Problem Statement

Melissa Smith

Capella University

MSN-FP6030 MSN Practicum & Capstone

March 2021

Problem Statement

Need Statement

Central line-associated bloodstream infections (CLABSIs) are an infection that occurs when bacteria enters the bloodstream through a central line. These infections are labeled as healthcare-associated infections (HACs), which indicate they are acquired while under health care. One-third of all HACs involve CLABSIs and can cost a health care system between $21,000 and $100,000 per infection (Savage et al., 2019). CLABIs are indicated to have a 12% to 25 % mortality rate (Garrett, 2016). Patients who acquire these infections have an increased length of stay which incurs higher costs. Throughout the United States preventing CLASBIs are a large focus of quality improvement. Insertion bundles and sterile techniques are the center of education to reduce the incidence. However, even with the current standards of care and education, CLABIs continue to be costly. Within the United States, CLABSIs cost about 1.9 billion dollars annually (Larsen et al., 2019). Over the past few years, the Center for Medicare and Medicaid Services (CMS) have stopped payment for CLABSIs which are monitored nationally by the Center for Disease Control and Prevention (Garrett, 2016).

Since the COVID-19 pandemic, an increase in CLABSIs has occurred at Baylor Scott and White Medical Center at Irving (BSWI). The current CLABSI rate is eight for this current fiscal year with still three months left in the year. Last fiscal year only two CLABIs were reported. This quality improvement project will aim to identify evidence-based practices that justify the utilization of a vascular access team (VAT) in an acute care setting to decrease the incidence of central line-associated bloodstream infections (CLABSIs) by providing consistency in line management and education.

Population and Setting

BSWI is a 293 licensed bed facility located in the suburb of Dallas, Texas. Irving, Texas has a little over 220,000 residents and is known for its racial and ethnic diversity. This poses a challenge when caring for diverse patients. BSWI provides care for a large number of Hispanic patients. Studies have shown barriers and challenges to provide appropriate care to the Hispanic population. According to Wittenberg et al., 2018, many nurses report communication challenges with patients who speak English as a second language, and many patients have low health literacy. The target population for this project is patients in the intensive care unit (ICU) and cardiac care unit (CCU) requiring central line placement and management at BSWI. As a result of increasing rates of CLABSIs within the critical care units at BSWI, an intervention of implementing a VAT to insert, manage and educate is necessary. 60 to 70% of CLABSIs are the result of inappropriate or insufficient infection control practices (Savage et al., 2019). The VAT will develop, implement, and standardize policies and procedures that address central lines. This will provide consistency in the care of lines.

Intervention Overview

Implementing a dedicated VAT to insert, maintain, and educate central lines will be the intervention associated with this project. The VAT will be responsible for inserting and managing central lines for CCU and ICU. As the program gets established and becomes successful, implementation throughout the facility will be on the agenda. Another intervention for the VAT will be to collaborate with nursing units and target education regarding the administration of medications through a central line and assessing the dressing. Not only does a dedicated VAT help reduce CLABSIs, but the team also assists in decreasing expenses and increasing efficiency, quality of care, and patient satisfaction by standardizing workflow and identifying the appropriate use of PICC and CVC insertions, maintenance, and removal (Johnson et al., 2017).

Comparison of Approaches

A similar interprofessional approach to decreasing CLABSIs would be to not implement a dedicated VAT in the facility and train designated staff on CCU and ICU to insert and manage lines. The dedicated staff will attend special training and be responsible for maintaining the central line while on the unit. Education for nurses on the units would be provided by the hospital education department. Another approach can be to train a special area such as Cath Lab or Interventional Radiology nurses to insert all lines ordered within the facility. This alternative would still address the concerning rise of CLABSIs in the organization, but all in all, studies show that a dedicated VAT is successful and improves patient outcomes. This approach will be costly, it will require multiple designated staff to be trained. The insertion and care of central lines need consistency in the process, this approach still will not provide this.

Initial Outcome Draft

The overall outcome is to achieve a decrease in CLABSIs by implementing a dedicated VAT. The VAT will assess the need for central lines, and determine if a peripheral or midline can be inserted instead. The VAT will allow consistency with the insertion and management of invasive lines. Providing consistency with the management of lines will improve quality and create positive outcomes for patients. Education for maintaining lines will be standardized by the VAT. VATs are also economically more cost-effective as they have better first-time insertion success as well as reducing the length of hospital stay, improving efficiency with supplies, and reducing device complications (Carr & Moureau, 2019). Outcomes will be measured by a decrease in CLABSI rates and a decrease in central line usage.

This project supports Healthy People 2020's goals by providing high-quality care free of preventable disease, disability, injury, and premature death (Healthy People 2020, 2020). Healthy

People 2020 have developed a national action plan to reduce healthcare-associated infections (HAIs). This project correlates in providing the elimination of HAIs associated with CLABSIs.

Time Estimate

The development of this project is three months. Since many institutions utilize VATs, the development will simple to establish as there are many evidence-based guidelines to follow. The longer process will be implementing this project, it is estimated to take twelve months. Once the project is developed then approval from stakeholders will be required. Once the project is approved, then a team will be created to assist with the planning and implementation of the VAT. The time frame of fifteen months is realistic and aligns with the start of the fiscal year 2022. A potential challenge in the timeline could be the hiring of staff for the VAT as it is unknown how the recruiting will be handled. Another unknown is how long it will take to purchase equipment for the VAT as it will have to be approved through the capital budget process.

Literature Review

Vascular access teams (VATs) are an asset to the organizations that have implemented them in their institutions. Studies prove that VATs decrease CLABSIs, improve quality of care, save organizations money, and improve patient satisfaction. A study of 275 PICCS inserted by the VAT at the Complejo Hospitalario de Navarra was performed to analyze the effectiveness and quality of the VAT that was created in 2018. The items analyzed were the impact of complications, the total cost per PICC insertion, and patient satisfaction. The results included a 1.1% CLABSI rate, a high level of patient satisfaction based on surveys, and a calculated savings of 61.81% when the VAT inserted the line over Anesthesia Services. The overall conclusion of the study indicates low complication rates, high patient satisfaction, and clear economic benefits to the implementation of a VAT (Corcuera Martínez et al., 2020).

According to Martillo et al., 2020 study, the role of the VAT decreased the rate of CLABSIs. By promoting vascular access device care and maintenance, assisted in the reduction of CLABSIs. The study was conducted over 24 months after implementing the VAT. Before implementing the VAT, nurses and house staff inserted peripheral IVs which resulted in multiple attempts and unsatisfied patients. For central venous placement, the patients were sent to Interventional Radiology. After the implementation of the team, now the VAT places all peripheral IVs and central lines. The CLABSI infection rate reduced 58% with the implementation of the VAT. The VAT decreased the CLABSI rate by inserting the appropriate access according to patient needs and educated hospital staff on care and maintenance of vascular access devices.

Bell & Spencer, 2020, examined the process and outcomes of a VAT that was implemented in a 90-bed community hospital emergency department. The study consisted of utilizing a comprehensive-difficult IV access tool that guided the clinicians in when the VAT is utilized. 3,351 devices were attempted in the study, and it resulted in a need for implementing a VAT to provide a higher quality of care. The study validated that clinicians with dedicated training and guidance achieve higher success rates. The study stated still needs investigation of financial impacts.

Mathew et al., 2020, conducted a CLASBI reduction initiative. The key drivers in the study were standardizing practice, data transparency, and accountability. Standardized approaches to central line maintenance were established as well as an audit process. A dashboard was developed for data to be more transparent to staff and patients. For accountability, attestations were created for individuals and daily huddles to discuss. Focusing on these key

drivers CLABSI rates had a 71% decrease. This study aligns with the project by proving that consistency in practice can assist in decreasing CLABSIs.

Savage et al., 2019 demonstrated whether the establishment of a dedicated VAT decreased the incidence of central line usage and CLABSIs through implementing evidence-based guidelines. Once the team was developed, they underwent training to place lines. The team reviewed all orders to determine the appropriateness of line placement. All patients with lines in the hospital were audited daily. Things audited were dressings, missing caps, and connectors. The VAT corrected all defects. The VAT also reviewed protocols and changes processes to reduce risks. Outcomes to evaluate the effectiveness of the VAT compared utilization rates of central lines, the incidence of CLABSI, and the CLABI rate. Central line usage decreased 45.2%, CLABSI incidence decreased 90%, and CLABSI rate improved 80% after the implementation of the VAT. A dedicated VAT contributed to positive results in the hospital. This study suggests that hospitals struggling with CLABI infections will benefit from creating a dedicated VAT.

Carr et al., 2018 compared the use of a VAT to a generalist model approach requiring vascular access for insertion success, device failure, and cost-effectiveness. This study reviewed literature and there are no randomized controlled trials to evaluate the effectiveness on clinical outcomes. This review concludes that a VAT attributes to an increased first-time insertion success, decreased device-related complications, and reduced CLABSIs. Cost-effectiveness is considered with the VAD approach when compared with adverse events of complications and CLABSI.

Pathak et al., 2018 evaluated the use of a midline program to decrease CLABSI and reduce the number of central-line days. Data was collected from 2012 to 2015. In 2014, a central venous catheter bundle was introduced which did assist in decreasing the CLABSI rate. The

midline program initiated in 2015 with the use of a VAT had significant CLABSI results. The infection rate went from 0.289% to 0.047%. This study shows that utilizing a VAT to replace central lines when feasible with midlines decreases CLABSI rate and the number of catheter-days within the hospital.

Another study done at Banner Boswell Medical Center implemented registered respiratory therapists (RRTs) in the role as their VAT. They had them complete specialized training, which is not detailed in the article. They collected data for a year, the hospital experienced a decrease in PICC orders not meeting indications, decrease patient wait times for lines to be inserted, and decreased CLABSI rate. This study concluded that the implementation of a VAT can lead to a reduction in CLABSIs, increase patient satisfaction, and decrease cost for the hospital (Johnson et al., 2017).

A summary of evidence-based practices for bloodstream infection prevention by Garrett, 2016, concluded that vascular access clinicians must be vigilant in infection prevention and control as it is the core element for patient safety and reducing CLABSIs. This study is useful as it discusses the CLABSI prevention strategies such as education of insertion practices and maintenance of central lines. The summary discusses by practicing proper hand hygiene, maintaining a clean clinical environment, and performing proper skin antisepsis contributes to decreasing CLASBIs. This evidence-based summary will be useful with the development of education strategies for the project.

Legemaat et al., 2015 reviewed the effect of a VAT on the incidence of CLABSIs in infants admitted to a neonatal intensive care unit. Selected studies were examined by the implementation of a VAT with a focus on CLABSI rates as well team composition and responsibilities. All VATs included nurses and some physicians. Main duties included insertion

and maintenance of central lines. In all seven studies, a decrease of 45-79% in CLABSIs was reported. A VAT is a positive intervention to implement to decrease CLABSIs in ICU.

Researching and reviewing the literature indicates that implementing a VAT at BSWI will be beneficial in reducing CLABSIs and providing consistency in patient care to improve the quality of care.

References

Bell, J. A., & Spencer, T. R. (2020). Implementing an emergency department vascular access team: A quality review of training, competency, and outcomes. *The Journal of Vascular Access*, *22*(1), 112972982092455. https://doi.org/10.1177/1129729820924554

Carr, P. J., Higgins, N. S., Cooke, M. L., Mihala, G., & Rickard, C. M. (2018). Vascular access specialist teams for device insertion and prevention of failure. *Cochrane Database of Systematic Reviews*, *3*(3). https://doi.org/10.1002/14651858.cd011429.pub2

Carr, P. J., & Moureau, N. L. (2019). Specialized Vascular Access Teams. *Vessel Health and Preservation: The Right Approach for Vascular Access*, 59–65. https://doi.org/10.1007/978-3-030-03149-7_5

Corcuera Martínez, M. I., Aldonza Torres, M., Díez Revilla, A. M., Maali Centeno, S., Mañeru Oria, A., Elizari Roncal, I., Ibarra Marín, B., Casado del Olmo, M. I., Escobedo Romero, R., & Ferraz Torres, M. (2020). Impact assessment following implementation of a vascular access team. *The Journal of Vascular Access*, 112972982098428. https://doi.org/10.1177/1129729820984284

Garrett, J. H. (2016). Summary of Evidence-Based Practices for Bloodstream Infection Prevention Across the Health Care Continuum of Care for Vascular Access Clinicians: Addressing the 3 Common Sources of Health Care-Associated Infection Transmission. *Journal of the Association for Vascular Access*, *21*(2), 72–74. https://doi.org/10.1016/j.java.2016.03.004

Healthy People 2020. (2020). *About healthy people | Healthy people 2020*. Healthypeople.gov. https://www.healthypeople.gov/2020/About-Healthy-People

Johnson, D., Snyder, T., Strader, D., & Zamora, A. (2017). Positive Influence of a Dedicated Vascular Access Team in an Acute Care Hospital. *Journal of the Association for Vascular Access*, *22*(1), 35–37. https://doi.org/10.1016/j.java.2016.12.002

Larsen, E. N., Gavin, N., Marsh, N., Rickard, C. M., Runnegar, N., & Webster, J. (2019). A systematic review of central-line–associated bloodstream infection (CLABSI) diagnostic

reliability and error. *Infection Control & Hospital Epidemiology*, *40*(10), 1100–1106. https://doi.org/10.1017/ice.2019.205

Legemaat, M. M., Jongerden, I. P., van Rens, R. M. F. P. T., Zielman, M., & van den Hoogen, A. (2015). Effect of a vascular access team on central line-associated bloodstream infections in infants admitted to a neonatal intensive care unit: A systematic review. *International Journal of Nursing Studies*, *52*(5), 1003–1010. https://doi.org/10.1016/j.ijnurstu.2014.11.010

Martillo, M., Zarbiv, S., Gupta, R., Brito, A., Shittu, A., & Kohli-Seth, R. (2020). A comprehensive vascular access service can reduce catheter-associated bloodstream infections and promote the appropriate use of vascular access devices. *American Journal of Infection Control*, *48*(4), 460–464. https://doi.org/10.1016/j.ajic.2019.08.019

Mathew, R., Simms, A., Wood, M., Taylor, K., Ferrari, S., Rhein, M., Margallo, D., Bain, L. C., Valencia, A. K., Bargmann-Losche, J., Donnelly, L. F., & Lee, G. M. (2020). Reduction of Central Line-associated Bloodstream Infection Through Focus on the Mesosystem. *Pediatric Quality and Safety*, *5*(2), e272. https://doi.org/10.1097/pq9.0000000000000272

Pathak, R., Gangina, S., Jairam, F., & Hinton, K. (2018). A vascular access and midlines program can decrease hospital-acquired central line-associated bloodstream infections and cost to a community-based hospital. *Therapeutics and Clinical Risk Management*, *Volume 14*(), 1453–1456. https://doi.org/10.2147/tcrm.s171748

Savage, T. J., Lynch, A. D., & Oddera, S. E. (2019). Implementation of a Vascular Access Team to Reduce Central Line Usage and Prevent Central Line-Associated Bloodstream Infections. *Journal of Infusion Nursing*, *42*(4), 193–196. https://doi.org/10.1097/nan.0000000000000328

Wittenberg, E., Ferrell, B., Kanter, E., & Buller, H. (2018). Health Literacy: Exploring Nursing Challenges to Providing Support and Understanding. *Clinical Journal of Oncology Nursing*, *22*(1), 53–61. https://doi.org/10.1188/18.cjon.53-61