introduction

The purpose of this DNP project was to improve the culture of safety in the NICU by cultivating effective communication and teamwork. I conducted a baseline measurement of the work environment using the AACN's HWE tool to ascertain the staff perceptions of their work environment and the limitations they ascribed to effective teamwork and communication. In addition to the HWE assessment, a baseline number of the good catches was also captured and compared to the good catches reported weekly over the 4-week intervention and reinforcement period. Good catches are an expression of a unit's safety culture which occur when staff are confident in the team dynamics to speak up for safety. When staff reported good catches during the change of shift huddle handover, they shared preventable events of harm and mitigated the error from repeating by raising awareness of other team members. I compared the baseline HWE assessment and the good catches reported at safety huddle to the NICU results postadministration of the TeamSTEPPS curriculum and against the HWE benchmark results at the end of the 4-week period (see Tables 1 and 2) of the NICU baseline and HWE and the post intervention data

Findings and Implications

Healthy Work Environment (HWE)

I made the HWE survey available to all 71 NICU staff, and 41 staff completed the baseline survey and 31 completed the postintervention survey, representing 58% and 44% participation respectively. The pre- and postresults were then compared to the AACN

HWE benchmark results and provided to all the NICU team at their July unit practice council meetings. The session where the results were reported was interactive and feedback on the project, tools and process were also received.

Baseline Results

The baseline results indicated opportunity to improve in all of the six HWE domains as compared to the AACN benchmark group (see Table 1). All of the baseline responses were below the AACN benchmarks and significantly below in the domains of skilled communication, adequate staffing, and authentic leadership ($p < .001$). Additionally, there were no medication errors, serious safety events, or sentinel events during the intervention period. The event types reported included preventable medication errors, equipment or supply issues, and specimen collection errors.

Table 1

NICU Baseline HWE Results

	Skilled communication	True collaboration	Effective decision making	Adequate staffing	Meaningful recognition	Authentic leadership
Baseline	3.22	3.07	3.51	2.30	3.00	2.72
Benchmark	3.44	3.23	3.57	3.29	3.23	3.53
p value	.004	.275	.212	.002	.217	<.001

Postintervention Results

Three of the HWE domains, skilled communication, true collaboration, and effective decision making, outperformed the HWE benchmarks (see Table 2). The other three, meaningful recognition, authentic leadership, and adequate staffing, did not

outperform the benchmarks. Skilled communication was significantly higher than the benchmark ($p = .004$), while authentic leadership ($p < .001$) and adequate *staffing* ($p = .002$) were significantly below the benchmark.

Table 2

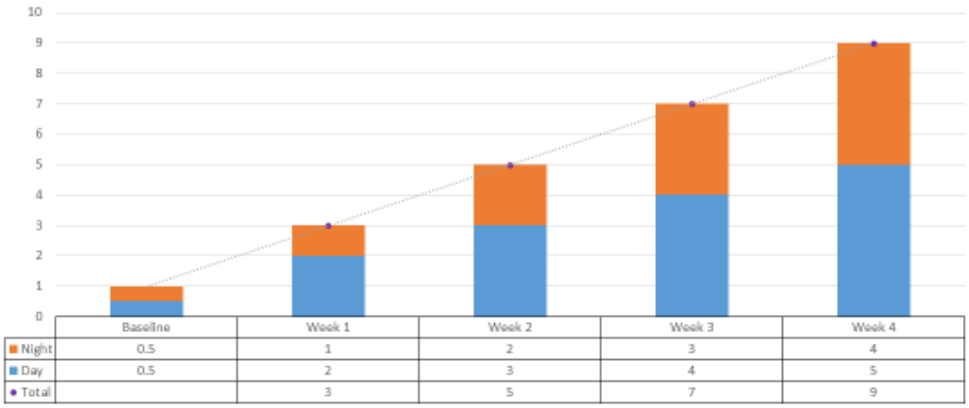
NICU Postintervention HWE Results and p Values

	Skilled commun-ication	True collabo-ration	Effective decision making	Adequate staffing	Meaning-ful recog-nition	Authentic leader-ship
Postinter-vention	3.62	3.24	3.69	2.84	3.20	3.31
Benchmark	3.44	3.23	3.57	3.29	3.23	3.53
p value	.004	.280	.216	.002	.224	<.001

Good Catch Findings and Implications

Good catches are a manifestation of safety practices that occurred once the staff ascribed value and importance to them after the training. Good catches impact and improve patient care and outcomes by raising awareness to prevent harm from occurring (Armstrong et al., 2009). While good catches are a process outcome, they are also an effective measure of the staff's adoption and reliable engagement of safety practices (Armstrong et al., 2009; Dinndorf-Hogenson, 2015). Prior to the TeamSTEPPS intervention, the unit manager reported having one good catch reported to her a week. This reporting was incidental and not shared amongst or with other team members. Over the 4-week intervention period the staff began sharing the reporting of good catches at their handover huddles and increased their good catch reporting by 800% (see Table 3).

Table 3



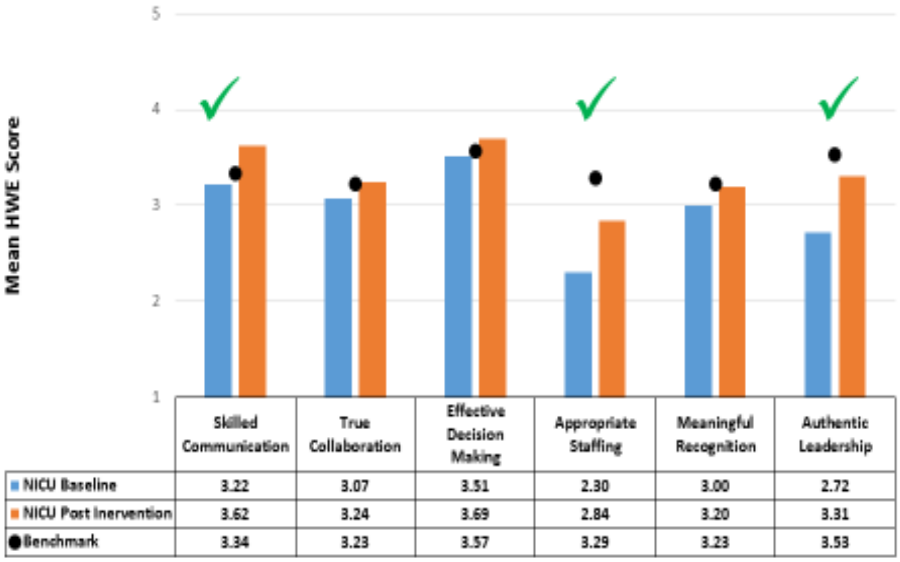
Good Catches Reported at Safety Huddle

Related Findings and Implications

The lowest scoring item in the HWE baseline assessment was the adequacy of resources. In exploring this score further, I identified that the NICU, during the time of the baseline survey and intervention occurred, was experiencing a census surge that was above both their core staffing and average daily census (ADC). The ADC of the prior 10 months was 24. The month preceding the intervention the ADC was 29 and the month during the intervention the ADC was 31. The implications of this surge in census may have influenced the perceptions of the adequacy of resources as well as the overall impression of the work. This was also one of the domains that was statistically

significant and improved the most from the baseline to the postintervention measurement from a mean of 2.30 to 2.84 (p = .002; see Tables 2 and 4).

Table 4



	Skilled Communication	True Collaboration	Effective Decision Making	Appropriate Staffing	Meaningful Recognition	Authentic Leadership
NICU Baseline	3.22	3.07	3.51	2.30	3.00	2.72
NICU Post Inervention	3.62	3.24	3.69	2.84	3.20	3.31
Benchmark	3.34	3.23	3.57	3.29	3.23	3.53

✓ = statistically significant

NICU Healthy Work Environment Score Summary and Benchmark Comparison

Implications

The implications of the HWE results supported the evidence from the literature specific to the relationship between authentic leadership and communication (Agnew & Flin, 2014; Armstrong et al., 2009; Brady et al., 2015; Dinndorf-Hogenson, 2015; Kirwan et al., 2013; Riley, 2009). In addition, these findings correlated with the TeamSTEPPS evidence that demonstrated the reliability of the curriculum when continually reinforced by the leader who valued the importance of communication as strongly as they do clinical acumen to promote a culture of safety (AHRQ, 2016).

Recommendations

The results of this project demonstrated that effective communication and staff engagement can be improved with the use of evidence-based tools when done in synergy with the leader's efforts to reinforce the safety practices that result in improved patient care and outcomes. My recommendations are to establish an authentic leadership competency and develop a consistent model for the staff to emulate as well as to amplify the confidence of the leaders for the explicit skills needed to promote the HWE standards. The NICU staff created a work team, through their NICU practice council, to support the ongoing quality improvement efforts with an action plan to sustain their results. The action plan addresses each of the HWE standards, is compared to the TeamSTEPPS curriculum, and is prioritized based on their results so that the NICU staff efforts are focused on the areas of greatest opportunity. The NICU team has requested to repeat the HWE survey at a future point to monitor their progress on a quarterly basis to objectively measure the team's progress and improvements. The NICU team has also indicated they would like ongoing assistance from the me in addition to their leadership team.

Strengths and Limitations of the Project

A key strength of this project was my use of reliable and validated evidence-based instruments. The NICU team was highly engaged in the process and had confidence in the processes citing the tools and methods as the primary reason. Perhaps the most critical strength was the organizational imperative of creating a highly reliable culture where the preoccupation with failure shaped the systems for staff to provide optimal patient care along with pristine staff engagement. Additional strengths of this project

emerged from the leadership engagement and responsiveness to having their practice environment highlighted in a DNP quality improvement project. While this intervention occurred over a relatively short period of time with high intensity support, there would be value in developing an ongoing peer review process to establish both the expectation and commitment to having a highly reliable culture dedicated to patient safety, quality outcomes, and staff engagement.

The staff interest and ownership of the practice environment was also a strength. The pride the NICU team had in the care they provide to the patients and families was essential in leveraging their engagement. The primary limitation of the project was the impact of the census surge and survey responses and the inability to correlate demographic information with the actual survey responses to have been able to do other types of statistical analysis.

Summary

The findings of this project supported my use of evidence-based tools to improve the communication behaviors that result in an improved culture of safety. The three HWE domains that were statistically significant demonstrated the interdependence of skilled communication, adequate resources, and authentic leadership. Section five will discuss the dissemination plan.

Section 5: Dissemination Plan

Dissemination

I provided the results of this DNP project to the chief nursing officer, nursing director of women's and children's services, the NICU nurse manager, the NICU nurse educator, and my DNP project mentor in a Power Point presentation as the key stakeholders of the project prior to sharing them with the NICU staff. The staff received the same presentation that included a summary of the results, census surge data, demographics, and the results provided by AACN. My presentation of the information to the staff during their unit practice council meetings occurred over the course of 3 days and had 98% attendance of the nurses. The presentation to the staff was designed to be interactive to validate their understanding of the process, the data, and the opportunity to sustain the improvements.

Analysis of Self

The DNP project provided the venue for my academic skills and new knowledge to be tested and used in the clinical practice setting. The *Essentials of the DNP* specify the competencies and domains of practice the DNP is expected to fulfill (American Association of Colleges of Nursing, 2006). The *Essentials* combined with the clinical practicum setting helped me create the forum to synthesize and test the changes in practice using evidence-based methodology.

One of my key areas of growth was the opportunity to fully understand the relationship between the PhD-prepared nurse and the DNP. The success I achieved in my project was directly related to the guidance of the PhD mentor and chairperson. This

experience, culminating in my completion of the DNP project, satisfied the full expression of the DNP role, providing me with an solid foundation to build upon.

Summary

The use of evidence-based practices to improve the care and outcomes in the clinical setting are central to the role of the DNP (ANA, 2010; D'Antonio et al., 2014). Courageous leadership in creating an environment free of fear of retaliation so that staff can speak up for safety occurs more reliably when leaders model the behaviors for the teams they lead (Dahinten et al. 2014; Dinndorf-Hogenson, 2015; Hamric & Mohrmann, 2015; MacPhee et al. 2014). The translation of evidence to practice is optimized when staff are engaged and directly involved in all aspects of improvement work, both of which are key elements to sustaining and spreading the work to other areas.

References

Agency for Healthcare Research and Quality. (2014). TeamSTEPPS learning benchmarks. Rockville, MD: Author. Retrieved from http://www.ahrq.gov/teamstepps/instructor/reference/learnbench.html

Agency for Healthcare Research and Quality. (2016). *Team STEPPS®: Strategies and tools to enhance performance and patient safety.* Retrieved from http://www.ahrq.gov/professionals/education/curriculum-tools/teamstepps/index.html

Agnew, C., & Flin, R. (2014). Senior charge nurses' leadership behaviours in relation to hospital ward safety: A mixed method study. *International Journal of Nursing Studies, 51,* 768-780. doi:10.1016/j.ijnurstu.2013.10.001

American Association of Colleges of Nursing. (2006). The essentials of doctoral education for advanced nursing practice. Retrieved from www.aacn.nche.edu/publications/position/DNPEssentials.pdf

American Association of Critical Care Nurses. (2016). *Healthy work environment.* Retrieved from http://www.aacn.org/default.aspx?pageid=331&menu=HWE

American Nurses Association. (2010). *Nursing: Scope and standards of practice.* Silver Spring, MD: American Nurses Association.

American Nurses Association. (2014). *Code of ethics*. Retrieved from http://www.nursingworld.org/codeofethics

Armstrong, K., Laschinger, H., & Wong, C. (2009). Workplace empowerment and magnet hospital characteristics as predictors of patient safety climate. *Journal of Nursing Care Quality*, *24*(1), 55-62. doi:10.1097/NCQ.0b013e31818f5506

Arries, E. J. (2014). Patient safety and quality in healthcare: Nursing ethics for ethics quality. *Nursing Ethics 21*(1), 3-5.

Barnes, S. A., Compton, J., Saldaña, M., Tecson, K. M., Hastings, C., & Kennerly, D. A. (2016). Development and testing of Baylor Scott & White's Health Attitudes and Practices of Patient Safety Survey. *Baylor University Medical Center Proceedings*, *29*(4), 367-370.

Beitlich, P. (2015). TeamSTEPPS implementation in the LD/NICU settings. *Nursing Management*, *46*(6), 15-18.

Blakeman Hodge, M., Campbell, P., & Tobar, K. (2016). Spotlight on leadership. Engaging nurses in the development and implementation of a professional practice model through nursing salons. *Journal of Nursing Administration*, *46*(9), 425. doi:10.1097/NNA.0000000000000370

Brady, P. J., Battles, J. B., & Ricciardi, R. (2015). Teamwork: What health care has learned from the military. *Journal of Nursing Care Quality*, *30*(1), 3-6. doi:10.1097/NCQ.0000000000000094

Brennan, R. A., & Keohane, C. A. (2016). In focus: How communication among members of the health care team affects maternal morbidity and mortality. *Journal of Obstetric, Gynecologic & Neonatal Nursing*, *45*(6)doi:10.1016/j.jogn.2016.03.142

Castellano, J. F., Roehm, H. A., & Shaw, C. M. (2016). Maintenance required. *Quality Progress, 49*(4), 14.

Castner, J. (2012). Validity and reliability of the Brief TeamSTEPPS Teamwork Perceptions Questionnaire. *Journal of Nursing Measurement*, *20*(3), 186-198.

Centers for Medicare & Medicaid Services (2014). HCAHPS: Patients' Perspectives of Care Survey. Retrieved from https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/HospitalQualityInits/HospitalHCAHPS.html

Centers for Medicare & Medicaid Services. (2016). The CMS National Patient Safety Initiative. Retrieved from https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/QualityImprovementOrgs/index.html?redirect=/qualityimprovementorgs

Cote,´F., Gagnon, J., Houme, P. K., Abdeljelil, A. B., & Gagnon, M. P. (2012). Using the theory of planned behaviour to predict nurses' intention to integrate research evidence into clinical decision-making. *Journal of Advanced Nursing*, *68*(10), 2289–2298.

Dahinten, V. S., MacPhee, M., Hejazi, S., Laschinger, H., Kazanjian, M., McCutcheon, A., & O'Brien-Pallas, L. (2014). Testing the effects of an empowerment-based leadership development program: Part 2–staff outcomes. *Journal of Nursing Management, 22*(1), 16-28.

D'Antonio, P., Beeber, L., Sills, G., & Naegle, M. (2014). The future in the past: Hildegard Peplau and interpersonal relations in nursing. *Nursing Inquiry*, *21*(4), 311-317. doi:10.1111/nin.12056

Deming, E. W. (1982). *Out of crisis*. Cambridge, MA: Massachusetts Institute of Technology, Center for Advanced Engineering Study.

Dinndorf-Hogenson, G. (2015). Moral courage in practice: Implications for patient safety. *Journal of Nursing Regulation*, *6*(2), 10-16.

Duncan, S., Thorne, S., & Rodney, P. (2015). Evolving trends in nurse regulation: What are the policy impacts for nursing's social mandate? *Nursing Inquiry*, *22*(1), 27-38. doi:10.1111/nin.12087.

Falter, E., & Read, L. (2013). Beyond the checklist: What else health care can learn from aviation teamwork and safety. *Nursing Administration Quarterly*, *37*(2), 186. doi:10.1097/NAQ.0000000000000027.

Fore, M, A., & Sculli, L. G. (2013). A concept analysis of situational awareness in nursing. *Journal of Advanced Nursing, 69*(12), 2613-2620.

Gazarian, P. (2013). Use of the critical decision method in nursing research: An integrative review. *Advances in Nursing Science, 36*(2), 106–117

Goldenhar, L. M., Brady, P. W., Sutcliffe, K. M., & Muething, S. E. (2013). Huddling for high reliability and situation awareness. *BMJ Quality & Safety*, *22*(11), 899-906. doi:10.1136/bmjqs-2012-001467

Hamric, A. B., Arras, J. D., & Mohrmann, M. E. (2015). Must we be courageous? *Hastings Center Report*, *45*(3), 33-40. doi:10.1002/hast.449.

Institute of HealthCare Improvement. (2016). Patient safety. Retrieved from http://www.ihi.org/Topics/PatientSafety/Pages/default.aspx

Institute of Medicine. (2000). *To err is human: Building a safer health system.* Washington, DC: National Academy Press.

The Joint Commission. (2016). Patient safety topics. Retrieved from https://www.jointcommission.org/topics/patient_safety.aspx

Kangasniemi, M.., Vaismoradi, M., Jasper, M., & Turunen, H. (2013). Ethical issues in patient safety: Implications for nursing management. *Nursing Ethics, 20*(8), 904-916. doi:10.1177/0969733013484488

Kirwan, M., Matthews, A., & Scott, P. A. (2013). The impact of the work environment of nurses on patient safety outcomes: A multi-level modelling approach. *International Journal of Nursing Studies, 50*(2), 253-263. doi:10.1016/j.ijnurstu.2012.08.020

Lewin, K. (1947). Frontiers in group dynamics. *Human Relations, 1*(1), 5. doi:10.1177/001872674700100103

MacPhee, M., Dahinten, V. S., Hejazi, S., Laschinger, H., Kazanjian, A., McCutcheon, A., & O'Brien-Pallas, L. (2014). Testing the effects of an empowerment based leadership development program: Part 1–leader outcomes. *Journal of Nursing Management, 22*(1), 4-15.

McEwen, M., & Wills, E.M. (2014). *Theoretical basis for nursing* (4th ed.). Philadelphia, PA: Wolters Kluwer Health.

Miller, K., Riley, W., & Davis, S. (2009). Identifying key nursing and team behaviours to achieve high reliability. *Journal of Nursing Management, 17*, 247–255.

Morath, J., (2011). Nurses create a culture of patient safety: It takes more than projects. *Online Journal of Nursing Issues in Nursing, 16*(3),pp 2.

Morrow, K. J., Gustavson, A. M., & Jones, J. (2016). Speaking up behaviors (safety voices) of healthcare workers: A meta-synthesis of qualitative research studies. *International Journal of Nursing Studies*, 64:4251doi:10.1016/j.ijnurstu.2016.09.014

Okuyama, A., Wagner., C., & Bijnen., B. (2014). Speaking up for patient safety by hospital-based health care professionals: A literature review. *BMC Health Services Research, 14*, 61.

Read, C. Y., Pino, , D. M., & Morrison, C. (2016). Social change: A framework for inclusive leadership development in nursing education. *Journal of Nursing Education*, *55*(3), 164. doi:10.3928/01484834-20160216-08

Riley, W. (2009). High reliability and implications for nursing leaders. *Journal of Nursing Management, 17*, 238–246

Sax, H. C., Browne, P., Mayewski, R. J., Panzer, R. J., Hittner, K. C., Burke, R. L., & Coletta, S. (2009). Can aviation-based team training elicit sustainable behavioral change? *Archives of Surgery, 144*(12), 1133-1137. doi:10.1001/archsurg.2009.207.

Shirey, M. R. (2013). Strategic leadership for organizational change. Lewin's theory of planned change as a strategic resource. *Journal of Nursing Administration*, *43*(2), 69.

Sitterding, M. C., Broome, M. E., Everett, L. Q., & Ebright, P. (2012). Understanding situation awareness in nursing work: A hybrid concept analysis. *Advances in Nursing Science*, 35(1), 77-92.

Skinner, L., Tripp, T. R., Scouler, D., & Pechacek, J. M. (2015). Partnerships with aviation: Promoting a culture of safety in health care. *Creative Nursing*, *21*(3), 179-185. Doi:10.1891/1078-4535.21.3.179

Yee-Shui Law., B., & Chan., E. (2015). The experience of learning to speak up: A narrative inquiry on newly graduated registered nurses. *Journal of Clinical Nursing*, *24*, 1837-1848.

Appendix

Appendix A

Time Line		*N*	*M*	*SD*	Std. Error Mean
ALL Skilled Communication	Baseline	120	3.22	.997	.091
	4 week Follow-Up	87	3.62	.979	.105
ALL True Collaboration	Baseline	120	3.07	1.106	.101
	4 week Follow-Up	87	3.24	1.171	.126
ALL Effective Decision Making	Baseline	120	3.51	1.004	.092
	4 week Follow-Up	87	3.69	1.060	.114
ALL Appropriate Staffing	Baseline	120	2.30	1.142	.104
	4 week Follow-Up	87	2.84	1.284	.138
ALL Meaningful Recognition	Baseline	120	3.00	1.077	.098
	4 week Follow-Up	87	3.20	1.180	.126
ALL Authentic Leadership	Baseline	120	2.72	.997	.091
	4 week Follow-Up	87	3.31	1.194	.128

Group Statistics Summary of the HWE Data

Appendix B

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	*t*	*df*	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
ALL Skilled Communication	Equal variances assumed	.244	.622	-2.899	205	.004	-.404	.139	-.679	-.129
	Equal variances not assumed			-2.907	187.385	.004	-.404	.139	-.678	-.130
ALL True Collaboration	Equal variances assumed	.465	.496	-1.095	205	.275	-.175	.160	-.489	.140
	Equal variances not assumed			-1.085	179.038	.280	-.175	.161	-.493	.143
ALL Effective Decision Making	Equal variances assumed	.396	.530	-1.253	205	.212	-.181	.145	-.467	.104
	Equal variances not assumed			-1.242	179.428	.216	-.181	.146	-.469	.107
ALL Appropriate Staffing	Equal variances assumed	1.873	.173	-3.181	205	.002	-.539	.169	-.873	-.205
	Equal variances not assumed			-3.122	172.054	.002	-.539	.173	-.880	-.198
ALL Meaningful Recognition	Equal variances assumed	3.252	.073	-1.238	205	.217	-.195	.158	-.507	.116
	Equal variances not assumed			-1.220	175.114	.224	-.195	.160	-.512	.121
ALL Authentic Leadership	Equal variances assumed	4.008	.047	-3.889	205	.000	-.594	.153	-.895	-.293
	Equal variances not assumed			-3.779	164.569	.000	-.594	.157	-.904	-.284

Statistical Analysis or paired T test of the HWE Data