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The Effectiveness of the Biopatch Disc in Decreasing MRSA in Peripherally Inserted Intravenous Catheters

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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
the review committee have been made.

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Walden University
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Abstract

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MSN, Walden University, 2011

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Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Nursing Practice

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Abstract

Methicillin-resistant Staphylococcus aureus (MRSA), drug-resistant bacterial infection, is a pressing global health care issue that decreases patients' quality of life and places a high burden on health care delivery systems. The purpose of this quality improvement evaluation project was to evaluate an infection prevention management program derived from evidence-based research to decrease the incidence of MRSA in peripherally inserted intravenous catheters (PIVs) in acute care settings through the utilization of the Biopatch disc. The practice-focused question addressed whether the use the Biopatch disc over a 6-month period in acute care would coincide with a reduction of the incidence of MRSA infection in PIVs. The number of MRSA infections at the hospital project site during a 30-day pre-implementation period was compared to those during 2 post-implementation phases of Biopatch disc usage. Deming's model for continuous quality improvement served as the conceptual framework. Data were analyzed using the Fisher's exact test. The plan, do, study, and act phases of Deming's model were used in a rapid-cycle format during the evaluation, which allowed for changes in protocol as feedback was gathered. Results suggest that the Biopatch disc could possibly decrease the incidence of MRSA in PIVs when utilized according to organizational protocols. Infection prevention, quality improvement, and risk management teams should be able to collaborate and develop local and regional surveillance programs based on use of the Biopatch. This project had the potential to effect positive social change by improving the quality of life and safety of patients in acute care setting, and by reducing costs of healthcare overall so as to promote broader access to quality healthcare across populations.

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Dedication

This project is dedicated to the sisterhood and memory of Carolyn "CeeCee" Cozart. She was my sister who encouraged me in the pursuit of this study, and over many years, she facilitated my education by supporting me financially, spiritually, and emotionally. CeeCee's strength and faith during the last year of her life gave me a new appreciation for the meaning and importance of family. She lived her life well, acting upon her spiritual beliefs conscientiously by assisting family, friends, and strangers who were in need. She faced her too-early death bravely. During her terminal illness she managed to complete her CPA. Her exemplary determination kept me working when I wanted to give up. I would also like to dedicate this project to my first-born grandchild, Zuri Watkins, who arrived on this earth 3 months early. I watched him fight, grow, and get stronger each day determined to take his stand in this world. His courageous fight and determination gave me the strength, courage, and incentive to continue to see this to the very end. Keep thriving, Zuri.

My thanks and appreciation to Stoerm Anderson for persevering with me as my advisor throughout the time it took me to complete this project to the end. The inspiration for doing the project came from my experience as a patient during a very critical time of being hospitalized. The hospital experience was one of the most educational and knowledgeable ones in my life. I am grateful as well to Brenda Brazzell for coordinating and overseeing the administrative concerns that made it possible for me to complete my degree.

The members of my project committee, Dr. Stoerm Anderson, Dr. Allison Terry, and Dr. Faisal Aboul-Enein, have generously given of their time and expertise to help me better my project. I thank them for their contribution and their good-natured support.

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Section 1: Nature of the Project

Intravenous (IV) catheters have been one of the most customary and frequently used interventions for IV therapy in medical care. Although this therapy method seems simple and most effective, it was not without health risks. Skin penetrating devices such as IV catheters can act as a portal of entry for infectious organisms to enter the body and increase patients' risk for infection. IV catheters are reported to be the single most common source of bacteremia and fungemia worldwide, yet infections associated with short peripheral catheters have received very little attention (Hadaway, 2012). The medical benefits for intravascular devices (e.g., peripherally inserted intravenous catheters [PIVs]) should be carefully considered against both the infectious and noninfectious risks (Mutters, Gunther, Heininger, & Frank, 2014). The establishment of an environment free of methicillin resistant *staphylococcus aureus* (MRSA) as part of an infection prevention protocol in an acute care setting has been found to yield positive results (Mutters, 2014).

Problem Statement

IV catheters have been the most frequently used interventions for IV therapy in medical care. This method of therapy is simple and frequently used, but it does not come without other potential health risks. Devices that penetrate the skin, such as IV catheters, create a portal of entry for infectious agents to enter the body, therefore increasing the patient's risk for infection ((Hadaway p.2012). Although the number of patients who receive short peripheral catheter therapy is far greater than those with central venous catheter access devices, the rate of infection associated with the short PIV is very low,

according to Hadaway (2012). It is important to note that scientific data related to the infection rate of short peripheral catheters is limited (Hadaway, 2012).

A recent report cited as many as 10,000 *staphylococcus aureus* bacteremia due to the usage of PIVs in the United States (Hadaway, 2012). Experts view the conflicting data to be related to short dwell time and early patient discharge ((Hadaway p.2012). In other IV access devices, the Biopatch disc was shown to be an effective tool in decreasing MRSA in peripherally inserted central catheter (PICC) lines as well as in central venous lines (CVL) ((Hadaway p.2012). However, there is currently no surveillance tool available to show the effectiveness of the Biopatch disc on PIVs, based on my review of the literature. The problem that was addressed in this evaluation project was the lack of knowledge regarding whether the Biopatch disc would be effective in preventing infections in patients with PIVs.

Purpose

The published rates, causes, and prevention of infections associated with short peripheral catheters needed more clarity. Improving patient outcomes was the driving force behind the implementation of this project. Healthcare in general and the nursing profession, specifically, should advocate for the safety of the patients within their care. Relevant literature suggested that the best approach for tackling the problem of MRSA is through active surveillance of high-risk patients or during the times when the potential is greatest by adopting simple perioperative practices to reduce the incidence of MRSA infection and, in turn, its emergent resistance (Byrne, Hazlerigg, Khan, & Smitham, 2011). The purpose of this evaluation project was to assess the current practices of using

the Biopatch disc on PIVs and to determine the association with the incidence of MRSA in patients in acute care settings.

The practice-focused question that was used to help guide the evaluation project was, In the acute care setting, would using the Biopatch disc reduce the risk of MRSA infection when used on peripheral IV catheters over a 6-month period? The goal of the evaluation was to provide evidence regarding whether the use of the Biopatch disc decreased the incidence of MRSA in PIVs in patients in acute care settings over a 6-month period. The results of the quality improvement evaluation showed reliability. Evidence of the reliability may compel other healthcare professionals and the infection prevention (IP), quality improvement (QI), and risk management (RM) teams of acute care organizations to collaborate and develop local and regional surveillance programs. These programs, along with other existing initiatives to educate nursing staff and other personnel on the incidence of decreasing MRSA, may lead to reduction in the number of MRSAs in acute care settings. Furthermore, the evaluation findings empower the local hospital/acute care setting to make the necessary changes within its IP, QI, and RM programs to independently develop a surveillance program to further decrease rates of MRSA in PIVs within the organization.

Nature of the Doctoral Project

The quest to find the right combination of preventive measures and interventions to decrease patients' incidence of MRSA in PIVs in the acute care setting continues to evade the nursing profession. There was a limited amount of literature dedicated to peripheral IV therapy and MRSA (e.g., Serane & Kothendaraman, 2016) and a limited

number of options available for healthcare personnel to use to decrease MRSA in PIVs. The documented research on current EBPs developed with the intent of mitigating this problem is readily available to support measures that can be implemented in preventing MRSA (e.g., Serane & Kothendaraman, 2016). Although any infection prevention program must be an interdisciplinary strategy; MRSA is still considered a nursing quality indicator.

The main topic that was identified in the literature on MRSA was the need for a tool to thoroughly and accurately assess and identify at-risk patients and a strategy to prevent and control infections in the acute care setting (Serane & Kothendaraman, 2016). The rate of infections associated with short PIVs was believed to be very low--even rare in the same instances (Hadaway, 2012). The available literature focused on a more comprehensive preventive strategy aimed at implementation of a specific anti-infective measure such as the use of the Biopatch disc (Hadaway, 2012). There is, however, a growing body of recent literature that addresses the incidence of MRSA in other indwelling devices as it relates to hospital-acquired infections (HAIs); Mutter, 2014).

This DNP project was an evaluation of an implemented Phase I and Phase II quality improvement program that was implemented in 2016. In the case of this program, all the patients that were admitted on a general oncology and medical surgical unit were included in a 6-month Phase I implementation program. All staff of the nursing units in the program were trained in utilizing the Biopatch disc with PIVs to decrease the incidence of MRSA.

I used a convenience sample method based on the inpatient population of the nursing units. Convenience sampling is a type of nonprobability sampling that includes participants who were in place at the time of the study; it is the most widely used method in nursing research studies (Burns & Grove, 2009). I used historical and concurrent data that had previously been collected by the IP, QI and RM teams to evaluate trends in the project organization's practices and incidence of MRSA.

The outcome that was compared was the incidence of MRSA in PIVs in patients who were admitted to the Oncology and Medical-Surgical units, in which the Biopatch disc was utilized, compared to those patients who did not utilize the Biopatch disc. I analyzed whether the Biopatch disc was effective in meeting the objectives of decreasing the incidence of MRSA in PIVs for patients admitted to these units. Findings showed whether the Biopatch disc was beneficial in decreasing MRSA in PIVs for patients who were admitted to those units.

The detection of patient risks nursing theory was the framework used for the development of this MRSA risk/prevention program. The goal of the project was to evaluate if there was a decrease in the incidence of MRSA in patients with PIVs by using the Biopatch disc by 50% over a 6-month time frame during Phase I of the implemented pretrial program. The Biopatch disc implementation was accomplished by creating an implementation plan in collaboration with clinical leaders, educating/in-servicing of admissions in the inpatient areas, and through point prevalence follow up to identify additional educational needs. The Agency for Healthcare Research and Quality (AHRQ) has been supportive of the movement towards creating high reliability in healthcare to

improve the quality and safety of care delivery (Blouin & McDonagh, 2011). Being designated a high-reliability organization is what most organizations would like to achieve; however, the framework has had only borderline success in the healthcare industry (Polonsky, M.S., 2019. However, when safety and consistency are embedded in every aspect of performance, it should ultimately decrease the number of infections within an organization.

Initiating a surveillance program in the acute care setting contributes understanding of how indicators are detected, which is important to ensure optimal patient outcomes. The patient outcomes that were realized through this initiative were the true driving force behind this implementation. Being a nurse in the healthcare arena, we should advocate for the overall safety of the patients trusted in our care. The new evidence-based best practices and guidelines for PIV catheter management were not well disseminated within the medical community of practice and presented a serious knowledge gap, with the potential to negatively impact patient safety and decrease quality of care and patient outcomes.

Significance

In conducting the project, I evaluated the outcomes pre- and postimplementation of the Biopatch disc at the medical facility, utilizing the historical and concurrent data that had already been collected by the IP, QI, and RM teams. The information provided was used to evaluate trends in decreasing MRSA in patients with PIVs.

The methodology for the project consisted of a review of data from patients who were admitted to the facility and received a PIVs without the use of the Biopatch disc

versus those who were admitted and received a PIV utilizing the Biopatch disc. I compared incidence of MRSA in the two groups. This allowed me to evaluate the effectiveness of the Biopatch disc on PIVs and whether it resulted in a decrease in the incidence of MRSA in PIVs or not over a 6-month period.

This was a QI project that was implemented in an acute care setting hospital in Jefferson County, Birmingham, Alabama, a setting where the number of catheter-related PIVs and incidence of MRSA had increased in patients who were admitted and had a hospital stay longer than seven days. IV catheters are one of the most customary and frequently used interventions for IV therapy in medical care (Byrne et al., 2011). Skin-penetrating devices such as IV catheters can act as a portal of entry for infectious organisms to enter the body and increase the patient incidence for infection (Byrne et al., 2011). There has been substantial focus on the risks associated with central venous catheters, including catheter-related bloodstream infections (Byrne et al., 2011); however, PIVs are much more common in acute care setting hospitals and carry a more associated risk (Byrne et al., 2011).

A comparison of the pre- and posttest data sets obtained from the IP, QI, and RM team resulted in a better understanding of the problem that impeded MRSA in acute care settings. With this information, I was able to evaluate the effectiveness of the Biopatch disc on PIVs. These data also provided reliable information on how to decrease the incidence of MRSA in PIVs and decrease overall patient hospital length of stay to fewer than seven days. These reductions can improve patient outcomes as well as patient hospital experience.

MRSA is a part of a strain of resistant beta-lactam antibiotics, including penicillin and cephalosporin. MRSA is the cause of a significant number of HAIs (Byrne et al., 2011). Evidence has shown that whenever patients have a break in their natural host of defense, they are potentially at risk to be exposed to pathogens from the hospital's environment (Byrne et al., 2011). The use of the Biopatch disc has had a positive impact on decreasing the incidence of MRSA in PIVs in patients admitted to acute care settings and has helped to improve patient outcomes (Byrne et al., 2011).

The published rates, causes, and prevention of infections associated with short peripheral catheters needed more clarity. This information and on patient outcomes may enable healthcare practitioners in general, and the nursing profession, specifically, to better advocated for the safety of the patients in their care. The goal of the evaluation was to show whether the use of the Biopatch disc decreased the incidence of MRSA in PIVs in patients in acute care settings. The results of this QI evaluation showed reliability. Evidence of the reliability may allow other healthcare professionals and the IP, QI, and RM teams of acute care organizations to collaborate and develop local and regional surveillance programs. These programs, along with other existing initiatives to educate nursing staff and other personnel on the incidence of decreasing MRSA, may promote patient safety. Furthermore, they may provide local hospitals/acute care settings with the empowerment to make necessary changes within their IP, QI and RM programs to develop a surveillance program of their own to decrease their rates of MRSA in PIVs within their organizations as well.

The medical benefits of an intravascular device should always be considered carefully against both the risks and the benefits. Furthermore, catheters should always be removed if there are impeding signs of infection trying to occur or if the device is no longer essentially necessary (Austin et al., 2016, para 1). The large number of PIVs that are implemented in acute care settings and the scant attention given to HAI risks associated with these lines constitute an urgent consideration of IV therapy (Austin et al., 2016, para 1). Although the IV device is an essential component of modern health care, it must not be forgotten that its presence could increase the risk of HAIs to recipients. Skin flora such as the staphylococci spp are the organisms most associated with line-related bacteremia and can have potentially fatal consequences for patients (Austin et al., 2016, para. 1).

MRSA in PIVs remains a major concern in acute care settings. Site monitoring before and after removal of PIVs should be a priority in preventive efforts to help decrease the incidence of MRSA in acute care settings. Based on my review of the literature, more prospective studies are needed, both to assess the true incidence and burden of PIV-related bloodstream infections and to evaluate effective innovative prevention strategies, such as checklists for PIV insertion, monitoring PIV sites, and the use of qualified trained personnel in IV therapy.

Summary

In summary, catheter-related bloodstream infections such as MRSA are expensive, prevalent, and often fatal. The number of such infections could possibly be reduced, and the outcomes can be improved if specific standards in the quality of care are

maintained through a surveillance prevention program. It is possible to develop indicators for mandatory QI programs on MRSA that take into consideration the different perspectives of all stakeholders involved. Ongoing efforts could be put into place to increase the prevention of MRSAs and improve the care of those who experience MRSA, along with other HAIs, in acute care settings. The number of patients who are affected worldwide by MRSA is slowly declining, but not to the point where a significant difference can be seen Austin et al., 2016). Broad use of a QI surveillance program could significantly reduce morbidity and costs of care associated with catheter-related bloodstream infections such as MRSA in an acute care setting.

Section 2: Background and Context

Prevention of healthcare-associated infections such as MRSA is a major patient safety concern worldwide. Screening of patients for MRSA colonization is becoming a routine aspect of hospital admission; however, there is limited published literature as it relates to MRSA screenings (Currie, Knussen, Price, & Reilly, 2013). IV catheters are now reported to be the single most common source of bacteremia and fungaemia, but infections that are associated with short peripheral catheters have received very little attention (Hadaway, 2012). The medical benefits of an intravascular device (e.g., a PIV) should be carefully considered against both the infectious and noninfectious risks (Mutters et al., 2014). The establishment of an environment free of MRSA as part of an infection prevention protocol in an acute care setting has been shown to yield positive results.

The problem that was addressed in this evaluation project was the increased incidence of MRSA in PIVs in patients in acute care settings. I undertook the evaluation to address the lack of knowledge regarding whether the implementation of the Biopatch disc was effective in decreasing the incidence of MRSA in patients with PIVs in acute care settings. The purpose of the project was to evaluate the current practice of using the Biopatch disc on PIVs to determine its association with the incidence of MRSA in patients in acute care settings.

In one study, patients receiving IV therapy were four times more susceptible to healthcare associated bacteremia than those not receiving this form of intervention (Jeanne, Z., 2008). The increased use of IV therapy throughout medicine has been

accompanied by a high incidence of morbidity and mortality associated with catheter-related sepsis (Waghorn, 1994). In this doctoral project, I evaluated the effective use of the Biopatch disc in reducing the risk of bacteremia infections associated with IV catheters in an acute care setting as part of a QI program. The program was recently implemented in a Phase I and Phase II within the organization.

The published rates, causes, and prevention of infection associated with short peripheral catheters needs more clarity. The patient outcomes which was discovered through this initiative was the true driving force behind its implementation as healthcare in general and the nursing profession advocated for the safety of the patients that was in their care. The theoretical framework, Deming's (1973) model for improvement, supported the idea that the best approach for tackling this problem of MRSA was through active surveillance of high-risk patients or during the times of when the potential was greatest by adopting simple perioperative practices. The purpose of this project was to evaluate the use of the Biopatch disc on PIVs and its impact on reducing the incidence of MRSA in patients in acute care settings. I sought to answer the following practiced-focused question: In the acute care setting, did using the Biopatch disc reduced the risk of MRSA infection when used on PIVs over a 6-month period?

The goal of the evaluation was to provide evidence regarding whether the use of the Biopatch disc decreased the incidence of MRSA in PIVs in patients in acute care settings. The results of this QI evaluation showed reliability; evidence of reliability may support collaborations by other healthcare professionals and IP, QI, and RM teams in acute care settings organizations to develop local and regional surveillance programs.

These programs, along with other existing initiatives, may educate nursing staff and other personnel on ways to decrease MRSA. Furthermore, findings may provide local hospital/acute care settings with the empowerment to make necessary changes within their IP, QI and RM programs to develop a surveillance program of their own to decrease their rates of MRSA in PIVs within their organization.

Concepts, Models, and Theories

To increase the likelihood of a program's success, good planning is critical. The model that I chose to guide this project was Deming's (1973) model for improvement. I used the plan, do, study, and act phases of the model in a rapid cycle format, which allowed for changes in the protocol as feedback was gathered and facilitated the use of teamwork to make improvements. Individuals who were admitted to the acute care facility and who had a PIV initiated and implemented were at risk for developing MRSA within the site. Educating personnel on the importance of developing a QI plan to stay in compliance with the facility policy and procedure protocols may help to reduce the increased number of infections and make the jobs of IP, QI and RM team members a little easier.

The theorist who promoted the implemented Phase I of the project was Patricia Benner. Benner viewed that clinical nursing expertise as being embodied; in other words, "through experience, skilled performance is transformed from the halting, stepwise performance of the beginner…to the smooth initiative performance of the expert" (Masters, 2012, p.72). Benner's model underpinned the initiative behind the use of the Biopatch disc in PIVs in that, through education and training, staff helped to

improve their skill performance, from a beginner to the smooth transition of an expert. Staff members' increased efficacy decreased the incidence of MRSA in patients with PIVs and improved overall patient satisfaction and outcomes in those who were admitted to the acute care facility.

Professional conduct is socially embedded, wired, and embodied in the practices, ways of being, and responses to clinical situations that promote patient well-being, where clinical and ethical judgements are inseparable (Masters, 2012). Benner identified nine domains that are critical to patient care and their outcomes. The domain that best correlated to the implemented Phase I and Phase II evaluation of the Biopatch disc in decreasing the incidence of MRSA in PIVs was administering and monitoring therapeutic interventions and regimens. One of the core competencies in the healthcare arena is to provide an environment that is free of infection as much as possible. One of Benner's competencies within her domain of administering and monitoring therapeutic interventions and regimens included "starting and maintaining intravenous therapy with minimal risks and complications" (Masters, 2012, p. 76). Benner assumed that the meaning embedded in skills, practices, intentions, expectations, and outcomes cannot be made completely explicit; however, the meaning can be interpreted by someone who shares a similar background and can be validated by participants and practitioners (Masters, 2012, p. 80). I implemented this project using a multidisciplinary approach, by soliciting stakeholders' input, identifying key concepts to be communicated, and mapping those concepts to Benner's theory.

Definition of Terms

To ensure understanding of the terms used in this project, the following definitions are provided:

Bacteremia: The presence of bacteria in the bloodstream.

Client: A customer of a professional service provider or the principal of an agent or contractor.

Educator: A person who provides instruction or education; a teacher.

Methicillin-resistant Staphylococcus aureus (MRSA): Bacteria that is resistant to many antibiotics.

PIV (peripheral intravenous catheter): A small, flexible tube placed into a vein to administer medication or fluids.

Relevance to Nursing Practice

MRSA was the cause of a significant number of HAIs (Byrne et al., 2011). Attempts had been made to reduce a patient's risk for contracting any type of infection, especially MRSA. As nursing continues to evolve, it should be a culture of safety in which the rates of the HAIs, particularly MRSA have a substantiated decline rate in patients in acute care settings. It has been shown that large-scale QI studies are challenging to conduct because they receive less funding than randomized trials that are of the same size. The need to improve the quality of care is too great and the resources devoted to such an effort are very limited to be unsure about whether these types of QI interventions work. QI studies require more rigor and resources (Daley, Provost, Needham, & Berenholtz, 2007).

Catheter-related bloodstream infections are common, costly, and potentially lethal. In the United States, central venous catheters alone caused an estimated 80,000 in catheter-related bloodstream infections, thus, up to 28,000 deaths of patients in intensive care units (Pronovost et al., 2006). Per the National Nosocomial Infections Surveillance (NNIS) system of the Centers for Disease Control and Prevention, the median rate of catheter-related bloodstream infection of all types ranged from 1.8 to 5.2 per 1000 catheters-days. Interventions aimed at decreasing the infection rate are needed to reduce the serious public health consequences of this HAI (Pronovost et al., 2006).

PIV insertion is a common procedure among hospitalized patients in acute care settings, but few studies have focused on the risk associated with PIV infections (Austin, Sean, Whittier, Lowy, & Uhlemann, 2016, para. 1). Bacteremia as a complication of PIV was considered rare and estimated to occur in 0.1 percent of patients with PIV infections. However, the large numbers of PIVs that are placed annually mean that the public health burden associated with this could even be substantial. Furthermore, most PIV-related bacteremias was related to MRSA and are associated with the most severe complications with a mortality rate that could approach 20-30 percent (Austin et al., 2016). The significant for nursing practice was indicated by providing evidence-based practice on approaches that would decrease MRSA in PIVs in hospitalized patients in acute care settings and increased their overall patient outcomes.

Local Background and Context

There has been substantial focus on the risks associated with PIV bloodstream infections. PIVs are much more common in acute care settings and have increased

associated risks of MRSA. Peripheral IV catheters allow reliable and convenient delivery of life-saving medications for hospitalized patients. Placement of a peripheral IV catheter is, however, a painful experience for patients. For staff that have limited amount of experience in placing peripheral IV catheters, multiple attempts are sometimes required, especially for those with difficult venous access, thus making the experience of one being very unpleasant.

IV therapy is a common and frequently vital intervention for patients undergoing medical care. Although this may have a positive effect on the health of the person receiving such therapy, it did not come without risks. Any breach in the integrity of the skin, caused by wounds, incisions, or the use of penetrating devices such as intravascular catheters, could act as a portal for access to normally sterile tissues by micro-organisms and thereby predisposes them to infection.

Patients receiving IV therapy was four times more susceptible to healthcare-associated bacteremia than those not receiving this form of intervention (Jeanne, Z., 2008). The increased use of intravascular devices throughout treatment has been accompanied by significant morbidity and mortality associated with catheter-related sepsis (Jeanne, Z., 2008).

Interest in this form of infection had recently increased. Bacteremia has now become the focus of political attention due to perceived problems of healthcare-associated infection (Public Health Laboratory service, 2002). Because of the increase in media interest in healthcare-associated infections, there was a perception that these

infections were increasing. Therefore, it was not possible to state whether any increase was an actual one or the potential for increase.

The organization that was being evaluated had a high increase of MRSA within their organization when compared to other institutions within the same area. Local trends showed that this organization was worse than the national benchmark when compared to other organizations within the same area as it related to MRSA due to failure to follow best practices when treating patients with PIVs ("Hospital Compare Quality of Care Profile Page," 2017, table 1). This organization sought out an engineering approach to use the Biopatch disc on PIVs to see if it would have a profound affect in decreasing MRSA as well. Although few facilities focused on MRSA in PIVs, bloodstream infection (BSI) risk from PIVs may exceed central line-related risk.

A national surveillance scheme for reporting MRSA as a result, have now been established. To address this situation, the Federal Joint Committee, took a stand, which is the highest joint decision-making body of the joint self-government of physicians, dentists, hospitals and health insurance funds. Few studies have focused on the risks of PIVs as a source for MRSA, as a life-threatening complication. National rates of catheter-associated bloodstream infections continue to decrease, especially for *Staphylococcus aureus* infections, but little data exist on infections due to peripheral catheters.

Role of the DNP Student

This evaluation project goal was to improve patient's safety in acute care settings in a local hospital in Jefferson County, in Birmingham, Alabama. The evaluation focused

on the incidence of MRSA in PIVs in patients hospitalized in acute care settings. The goal was to evaluate Phase I and Phase II of this QI project. During Phase I, did the implementation of the Biopatch disc utilized with the PIVs reduce the incidence of MRSA infections in the 206 medical patients that was admitted in a local hospital in Jefferson County in Birmingham, Alabama in 2016. Within 3 months after implementation, the median rate of infection was 3, a rate that was sustained throughout Phase II of the implementation program. The role of the DNP educator was to collaborate with IP, QI and the (RM) teams to identify indicators that could be evidence-based as well as being tailored to suit the specific requirements of the organizations concerns and which should be implemented on a mandatory basis.

Summary

While the IV device is an essential component of modern healthcare, remarkable as it is, its' presence can increase the incidence of healthcare-associated infections in its recipients. Catheter-related bloodstream infections are expensive, prevalent, and often fatal. IV therapy continues to be the most frequently used medical procedure for hospitalized patients in acute care settings that they continue to experience. Scrupulous aseptic and sterile techniques during the placement and maintenance of such sites can prevent catheter-associated complications. Patients who are in acute care settings are at increased incidence for IV catheter-associated infections. Furthermore, the increased use of the device with antibiotics can create a patient care environment where MRSA emerges. Therefore, following the hospital IP, QI, and RM standards and protocols for

IV therapy can help to decrease the risk of PIVs infections and can improve patient's outcomes.

Section 3: Collection and Analysis of Evidence

MRSA is a type of staph bacteria that is resistant to many antibiotics. In healthcare settings, such as acute care facilities or nursing homes, MRSA can cause severe problems, such as bloodstream infections, pneumonia, and surgical site infections that could lead to sepsis and death (Centers for Disease Control and Prevention, 2016). The focus of the evaluation was on assessing the potential for decreasing the incidence of MRSA utilizing the Biopatch disc on PIVs on patients in acute care settings. When healthcare organizations and communities within them can work together to decrease HAIs and increase better patient outcomes, they may be better able to reduce the incidence of MRSA in acute care settings. The collaborative efforts between IP, QI and the RM teams determined the incidence of MRSA and whether the Biopatch disc decreased the incidence in PIVs. The development of such a collaborative based program consisted of educating and training of nursing staff on IV techniques, hand hygiene, and infection prevention practices to improve patient outcomes.

The implementation of a surveillance QI initiative significantly enhanced the adherence of prevention guidelines set forth by this evaluation program. The Centers for Disease Control and Prevention had initiated several short- and long-term surveillance (infection tracking) programs that involved collaboration with health departments, individual hospital, and academic medical centers, among others (Centers for Disease Control and Prevention, 2016). Acknowledging the burden that MRSA had on patient outcomes, how frequently it occurred, and how it was spread made it vital for developing an effective surveillance prevention program. The need to improve the quality of care

and improve patient outcomes was too great, and the resources devoted to this effort were very limited, resulting in uncertainty about whether the QI intervention program really worked. QI initiatives require more rigor and resources. It was evident that the health care community needed more research on this issue to enhance knowledge of infection rates, pathophysiology, and the most appropriate preventive methods to utilize.

Practice-Focused Question

The practiced-focused question for this evaluation Phase I and Phase II project was as follows: In the acute care setting, did using the Biopatch disc reduce the incidence of MRSA infection on PIVs over a 6-month period? The objectives of the project were to analyze empirical data to answer the practice-focused question. Specifically, I wanted to answer of whether the facility/organization reduced their incidence of MRSA in patients with PIVs who utilized the Biopatch disc in the acute care setting over the 6-month pre- and postimplementation time period.

Sources of Evidence

There was empirical evidence to suggest that MRSA in PIVs could be reduced using the Biopatch disc along with some basic nursing implementation strategies. The risk of catheter-related bloodstream infections associated with the use of a central IV line or peripherally inserted central catheters was well known and well documented (DeVries, Mancos, & Valentine, 2014). Far less attention had been devoted to the BSI risk from PIVs, although that risk might be just as large. The individual risk of a BSI occurring with a PIV is lower than in a central line/peripherally inserted central catheter. However,

some 150 million PIVs are placed in the United States annually, a number that is much greater than the number of central lines used overall (DeVries et al., 2014).

With the approval of the Organization Institutional Review Board, Compliance Officer and the Walden Institutional Review Board, (06-12-20-0171452), I evaluated data that had previously been collected by a local hospital in Jefferson County in Birmingham, Alabama. The data were compared to a 6-month postimplementation period from July 2016 to December 2016, when the Biopatch disc was being utilized hospital wide, and to the preimplementation period of January 2016 to June 2016, which was also a 6- month time interval. In analyzing these data, I wanted to determine the effect of the Biopatch disc on PIVs and the reduction of MRSA.

A more comprehensive prevention strategy for the implementation of specific anti-infective measures such as the Biopatch disc needs to be a part of a broader patient safety program. Indeed, infection control programs are a prototype of safety intervention programs within the organization and therefore are responsible for preventing harm to inpatients within the acute care setting. The evidence I reviewed suggests that facilities implement a surveillance program to reduce device-related infections (see Mutters et al., 2014). One of the most important components of infection control programs is the implementation of surveillance programs. Sources indicated that it is very important to identify morbidities, assess infection rates, ensure adherence to preventive measures, and identify components of infection control programs (Mutters et al., 2014).

I analyzed archival data that were collected from a local hospital in Jefferson County in Birmingham, Alabama, before and after the Biopatch disc was implemented.

My objective was to determine whether there was a significant reduction in MRSA in PIVs in patients who were admitted within the acute care setting. Evaluating the interventions assisted in determining whether the organizations' IP, QI and RM programs led to a reduction of MRSA in PIVs by implementing the Biopatch disc on patients who were admitted in the acute care setting.

Analysis and Synthesis

I studied the IP, QI and RM team's adherence to treatment guidelines using the theory of health prevention, as well as the overall effectiveness of decreasing MRSA in PIVs using the Biopatch disc in patients in acute care settings. I based the evaluation on the Centers for Disease Control and Prevention Surveillance program for tracking infection. The guidelines suggest that collaboration with health departments, individual hospitals, and academic medical centers, among others, are essential for developing effective prevention programs and measuring their impact Centers for Disease Control and Prevention, 2017, para. 1. The Centers for Disease Control and Prevention had a Category 1A recommendation to evaluate compliance with insertion and maintenance protocols for all staff involved with intravascular devices. Nonetheless, it was commonplace for hospitals to not perform such process monitoring on peripheral lines, especially those in acute care settings (Centers for Disease Control and Prevention, 2017, para. 3).

However, in support of the Evaluation Plan from the Centers for Disease Control, including plans from the state and community-level, the evaluation framework offered perspectives for the measurement of components for prevention protocols, as well

recommendations for IP and RM Program protocols. The assessment provided evidence regarding the effectiveness of using the Biopatch disc on PIVs aimed at preventing MRSA in patients in acute care setting

I obtained and analyzed the following sets of data in in this Phase I and Phase II evaluation study: the preprogram MRSA data of the numbers of patients with PIVs admitted within the acute care setting without the Biopatch disc and the post program MRSA data of the number of patients with PIVs admitted to the same acute care settings using the Biopatch disc. All sets of data were essential in measuring the impact of the Biopatch disc in decreasing the incidence of MRSA in PIVs among patients admitted to the acute care setting. Data analysis was done using the SPSS Statistics Data Analysis package. The Fischer exact test was most appropriate for this evaluation of PIV utilizing the Biopatch disc verses those that did not utilize the Biopatch disc during implementation of a PIV and the incidence of MRSA during their hospitalization. In this case, the test compared the proportions of the pre-and post-test participants of those that was admitted to the same acute care setting utilizing the Biopatch disc on admission within the organization. To show the desired outcomes between the patients with and without the Biopatch disc the Fischer exact test of two proportions analysis was utilized. This test the hypothesis and showed that there may or may not be a difference between using the Biopatch disc in decreasing the incidence of MRSA in PIVs in patients that was admitted to acute care settings.

The results of the categorical outcomes analysis enabled this scholar in accepting or rejecting the null hypothesis and after that offered an answer to the study question

regarding the effectiveness of the Biopatch disc in decreasing the incidence of MRSA in PIVs among patients who was admitted into the acute care setting. The answer to the study question also assisted various stakeholders, including healthcare advocacies in designing surveillance programs and adherence to protocols that would further reduce patients the risks of HAIs in Jefferson County where the data was obtained.

Summary

In summary, there was much controversy over the best approach to tackling the problem of MRSA. While targeted active surveillance was best reserved for high-risk patients or during times of an outbreak, adopting the simple perioperative strategies could lower the incidence of MRSA in PIVs in acute care settings. Standardization of practice in acute care settings where patients are at increased risk for infections could be reduced by utilizing these practices. If infection prevention is to be successful, all intricate staff and personnel must be involved in implementing those procedures and practices that reduces the risk of patients acquiring HAIs within their organization/facility.

Section 4: Findings and Recommendations

The purpose of this project was to evaluate the utilization of the Biopatch disc on PIVs implemented in a hospital. The Biopatch disc was a QI initiative aimed at reducing the incidence of MRSA in PIVs in patients admitted into the hospital acute care setting. The disciplinary team that was initiated at the project site to reduce HAIs discussed IP, QI, and RM hurdles. Improving quality of care with the use of fewer resources can potentially help in reducing mortality and morbidity outcomes as well as health care costs (Austin et al. (2016). The members of the healthcare team were informed of the QI initiative along with the pilot dates and organization-wide implementation dates. Nursing staff was educated on the proper use and technique for utilizing the Biopatch disc and given an opportunity to provide feedback regarding the use and effectiveness of the disc in decreasing the incidence of MRSA in PIVs in patients admitted into acute care setting.

I examined if the implementation of the Biopatch disc resulted in a reduction of MRSA in patients with PIVs. The difference in the rate of MRSA in PIVs before and after the implementation of the Biopatch disc was examined and statistical significance was determined. Archival data of MRSA in 2016, the year prior to the implementation of the Biopatch disc, obtained from the IP, QI, and RM department was used as the pretest data. I also collected posttest data from after the implementation of the Biopatch disc. The pre- and posttest data were compared using the Chi-square test of two proportions. I sought to answer the following practice question: In the acute care setting, did using the Biopatch disc reduce the risk of MRSA infection when used on PIVs over a 6-month

period? In other words, in the acute care setting, did the hospital and nursing staff benefit from a 7-day peripheral IV protocol using the Biopatch disc over a 6-month period?

The study time frame included a 1-year period from January 2016 through December 2016, during which the Biopatch disc was used. This time frame was a year after the 30-day pretrial implementation of the initiative. The data included the utilization of the Biopatch disc of patients in all inpatient units within the hospital.

Findings and Implications

PIVs insertion is a very common practice procedure among hospitalized patients within acute care settings, but there has been limited attention focused on the risks associated with PIVs infections. The development of a QI program to evaluate and educate staff on the implementation of the Biopatch disc during the insertion of PIVs embraces this concept from an evidence-base best practice methodology. According to Austin et al. (2016), the large number of PIVs that are placed annually means that the public health burden associated with this low-frequency event can be substantial. Subsequently, the Biopatch disc was implemented to help decrease the incidence of MRSA in PIVs within this organization. The peer-reviewed literature only appraised the Biopatch disc being utilized with central venous catheter lines and peripherally inserted central catheters, but not with PIVs. The evaluation program was developed to assist the IP, QI, and RM teams to help support the nursing staff in their ability to help detect and prevent patients from the increased incidence of developing MRSA in PIVs in acute care settings using the Biopatch disc. The intended outcome was to decrease the incidence of MRSA in PIVs in hospitalized patients admitted to acute care settings by utilizing the

Biopatch disc. The educational initiative was designed to evaluate and validate the significance and importance of nurses to recognize and decrease the incidence of MRSA developing in PIVs. It was essential that the primary focus of the evaluation program for nurses to be able to identify the signs and symptoms of developing infections in PIVs.

Implementation

Prior to the implementation of Phase I and Phase II, I developed a program timeline that outlined the required steps needed for the implementation of the Biopatch disc in the acute care setting. The hospital had an existing process for implementing organizational systems projects. The hospital chose to pilot the project first on a medical oncology unit for 30 days prior to implementing the project organization-wide. IP, RM, and QI looked at all patients who were admitted to the unit over the designated time frame who had a length of stay over seven days and were at increased risk for acquiring MRSA after receiving a PIV. During the pretrial 30-day pilot month, the organization had a total of six MRSA incidents that manifested. The team looked at those patients, and, after reviewing the numbers founded on the results, started implementing the Biopatch disc in Phase I and Phase II organizational wide.

Table 1

Pre-Trial 30-day Pilot Month December 2015

	Results		
	Biopatch disc	No Biopatch-disc	Marginal row totals
MRSA	49	6	55
# of Lines	176	127	303
Marginal column totals	225	133	358 (grand total)

One hundred and seventy-six patients were admitted on the medical oncology unit for the 30 days prior to implementing the Biopatch disc. Of these patients, 49 (3.6%) used the Biopatch disc but had no incidence of MRSA compared to 127 patients (1.4%) who did not use the Biopatch disc. Due to the small sample sizes, Fischer's exact test was run. There was a statistically significant difference. The Fisher exact test statistic value was < 0.00001. The result is significant at $p < .05$.

Phase I implementation plan was centered on the population sample that was chosen based on those patients that was admitted into the acute care setting and required a PIV during the 6-month trial period. These patients were evaluated based on the incidence of acquiring MRSA during their hospitalization based on implementation of the Biopatch disc being utilized. The analysis was focused on the implementation of the Biopatch disc to reduce the rate of incidence of MRSA in PIV infections in the acute care setting of a local hospital in Jefferson County in Birmingham, Alabama in 2016. Within the first 6 months of implementation, the median rate of infection was three, a rate that they could see slightly declining throughout the implementation of this project as seen in Table 2.

Table 2

Phase I- Implementation First Six Months Biopatch Disc January 2016-June 2016

	Results		
	No Biopatch disc	Biopatch disc	Marginal row totals
MRSA	34	3	37
# of lines	240	206	446
Marginal column totals	274	209	483 (grand total)

During Phase I implementation of the Biopatch disc, there was 240 patients who was admitted to the medical Oncology unit, where 206 patients (7.1%) utilized the Biopatch disc showed no incidence of MRSA, when compared to the 34 patients (1.2%) who did not utilize the Biopatch. Though the sample size was small, but larger than the 30-day pre-trial phase, a statistically significant could be seen when utilizing the Fischer exact test statistic value was < 0.00001. The result was significant at $p < .05$.

During Phase I of the implementation of the project, the Biopatch disc was shown to make a slight decrease in reducing the incidence of MRSA during this time frame. The Fischer exact test of two proportions was used to analyze the data that had already been collected by the organization. This test showed that although the sample size was relatively small, there was a small statistically reduction in the proportions of patients to MRSA cases in the pre-trial 30-day Pilot month and the post implementation of Phase I of the Biopatch disc as seen in Table 3.

Table 3

Pre-trial 30-day Implementation Compared to Phase I Implementation of Biopatch Disc

	Results		
	No Biopatch disc	Biopatch disc	Marginal row totals
MRSA	6	240	246
# of lines	176	3	179
Marginal column totals	182	243	425 (grand total)

When the pre-trial 30-day implementation was compared to Phase I implementation of the Biopatch disc there could still be seen a slight statistical difference in the incidence of MRSA in those patients who utilized the Biopatch disc, versus those

patients who did not utilize the Biopatch disc in PIVs. Although, the difference was not all that great, it afforded the IP, QI, and RM team the opportunity to help decrease their incidence of MRSA in the future. The Fischer exact test value was <0.00001. The result was significant at p <0.05.

In Phase II of the implementation of the project, there was seen a greater decrease in the incidence of MRSA in PIVs when the pre- trial implementation and Phase II of the project was analyzed using the Fischer exact test. When comparing the pre-trial month against Phase II a statistically significance could be seen in the decreased incidence of MRSA in PIVs as indicated in Table 4. If the Biopatch disc continues to be utilized, overtime it could prove to be very beneficial in decreasing the incidence of HAIs as it relates to PIVs.

Table 4

Phase II Implementation of Biopatch disc July 2016- December 2016

	Results		
	No Biopatch disc	Biopatch disc	Marginal row totals
MRSA	2	299	301
# of lines	324	25	349
Marginal column totals	326	324	650 (grand total)

During Phase II implementation of the Biopatch disc, there was 324 patients who was admitted to the medical Oncology unit, where 299 patients (99%) utilized the Biopatch disc and showed no incidence of MRSA, when compared to the 25 patients (1%) who did not utilize the Biopatch. Though the sample size had increased compared to the initial implementation of the Biopatch disc, a statistically significant could also be

seen when utilizing the Fischer exact test statistic value was <0.00001. The result was significant at $p < .05$.

Table 5 shows that when the pre-trial 30-day Pilot month was compared to Phase II of the implementation of the Biopatch, there could be seen an even greater decline in the incidence of MRSA in PIVS in patients admitted to the acute care setting.

Table 5

Pre-trial 30-day Implementation Compared to Phase II Implementation of Biopatch Disc

	Results		
	No Biopatch disc	Biopatch disc	Marginal row totals
MRSA	6	324	330
# of lines	176	2	178
Marginal column totals	182	326	508 (grand total)

When the 30-day pre-trial utilization of the Biopatch disc implementation was compared to Phase II execution of the Biopatch disc, IP, QI, and RM determined that the incidence of MRSA in patients with PIVs could possibly be decreased through the utilization of the Biopatch disc. Although the sample sizes were small, there was the possibility that the Biopatch disc could possibly decrease the incidence of MRSA in those patients who were admitted in an acute care setting. The numbers were significant when utilizing the Fischer exact test, where the value could be <0.00001. The result was significant at $p < .05$.

Important reductions in morbidity and health care cost could be achieved if the implementation of the Biopatch disc continues to prove fruitful in reducing the incidence of MRSA in PIVs. The ability to measure and evaluate the true effectiveness of the

implementation of the Biopatch disc to decrease the incidence of MRSA in PIVs is still underdeveloped. In this project, monitoring the rates of occurrence of MRSA in PIVs was possible because of the existence of the infrastructure of having an IP, QI and RM team who worked hand in hand in educating and training staff on the importance of hospital-based infection control practices. Most importantly, the reduction in the morbidity and health care cost that could be achieved worldwide if the implementation of the Biopatch disc proved to be successful.

Evaluation

The evaluation plan was the biggest concern. The data would not be collected until after implementation of each phase of the project. The IP, QI, and RM team desired an evaluation plan that would include CLABSI, line days, patient days, CLABSI rate/1000 CL days and CL utilization ratio. The evaluation showed that reducing the incidence of MRSA in PIVs using the Biopatch disc was feasible and could have a major impact on public health concerns. The ability to measure and evaluate the effect of the project to increase patient safety remains underdeveloped. In this evaluation project, monitoring catheter-related blood stream infections such as MRSA was possible because of the existence and strong commitment of the IP, QI, and RM team within the organization.

According to Kettner et al. (2008), the primary purpose of the program evaluation was to provide feedback on the results or outcomes of the program impact to inform policy makers and planners about the effectiveness of the program or the appropriateness of the social intervention hypothesis that underlines them. Consequently, when

disseminating an evaluation plan, it was important to include key stakeholders for the program to be effective and attainable. It was imperative to have developed a well-designed and structured plan to help simplify the discovery of its success.

The initial implementation of the program was evaluated against the development and contents from peer-reviewed literature, the primary evaluation was conducted at the end of a 12-month review by the IP, QI, and RM team. This QI project provided an opportunity for increased awareness in decreasing the incidence of MRSA by using the Biopatch disc on PIVs for patients in acute care settings through education and training of staff on their use. The program's objective was to be able to show a steady decrease in the incidence of MRSA in PIVs through the implementation of the Biopatch disc within 12-months. The nurses on the unit were educated and trained on the proper use of the Biopatch disc and were asked to later provide feedback on the ease of use and the potential effectiveness in decreasing the incidence of MRSA in PIVs. The feedback was intended to identify the effectiveness of the Biopatch disc, and whether the program captured the intention of the objectives and if the implementation of the Biopatch disc would have a successful transition into the clinical fold. Finally, would the staff state that the implementation of the Biopatch disc would be successful and sustainable within the organization to improve patient's outcomes and decrease the incidence of MRSA in PIVs? Emphasis on the care and maintenance of catheters once they are inserted should be the focus of performance improvement and quality assurance for all IP, QI, and RM programs.

Discussion of Findings in the Context of the Framework and Literature

The findings showed that there was some statistical significance in the reduction of MRSA in PIVs using the Biopatch disc. The Detection of Patient Risks by Nurses was the framework used to evaluate the Biopatch disc which was a QI project that involved decreasing the incidence of MRSA in PIVS of patients admitted in acute care settings. This process improvement project involved collaboration with clinical leaders, education/ in-services of inpatient areas. There were point prevalence follow-up to identify additional educational needs as they raised. Small tests of change were used with the Biopatch disc starting in one unit which served as pilot for the initiative. The Biopatch disc was carried out on the remaining units who implemented the initiative and the evaluation, innovation and spread. QI projects involve continuous implementation, innovation and evaluation (Singh, et al., 2013). The engagement of the staff in turn, could be influenced by lower patient satisfaction scores. Leadership engagement likewise influenced by the potential for negative impact on patient safety and decrease quality of acre and patient outcomes. Leadership and management should be able to maintain a constant purpose of improving quality (Zarbo, 2012). The reduction of the MRSA can be attributed to other initiatives which was started before the Biopatch disc.

Project Implications

The implications for this project would serve as a catalyst to offer staff nurses the ability to be able to recognize the signs and symptoms of infection and help decrease the incidence of MRSA in patients with PIVs in acute care settings. PIV infections are a preventable source of MRSA. Through the efforts of IP, QI, and RM in educating staff in

recognizing and monitoring PIVs by utilizing the Biopatch disc would help to decrease the incidence of this occurrence and help to decrease the incidence of MRSA. According to Austin, et, al. (2016), suggests that site monitoring after the removal of PIVs should be a priority in preventive efforts. More studies are needed in both to assess the incidence and burden of PIV-related blood stream infections and to evaluate effective innovative prevention strategies, such as checklists for PIV insertion, monitoring old PIV sites, or the use of anti-microbial- coated peripheral catheters.

Implications of findings for individuals. The findings showed that there is statistical significance with the implementation of the Biopatch disc in reducing MRSA in PIVs of patients in acute care settings. The Biopatch disc offered an important indicator on the importance of how to ensure optimal patient outcomes by initiating surveillance programs in acute care settings. Healthcare in general and the nursing profession should advocate for the safety of the patients within their care.

Implications for policy. The findings showed that there is some statistical significance with the implementation of the Biopatch disc in reducing MRSA in PIVs of patients in acute care settings. The Biopatch disc increased the awareness of the IP, QI, and RM team that the Biopatch disc could make a difference in decreasing the incidence of MRSA in PIVs and therefore would warrant a change in hospital policy by incorporating the Biopatch disc in the hospital IV start kits.

Implications for practice. The development of good practice guidelines with the implementation of the Biopatch disc could prove fruitful. Educating and training personnel regarding the indications for the Biopatch disc in PIVs, proper procedure for

the use of the Biopatch disc and maintenance of IV catheters and appropriate infection control measures to prevent MRSA infections in PIVs could further decrease the incidence of occurrence when used properly. Collaboration with IP, QI, and RM could increase performance improvement initiatives and further decrease the incidence of MRSA on PIVS and together improve hospital compliance.

Implications for research. The Biopatch disc in decreasing MRSA in PIVs requires further research. There have been numerous QI studies that have looked at the Biopatch disc on central venous lines, but limited research has been directed and focused on the Biopatch disc on PIVs. The IP, QI, and RM team can potentially start a culture change wherein patients have a decrease incidence of MRSA in PIVs when they employ these multifaceted approaches in with several strategies and bundle together to improve compliance with the evidence-based guidelines.

Implications of findings for systems. Healthcare systems should consider training for healthcare personnel on MRSA and how to decrease the incidence within their organization. Increased collaboration among the health care team should be enhanced as they work towards decreasing HAIs of patients and providing greater patient outcomes. The agency for Healthcare Research and Quality (AHRQ) has been supportive of the movement towards creating high reliability in healthcare to improve the quality and safety of care delivery (Blouin & McDonagh, 2011). When safety and consistency is embedded in every aspect of performance it would ultimately decrease the number of infections within the organization.

Implications for positive social change. The Biopatch disc can potentially start a hospital culture change, wherein patients HAI infection rate can be reduced and lead to better patient outcomes and decrease length of stay. The Biopatch disc may provide local organizations/ acute care settings with the empowerment to make changes within their IP, QI, and RM departments to develop surveillance programs of their own to decrease their rates of MRSA in PIVs within their organization along with other HAIs initiatives.

Recommendations

There was a reduction of MRSA in PIVs of patients from 2015 to 2016 after the implementation of the Biopatch disc. Based on the monthly results, there was still variations in the rate of infection that patients displayed in the hospital. This could be diagnosis or technique-related and could be the seasons of the year when the rate of exacerbation of disease is greater. There are other causes of suspension in the site monitoring before and after removal of the PIV that should have been a priority but was not able to be isolated.

Although the data from this project did not measure the degree of reliability that the organization had hoped for, but the reliability could allow for other healthcare professionals and acute care settings organization, IP, QI, and RM teams to collaborate and develop local and regional surveillance programs that could be fruitful. This project, along with other existing initiatives to educate nursing staff and other personnel on the incidence of decreasing MRSA in PIVs could prove sustainable. Furthermore, it could provide local hospital/acute care settings to be empowered to make the necessary changes within their IP, QI, and RM programs to develop a surveillance program of their own to

decrease their rates of MRSA in PIVS within their organization. Future research studies could be conducted, both to assess the true incidence and the burden of PIV-relate bloodstream infections and to evaluate effective innovative prevention strategies, such as checklists for PIV insertion, monitoring PIV sites and the use of qualified trained personnel in IV therapy.

The information obtained from this study could provide additional knowledge on the reduction of MRSA using the Biopatch disc on PIVs of patients in acute care settings. Hospitals and health care systems could consider opportunities of improving progression of patient care and outcomes through collaboration of the health care team, IP, QI, and RM program in the acute care settings. Through these collaborative efforts hospitals and health care systems could decrease its HAIs rates and improve their overall patient outcomes as well as decrease patients' length of stay, mortality, and morbidity rates.

Strengths and Limitations of the Project

Strengths

The strengths of this DNP Project were that by using the Biopatch disc, the organization's QI initiative was able to increase patients' outcomes and place them at the center of good quality care. The project was evidence-based and proved to be successful by the nursing staff. The project was validated by the IP, QI, and RM team in the field of QI as it relates to patient care and outcomes.

Limitations

The evaluation did have some limitations. First, potential under reporting of MRSA infections and the lack of baseline data from the units that immediately

implemented the intervention when the evaluation was implemented could have created a measurement prejudice that inflated the results. However, the infection rates were collected and reported by the hospital IP, QI and RM team who were impartial of the unit staff implementing the intervention. Second, they did not evaluate compliance with the project intervention, because of limited resources that prevented the observation of PIVs placement. Lastly, the data on the organisms that caused the MRSA or catheter related blood stream infection were not collected, limiting the insight into the mechanism of the observed benefit of utilizing the Biopatch disc.

Summary

The implementation of the Biopatch disc on PIVs would serve as one way to help decrease the incidence of MRSA in PIVs in patients in acute care settings. There is still much debate over the best approach to undertaking the problem of MRSA. If infection prevention is to be successful, all concerned staff and personnel must be involved in implementing these procedures and practices that can help reduce the incidence of patient acquiring HAIs within their organization.

Section 5: Dissemination Plan

Healthcare arenas are discovering ways to reduce HAIs due to the increasing length of stay and the related increase in healthcare costs and changes as they relate to the reimbursement process from payee resources (Mutter, 488). Dissemination of the results of the project started in the hospital where the Biopatch disc was implemented. The first to be informed will be the medical oncology unit nurse manager and nursing staff so that the team and managers who were influential in the implementation of the QI initiative will be informed of the results. Another setting was the IP, QI, and RM team meeting to provide them with the information on the changes that were the result of their initiative.

I plan to disseminate findings from this project to the broader IP, QI, and RM community through a Power Point presentation at one of the yearly Healthcare conferences so that other organizations will be informed of the QI project. For a wider audience, the project was presented to the organization of hospital QI and RM through its website. This dissemination provided information to other organizations who were considering ways to reduce their number of HAIs as it related to MRSA and PIVs.

Analysis of Self

I began this project as I was recovering from a knee injury that resulted in major complications at the hospital. I have been a staff nurse for 18 years and a classroom and clinical instructor, so my involvement in the hospital was not limited to just this area. When I became a nurse, I was groomed to be an educator and introduced to other clinical educators and clinical leaders who advocated for health promotion and disease prevention. I was recovering, and when the Biopatch disc was conceptualized and

implemented, I was a participant in the initiative without my knowledge. I witnessed how this QI initiative was carried out and saw how IP, QI, and RM interacted with the nurse managers and nursing staff to improve patients' outcomes and quality of care.

The biggest challenge in completing this project was recovering from surgery, sickness, and the death of a spouse and balancing time between work, school, and family. My hospital has been going through many changes and challenges including being bought out and merged with another organization. Completing this project was also affected by the preterm birth of my first grandchild. I spent plenty of sleepless nights waiting on the phone to ring with more bad news and prognosis. I also spent time relearning statistics, which was very perplexing for me, while analyzing and interpreting the data.

This DNP project has taught me that I should always follow my heart and focus my goals on those things that I desire and make me uniquely and wonderfully interesting to those who cross my path. I have realized that anything in this life that I want, I must set goals to attain and allot plenty of time, money, and energy to achieve. I have also recognized that as an advanced practice nurse, I am expected to lead and guide others into making the best decisions as they relate to the patients we advocate for daily. Best of all, this project has taught me to never give up on my dreams and never to accept defeat as the last word--to always be as passionate about being a nurse as the first day I became one.

Summary

This DNP project was an evaluation of the Biopatch disc QI initiative that was implemented to reduce the incidence of MRSA in PIVs for patients in the acute care project setting. I evaluated whether there was a statistically significant difference in the reduction of MRSA with the implementation of the Biopatch disc compared to PIVs without the Biopatch disc. Project findings showed that there were some statistical differences between MRSA and the Biopatch disc. Although the findings showed some statistical differences, the reduction of MRSA in PIVs cannot be fully attributed to the Biopatch disc as there could have been other changes that emerged which could have affected the findings.

The information acquired in this project can be used and tried at another organization to see whether it would produce similar results. The Biopatch disc should be included for consideration in other recommended bundles of professional organizations and for use on PIVs. This would offer information to these organizations who are considering ways of decreasing their incidence of HAIs as it relates to MRSA and PIVs and improve their overall patient outcomes.

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