Evaluating the Implementation of a Risk Stratification Algorithm to Decrease the Incidence of Postoperative Nausea and Vomiting

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DNP Scholarly Project Final Approvals

The DNP student KATRINA M. NIBA and the Scholarly Project EVALUATING THE IMPLEMENTATION OF A RISK STRATIFICATION ALGORITHM TO DECREASE THE INCIDENCE OF POST OPERATIV N&V meet all the requirements for the degree of Doctor of Nursing Practice at University of Saint Francis-Fort Wayne, IN.

Date of Final Approval: 6-24-22

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Copies to: Student File, Graduate office and attached to the Final Project Manuscript.

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DNP Scholarly Project Proposal Initial Approval

TO: Caitlin Krouse, DNP, FNP-BC, RN
Assistant Professor and Graduate Nursing Program Director

FROM: Katrina Niba, BSN, RN, DNP-NAP Student

RE: DNP Project Proposal Review Council Endorsement

DATE: November 11, 2021

DNP Scholarly Project Title:

Evaluating the Implementation of a Risk Stratification Algorithm to Decrease the Incidence of Postoperative Nausea and Vomiting

DNP Scholarly Project Review Council:

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Date of initial approval to implement: November 11, 2021

1 - Student File
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Abstract

Problem statement

Antiemetics are routinely administered by anesthesia providers to patients undergoing general anesthesia based on a variety of causes. Despite this intervention, postoperative nausea and vomiting occurs in 30% of surgical patients undergoing general anesthesia and up to 70% to 80% of these patients are high-risk. Anesthesia providers at Kosciusko Community Hospital (KCH) fall under the above mention statistics.

Purpose

This DNP Scholarly project attempted to evaluate the utilization of a risk stratification algorithm to decrease the incidence of PONV at KCH.

Methods

During the evaluation of the implementation of the risk stratification algorithm for decreasing the incidence of PONV, a pre/post chart review intervention survey. It tracked the use of the APFEL score (a risk stratification algorithm) for the prevention of PONV over a four-week. interval. The interventions endeavored to increase the utilization of the APFEL score by

Inclusion Criteria

Project participants comprised all permanent anesthesia providers and PACU nurses.

Results

Post intervention results showed that anesthesia providers at KCH used the APFEL score which resulted to a decrease in the incidence of PONV. There was a percentage increase of 100% in the utilization of the APFEL score, a percentage decrease of 60% in PACU length of stay due to PONV complications and a percentage decrease of 40% in the incidence of PONV

Implications

It is crucial to avoid PONV than to treat. Even though no single method has been proven to be effective in treating PONV, a multimodal approach is justified, and it includes the use of a risk stratification tool.

Chapter 1: Introduction

Postoperative nausea and vomiting (PONV) are defined as any nausea, retching, or vomiting occurring for the first 24-48 hours after surgery in patients. It is amongst the most frequently occurring undesirable and distressing complication in patients undergoing surgery with general anesthesia. Dewinter et al. (2018) states that PONV prophylaxis should be considered by anesthetists as an essential part of high-quality care, as important as providing sufficient pain relief. The implementation of a departmental PONV management algorithm such as the APFEL Score (Appendix A), and the repetitive evaluation of patients' outcome are crucial for quality control and management of PONV. A goal of the current consensus guideline for PONV is to create an algorithm that summarizes the risk stratification, risk reduction, prophylaxis, and treatment of PONV (Gan et al., 2014). Research has shown that a radically simplified algorithm for the prophylaxis of PONV has resulted in a significant reduction in the incidence of PONV (Dewinter et al., 2018). Successful prevention and management of PONV relies on accurately assessing individual risk prior to surgery and a valid and reliable APFEL Score is commonly used to assess patients' risk (Apfel et al 2012; Zheng et al., 2019). In this manuscript, the utilization of the APFEL Score for the prophylactic treatment of PONV will be discussed and an appropriate PONV prophylaxis will be initiated for patients undergoing general anesthesia as indicated by risk factor assessment.

Problem Statement

PONV occurs in 30% of surgical patients undergoing general anesthesia and up to 70% to 80% of high-risk patients within 24 hours after surgery, with symptoms persisting as long as 24 to 48 hours postoperatively (Apfel et al., 2012; Hooper 2015; Masiongale et al., 2018; Weibel et al., 2020; Zheng et al., 2019). Recognizing the importance of early prevention of PONV is essential to the avoidance of postoperative complications and the improvement in patients' overall health and satisfaction after general anesthesia (Veiga-Gil et al., 2016). In addition to pain, one of the most common distressing or unpleasant complaints following surgery is PONV (Apfel et al., 2012; Cao, 2017; Uribe & Bergese, 2020). PONV decreases patient comfort and satisfaction and rarely may cause postoperative complications such as dehydration, electrolyte imbalances, aspiration of gastric contents, esophageal rupture, suture dehiscence, and bleeding (Apfel et al., 2012; Hooper 2015; Hymel & Davises, 2020; Jangra et al., 2018). Some patient populations are more at risk for developing PONV than others; as such a PONV risk prediction and prophylaxis protocol can be implemented to be tailored to the patient's risk factors and needs leading to improved patient satisfaction and, most importantly, a decrease in the incidence of PONV.

Background of the Problem

Postoperative nausea and vomiting (PONV) are generally easier to prevent than treat (Apfel et al., 2012; Chandrakantan, 2011; Dewinter et al., 2018). PONV is a multifactorial phenomenon that is triggered by multiple receptor pathways at peripheral receptor sites, central receptor sites, or both (Apfel et al., 2012; Chandrakantan, 2011). It is imperative to target all nausea and vomiting causative receptor sites; as such, a multimodal approach using two or more drugs that act at different neuro-receptor sites is suggested in patients with one or more risk factors to successfully address PONV and reduce its incidence (Chandrakantan, 2011; Uribe &

Bergese, 2020). This multimodal technique offers the benefits of enhanced PONV reduction with a lower incidence of side effects.

Despite the extensive evidence describing the use of several regimens in different surgical populations, the ideal regimen has not been established (Uribe & Bergese, 2020). A retrospective pre- and post-implementation quality improvement project conducted by Thomas et al. (2018) suggests that a risk assessment approach to PONV prophylaxis using a risk predictive algorithm along with treatment recommendations is effective at reducing the incidence of PONV. In addition, Rush et al. (2005) states that according to consensus PONV guidelines, routine prophylaxis of PONV is not justified. Instead, a strategy focusing on patients at high risk for PONV seems to be most appropriate and recommended. Apfel et al. (2002) and Dewinter et al. (2018) both reported a simplified algorithm for PONV prophylaxis which resulted in a significant reduction in the PONV incidence and better compliance with the PONV predictive algorithm. Given that PONV has multiple causes, prevention has been problematic. Therefore, prophylactic antiemetic therapy must be tailored to the level of risk (Norred, 2003). The above-mentioned authors continue to solidify evidence-based recommendations for the use of a PONV risk assessment predictive algorithm (APFEL Score) in decreasing the incidence of PONV.

Significance of Problem

One of the most common drawbacks of individuals undergoing general anesthesia is the nauseating residual effects. PONV can be unremitting and debilitating; surgical patients have ranked it as the most feared and undesirable surgical outcome, ranking higher than post-operative pain (Gan et al., 2012; Hooper, 2015; Masiongale et al., 2018). Unrelieved post-discharge nausea and vomiting (PDNV) is associated with delayed return to work/normal activities of daily living and contributes to emergency department visits and associated hospital readmission (Gan et al.,

2014; Hooper, 2015). Early identification and prevention of patients at high risk for PONV is essential in the perioperative period (Jangra et al., 2018) as its complications are detrimental to patient safety. Masiongale et al. (2018) states that patients asserted a high willingness to pay up to $100 of their own money for an effective antiemetic to avoid PONV. Gan et al. (2014) and Habib & Gan (2004) found that patients are willing to pay approximately $30 to prevent PONV. The data collected from the above-mentioned authors labels PONV as a chronic problem in surgical patients undergoing general anesthesia.

Needs Assessment/Practice/Knowledge Gap

This DNP scholarly project was implemented at Kosciusko Community Hospital (KCH). After an extensive interview with the anesthesia providers and perioperative nurses at KCH, the project manager came to the understanding that KCH did not have an evidenced-based risk stratification algorithm in place for identifying patients at high risk for developing PONV. After working with different anesthetists, the project manager observed that their administration of antiemetic prophylactic varied (dose of medication administered, type of antiemetic, timing of administration, patients PONV risk percentage) which could be one reason for the increase incidence of PONV at KCH. Furthermore, the post anesthesia care unit (PACU) nurses continue to report a 40% incidence of PONV despite the prophylactic treatment administered by anesthetists. With overwhelming data recommending the utilization of a PONV predictive tool in the identification and treatment of high-risk patients, it appeared there was a knowledge gap in targeting PONV at KCH. In the implementation of this project, anesthesia providers were educated on the importance of completing a risk predictive algorithm (APFEL Score) for negating PONV on admission. Also, anesthesia providers used the results procured in their

preoperative assessment to implement a treatment plan intraoperatively. The PACU nurses documented the effectiveness of the treatment plan postoperatively

PICOT Question

In patients undergoing general anesthesia, does the implementation of a risk stratification algorithm in its entirety compared to current practice at Kosciusko Community Hospital of not utilizing the risk assessment tool decrease the incidence of postoperative nausea and vomiting?

DNP Project Overview

Scope of Project

The main purpose of this DNP project was to utilize a risk assessment tool to identify patients who are at higher risk of acquiring PONV and treat them prophylactically with a multimodal regimen approach. The goal of this evidence-based project was to implement a multimodal approach to managing PONV by anesthesia providers. The consensus guideline recommends that after assessing a patient's risk factor, the provider should consider cost, patient preferences, and the patient's baseline risk for PONV (Gan, et al., 2014; Hooper 2015). For patients with medium risk, one to two interventions should be used prophylactically. In those at high risk, more than two interventions should be implemented prophylactically (Gan, et al., 2014). If PONV incidence is decreased, patients will have a minimum PACU time, thus decreasing hospital durations, as well as cost, and improving patient satisfaction.

Stakeholders

The project team consisted of the project advisor, Dr. Carla Mueller; Nurse Anesthesia Program Director, Dr. Gregory Louck; Nurse Anesthesia Assistant Program Director, Dr. Michael Cotrell; and the Project Site Manager, Danette Platz CRNA. Members of the project team clearly understood their role in the completion and success of the project.

Budget and Resources

Cost

This DNP scholarly project required an in-kind cost of approximately $530. This included handouts, snacks for the KCH staff involved in this DNP scholarly project, laminated copies of the APFEL Score, and travel expenses for the project manager to and from the implementation site. Direct costs included the price of SPSS Statistics Version 26 and 27 for $100.

Description of Resources

This DNP scholarly project was conducted in person at KCH. Before the educational session an informed consent (Appendix B) was completed by participants. Data collected from chart reviews was recorded in the data log sheet (Appendix C) and logged into SPSS for analysis.

Process and Outcomes

General Timeline

A facility letter of support to USF for IRB approval was requested by the project manager on August 28th, 2021. Because this project was a Quality Improvement (QI) project and not a research project, a facilities IRB approval was not required as such a letter of approval for project implementation was completed. Implementation of this project took place as soon as USF's IRB approval was granted. The tentative plan for implantation and data collection was within the months of November 2021 to December 2021. Data collection and analysis occurred the following month January 2022. Finally, the DNP project presentation was done in May 2022.

Setting and Target Population

The setting of this DNP scholarly project was at Kosciusko Community Hospital in Warsaw Indiana and the target population were anesthesia providers and PACU nurses.

Participant Inclusion and Exclusion Criteria

Inclusion criteria involved six anesthesia providers and four PACU nurses employed by KCH. The exclusion criteria were, preoperative nurses, operating room nurses, locums (travelling anesthesia providers, medical students and student registered nurse anesthetists. The participants were expected to partake in an educational training session on the importance of negating PONV in patients undergoing general anesthesia and how to use an evidenced based guideline algorithm (APFEL Score) to attain this goal. A 20-minute time frame was required from the participants for a PowerPoint presentation. Furthermore, as the providers used the APFEL Score, they were informed of a 2 minutes time addition to their daily intraoperative and postoperative routine. The project mentor conducted a chart review post project implementation. The chart review was completed in an hour.

Expected Outcomes

This DNP scholarly project had two expected outcomes. Decreasing the incidence of PONV in patients undergoing general anesthesia. The second expected outcome was a decrease in PACU prolongation time due to complications from postoperative nausea and vomiting.

Risk Analysis

There were no anticipated risks to the participants of this DNP scholarly project. An informed consent (Appendix B) was completed by participants prior to the execution of an educational session at KCH. There was no monetary compensation for participating in this DNP scholarly project. Participation was solely up to the participant. Being involved in this project

only enhanced providers knowledge thus improving patient outcomes from PONV. Data obtained was stored for one year up until project dissemination. All data collected was stored by the project manager was erased using a commercial software designed to erase data from storage devices. All paper data was shredded and discarded. No forms of video or audio recording were used in the implementation or data collection process in this DNP scholarly project.

Chapter 2: Synthesis of Supporting Evidence and Project Framework

Relevant Theory and Concepts

Frameworks/Models/Concepts/Theories

A framework is a group of concepts that are broadly defined and systematically organized to provide a focus, a rationale, and a tool for the integration and interpretation of information (Moran et al., 2017). The framework found suitable for this DNP Scholarly Project is the Quality Improvement (QI) Framework-Plan Do Study Act (PDSA) Model (Appendix D). This model is a systematic process for gaining valuable learning and knowledge for the continual improvement of a product, process, or service (The Deming Institute, 2020). The PDSA cycle is also known as the Deming Circle which is a quality control program and a management plan for this Doctoral Scholarly Project. The model comprises of four phases: A plan phase, do phase, study phase, and an act phase.

The PDSA cycle begins with the plan phase, which involves identifying goals or purposes, formulating theories, defining success metrics, and putting a plan into action (The Deming Institute, 2020). In this DNP Scholarly Project, planning involves studying the process and pathophysiology of PONV in patients undergoing general anesthesia. The project manager assessed how anesthesia providers determine patients at high risk for PONV and what treatment modalities are utilized by anesthetists based on their assessment. Anesthesia providers were

educated about a risk assessment tool (APFEL Score) for identifying high-risk PONV patients; evidence of the success of the APFEL Score were discussed, barriers that affect compliance were identified and strategies were implemented to help providers utilize this tool with ease.

The do phase continues the cycle with the components of the project plan which were implemented, such as making a product: carrying out a test on a small scale, documenting barriers and limitations and analyzation of data (The Deming Institute, 2020). Anesthesia providers, as well as PACU nurses, were educated on the importance of negating PONV; the importance of APFEL Score in identifying high-risk patients and treating these patients prophylactically. Laminated copies of the risk assessment tool were presented to providers and the importance of compliance was emphasized. Providers barriers, limitations and willingness to participate was assessed during this phase.

The study phase follows with outcomes from the do phase that are monitored to test for the validity of the plan, signs of progress and success, or problems and areas for improvement (The Deming Institute, 2020). The change in the practice of identifying patients at high risk for PONV preoperatively occurs while identifying the effectiveness of the APFEL Score. Determination of the effectiveness and success of this DNP scholarly project is dependent on the study phase. Furthermore, in this phase, the project manager will complete the analysis of the data collected, compare the data to predictions, summarize and reflect on what was learned from the project implementation.

Lastly, the act phase finalizes the cycle by refining change based on what was learned from the data collected (The Deming Institute, 2020). The tested change in practice is implemented to improve the process of assessing and treating PONV in patients undergoing general anesthesia. Changes will be refined based on the information that was gathered in the

study phase. The APFEL Score risk predictive tool of PONV assessment could be utilized indefinitely at KCH when proven effective after the implementation of this DNP scholarly project.

Literature Review

The literature review for this DNP project involved canvassing through several databases including CINAHL, EBSCO Open Dissertations, ProQuest, PubMed, and Cochrane Library. The key search terms comprised of "postoperative nausea and vomiting," "nausea," "vomiting," "antiemetic prophylactic," "non-pharmacological treatment modalities for PONV," and "general anesthesia and PONV." A review of evidence addresses factors involved in identification of patients at risk of developing PONV, the pathophysiological understanding of nausea and vomiting, the physiology, the identification of high-risk patients, and a multimodal approach to negating PONV in patients undergoing general anesthesia.

Major Topics

Pathophysiology of PONV

The pathophysiology of PONV is multifactorial, a complex and not fully understood process (Chandrakantan, 2011; Fernández-Guisasola et al., 2010; Furyk, 2015; Norred 2003). Emesis or vomiting is believed to be governed by the emesis center in the brain, which receives several afferent (signals from the peripheral receptors to the brain) inputs. The vagal input from the gut can activate the emetic center by sending signals to the chemoreceptor trigger zone (CTZ) (Furyk, 2015). The CTZ is located outside the blood–brain barrier and contains several different receptors that modulate its activity. Most antiemetic medications act by either a direct or indirect antagonizing of emetogenic substances on receptors in the CTZ (Furyk, 2015). Due to the presence of multiple receptor systems involved in the treatment of PONV, a combination of

drugs acting at the different receptors would have greater efficacy than a single drug (Chandrakantan, 2011). A multimodal approach algorithm initiated in the preoperative setting can significantly reduce the incidence of PONV (Kappen, 2018). This includes a strategy for risk assessment, risk reduction, and therapy targeted at matching the risk with the number of antiemetics administered to a patient prophylactically.

High Risk Factors for PONV

Gan et al. (2014) and Hymel & Davies (2020) state that although the APFEL criteria for stratifying risk predictors of PONV is successful, other multiple PONV risk factors have been identified such as: patient characteristics (female gender, non-smokers, genetic predisposition, previous history of PONV, and motion sickness), anesthetic characteristics (inhalation agents, nitrous oxide, large-dose neostigmine, and intraoperative and postoperative opioid use), and surgical procedure (longer duration of surgery and different types of surgeries). Commonly used risk assessment tools for identifying surgical patients at risk for PONV undergoing anesthesia are the Koivuranta and the APFEL Score (Hymes & Davises, 2020). The APFEL simplified risk score (Appendix E) is based on 4 predictors: female sex, history of PONV and/or motion sickness, nonsmoking status, and use of postoperative opioids (Gan et al., 2014). The incidence of PONV with the presence of 0, 1, 2, 3, and 4 risk factors is approximately 10%, 20%, 40%, 60%, and 80%, respectively (Gan et al., 2014). The panel (American Society of Peri anesthesia Nurses) classifies patients with 0–1, 2, or 3-plus risk factor into “low,” “medium,” and “high” risk categories, respectively (Gan et al., 2014; Masiongale et al., 2018). In anesthesia, the assessment of patients prior to surgery is valuable; identifying risk factors that can interfere with the anesthetic plan and ensuring patient safety during surgery is a priority to the anesthetist.

Complications & Risk Assessment Algorithms of PONV

Nausea and vomiting possess a real threat to quality and safety outcomes of patients in the postoperative period (Hymel & Davies, 2020). PONV can contribute to detrimental consequences such as increased length of stay, inadvertent hospitalization, aspiration, dehydration, electrolyte imbalance, wound dehiscence, bleeding, neck hematoma, and airway compromise (Gan et al., 2014; Hymel & Davies, 2020; Norred, 2003; Masiongale et al., 2018). With the wide variety of PONV complications, prophylactic treatment is prime.

According to Hymel & Davies (2020), standardized protocols and checklists have been shown to clarify decisions and improve safety in surgical patients undergoing general anesthesia. Algorithms, protocols, and guidelines are tools that may help decrease mental burden, allow the anesthetist to focus on higher order tasks, contribute to higher standards of care, and facilitate better outcomes thus the importance of utilizing a nausea and vomiting preoperative checklist.

Multimodal Approach to the Treatment of PONV

Optimal management of PONV is a complex process as such anesthetists have many factors to consider when administering a PONV regimen to patients (Gan et al., 2014). Because PONV has multiple causes, it is easier to prevent than to treat; as such prophylactic antiemetic therapy must be tailored to the level of risk (Norred, 2003). Antiemetics should be chosen by considering the mechanism of action, onset of action, duration of action, indications, contraindications, side effects, and drug interactions that may preclude administration. A multimodal approach of combined low dose antiemetic drugs that affect multiple receptors is a logical and effective strategy to provide a more pleasant emergence for surgical at risk for PONV (Gan et al., 2014; Norred, 2003). Also, the dosage and timing of antiemetic administration for adult PONV prophylaxis is paramount to its effectiveness. Masiongale et al. (2018) reports

recommended pharmacologic interventions under the current PONV guidelines; dexamethasone, 5-HT3 receptor antagonists, antihistamines, transdermal scopolamine patch, droperidol, and neurokinin-1 antagonists; all of which are included in the APFEL Score.

Side Effects of Medications Used for the Treatment of PONV

Though a risk assessment tool is essential in identifying patients at high risk for PONV, the medications allocated on the AFEL Score can be potentially harmful in some patient populations. For instance, patients receiving ondansetron may experience side effects such as headache, dizziness, diarrhea, constipation and QT prolongation (Hymel & Davies, 2020). Anesthetists should be aware of the side effects of these antiemetics and use it cautiously in patients at high risk or utilize an antiemetic in the same class to decrease PONV. When considering the risk of side effects, drug interactions, and adverse drug events, the provider must keep the role of polypharmacy in mind (Hymel & Davises 2020). Medication side effects can be as detrimental to patient as well as the effects of PONV.

Cost Effectiveness of Risk Assessment Tool for PONV

According to the American Association of Peri Anesthesia Nurses practice guidelines for PONV, PONV is one of the strongest predictors of prolonged postoperative stay, unanticipated admission, the financial impact of which is significant, costing several million dollars a year. The total cost of PONV in the United States is due to delayed discharge and unanticipated hospital admissions is thought to be several hundred million dollars (Masiongale et al., 2018). The estimated cost of PONV to a busy ambulatory surgical unit was estimated to range from $0.25 million to $1.5 million per year in lost surgical revenue (Gan et al., 2014). In a prospective observational study by Carroll (1994), the expenses to manage a patient with PONV included personnel (PACU nurses wages), supply, and drug cost which amounted to $14.94 per patient.

Also, PONV increased the centers' operating costs by delaying patient discharge by an average of 24 minutes. In addition, Parra-Sanchez et al. (2012) stated that, the incremental costs of PONV are about $75 per patient. The PACU nurses turn to spend an hour with the patients that had PONV than with patients who did not thus incurring more cost to facilities.

Over the years, the cost of treating PONV has decreased due to the availability of cheaper yet effective antiemetics. Limiting PONV development benefits the hospital system as studies have shown that prevention is associated with shorter PACU stays as well as decreased supply costs and staffing burden (Gress et., 2020). The financial burden for prophylaxis against PONV has been shown to be less than what patients are willing to pay to prevent the development of PONV. Habib & Gan (2004) states that the universal prophylaxis for PONV is not cost effective and puts patients at unnecessary risk of drug related adverse effects. Rather, the identification of patients at high risk for PONV allows targeting prophylaxis to those who will benefit most from it.

Summary of Supportive Evidence

In summation, with the overwhelming evidence surrounding PONV risk prediction and prevention, the above-mentioned literature proofs that patients who undergo general anesthesia and develop PONV; prior prophylaxis administration should be assessed, and rescue treatment should consist of drugs from a different class than those used for prophylaxis. Clinicians at KCH were advised to use their judgment, considering the patient factors, administration of prophylaxis, and institutional drug availability. As such the importance of utilizing an APFEL Score.

Chapter 3: Project Design

Methodology

Project Design

The approach and design for this DNP scholarly project was a QI project. A QI project entailed a systematic data-guided activity to monitor, evaluate, and improve quality and safety outcomes of health services and care processes (Moran et al., 2017). The purpose of this project was to initiate change through intervention and practice improvement (Moran et al., 2017). In this case, an evidence-based risk stratification tool (APFEL Score) was implemented to decrease the incidence of postoperative nausea and vomiting. As mentioned in chapter 2, the PDSA model was a systematic process for gaining valuable learning and knowledge for the continual improvement of a product, process, or service (The Deming Institute, 2020). This supported the APFEL Scores' evaluation of patients at high risk for PONV, and its implementation improved the overall safety and satisfaction of patients who experience nausea and vomiting after receiving general anesthesia.

Ethical Considerations

Ethical considerations were reflected upon throughout this DNP scholarly project. The study was conducted in an ethical manner. The project manager used patient identifiers to access selected charts, but patient identifiers were neither recorded in audit tools nor reported in project outcomes. The participants in this project had the choice not to participate in this DNP Scholarly Project implementation process. In completion of Collaborative Institutional Training Initiative (CITI) program (Appendix F), the project manager ensured an optimal standard of ethics. A formal debriefing was done with the participants to ascertain their confidentiality throughout this project. Participants were given a PowerPoint lecture on the importance of using the APFEL

Score to negate PONV. Participation in educational sessions were voluntary. No compensation or penalty was considered during this process.

Project Schedule

The project timeline depicted the process from the identification of a problem to the dissemination of this DNP scholarly project. Internal Review Board approval (IRB) review at USF began in September 2020. In addition, facility IRB was granted by KCH/Lutheran Health in October 2020 and USF IRB approval was granted in November 2020. After USF IRB approval, project implementation of this DNP scholarly project began at KCH. The project was implemented in December 2021 up until January 2022. Data collection occurred in February 2022 to compare preintervention data to postintervention data. Dissemination of project results occurred in June 2022. A representation of the project timeline can be found in Appendix G.

Implementation Methods

In this DNP scholarly project, the APFEL Score "a PONV risk predictive algorithm" was used by the KCH perioperative staff to decrease the incidence of PONV. The perioperative staff was educated on how to use this tool and laminated copies were provided to each participant for continuous reference. After training, the providers implemented the APFEL Score preoperatively intraoperatively, postoperatively. The risk prediction allocated for each patient was tallied and the equivalent antiemetic treatment was delivered intraoperatively based on that risk prediction. A data log sheet (Appendix G) was given to providers to indicate the patients' risk prediction and the number of antiemetics that were administered intraoperatively. Postoperatively, the PACU nurses recorded the incidence of PONV together with extended PACU stays. The above-mentioned data log sheet was placed at a secured location in a box upon completion. The box was wrapped with paper to determine if it had been tampered with. This box had a slit cut into its

top to allow for placement of the data log sheet without removal of other documents. After the box was collected each week, the project manager entered the data collected into Microsoft Excel on a password protected computer.

Measures/Tools/Instruments

The APFEL Score for risk prediction of PONV was the primary tool used in this project. The tool was used to identify patients undergoing general anesthesia who are at high risk for developing PONV. The APFEL Score assigned each risk factor one point and the cumulative number of points equates to the patient's individual risk for PONV (Thomas et al., 2019). Risk factors included female gender, nonsmoker, history of PONV/motion sickness and opioid administration (Appendix E). Scores were divided into low risk (0-1 points), moderate risk (2 points), and high risk (3 or more points). Scores could range from 0-4 with the corresponding risk for PONV to be 10%, 20%, 40%, 60%, and 80% respectively (Thomas et al., 2019). Additionally, the APFEL Score linked risk severity with treatment recommendations.

In order to enable measurable results of this DNP scholarly project, two aims where devised and their outcomes evaluated. These aims comprised of the following: decreasing the incidence of PONV in patients undergoing general anesthesia and decreasing PACU time as a result of PONV complications in patients undergoing general anesthesia. A variety of outcomes were anticipated to be achieved from both aims as stated below:

Aim 1: Decreasing the incidence of PONV in patients undergoing general anesthesia

Outcome:

1. There will be a 50 % increase in the completion of the APFEL score by anesthesia providers in patients undergoing general anesthesia during a one-month period.

2. There will be 30 % increase in the follow up of appropriate medication on the APFEL score by anesthesia providers in patients undergoing general anesthesia during a one- month period
3. When the APFEL score is used, patients will exhibit a 20% decrease incidence of PONV as compared to when the tool is not use

Aim 2: Decreasing PACU length of stay as a result of PONV complications in patients undergoing general anesthesia

Outcome:

1. There will be a 30 % decrease in PONV indicators in patients that experience an extended PACU time as compared to the hospitals benchmark

A retrospective chart review was done to collect data post implementation. Data was collected with a pen/pencil by utilizing a data log sheet (Appendix C) created by the project manager. As stated in the informed consent (Appendix B), personal information collected from participants such as demographic information will be confidential and saved in a locked cabinet which could only be accessed by the project manager and project site mentor.

Evaluation Plan

A comparative descriptive design and measure of percentages were used to analyze data. The project manager was in charge of data collection while the project site mentor enforced utilization of the APFEL Score in the project managers absence. Continuous communication between the project manager and mentor was maintained. Data was stored for the duration of the project up until dissemination. Post dissemination, all data was erased from the statistical software. The data analysis plan was discussed with participants and their reassurance of

confidentiality was maintained through the entire project implementation process. No aggregate data was reported during dissemination.

Methods for Collection of Data

The project manager began the project implementation process upon receipt of IRB approval from both KCH and University of Saint Francis. A chart audit over one week in the month of December 2021 was conducted by the project site mentor and the project manager. Anesthesia providers who did not adhere to the PONV prophylaxis protocols charts were excluded from the data analysis. Data collected was recorded on a log sheet. The data on the log sheet was later inserted into Microsoft excel and then analyzed. The targeted sample size for this project was 10-15 anesthesia providers and PACU nurses. The project manager was responsible for collecting data. In the absence of the project manager, the project mentor ensured adherence to the APFEL Score by the KCH staff. The project manager was accountable for checking data to ensure its accuracy and completeness. During the PowerPoint presentation at KCH, the participants in the project were educated on the importance of the APFEL Score and its adherence during the implementation process. The project manager was responsible for storing the data collected. The data was saved in a password protected computer hard drive. The project manager was in charge of entering data into the statistical package for analysis as well as cleaning the data prior to entry into Microsoft excel.

Data Analysis Plan

A baseline frequency for the incidence of PONV occurrence was compared after a retrospective chart review was done. After the APFEL Score was implemented, frequencies of each of the previously discussed variables occurred for each patient that the APFEL Score was utilized on. After the implementation phase, the frequency of the incidence of PONV was

assessed and compared to the total number of patients who were at high risk for developing PONV. In addition, the duration of PACU length of stay due to PONV pre- and post-implementation was recorded and compared. Data collected was entered into SPSS on a weekly basis over the duration of the project implementation process.

Dissemination Plan

This DNP scholarly project was disseminated to various parties of interest. These parties included the DNP and Anesthesia Faculty at the University of Saint Francis, Student Registered Nurse Anesthetists (SRNA) at the University of Saint Francis, and administrative faculty and anesthesia providers PACU nurses at KCH. A presentation was provided at the University of Saint Francis. In addition, an executive summary was shared with the DNP project facility and stakeholders.

Implementation Process Analysis

The implementation process was reflected upon collection of post implementation data. The anesthesia providers where receptive to the idea of changing their practice on treatment of PONV by utilizing the APFEL Score algorithm. Some individuals verbalized the understanding of the project but had not implement it in their practice and others where hearing about the APFEL Score for the first time in their careers. The overall takeaway from this project implementation was that there is a potential for long term utilization of the APFEL Score at KCH in Warsaw Indiana or another facility with similar interest in decreasing the incidence of PONV.

Chapter 4: Results and Outcomes Analysis

Data Collection Techniques

Data collection for this DNP project was done at various time intervals with the use of data collection sheets. Prior to project implementation, 50 patient charts were reviewed through

the electronic medical record (EMR) to identify a baseline for the incidence of PONV for patients undergoing general anesthesia at KCH. During the implementation phase the following materials were provided to the anesthesia providers; the APFEL Score for individual participant reference and a data collection sheet.

In December 2021, an EMR chart review was done to determine the incidence of PONV amongst 50 patients who underwent general anesthesia within the month of November 2021. This chart review was done by the project site mentor Danette Plautz CRNA. During this period the APFEL Score was not utilized. Each anesthesia provider used a different treatment regimen for PONV and the PONV risk percentage was not determined. Amongst the 50 patients, 25 patients had an increase incidence of PONV, and 10 patients had a prolong PACU time (greater than one hour).

During the intervention phase, data collection was done manually through data collection sheets by the project site mentor. Between December 13, 2021 to January 13, 2022, a total of 77 patients underwent general anesthesia and the anesthesia providers used the APFEL Score on all 77 patients to determine their risk of PONV. Anesthesia providers administered antiemetics intraoperatively based on the patients risks as stipulated by the APFEL Score. The follow up with appropriate medications on the APFEL Score for patients with high risk for PONV was 100%. Upon arriving the PACU, the nurses recorded 12 patients out of 77 experienced PONV. Also, 4 patients out of 77 had an extended PACU time due to the incidence of PONV. The data collected was inserted into Microsoft Excel by the project manager for analysis.

Measures/Indicators

All data analysis was done on Microsoft Excel. The data inserted into Microsoft Excel was collected from 77 data collection sheets which were dropped off by the PACU nurses into

the data collection drop box. Four variables which were inserted into Microsoft Excel included an increase in the utilization of the APFEL Score, follow-up of appropriate medications used on the APFEL Score, incidence of PONV after the implementation of the APFEL Score and PACU length of stay. The data obtained from each variable was assessed for percentage change and grouped by its corresponding aim and outcome.

Data Analysis Inferences

Aim 1: Decreasing the incidence of PONV in patients undergoing general anesthesia

Outcome 1: There will be a 50 % increase in the completion of the APFEL score by anesthesia providers in patients undergoing general anesthesia during a one-month period.

Results: Outcome 1 was met by a 100%. 77 general anesthesia cases were done within the projected intervention phase. When comparing the pre- and post-implementation data, the project manager determined that the utilization of the APFEL Score went from 0% to 100%.

Outcome 2: There will be 30 % increase in the follow up of appropriate medication on the APFEL score by anesthesia providers in patients undergoing general anesthesia during a one-month period

Results: Outcome 2 was met by a 100%. 77 general anesthesia cases were done within the projected intervention phase. When comparing the pre- and post-implementation data, the project manager determined that the follow-up on appropriate medication used on the APFEL Score went from 0% to 100%.

Outcome 3: When the APFEL score is used, patients will exhibit a 20% decrease incidence of PONV as compared to when the tool is not used.

Results: Outcome 3 was met by a 52% decrease incidence of PONV after the implementation of the APFEL Score. Prior to project implementation, amongst 50 patients who

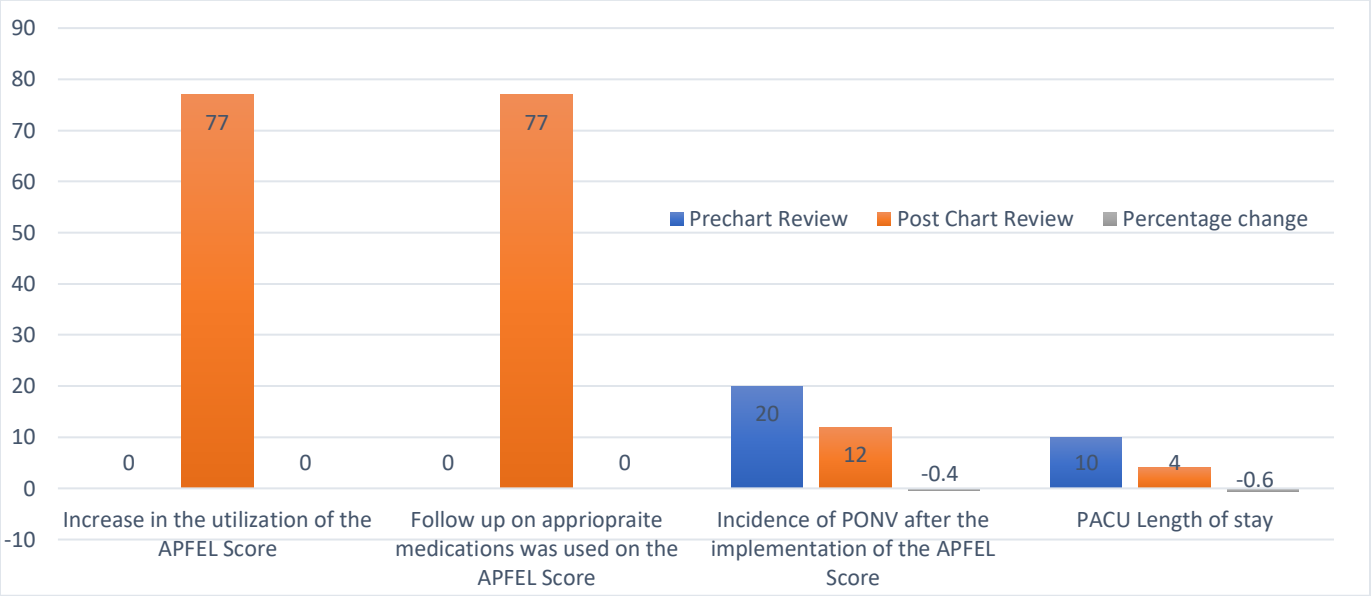
were evaluated for PONV after general anesthesia, 25 of those 50 patients experienced PONV. After project implementation, amongst 77 patients who underwent general anesthesia, 12 patients experienced PONV and were treated with antiemetics. Though some patients had PONV the data analyzed showed a 52% decrease in the incidence of PONV.

Aim 2: Decreasing PACU length of stay as a result of PONV complications in patients undergoing general anesthesia

Outcome1: There will be a 30 % decrease in PONV indicators in patients that experience an extended PACU time as compared to the hospitals benchmark

Results: Outcome 1 was met by a 60 decrease in PACU length of stay. Prior to project implementation, amongst 50 patients who were evaluated for prolonged PACU length of stay due to PONV complications, 10 of those 50 patients exceeded PACU time. After project implementation, amongst the 77 patients who underwent general anesthesia, 4 patients exceeded PACU length of stay. The data analyzed showed a 60% decrease in the PACU length of stay in patients who experienced PONV complications after general anesthesia.

Figure 1



Gaps

The main gap identified by the project manager was the lack of risk prediction for the incidence of PONV in patient undergoing general anesthesia. Based on the percentage changes that were obtained from the aims and outcomes measured, these patients benefited from the APFEL Score algorithm.

Unanticipated Consequences

Unanticipated consequences of this DNP project were due to COVID 19. The project manager had planned to do a PowerPoint presentation in the physician's lounge at KCH prior to project implementation. All anesthesia providers as well as nurses involved in the project implementation could not be in the same conference room due to social distancing. Though this was an unforeseen consequence it was not a major hindrance to the project implementation process. The project manager had one on one communication with each provider that was involved in the project implementation process.

Expenditures

The project manager spent $20 to make laminated copies of the APFEL Score to be distributed to the anesthesia providers. In addition, the project managers transportation to and from KCH was about $30. A total of $50 was spent.

Chapter 5: Leadership and Management

Organizational Culture

Culture can be defined as a blueprint for the way of living, behaving, thinking, and feeling (White et al., 2018). It defines the limit and guides ways in which societies and ethnic groups derive and solve problems. Culture plays a fundamental role in the translation of evidence into practice (White et al., 2018). Ost et al. (2020) stipulate that, even though processes were

established to support the development of evidence-based practice (EBP) knowledge skills in leadership, enculturation of EBP will not occur until an organization's infrastructure also supports EBP. In this chapter, the following is discussed; the importance of organizational culture and climate in the success of EBP change, a cultural model, transformational-transactional change and innovation of an organizations culture, a change strategy, leadership style, interprofessional collaboration, and conflict management at Kosciusko Community Hospital (KCH) the planned DNP (Doctor of Nursing Practice) project implementation site.

The Importance of Organizational Culture in the Success of EBP Change

Organizational culture and climate differ though they are used interchangeably. Organizational climate is easy to measure by viewing policies and procedures, whereas organizational culture is difficult to assess, as values and beliefs are intangible. In unison, organizational culture and climate are associated with morale, stress, and adverse events in an organization (White et al., 2018). Organizational culture reflects a set of shared fundamental beliefs, assumptions, and standard practices (Grant et al., 2014; Ingersoll et al., 2000; Lui & Johnston, 2019). Health care is increasingly contributing to the quality of patient care, and EBP leads to improved patient outcomes. Organizational culture and climate are crucial in improving workforce well-being and the quality of care in the health care arena.

According to White et al. (2018) in nursing, an organization's culture is referred to as "the way things are done around here." This culture is manifested through values, beliefs, and assumptions embedded in institutions and organizations. Also, structure and culture collectively guide the internal workings of organizational systems and are conduits for individuals to achieve successful outcomes. Frances Hesselbein, a former CEO of Girls Scout of the USA, states that culture does not change because we desire to change it. Culture changes when an organization is

transformed; the culture reflects the realities of people working together every day. A deeper dive into KCH’s culture and readiness for EBP when planning the translation of evidence into practice will ensure the success of this DNP project.

The National Academy of Medicine in 2009 established a goal that 90% of all health care decisions would be based on evidence by 2020 (Ost et al., 2020). EBP entails making decisions about providing or promoting healthcare by integrating the best available research evidence with clinical expertise, patient values, plus preferences (Li et al., 2018). Health care organizations encounter significant implementation barriers despite major financial investments and advancements in knowledge generation for EBP's (Li et al., 2018; Ost et al., 2020). Some of these barriers include inadequate knowledge and skills, a lack of experienced mentors to facilitate the change process, and the perception that implementing EBP is too time-consuming. A project manager in implementing an EBP DNP project should realize these barriers are and devise solutions to eradicate them, such as emphasizing good communication, continuing education, and time management.

A Causal Model of Organizational Performance and Change

A Causal Model of Organizational Performance and Change (CMOPC) also known as the Burke-Litwin Model is a model of organizational change and performance. CMOPC distinguishes between transformational and transactional organizational dynamics in organizations. This model suggest links that hypothesize how performance is affected by environmental factors such as culture, leadership, mission and strategy. The Model was developed in 1922 by Burke W. Warner and George H. Litwin to provide a framework to assess organizational and environmental dimensions which are key to successful change (Burke & Litwin, 1992). Twelve organizational variables of the Burke-Litwin Model include, the external environment, mission and strategy, leadership style, organizational culture, organizational structure, management practices, systems, work units, motivation, individual skills, individual need and values, and individual organizational performance. Each of the twelve variables interact interchangeably as a result, a change in each one evidently emphasizes an impact on the others. This is useful in explaining not only how organizations perform, but also how they can be changed. Some of the twelve variable that pertain to KCH will be elaborated on below.

External Environment

The external environment is the most powerful driver for an organizational change (Burke & Litwin, 1992). Some variables of the external environment include culture, leadership, mission, and strategy. At KCH the facility provides excellent care for their patients and to creating a safe work environment for practitioners and staff. They foster a diverse workforce which benefits both employees and patients by offering an inclusive place to provide and receive care. Culturally competent care is provided by encouraging employees to receive annual training designed to support and encourage an inclusive environment for healthcare delivery and

customer service. KCH is committed to a diverse workforce as they recruit members with valuable expertise from different races, religions, genders, and sexual orientations. With the outstanding organizational commitment of the team at KCH to their employees and patient care, it would make an excellent site for the implementation of a DNP project.

Mission and strategy

This includes culture, structure, and leadership of the organization. It also involves the perception of what the managerial sector views as the organizations mission and strategy (Burke & Litwin, 1992). KCH is a 72-bed facility with all-private rooms, located on a 30-acre medical campus and a proud member of the Lutheran Health Network. It has a clear vision which states, "to be the region's leader in population health by collaborating to provide a continuum of care focused on quality, efficiency and value through physician leadership and guidance (LHN, 2021). The mission of the facility is also clearly stated "to unite independent and employed physicians along with hospitals and other community partners in a program that fosters improvements in efficiency and health outcomes" (LHN, 2021). Employees at KCH perceive the hospitals' mission as adequate thus boosting their commitment to achieving quality patient outcomes.

Leadership Style

Leadership is essential in providing overall organizational direction and serving as a behavioral role model for all employees (Burke & Litwin, 1922). Li et al (2018), states that leadership was reported in 20 of 36 (56%) studies as an important feature for implementation effectiveness. Leaders who created environments with high staff morale allowed staff to perceive themselves as part of the implementation team. Jae Dale is the CEO at KCH. He practices a transformational leadership style by encouraging inspiring and motivating employees to perform

activities in ways that create meaningful change to the facility. Grossman & Valiga (2017) defines transformational leadership as a process in which leaders and followers raise one another to higher levels of motivation and morality. Motivation though not frequently may energize employees to perform beyond expectations by creating a sense of ownership in reaching the vision.

Organizational Culture/Structure

Culture is collective in nature and evolves over time through interaction, development, and sharing of common beliefs and values (Burke & Litwin, 1992; White et al., 2017)). As mentioned above, at KCH they are committed to building a diverse workforce that reflects the diversity of the community being served (LHN, 2021). Also, culture represents value, regard for individuals, consistency, teamwork, power, recognition, challenges and commitment to transform research for effective impact in healthcare (White et al., 2017). With the acceptance of KCH employee's readiness to change their practice on the treatment of postoperative nausea and vomiting (PONV), it validates Ingersoll et al (2000) saying that organizational readiness is the strongest predictor of employee commitment.

Burke & Litwin (1992) define structure the arrangement of functions and people in specific levels of responsibility, decision making authority, communication, relationship to assure effective implementation of an organizations mission and strategy. KCH has a systematic perioperative (preoperative, intraoperative, and postoperative team) structure. Effective communication is emphasized and encouraged.

Transformational-Transactional Change and Innovation of an Organizations Culture

Innovation in nursing is a fundamental source of progress for healthcare systems around the world and nurses are strategically positioned to provide creative and innovative solutions that can make a difference in the lives of patients, organizations, communities, and the nursing profession (Lindell, 2015). For innovation to thrive, individual motivation and ability must exist in abundance. For an EBP Doctoral Project to be successful, members of the team must be willing to practice in a cultural environment that is both transformational and transactional. The transformational variables according to Burke-Litwin model are culture, leadership and reward system while transactional variable include structure and work units. At KCH, the members of the organization involved in this writer's DNP Project were motivated and willing to participate in changing their practice when treating patients who were increased risk for developing postoperative nausea and vomiting.

Change Strategy

Change is the making of something different from the way it was, it is an alteration. Change is a dynamic process and not a one-time event that results from differences and conflicts in a system (Grossman & Valiga, 2017; Kachian et al., 2018). Utilization of an evidence-based practice preoperative assessment algorithm for determining patients at high risk for PONV at KCH may or may not be challenging as change potentiates the possibility of accomplishing goals, attenuating PONV by the perioperative staff. As a leader to this DNP project, the project manager exercised a critical skill involved in the change process which is coaching (Grossman & Valiga, 2017). To facilitate the change process at KCH, the project manager informed the participants involved in the change process and elaborated detailly on the essence of changing

their current practice. Kachian et al. (2018) says that the most significant problem many organizations face is the concept of change. Change experts stipulate that change management and employment of change management models are among the approved methods of dealing with change. For an organizational change to be effective, readiness to change must be portrayed by the organization's members.

Prosci's ADKAR model is designed to explain change management from an individual's perspective (Kachian et al., 2018; Lawrence & Frater, 2017). This change model comprises of five phases; awareness, desire, knowledge, ability, and reinforcement which together are the building blocks to create change from the perspective of humans. It is crucial to understand these five phases as successful changes are more likely to occur for an individual and the rest of the team when changing. Lawrence & Frater (2017) concluded that the more individuals are aware of the change, the stronger the desire of the individual to change, and the stronger the desire to change, the more capable the individual will be to change and reinforce the changes.

Firstly, building awareness entailed communicating the reason for the change with the operating room leaders and managers at KCH. An open dialogue was organized with the staff involved in this DNP project. The staff included anesthesia providers, and the postoperative anesthesia care unit (PACU) nurses. The staff was educated on how PONV can be treated prophylactically and how their practice varies from other facilities. Also, employees were given handouts stipulating the importance of preventing PONV rather than treating PONV. The second phase desire is the ability of group members to participate in the change process to support the fruition of the organization. Employees were educated on the nature of the change process, how it impacted each individual's daily activities as perioperative staff. Employees at KCH were invited to share their knowledge and experiences about PONV prophylaxis. They were given

feedback, and all their questions were answered. Matern (2020) says that increasing the desire for change at an organization and ensuring a change resistance does not build up due to frustration, regular communication and involvement are essential.

The third phase is the development of knowledge on how to change. KCH staff's knowledge about PONV was assessed in the dialogue mentioned above. Those who were deficient in the pathophysiology of PONV were educated, and resources available for education and training were provided. Social learning must be addressed to create value and spread knowledge in an organization (Matern, 2020). Fourth, the fostering of the ability to implement required skills and behavior for changes in daily activities. The staff was informed of time constraints about the implementation process and the availability of support if required from the project manager. As a leader, encouraging staff to believe in themselves and their abilities is paramount (Matern, 2020). Lastly, the reinforcement to sustain change. The project mentor was encouraged to follow up with the KCH staff, allowing them to talk about barriers they have witnessed and how they can be addressed to ensure success in the change process. Though this step was difficult to achieve, some providers expressed themselves.

Leadership Style

Leadership is essential in providing overall organizational direction and serving as a behavioral role model for all employees (Burke & Litwin, 1922). Li et al. (2018) state that leadership was reported in 20 of 36 (56%) studies as an essential feature for implementation effectiveness. Leaders who created environments with high staff morale allowed staff to perceive themselves as part of the implementation team. The project manager utilized a transformational leadership technique in the implementation of this project. Grossman & Valiga (2017) defines transformational leadership as a process in which leaders and followers elevate each other to

higher levels of motivation and morality. Motivation energizes employees to perform beyond expectations by creating a sense of ownership in reaching the vision (Grossman & Valiga, 2017). Perioperative nurses' goal for postoperative patients is to decrease pain, relieve nausea and vomiting, decrease PACU prolongation times, and increase patient satisfaction. In order to motivate and energize them into participating in this DNP project, the project manager helped them understand they will achieve a common goal which is advocating for patients and decreasing any inconvenience experienced in the postoperative period, and the central problem being PONV.

Interprofessional Collaboration

White et al (2018) state that interprofessional collaboration (IPC) is a process during which different professional groups work together to impact healthcare processes and delivery positively; each member of the group values the expertise and contributions that others bring to the team. Though IPC is a critical and challenging topic in the health care environment nowadays, research recommends that strategies be developed to improve collaboration, communication, and respect among healthcare professionals. The ultimate goal of interprofessional teams in health care, according to Moran et al. (2017), is to improve quality, provide cost-effectiveness and efficient care, and improve patient outcomes. The project manager assessed the various disciplines involved in the above-stated DNP project. Every individual's role was designed. The essence of communication between participants was emphasized as communication is the key to team building. The primary interprofessional collaboration anticipated in this project is between the nurses, anesthesia providers, and pharmacy. In utilizing the APFEL score, providers are encouraged to communicate with each other to avoid medication errors and drug interactions between medications on the scale. The

joint commission has found that about 60% of medication errors result from miscommunication among health care professionals (Joint Commission, 2020). IPC can help eliminate all these discrepancies that may potentially occur a mist the implementation of this project.

Conflict Management

Conflict in a workplace is inevitable because of incompatible goals, needs, responsibilities, and values, among other fundamental differences in perception (Kim et al., 2015). Conflict management in health care is of equal importance as communication, planning, and decision making. A direct and constructive approach to conflict management contributes to employee's ability to accomplish every task promptly. Lack of collaboration, communication, and disruptive behavior can impact a team tremendously. Kim et al (2015) differentiate conflict as both constructive (innovation and growth, improved decision making, discovery of solutions to problems) and destructive (job stress, burnout, dissatisfaction). The project manager in the implementation of this project utilized a constructive manner of conflict management. Employees were encouraged to accommodate and collaborate, allowing room for open and honest communication. Also, employees were reminded of the common goal, to provide the patient with an optimal level of care, thus improving the quality of care.

Chapter 6: Discussion

Impact of Project

Evaluating the implementation of a risk stratification algorithm to decrease the incidence of PONV impacted the anesthesia providers positively. Participants were able to identity individual patients' percentage risk for developing PONV with a validated risk stratification tool (APFEL Score) and utilize the results to determine appropriate follow-up medications. Based on the pre- and post-intervention data, all measurable goals of this DNP project were met thus

showing a direct correlation between the risk predictive tool and a decrease incidence of PONV in high-risk patients. Overall, the APFEL Score will be easy to use and adaptable by anesthesia providers in their practice when managing patients undergoing general anesthesia who are at high risk for developing PONV.

Decisions and Recommendations

The results obtained from this DNP scholarly project demonstrates the importance of utilization of risk predictive tools to identify patients at high risk for PONV tailoring treatment to patient's risk percentages. Future recommendations to KCH anesthesia staff are to continue utilization of the APFEL Score or other risk predictive tools to assess PONV. Also, providers should stay updated on current evidenced-based guidelines and medication regimens for the treatment of PONV.

Limitations of the Project

The project manager foresaw a few limitations to this DNP Scholarly project. Firstly, if a patient was allergic to a medication allocated on the APFEL Score, the tool did not give an alternative treatment regimen. As a result, during the PowerPoint presentation and teaching of anesthesia providers, they were notified of this limitation and how to potentially resolve it. Recommendations were made by the project manager based on American Association of Nurses Anesthetists guidelines for PONV management. However, during the implementation process, none of the patients assessed were allergic to the antiemetics postulated on the APFEL Score. Secondly, COVID-19 changed the PowerPoint presentation style from a conference room setting to a one-on-one method of teaching due to social distancing precautions. These limitations did not interfere with the project implementation process.

Application to Other Settings

Education on PONV prevention and detection in patients undergoing general anesthesia is imperative as mentioned early in the beginning of this manuscript. This project design is applicable to other settings. The sharing of this project with other healthcare facilities would help enhance the overall knowledge on the prevention of PONV and ways to update and improve evidenced-based PONV guidelines. This increase in knowledge will increase the usage of the APFEL Score and ultimately improve the quality of care in patients undergoing general anesthesia.

Strategies for Maintaining and Sustaining

The project manager provided the anesthesia providers with laminated copies of the APFEL Score as well as PowerPoint handouts of evidenced-based research on PONV guidelines with references. The project site mentor was given extra laminated copies of the APFEL Score and handouts to distribute to new hires. The above-mentioned laminated copies of the APFEL Score will ensure access to information supporting risk predictions and treatment of PONV. In summation, the above-mentioned interventions were put in place to improve sustainability and maintenance of the usage of the APFEL Score.

Lessons Learned

Several takeaways were learnt by the project manager after this project implementation. Firstly, teamwork from all key stake holders made the project doable and efficacious. Secondly, collaboration and communication amongst team members was succinct, fluent and efficient, from the application of project proposal to facility and USF IRB acquisition, implementation of project, data collection/analysis and dissemination. Thirdly, the project manager had to cultivate stern time management abilities to be able to equalize a full-time clinical schedule of four to five

days a week with doctoral courses. the unique aptitudes, abilities and virtues of each member involved in this project contributed to its attainment. The following DNP essentials were met, DNP essential 1 was achieved by formation of a PICOT question with conduction of a literature review. DNP essential II was achieved by the performance of an organizational assessment and selection of a facility for project implementation. During the process of organizational assessment, a knowledge gap in practice was noticed at KCH as a result, DNP essential VII was achieved. Prior to project implementation, DNP essential III was attained by acquisition of a KCH and USF IRB approval. In preparation for project implementation, the project manager created and presented an educational PowerPoint presentation for the anesthesia providers at KCH as a result, both DNP essential IV and VIII was attained. Throughout the entire project implementation process, DNP essential VI was met by communicating with mentors, project advisor, anesthesia faculty and writing center associates.

Chapter 7: Conclusion

Potential Project Impact on Health Outcomes Beyond Implementation Site

The participants of this DNP scholarly project were positively impacted by its outcomes and could potentially use the laminated copies of the APFEL Score within the Lutheran Health System (LHS), (KCH a subset of the LHS). Also, anesthesia providers could potentially share their knowledge acquired from this project with other providers to maintain continuity of the project. A certain level of self-confidence is required as an advanced practiced registered nurse to be able to advocate for the profession in public settings, educate superiors and collogues on new practice guidelines, coordinate meetings and conferences. The project manager was able to eliminate stage fright and built a certain degree of self-confidence throughout the entire project

implementation process. This level of proficiency and self-assurance will be utilized by the project manager in the future.

Health Policy Implications of Project

The health care policy on PONV prophylaxis at KCH was not directly impacted by this DNP scholarly project. The use of risk predictive tools for assessment of PONV is evidently outlined in the fourth consensus guidelines for the management of postoperative nausea and vomiting (Gan et al., 2000). Even though risk predictive tools are not mandated for practice, with the increasing evidenced-based practice guidelines and suitable patient outcomes from employment of risk predictive tools, it may become a standard of practice for PONV prevention.

Proposed Future Direction for Practice

Anesthesia providers should embrace practices that will eliminate the incidence of PONV and the complications that arise may from it as a complication from general anesthesia. The project manager recommended the continual usage of the APFEL Score in combination with other techniques to decrease PONV. As revealed previously in the literature review, it has been recognized that prevention of PONV is a multi-modal approach, though risk estimation may be useful, it has to be used in conjunction with other techniques. In summation, the ultimate goal is to lessen patient distress following surgery and improve outcomes.

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Appendix

Appendix A: APFEL Score

PONV Prophylaxis Based on Apfel Score

Risk Score	Prevalence PONV	Prophylaxis: No of Anti-emetics	Examples*
0	9%	0-1	± Ondansetron 4 mg
1	20%	1	Ondansetron 4 mg ± Dexamethasone 4mg
2	39%	2	Ondansetron 4 mg +Dexamethasone 4mg ± Propofol infusion
3	60%	3	Ondansetron 4 mg + Dexamethasone 4 mg + Propofol infusion ± Scopolamine patch
4	78%	4	Ondansetron 4 mg + Dexamethasone 4 mg + Propofol infusion + Scopolamine patch

Combinations should be with drugs that have a different mechanism of action
Try not to order agents for treatment in PACU that have already been used for ppx

Appendix B: Informed Consent

Informed Consent

Evaluating the Implementation of a Risk Stratification Tool to Decrease the Incidence of Postoperative Nausea and Vomiting

Introduction:

My name is Katrina Niba, a doctoral graduate student at the University of Saint Francis Fort Wayne Indiana. You are cordially invited to partake in a Quality Improvement (QI) project. This project will be overseen by Dr. Carla Mueller PhD, RN a professor at the University of Saint Francis.

The APFEL score is a risk stratification algorithm that can be utilized to assess patients at high risk for developing PONV. The use of this algorithm can aid providers (perioperative nurses and anesthesia providers) in identifying patients at high risk for developing postoperative nausea and vomiting; as such targeting nausea and vomiting causative receptors sites prophylactically before the patient can be exposed to the triggers. This is evidence based best practice for negating postoperative nausea and vomiting as it is easier to prevent than treat.

Purpose of Research:

To implement a risk stratification algorithm (APFEL score) in identifying patients at high risk for postoperative nausea and vomiting.

Procedure:

In this project, the evaluation of the implementation of a risk stratification algorithm to decrease the incidence of postoperative nausea and vomiting will be assessed. The preoperative nurses are asked to assess a patient's risk for postoperative nausea and vomiting before surgery and general anesthesia. On determination of the patient's category of risk, the nurse will record the patients score. Secondly, anesthesia providers on performing their perioperative assessment, will obtain the results recorded by the preoperative nurses to determine what antiemetic prophylactic treatment is recommended intraoperatively for each patient by the postoperative nausea and vomiting risk predictive algorithm. Finally, the post anesthesia recovery nurses will determine the effectiveness of the prophylactic treatment administered by patients verbalizing a lack of nausea and vomiting postoperatively.

Risk and Benefits of Research Project:

There is no anticipated risk from participating in this project. This project may benefit the providers, patients and the facility by decreasing provider workload, increasing patient satisfaction/comfort after surgery and decreasing prolonged hospital stays respectively.

Confidentiality:

The identity of participants for this project will be anonymous and data collected will be

recorded onto the DNP project managers computer into an Excel spreadsheet and imported into SPSS for analysis. Data will be stored on the University of Saint Francis OneDrive and will be password protected. Project members will assess data by utilization of their personalized username in compliance with facility protocols.

Freedom to Withdraw:

Involvement in this research project is optional. Participants have the right to withdraw consent and halt engagement at any time during this process without sanction.

Inquires:

At the end of this study, the facility will receive a copy of the study results. Should you have any questions about this project, please contact me at:

Katrina Niba
(281)7825779
nibakm@cougars.sf.edu

Or

Nurse Anesthesia Department
2701 Spring Street
Fort Wayne, IN 46808

If at any time during this study, you have any complaints or feel you are not being treated accordingly, please call or write:

IRB Chairperson
University of Saint Francis
2701 Spring Street
Fort Wayne, IN, 46808
(260) 399-7700
Administration email: irb@sf.edu

I have received an explanation of this study and agree to participate. I understand that my participation in this study is strictly voluntarily.
Name _____

Date _____

Appendix C: Data Log Sheet

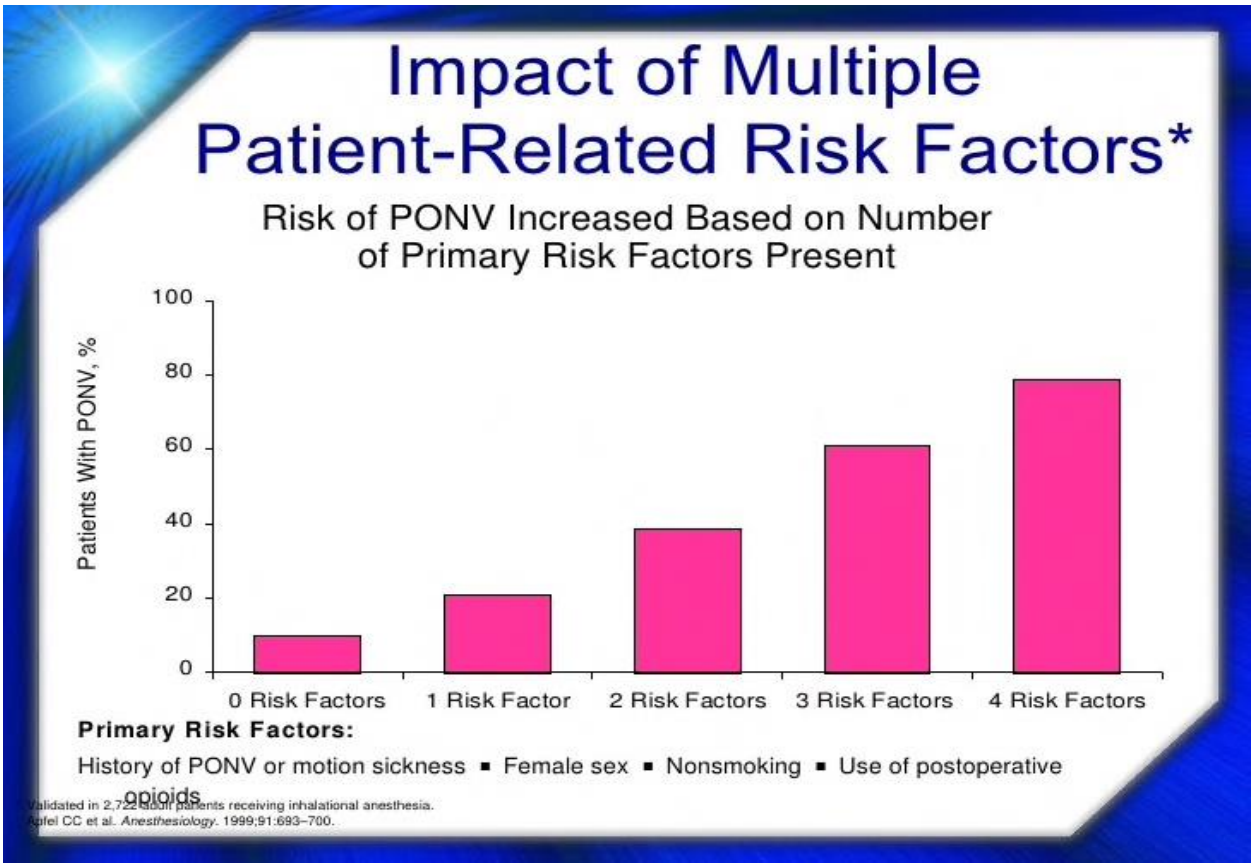
Variable	Level of Measurement	Total Number of Patients
Increase in the utilization of the APFEL Score	a) The APFEL score was used b) The APFEL score was not used	
Follow up on appropriate medications used on the APFEL score	a) Medication follow up was accomplished b) Medication follow up was not accomplished	
Incidence of PONV after the implementation of the APFEL score	a) Patients that experience PONV b) Patients that did not experience PONV	
PACU length of stay	a) Patients that exceed PACU time b) Patients that do not exceed PACU time	

Appendix D: Plan Do Study Act Model

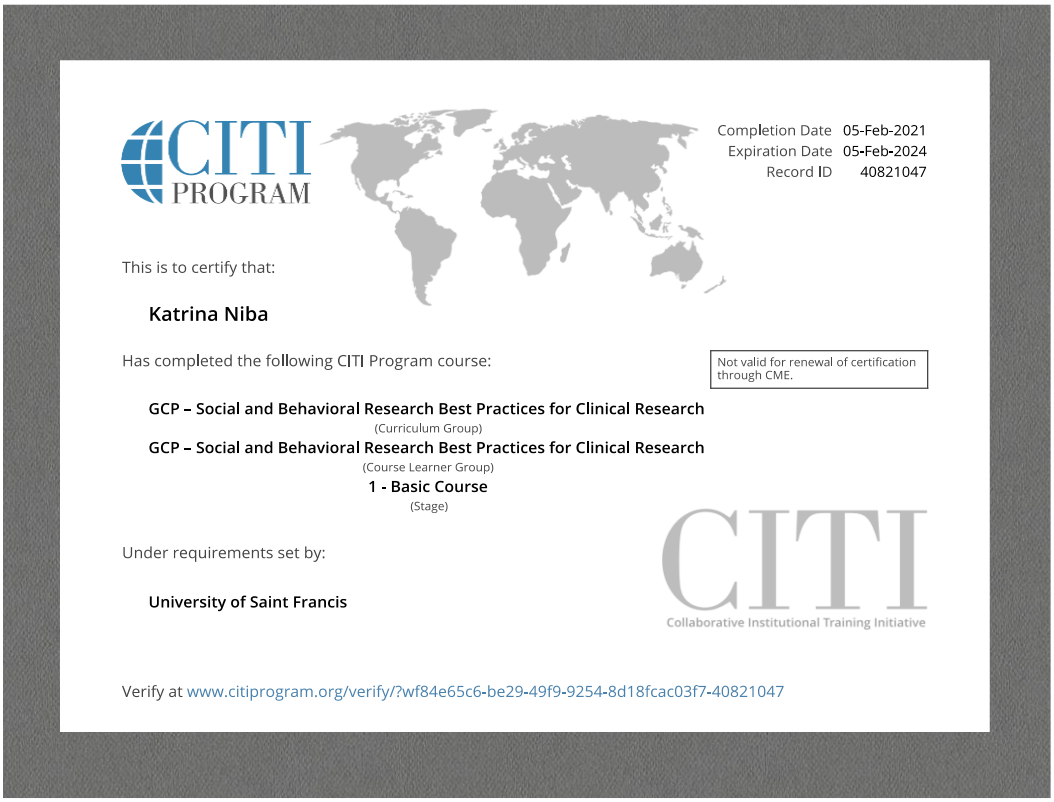
Appendix E: PONV Risk Factors

APFEL Simplified Risk Scoring for Adults

Risk Factors	Points
Female gender	1
Nonsmoker	1
History of PONV and motion sickness	1
Opioids administration	1
Sum of risk factors	0-4



Appendix F: CITI Training



CITI PROGRAM

Completion Date 05-Feb-2021
Expiration Date 05-Feb-2024
Record ID 40821047

This is to certify that:

Katrina Niba

Has completed the following CITI Program course:

Not valid for renewal of certification through CME.

GCP – Social and Behavioral Research Best Practices for Clinical Research
(Curriculum Group)
GCP – Social and Behavioral Research Best Practices for Clinical Research
(Course Learner Group)
1 - Basic Course
(Stage)

Under requirements set by:

University of Saint Francis

CITI
Collaborative Institutional Training Initiative

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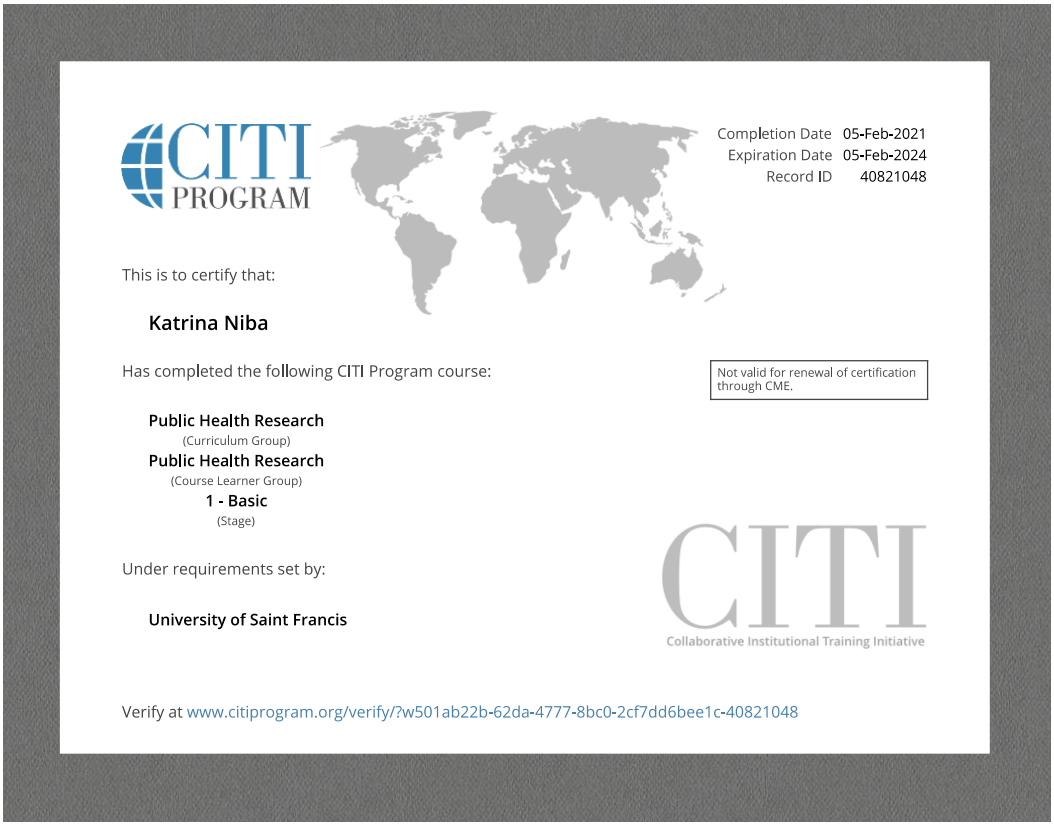

CITI PROGRAM

Completion Date 05-Feb-2021
Expiration Date 05-Feb-2024
Record ID 40821048

This is to certify that:

Katrina Niba

Has completed the following CITI Program course:

Not valid for renewal of certification through CME.

Public Health Research
(Curriculum Group)
Public Health Research
(Course Learner Group)
1 - Basic
(Stage)

Under requirements set by:

University of Saint Francis

CITI
Collaborative Institutional Training Initiative

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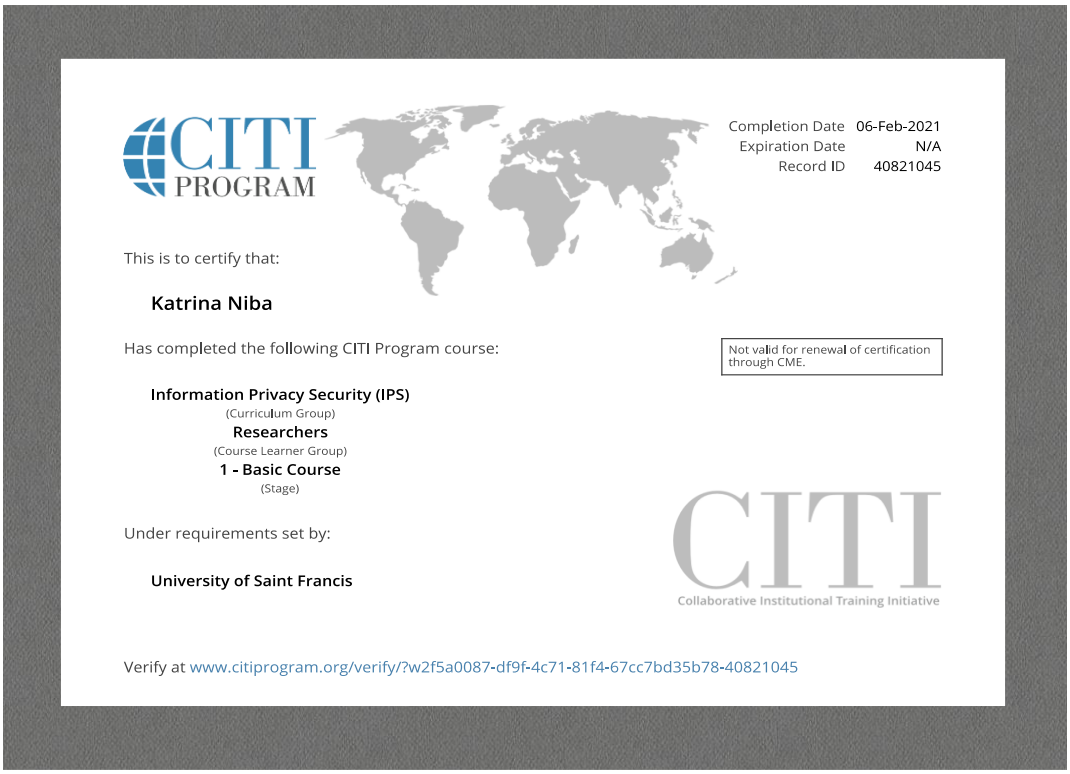


CITI PROGRAM

Completion Date 06-Feb-2021
Expiration Date N/A
Record ID 40821045

This is to certify that:

Katrina Niba

Has completed the following CITI Program course:

Not valid for renewal of certification through CME.

Information Privacy Security (IPS)
(Curriculum Group)
Researchers
(Course Learner Group)
1 - Basic Course
(Stage)

Under requirements set by:

University of Saint Francis

CITI
Collaborative Institutional Training Initiative

Verify at www.citiprogram.org/verify/?w2f5a0087-df9f-4c71-81f4-67cc7bd35b78-40821045

CITI PROGRAM

Completion Date 06-Feb-2021
Expiration Date 06-Feb-2024
Record ID 40821046

This is to certify that:

Katrina Niba

Has completed the following CITI Program course:

Not valid for renewal of certification through CME.

Social and Behavioral Responsible Conduct of Research
(Curriculum Group)
Social and Behavioral Responsible Conduct of Research
(Course Learner Group)
1 - RCR
(Stage)

Under requirements set by:

University of Saint Francis

CITI
Collaborative Institutional Training Initiative

Verify at www.citiprogram.org/verify/?w8708d0df-8dac-48c6-9851-58e6d3915685-40821046

CITI PROGRAM

Completion Date 06-Feb-2021
Expiration Date 06-Feb-2024
Record ID 40821044

This is to certify that:

Katrina Niba

Has completed the following CITI Program course:

Not valid for renewal of certification through CME.

Social & Behavioral Research - Basic/Refresher
(Curriculum Group)
Social & Behavioral Research
(Course Learner Group)
1 - Basic Course
(Stage)

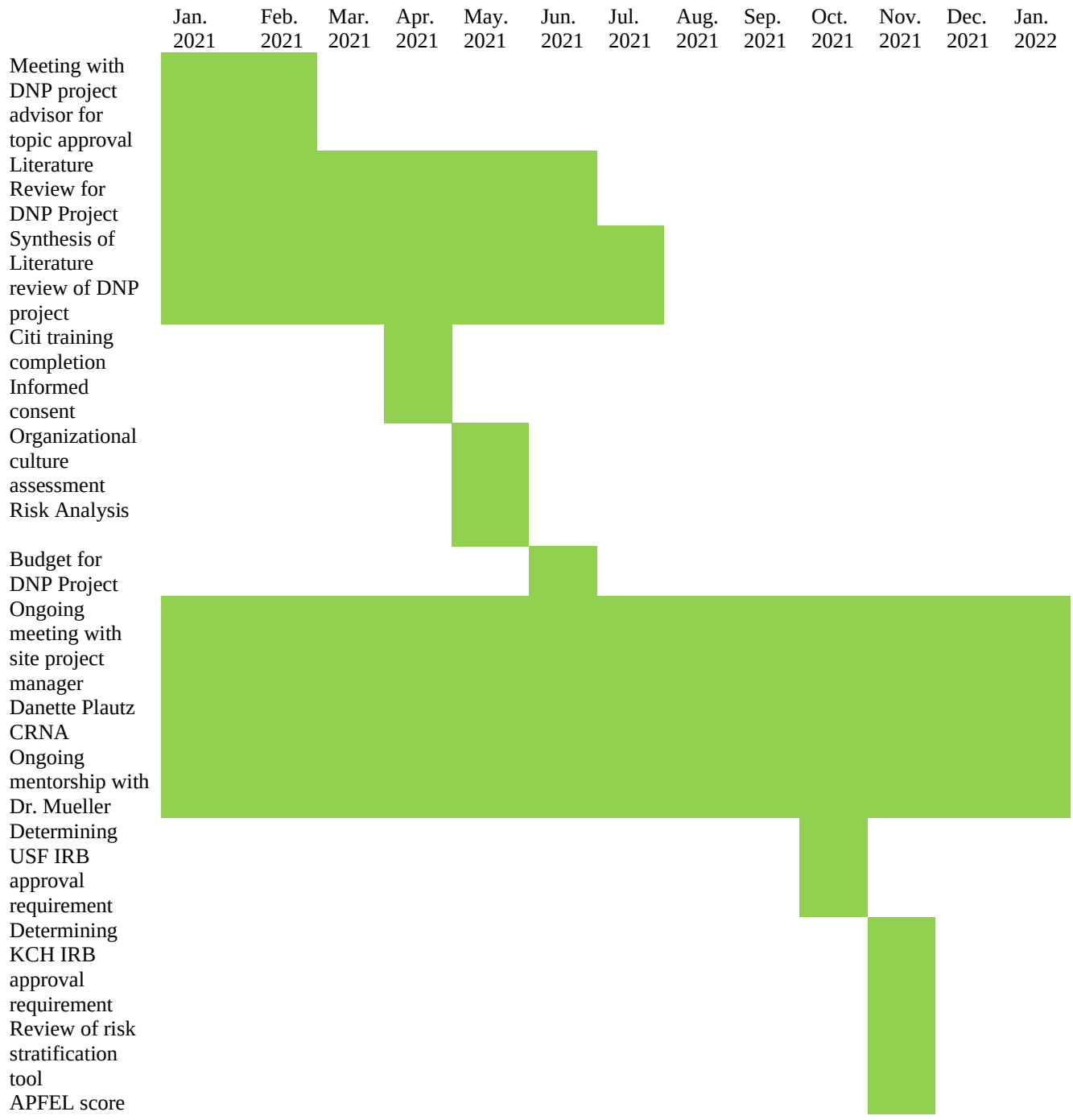
Under requirements set by:

University of Saint Francis

CITI
Collaborative Institutional Training Initiative

Verify at www.citiprogram.org/verify/?wd2d13f04-b4c1-4897-bd59-a225e52ae5f1-40821044

Appendix G: Project Timeline

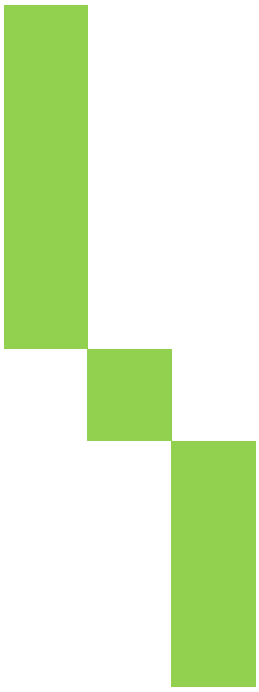


Meeting with operating room managers & pharmacy department

Inservice with the perioperative staff at KCH

DNP project implementation Data Collection

Review Data collected for Opportunities for improvement and Revision Presentation of DNP project



Appendix G: Facility Letter of Approval

Lutheran Health Network
Kosciusko Community Hospital

10/14/2021

To the University of Saint Francis Institutional Review Board:

This letter is being written in support of University of Saint Francis NAP/DNP student Katrina Niba. This student is the DNP project team leader of the Doctor of Nursing Practice Project Scholarly Project titled Evaluating the Implementation of a Risk Stratification Algorithm to Decrease the Incidence of Postoperative Nausea and Vomiting. This project is a quality improvement project, not a research project.

Kosciusko Community Hospital understands that the DNP Scholarly Project aims to improve postoperative nausea and vomiting prevention and treatment. The project intervention is to evaluate the implementation of the APFEL Score risk stratification algorithm. Anesthesia providers use this algorithm in the perioperative and intraoperative periods to decrease the incidence of postoperative nausea and vomiting in patients undergoing general anesthesia. The target population of this project involves anesthesia providers.

This letter is written as an agreement between the DNP project leader Katrina Niba and Kosciusko Community Hospital. This letter states that continued support and commitment to the student's DNP project to implement the APFEL Score algorithm. In addition, Kosciusko Community Hospital will allow the distribution of surveys to staff, provide time for educational presentation, and access electronic medical records if needed by Danette Plautz the project site manager. The institution does not require the proposal to go through their IRB since it is a quality improvement project and will go through the University of Saint Francis IRB.

☐ IRB needed

☑ Exempt from IRB

Sincerely,

Lora L. Beeson RN

Lora L. Beeson RN, BS, MSA
Director of Surgery and Outpatient Clinics
574-372-7827
lbeeson@kch.com

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Tables/Figures/Graphs

Figure 1: A Chart of DNP Project Data Analysis