DEVELOPMENT AND IMPLEMENTATION OF AN ADVANCED PRACTICE NURSE DRIVEN TELEMEDICINE PROJECT FOR PREOPERATIVE EVALUATION.

An Evidence-Based Scholarly Project

Submitted to the College of Health Professions and Natural Sciences

in Partial Fulfillment of the

Requirements for the Degree

Doctor of Nursing Practice

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Wilmington University

August 2023

Wilmington University
College of Health Professions and Natural Sciences
Doctor of Nursing Practice Program

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Title: Development and Implementation of an Advanced Practice Nurse Driven Telemedicine Project for Preoperative Evaluation.

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To improve patients' access to quality healthcare, the use of telemedicine for preoperative evaluation continues to increase. Several healthcare settings have proven their success with patient outcomes regarding access, efficiency, and experience with telemedicine visits. As a large urban oncology hospital that needs to meet the increasing need for surgical options for cancer care management, the practice reviewed used advanced technology trends for optimal healthcare delivery. This project focused on an evidence-based practice change involving the implementation of a telemedicine visit option in a pre-surgical testing clinic. The project is a retrospective analysis of 25 patients seen using in-person visits and 25 patients seen using telemedicine. Both visit options comprised patients going for low-risk gynecologic surgical procedures. Tele videoconferencing occurred in our clinic, connecting to patients who met the telemedicine inclusion and exclusion criteria remotely using Microsoft Teams. The measured outcome was the day of surgery cancellation among both visit options. After six weeks of telemedicine implementation, data was collected through Dataline using demographics such as age, race, gender, ASA level, and surgery type. The result revealed that 94% of all 50 patients seen with both visit options did not cancel their surgery. Data analysis using a two-tailed independent samples t-test showed a significant relationship between age and the visit options, indicating that different age groups were associated with varying visit options. However, the

two-tailed Wilcoxon signed rank test and linear regression showed insignificant surgery cancellation comparison among telemedicine and in-person visit groups.

Keywords: Telemedicine, patients undergoing surgery, preoperative evaluation, surgery cancellation.

ACKNOWLEDGMENTS

I thank the Almighty God for the motivation and strength to complete this program. I am deeply grateful to the following individuals who have played a vital role in completing this project.

Dr. Stacey Cuomo, my mentor, your guidance, expertise, and unwavering support have been instrumental throughout this project. Your dedication to my growth and development has been truly remarkable.

Prof. Anne Lara, my trusted advisor, provided me with valuable insights and constructive feedback throughout this journey. Your expertise and commitment to excellence have shaped the quality of this project.

Dr. Hallie Weiss, the Presurgical Testing (PST) Clinic Director, thank you for your willingness to support and facilitate the implementation of the telemedicine project. Your collaboration and expertise in the preoperative evaluation were instrumental in its success.

To my loving husband, Wale Ajiboye, thank you for your unwavering encouragement, patience, and understanding during this demanding period. Your love and support were my pillars of strength throughout the completion of this project.

To my children, Afolabi, Olawole, and Nefertiti, thank you for being a constant source of inspiration and motivation. Your understanding, love, and encouragement helped me balance my responsibilities and complete this challenging endeavor.

To my mother, Patricia Sawyerr, and mother-in-law, Dupe Taiwo, thank you for your unwavering belief in my abilities and constant encouragement. Your love and support have been instrumental in my journey to achieve this milestone.

To my colleagues at the PST clinic, the telemedicine project group and stakeholders, for their support and collaboration and commitment to improving preoperative evaluation through telemedicine, thank you. Your contributions and teamwork were vital in its successful execution.

Lastly, I would like to thank all the DNP faculty who provided guidance, shared their expertise, and taught me throughout the program. Your dedication to education and passion for nursing have profoundly impacted my professional growth. This accomplishment would not have been possible without your contribution, and I am genuinely grateful for that.

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ABBREVIATIONS

- AACN = American Association of Colleges of Nursing.
- APRN = Advanced Practice Registered Nurse
- ASA = American Society of Anesthesiologists
- BMI = Body Mass Index (BMI)
- DNP = Doctor of Nursing Practice
- EBP = Evidence-Based Practice
- HSRC = Human Subjects Review Committee
- MSKCC = Memorial Sloan Kettering Cancer Center
- METs = Metabolic Equivalents
- NQF = National Quality Forum
- PAE = Pre-Anesthesia Evaluation
- PAT = Preadmission Testing
- PDSA = Plan-Do-Study-Act
- PHI = Protected Health Information
- PSA= Patient Satisfaction Aggregate
- PST = Presurgical Testing
- *p*= probability
- QI = Quality Improvement
- ROI = Return on Investment

CHAPTER ONE

INTRODUCTION

Problem Description

The pre-surgical testing practice at Memorial Sloan Kettering Cancer Center (MSKCC) includes eight New York and New Jersey clinic locations that serve its patient population. With the increasing need for surgical options in cancer care management and the expansion of clinical sites, the practice at the time of the study faced serious challenges with the available appointment dates and timelines needed to accommodate the patients thorough evaluation and optimization before their surgery date. In 2021, data collected for quarters one through four revealed a 7.15% surgery cancellation rate for patients who were seen at the pre-surgical testing clinic proceeding for surgery. Among this percentage, about 4.5% of cancellations were due to patients not being medically cleared for surgery due to insufficient time between Preoperative evaluation and the day of surgery.

For quarters one through three in 2022, the cancellation rate was 7.06%. To expand services, MSKCC needed to adjust to the current trend of digital healthcare delivery (Cooling et al., 2021). MSKCC needed to incorporate telehealth forms of healthcare delivery to promote patient-centered outcomes (Manatt, 2019). The telemedicine platform considered accommodated the evaluation of patients proceeding with low-risk surgeries. Based on MSKCC's indicated testing grids, most low-risk surgery patients did not need diagnostic tests before surgery. This allowed workflow to schedule patients proceeding for intermediate and high-risk surgeries for Preoperative evaluation at least 2 weeks before their surgery date to allow time for workup if warranted. Research studies have shown the effectiveness of telemedicine for Preoperative evaluation in decreasing surgery cancellations (Mullen-Fortino et al., 2019). Surgery cancellation

is an ongoing benchmark that helps measure the performance and efficiency of the operating room in terms of revenue growth per patient, profit margin, and patient satisfaction.

Practice Prior to Implementation

Traditionally, pre-surgical testing entails an in-person medical evaluation of the patient to ensure the patient is optimized for surgery to ensure an optimal peri and postoperative outcome. The evaluation was completed in a Preoperative testing clinical setting where the clinician received a thorough medical, surgical, and anesthesia history taking, a review of the system, a physical examination, and diagnostic tests to evaluate their surgical risk. If identified, a referral was made to specialists who ensured patient optimization for surgery. The core assessment in a pre-surgical testing clinic is an anesthesia evaluation which entails an airway examination to identify potential needs in the operating room. The assessment was completed in person by an anesthesiologist or a trained advanced practice registered nurse (APRN).

Nursing Practice in Telemedicine

The healthcare system continues to adopt healthcare delivery through telephone and video conferencing as forms of telehealth or telemedicine visits between patients and their providers. The roles of APRNs in pre-surgical healthcare settings range from the design to the implementation of telehealth programs to help bridge healthcare gaps, particularly as seen during the COVID-19 pandemic. These platforms for Preoperative evaluation have shown to be as successful as in-person visits in different healthcare settings (Cooling et al., 2021).

Patients who meet the telemedicine inclusion/exclusion criteria are identified as low-risk and may need no preoperative diagnostic testing based on the indicated testing grids according to MSKCC guidelines. Typically, these patients will get a detailed provider-led examination via

video conferencing by the APRN to ensure they meet the patient optimization standard to avoid day-of-surgery cancellations.

Krupinski (2020) emphasized the need for healthcare systems to continue to utilize telemedicine technology to bridge healthcare gaps, especially in areas of inadequate access. These systems must continually meet the standards for healthcare delivery to ensure optimal patient access and satisfaction with the care received. In the surgical setting, telemedicine must continue to grow to accommodate the requirements of the subsequent generation (Kamdar et al., 2020). The pre-surgical testing clinic should also ensure that telemedicine visit meets the recommended guidelines of patient evaluation to avoid surgery cancellations that will negatively impact the hospital's return on investment (ROI).

Rationale

The only mode of healthcare delivery at the pre-surgical testing clearance clinic at the time of the study was the traditional in-person visit. With the ever-increasing demand for patient care, that characteristic was not perceived as best for overall practice health. The rate of patients seen during the pandemic decreased by 35% compared to pre-pandemic. Evidence in similar settings has shown success in improving patient satisfaction with minimal cancellation rates while reducing healthcare costs without more days of surgery delay (Mullen-Fortino et al., 2019). Many clinics could provide patients with digitally driven care through telemedicine and telehealth during the mandatory social distancing and lockdown COVID-19 period (McMaster et al., 2021). When implementing a new practice change to improve patient outcomes, it is essential to ensure that the outcomes align with the hospital's values.

Introducing a telemedicine visit option in an APRN-led clinic could positively impact healthcare cost, efficiency, and access by ultimately minimizing inconveniences and lowering

healthcare costs (McConville et al., 2021). The utilization of virtual healthcare delivery to impact patient-centered outcomes and how they improve individuals' health and lives is essential (Cooling et al., 2021). Outcome measurement needed to reflect when the surgery cancellations meet the benchmark and save hospital costs. The business impact on improving visit flow could increase the patients seen daily as well as the revenue developed therefrom.

The Theoretical Framework

The theoretical framework for this project was the Plan Do Study Act (PDSA) Model to impact change, improve quality, and maintain sustainability. The PDSA cycle presents a practical scientific method for testing changes in complex systems. Constantly testing system changes that need quality improvement (QI) is a significant advantage (Pattnaik et al., 2022). The cycle starts with a plan that identifies the intended change, the length of implementation, and changes for improvement. Then the implementor looks for the predictions and plans for carrying out the cycle. Then a hypothesis may be formed that should be improved (who, where, and when). During the Do cycle, a change is implemented on a small scale, executed among the patients undergoing low-risk procedures. Data analysis is a part of the process's latter stages, and in this case, surgery cancellation data among both comparison groups were collected.

The study phase of this project involved reviewing the effect of introducing telemedicine mode of visit, resistance, adaptation, learning, flaws, data analysis, prediction, and a summary of what conclusions could be made. In the Act phase, the adoption, abandonment, or repetition of the new change occurs, identifying changes to implement and include in the next cycle (Lincoln et al., 2021). PDSA's continuous method allowing for errors and correction complimented the study's implementation as well as its future sustainability. The model allowed for continuity of

care and expanded services, thereby sustaining telemedicine visits for future use, such as the expansion to patients proceeding with intermediate-risk surgeries.

Specific Aims

Surgery cancellation at the project site was 7.06% at the time of the study. This project aimed to positively influence the organizational structure by introducing an evidence-based practice (EBP) change to help bridge healthcare access. Telemedicine as a Visit option was intended to improve healthcare delivery efficiency, health outcomes, and organizational structure. The project aims to analyze the relationship between surgery cancellation and visit options.

PICOT Question

In patients undergoing surgery, how does telemedicine Preoperative evaluation compared to current practice affect surgery cancellation within six weeks?

P – Patients undergoing surgery

I – Telemedicine evaluation

C – Current practice

O – Surgery cancellation

T – Six weeks

PICOT Question Variables

The anticipated participants were 50 low-risk patients, n=50. (25 in-person patients with an additional 25 telemedicine patients). Patients proceeding with a low-risk gynecologic surgical procedure and have completed a Preoperative evaluation either in-person or via telemedicine at the pre-surgical testing clinic. Patients are considered low risk based on the American Society of Anesthesiologists (ASA) physical status classification level I or II.

The project is a retrospective analysis of 25 patients seen using in-person visits and 25 patients seen using telemedicine (n=50). Twelve staff were anticipated to participate in this project including four APRNs, the manager, two nurses, four patient care technicians, and two care coordinators. The study's intervention was the addition of telemedicine visit options compared to in-person visit options, which was the practice at the time of the study. Both were independent variables. The outcome measurement was surgical cancellation which was the only dependent variable. The project intervention completion period was six weeks, and data was collected during subsequent weeks, retrospectively.

Definition of Terms

The following are the conceptual and operational definitions of terms as described by the Medical Dictionary (2022) used throughout the project:

- ASA = American Society of Anesthesiologists classification of a patient's status based on underlining disease.
- MA = Meta-Analysis is a technique of synthesizing research results by combining different results from previous related studies.
- PAE/PST/PAT = Pre-Anesthesia Evaluation is the assessment of a patient's risks before anesthesia exposure.
- *P* = probability, which is a probable likelihood of an occurrence.
- T-Test = A statistic test under the null hypothesis has a *t* distribution to test whether two means differ significantly.
- Retrospective= To retrieve the record of an event that has previously occurred.
- SR = Systematic Review is a review that uses a repeatable analytical method to collect and analyze secondary data.

Chapter Summary

Chapter one introduced telemedicine as a visit option for Preoperative evaluation in the PST setting. It also described surgery cancellation as an outcome that may be potentially affected. The problem description was concisely described alongside the specific aims. Additionally, the PDSA model framework was noted to be the framework guide for this evidence-based DNP project, and PICOT variables were described in detail. Lastly, definitions of terms used for this evidence-based DNP project were included. Chapter two will provide a detailed analysis and synthesis, search strategy, EBP model, and available knowledge synthesized from the works of literature.

CHAPTER TWO

AVAILABLE KNOWLEDGE

Search Strategy

The search strategies for finding peer-reviewed literature included combing electronic databases to examine the development and implementation of an APRN-driven telemedicine program for preoperative evaluation. A comprehensive search was explicitly performed using databases such as Web of Science, PubMed, Google Scholar, Medical Literature Analysis and Retrieval System Online with Full Text, and Biosis Citation Index through the Memorial Sloan Kettering Library. The keywords used were based on the PICOT question. Keywords included telemedicine, patients undergoing surgery, preoperative evaluation, and surgery cancellation. The secondary search terms were telehealth, pre-surgical testing, pre-anesthesia evaluation, and surgery cancellation. The search inclusion criteria focused on the PICOT question and high-quality peri-operative nursing and preoperative anesthesia care in addition to the Advancing Research and Clinical Practice through a Close Collaboration Model (ARCC). The search limiters were English only, academic journals, human research, peer-reviewed, full text available, and the having been published between the years 2018-2022. The final bibliography, after the title and outcome, excluded telemedicine for post-operative care, the pediatric population younger than age 18, and an unclear study method. The data quality yielded 12 primary and eight secondary relevant studies (n=20). A copy of the search schematic can be found in this study (see Appendix A).

EBP Model

The EBP model used for this project is the ARCC. This model is a system-wide framework commonly used among other models when implementing EBP in hospital systems,

and it focuses on sustaining a culture of EBP. It ensures an alignment of the hospital systems and processes which supports nursing research and EBP (Speroni et al., 2020). An EBP model is essential in incorporating a clinical practice change because it ensures that the research findings translate into nursing practice. The EBP question for this project is, "Does the development and implementation of an advanced nurse driven telemedicine program for preoperative evaluation affect surgery cancellation?"

Following the EBP steps, according to Melnyk et al. (2018), the first step was to identify a gap in healthcare within the clinical site through a spirit of inquiry. An assessment of the organization led the DNP candidate to identify the current needs as it applies to readiness for EBP. Fortunately, the organization was ready and supported EBP and the participation of the APRN in implementing EBP changes. Then the strengths and barriers to the EBP implementation were identified before finding the project mentor (Melnyk et al., 2021). The PICOT question was developed, and evidence was gathered and critically appraised before selecting a method to measure the outcome before the evidence dissemination.

Available Knowledge

This EBP change plans to introduce a telemedicine visit for the preoperative evaluation of patients in the pre-surgical testing clinic. The practice change focuses on a safe, uninterrupted, and sustainable use of telemedicine for pre-surgical consultations. During the literature review of the final 20 pieces of evidence, it was important that the journal articles utilized aligned with the National Quality Forum (NQF) recommended domains for telehealth measures as described by Kosmetatos (2017). The outcome measures were the effectiveness of telemedicine delivery, access to healthcare, and patent experience, which corresponded with surgery case cancellation,

evaluation of time spent, and patient satisfaction. For this project's purpose, surgery cancellation was strongly supported by six peer-review journal articles.

Surgery Cancellations

Mullen-Fortino et al. (2018) compared case cancellations among patients who had a PAT visit via telemedicine versus an in-person visit. The result revealed that telemedicine PAT visits had benefits in terms of no surgery cancellations when compared to the in-person visit groups. There were also benefits in terms of patient access and satisfaction. Bias with this study may be noted due to the number of in-person visits, which was more than 20% of the telemedicine cohort comparatively.

Aldawoodi et al. (2021) conducted a retrospective analysis comparing a telemedicine and in-person cohort for pre-anesthetic evaluation to identify the difference in evaluating surgery cancellation among both groups. Results revealed 1.67% surgery cancellations in the telemedicine cohort versus 0% surgery cancellations in the in-person cohort. The study also showed positive time and cost savings findings among the telemedicine cohort. The bias noted with the study was that the ASA status and the mean age for the in-person cohort were higher than the telemedicine group, hence a potential for selection bias as this group was more likely to require specialist or medical clearances for patient optimization before surgery.

After the implementation of a telemedicine-based preoperative anesthesia evaluation setting, Kamdar et al. (2020) compared day-of-surgery case cancellations among patients evaluated by telemedicine versus in-person patients. The result revealed that 2.95% and 3.23% of patients' surgeries were canceled, respectively, for the telemedicine and in-person cohorts. The study showed positive findings concerning patient satisfaction and cost savings without an increase in day-of-surgery case cancellations among the telemedicine cohort.

A retrospective cohort study by Bovonratwet et al. (2022) assessed the difference in peri-operative outcomes between patients who had telemedicine and an in-person evaluation before surgery. The outcome studied was the case cancellation rate. Results revealed no differences in the rate of case cancellations before surgery and outcome measures between both groups. The study focused on orthopedic spine patients and reported cancellations due to patients with abnormal imaging studies rather than medical feasibility. These results supply evidence of the feasibility of telemedicine in preoperative evaluation among the patient population.

In the heat of the COVID-19 surge, many hospitals developed a teleconsultation program to help meet the patients' needs during the social distancing requirements. A study by Wienhold et al. (2021) evaluated the feasibility of the program, cancellations, and associated adverse effects of the procedure. Results revealed the medical and technical feasibility of teleconsultation without cancellations or adverse effects of the procedure. The feasibility of this project lies in the successful creation of a teleconsultation program within a short frame due to the unexpected COVID-19 lockdown amidst a national pandemic.

Among adults who received either telemedicine or in-person preoperative anesthesia evaluations, patient-reported reasons for cancellations were collected retrospectively. A large urban hospital reported fewer cancellations without a statistical difference in the appointment no-shows among the telemedicine group. Although completion of the visit was higher among the telemedicine cohorts, the study showed a bias for the use of telemedicine in serving older adults due to accessibility and interpreter service's needs (Le et al., 2022). These results evidence a potential barrier to overcome when implementing similar EBP changes.

Surgery Cancellation and Financial Burden

Surgery cancellation occurs for several reasons, ranging from the patient's request to medical optimization for surgery. Typically, after the patient consults with the surgeon for surgery, a pre-surgical testing appointment for preoperative evaluation was scheduled before proceeding for surgery. In the event the patient was not identified as medically optimized for surgery, the anesthesiologist may choose to cancel the case due to the potential non-favorable peri or postoperative outcomes. Cancellations can be avoided by a thorough medical evaluation at the pre-surgical testing clinic. Surgery cancellation has been identified to result in the underutilization of the operating room time and resources, ultimately affecting the hospital's ROI. Quality improvement programs aimed to identify the root cause of surgery cancellation revealed medical optimization being the leading cause of surgery cancellation, with a decrease in cancellation rates when a preoperative assessment clinic was integrated into their outpatient anesthesia department (Pattnaik et al., 2022).

Until recently, the management at the study site felt this must be an in-person visit rather than telemedicine to avoid the chance of surgery cancellation. Systematic review and meta-analysis of research studies by Zhang et al. (2021) have shown the success of telemedicine for preoperative evaluation in different healthcare settings. Medical reasons, mostly from the patient not being optimized for surgery or anesthesia exposure, remain the second largest reason for surgery cancellation which can be avoidable (Askari et al., 2020). Other studies have shown a smaller risk of surgery cancellation if the patient was evaluated far in advance prior to surgery, allowing time for optimization if needed, which ultimately reduced the chances of surgery cancellation (Pattnaik et al., 2022). The implementation of telemedicine as a preoperative

evaluation visit option should improve the flow of visits in the pre-surgical testing clinic, allowing time for patients to be evaluated far in advance of their surgery date.

Surgery Cancellation and Telemedicine

Since the COVID-19 pandemic, preoperative telemedicine evaluation and anesthesia care have become more popular because of proven benefits for patients and their care providers (McMaster et al., 2021). Prior to COVID-19, a significant barrier that limited the acceptance of telemedicine platforms for preoperative evaluation was the concern for work-up-related factors potentially leading to an increase in surgery cancellations. As healthcare continues to adopt technologically driven forms of healthcare delivery, many more hospitals have adopted telemedicine platforms for preoperative assessments.

Research studies in a systematic review by Koushan et al. (2021) have shown the causes of surgery cancellation across healthcare settings. They revealed that cancellation rates depend on hospital size and the type of scheduled surgeries. Unlike common beliefs, cancellations could stem from a multi-factor problem of about 44% hospital causes, 34% work-up-related causes, and 22% patient-related causes. Many hospitals have further addressed causes to implement multidimensional interventions to decrease surgery cancellations. One healthcare system set up an internal preoperative assessment clinic to address workup-related problems (Koushan et al. 2021). Research studies comparing surgery cancellation rates among patients in a PST clinic seen via telemedicine and in-person consultation revealed no surgery cancellation among patients evaluated with telemedicine appointments compared to in-person meetings (Mullen-Fortino et al., 2019). Kamdar et al. (2020) also revealed that preoperative teleconsultations could successfully reduce same-day cancellation rates when used as an adjunct to an in-person evaluation in preparing patients for surgery.

Chapter Summary

Chapter two presented the search strategy and how the final 20 articles were selected to evaluate the EBP question. The chapter also described the EBP model, which was the ARCC used for this project. The critically appraised literature review showed the feasibility of preoperative telemedicine evaluations' ability to improve patient experiences and access without increasing the risk of surgery cancellations. The financial burden of surgery cancellation was described, as well as how EBP change can potentially influence the issue as well. Chapter three will provide the context description, measures, and ethical considerations for this project.

CHAPTER THREE

METHODS

Context

Organizational Structure and Culture of the Organization

The structure and culture of MSKCC embraced the translation of EBP to clinical practice. The institution's vision, mission, and core values were to be a world leader in cancer care with respect for the individual, integrity, excellence through inclusion, innovation with lasting impact, and stewardship (Mskcc.org, 2023). Under the leadership of the president and CEO, a trained physician in oncology research, the institution purposed to deliver quality, evidence-based, and research-oriented oncology care. The institution's culture embraced EBPs to improve patient care delivery. MSKCC supported QI clinical projects through their quality and research and scholarly projects review committees to improve healthcare delivery. The APRN division, which encompasses board-certified nurse practitioners and physician assistants, has a director who is also an APRN.

The PST department at MSKCC was an APRN- run clinic comprising 44 board-certified adult or family health nurse practitioners working in collaboration with the anesthesiology department. The director of the PST clinic was an anesthesiologist and critical care attending physician. The PST clinic followed the ASA guidelines for the preoperative evaluation of patients proceeding with surgery.

The hospital had eight PST clinics throughout New York and New Jersey. Traditionally, preadmission testing was done in one of these clinic locations within 30 days of surgery. Unfortunately, due to the rising need for cancer care and the timeline for a surgical choice for cancer treatment, a rising need for same-day add-ons for patients proceeding with surgery the

next day existed. Patients undergoing elective surgeries required time for peri-anesthetic evaluation and optimization before surgery. The day before surgery, the anesthesia department reviewed the patient's charts. Patients noted with potential perioperative complications without prior optimization faced the risk of same-day surgery cancellations. The impact of surgery cancellation on the operating room resulted in a low ROI for the institution. The impact also affected the PST clinic volume, disrupting the visit flow process (Mihalj et al., 2020).

Project Barriers

To ensure compliance and facilitate the project's success, a policy that accommodated MSKCC's outpatient office practices' workflow to obtain a baseline height, weight, and vital signs was included in the inclusion criteria. Many surgical practices did not obtain these during an initial preoperative consultation. All diagnostic tests, if needed, were ordered through an outside lab close to the patient's home, sidestepping the need for an in-person visit before the day of surgery. An accurate baseline vital signs and calculated Body Mass Index (BMI) were necessary for optimizing patients for surgery. These statistics indicate that preoperative health conditions directly impact surgical physiological stress tolerance (Gillis et al., 2022). Patient optimization of a morbidly obese patient with low exercise tolerance or a patient with undiagnosed or poorly controlled blood pressure required a referral for medical consultation for a proper patient workup to avoid poor perioperative outcomes. Also, robotic-assisted surgical procedures, the most used surgical approach in the United States, experienced surgeon-reported difficulty with patients with higher BMIs (Shapiro et al., 2022). To overcome this barrier, the nursing policy needed to change to reflect the fact that patients have the measurement and documentation of vital signs, height, and weight every three months. After an initial office baseline measurement, following the three-month period, patients reported clinician-guided self-

measured blood pressure monitoring or an at-home scale-measured weight after the initial facility measurement. A self-measured blood pressure monitoring was valid if obtained by a patient who had received training and education from a clinician. The patient also must have used a validated device with an accurately sized cuff, proper positioning, and a measurement method (Wall et al., 2021).

Another barrier was pushback by the perioperative department on the physical examination requirement for a cardiac evaluation and lung function assessment via telemedicine. Evidence has shown the effectiveness of patient-directed assessment, including vital signs self-assessment during preoperative evaluation. Evidence supported using an electronic stethoscope for remote blood pressure monitoring, electrocardiogram, and even a heart murmur (Mihalj et al., 2020). Also, the anesthesia department strongly encouraged the need for an initial preoperative surgical consultation physical examination to include a lung and heart examination for Pre-Anesthesia Evaluation (PAE).

Project Facilitators and Organizational Support

The institution's culture supported evidence-based projects aimed at improving the best clinical practice for healthcare delivery. Such a culture made the spirit of inquiry easier. The institution held a quarterly workshop for APRN QI and research projects with the support of the quality and research department. Once an EBP project was approved, the institution provided support through the interdisciplinary team. After identifying a problem in the PST department and discussing it with the APRN manager and director, a PICOT question developed under the guidance of Wilmington University faculty was presented to the institution's monthly research and QI council.

The APRN quality council approved the project topic and research and QI council advised proceeding with the completion of an Internal Review Board (IRB) application. A project mentor was elected within the institution who provided guidance and support in collaboration with the PST clinic director. Team members, including the PST director, supported and guided the project. All stakeholders and the project management team within the institution provided subject matter guidance to help overcome barriers and support the project's success.

Key Stakeholders

All stakeholders, including the project management team, worked within the institution. These stakeholders provided subject matter guidance to help overcome barriers and support the project's success. Stakeholders included the interdisciplinary team, the APRN PST team and manager, the director of the PST clinic and the associate director of anesthesia, the nursing informatics specialist, nursing hospital administration, outpatient surgical APRNs and Nurse leaders, the telemedicine project managers, the manager of care coordinator PST, and the director of APRN quality. The telemedicine interval training department played a vital role in setting up training for the PST department APRN in collaboration with the project manager. The team was formed based on the skills held by each team member, each of whom acted as a subject matter expert who could help guide the project's success.

Benefits of Telemedicine as a Preoperative Visit Option

This evidence-based project practice change aimed to introduce telemedicine as a visit option in the PST clinics of a large urban clinic in New York City to impact healthcare delivery positively. Evidence proved that telemedicine potentially improved patients' experience with access to healthcare and improved health outcomes (Mullen-Fortino et al., 2018). Patients have reported their expectations of healthcare delivery and were satisfied with a videoconferencing

form of healthcare delivery. Also, telemedicine increased the effectiveness and efficiency of healthcare delivery as it related to travel time, cost, and distance savings (Kamdar et al., 2020).

Due to the increasing need for oncology healthcare and surgical options for cancer treatment, the institution studied needed to embrace the versatility that telemedicine offered providers as an option to meet the needs of patients, especially those in remote areas and those who travel to New York City. With the advancement in telehealth, the study site needed to embrace and explore telehealth's advantages as concerned with improving patient satisfaction, healthcare access, cancellation rate, and provider-patient engagement time savings (Mullen-Fortino et al., 2018).

Several studies have shown healthcare providers' perception of a high satisfaction rate with telemedicine used during the COVID-19 pandemic without the lapse in healthcare delivery. Healthcare providers were urged to explore telemedicine for long-term healthcare delivery among the surgical patient population (Zhu et al., 2020).

Interventions

Project Setting and Design

The setting for the EBP change implementation was the PST clinic at Memorial Sloan Kettering Cancer Center. Low-risk patients were scheduled to undergo an elective low-risk surgical procedure. Patients met the telemedicine or in-person visit requirement per the PST guidelines for a pre-anesthetic medical evaluation before surgery. This study retrospectively compared the cancellation rate among twenty-five patients scheduled for telemedicine and 25 patients scheduled for in-person visits. The design was a cohort, retrospective observational study.

Inclusion and Exclusion Criteria for Telemedicine Visits

Patients proceeding with a low-risk gynecologic surgical procedure and scheduled for a Preoperative evaluation over 18 years old and who were considered low risk based on ASA grade I and II. Inclusion criteria were ASA I patients who are non-smoking, have little or no alcohol use, little or no marijuana use, and have no biopsy-proven diagnosis of cancer. ASA II patients have mild systemic disease without substantive functional limitations, may be current smokers with social alcohol or occasional marijuana use, obese with a BMI less than 40, well-controlled Diabetes or hypertension, well-controlled asthma, good exercise tolerance, and localized cancer.

Exclusion criteria were patients considered ASA level III, IV, and V, such as patients with symptomatic or severe systemic disease, low exercise tolerance, frailty, morbid obesity, substance abuse, metastatic cancer, current or recent chemotherapy, and radiation therapy. This includes patients with cardiovascular disease with a pulse greater than 110 and blood pressure greater than 140/80, patients with cerebrovascular/peripheral vascular disease, pulmonary disease, neuromuscular disease, morbid obesity, previous major head and neck surgery with or without a history of radiation therapy, congenital or acquired maxillofacial abnormality and a history of airway-related anesthesia complication.

Patient metabolic equivalents (METs) of less than four due to cardiac, pulmonary, or neurologic diseases and patients with morbid obesity BMI greater than 40 would require an in-person assessment. Patient METs were calculated based on the estimated physical activities patients can perform without signs of cardiac failure. Patients with lower METs thresholds were at known risk for perioperative complications (Weinstein et al., 2018). Several studies showed

that traditional in-person pre-anesthetic medical evaluation may not be necessary for PST patients proceeding with low-risk procedures (Zhang et al. 2021).

A retrospective chart review was performed to evaluate if preoperative testing patients needed an in-person or telemedicine form of pre-anesthetic medical evaluation at the peak of the COVID-19 pandemic. The result revealed that by applying patients' related factors based on their age and comorbidities, those who did not need further diagnostic testing or evaluation, such as patients above age 65 with medical acuity, comorbidities, and metabolic diseases, were the only patients evaluated using the traditional face-to-face evaluation; other patients' evaluation was via telemedicine limiting healthcare exposure (Khera et al., 2022). The inclusion and exclusion criteria were developed based on available evidence-based resources and the ASA guidelines for pre-anesthetic evaluation.

Telemedicine for Preoperative Evaluation as the Project Intervention

The intervention was implementing a practice change, telemedicine service as a visit option for pre-anesthetic medical evaluation at MSKCC. At the time of the study, the only visit option the clinic offered was an in-person pre-anesthetic medical evaluation which had to be completed within 30 days of surgery. During the implementation phase, the implementation team started with a pilot group of low-risk oncologic gynecologic surgical patients undergoing low-risk procedures. The patients were ASA Physical Status Classification System levels I and II proceeding for same day or Ambulatory Extended Recovery pathway. The goal was to extend the implementation to other low-risk oncologic surgical services patients. Evidence showed that 60% to 70% of blood and diagnostic tests ordered at the PST pre-anesthetic evaluation were unnecessary, which prompted the initiation of evidence-based PST testing guidelines (Cuomo et al., 2018). The institution adopted indicated-testing grids developed using evidence-based PST

guidelines to evaluate patients proceeding with surgery. This change proved to be safe and cost-effective. Since its adoption in 2017, its expansion has accommodated low, intermediate, and high-risk surgical procedures, eliminating unnecessary preoperative diagnostic testing. Since its implementation, the rates of complete blood count, partial thromboplastin time, comprehensive metabolic panel, chest x-ray, and electrocardiogram have been reduced by 13.4%, 78.1%, 36.8%, 39.1%, and 15.5%, respectively (Aviki et al., 2021).

As mentioned by Khera et al. (2022), many clinical scholars have argued and shown that preoperative testing does not need a traditional face-to-face or in-person visit because many patients come into the PST clinic solely to obtain testing scheduled in conjunction with an in-person pre-anesthetic medical evaluation. Patients who fall under the low-risk testing grids PST guidelines may not need blood or diagnostic tests for pre-anesthetic medical evaluation. Telemedicine entails patient chart reviews, telephone visits, and video consultations and may be a visit option for these patients. Telemedicine allowed the provider time to evaluate these patients' surgical risks using medical history, review of systems, medication reconciliation, and physical evaluation (Khera et al., 2022). The daily rate of patient flow to the PST clinic compared to pre-pandemic showed a decline of about 35%. Large institutions like MSKCC have implemented telemedicine for preoperative assessment among their patient population. Results have revealed success in patient satisfaction and minimal cancellation rates while reducing healthcare costs without more days of surgery delay (Mullen-Fortino et al., 2019). Telemedicine for perioperative assessment has also been proven to minimize inconveniences while identifying health conditions affecting a patient's perioperative outcome (Kamdar et al., 2020).

Telemedicine Visit

According to MSKCC PST telemedicine guidelines, the clinician identified that the patients met the inclusion or exclusion criteria for a telemedicine visit during the preoperative surgical consultation. The office care coordinator scheduled candidates for a PST telemedicine visit. The framework used to guide this EBP was the PDSA method. The PDSA cycle was a method used to develop and test the implementation plan of a change (Institute for Healthcare Improvement, 2022). According to the Institute for Healthcare Improvement, the first step, which is the planning phase, is to test the change. The (Do) stage is the time to carry out the test, and the (Study) phase is when to observe, analyze, and learn from the effect of new visit mode. During the last cycle (Act), any modifications identified in the previous phase are incorporated into the workflow and implemented.

Once a patient was scheduled for a telemedicine visit, the APRN at the PST office reviewed the chart prior to the visit to identify if the patient would need any diagnostic testing and if the visit should be in-person. Once the patient met the criteria, videoconferencing occurred using Microsoft Teams on the day of the visit by a PST APRN, who had completed the telemedicine training and reviewed the patient's chart. Prior to the day of the visit, the patient received an invitation through the patient portal with instructions to test video, connectivity, and microphone as well as an option to invite a third party to the visit.

On the day of the visit, videoconferencing occurred at the Rockefeller Outpatient Pavilion location in a designated consultation room. The PST care coordinator was the telemedicine visit facilitator who alerted the patient 15 minutes before the start of the visit and connected the patient and staff with tele helpdesk support if the connection was difficult. At the set time, the PST APRN completed the visit per legal and regulatory requirements for a complete

history and physical examination which was good for 30 days prior to the day of surgery. Patient evaluation starts with a detailed medical, anesthesia, and surgical history, family and social history, a body system review, medication allergy review, a complete physical examination, and an oral airway examination as per guidelines. The APRN completed a medication reconciliation and provided the patient with day-of-surgery instructions, including medication instructions and the office number to call if there were any questions. If a medical necessity warranted diagnostic blood testing or an in-person visit was identified during a telemedicine video visit, patients were referred to one of the satellite locations or an outside lab for a blood test or scheduled in-person PST. In the (Do) phase of the PDSA cycle, the test site offered telemedicine service by service, starting with the gynecological surgical service. After the pilot group, the implementation team proceeded with the study and act stage before proceeding into another PDSA cycle, expanding telemedicine to other surgical services.

Study of the Interventions

Surgery Cancellation as an Outcome Measure

The NQF created a framework to measure the quality of telehealth services using four evaluation domains: access to healthcare, cost, experience, and effectiveness (Li et al., 2022). NQF used six critical areas under these four umbrellas for the highest priority for measuring telehealth's success. These included travel, appropriateness of care, actionable information, the value of telehealth to provide EBPs, patient empowerment, and care coordination as perceived by patients (Kosmetatos, 2017).

Comparison groups were low-risk patients proceeding with low-risk surgery who had their preoperative assessment through telemedicine and in-person visits. The author of this study compared the percentage of case cancellation rates of both preoperative visit types. The primary

outcome measure to evaluate was surgery cancellation. The criteria for surgery cancellation was the cancellation of a scheduled surgical case that had an assigned date and time on the operating room schedule due to medical optimization or an acute exacerbation of existing illnesses within 24 hours of the time of surgery.

Evaluation Plan

Evaluation of the cancellation rate measured the effectiveness of telehealth services, which entailed the intervention's operational, system, clinical, and technical effectiveness. Evaluation of the cancellation rate measured the effectiveness of telehealth services, which entailed the intervention's operational, system, clinical, and technical effectiveness. A randomized clinical trial to evaluate telehealth effectiveness has proven to have better outcomes in analyzing surgery cancellation (Li et al., 2022).

A meta-analysis of 11 studies comparing surgery cancellation as it affects telemedicine to in-person visits showed that four reported no difference, two reported the same, one reported lower cancellation rates, and four non-comparison studies reported no cancellations with the telemedicine preoperative (Zhang et al., 2021). Evaluating the outcome measure of surgery cancellation on in-person versus telemedicine pre-anesthetic evaluation was used for QI in the institution. Several research studies have established the safety of using telemedicine for the preoperative evaluation of patients (McMaster et al., 2021).

Observed Outcome Measure of the Interventions

The QI project studied the clinical effectiveness of using telemedicine accurately to diagnose and evaluate patients during a pre-anesthetic medical evaluation, identifying and referring those needing medical optimization accordingly to reduce surgery cancellations. The project called for the comparison of the percentage of surgery cancellations due to patient

optimization and medical illness exacerbation among both visit options. The team assessed to what extent telemedicine, as a form of pre-anesthetic medical evaluation, was as effective as the traditional in-person visit. The outcome changed the clinical practice at the PST clinic at MSKCC. Patients identified to be at a low perioperative cardiovascular risk proceeding for low-risk surgeries completed their pre-anesthetic medical evaluation as a visit option using telemedicine, bypassing the traditional in-person visits. A systematic review revealed the use of telemedicine for preoperative evaluation and diagnosis to benefit both the patients and the clinician (Asiri et al., 2018). Telemedicine improves healthcare delivery in the PST clinic. Improving the visit flow allowed the clinic scheduling template to accommodate the daily patient volume. They are also patient-reported outcomes of cost savings associated with commuting to the clinic locations (Kamdar et al., 2020). QI projects were encouraged to measure other outcomes, such as access to care, cost, travel times, and provider experience.

Measures

Surgery Cancellation Rate Analysis

A retrospective collection of pre-implementation data for surgery cancellation rates for 2019 through 2022 were analyzed to identify the trends of surgery cancellation. The data, once collected and analyzed, showed that surgery cancellations increased in the last four years.

Table 1

PST Visits and Surgery Case Cancellation Trend from 2019 to 2022.

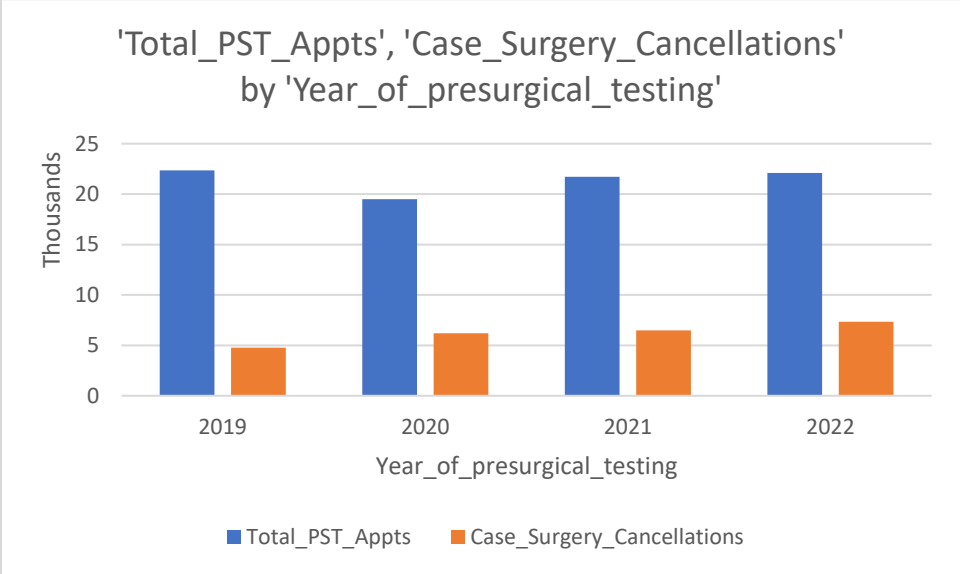
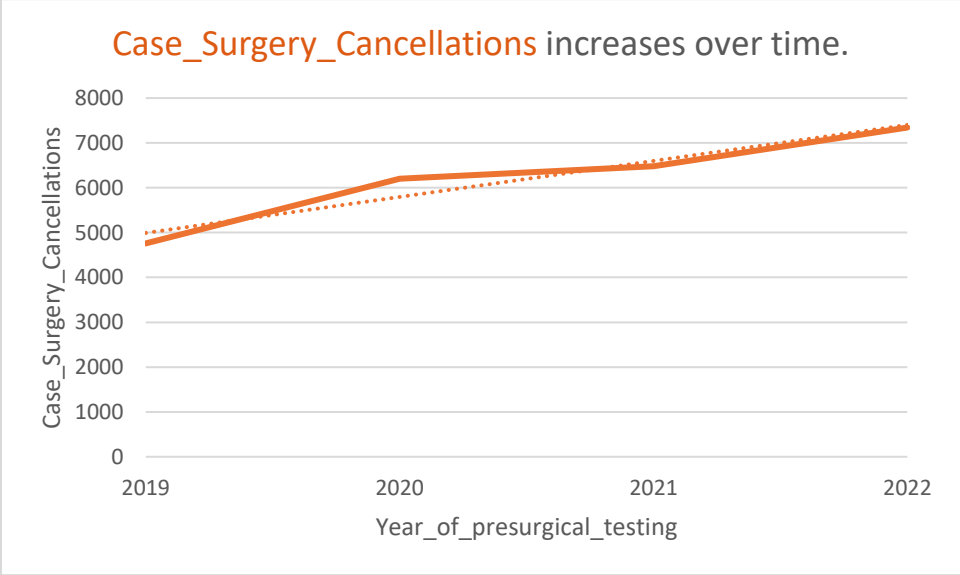


Table 2

Surgery Case Cancellation Trend from 2019 to 2022.



Data Collection

In the rate analysis for this project, data were retrospectively collected and compared from the in-person visit cohort to the telemedicine cohort after six weeks of implementation, n= 25 in-person and n= 25 telemedicine patients. The number selection was low due to the number of patients evaluated using telemedicine for six weeks. To avoid flaws in data comparison, future analysis to compare post- and pre-implementation data will be ideal when most low-risk surgical patient's consultations use telemedicine for PST, and the volume of patients has increased.

Data were extracted using the MSKCC data line. Considerations were made for surgery cancellations within 24 hours of a scheduled surgery due to medical optimization or an acute exacerbation of existing illnesses. The independent variables were the modes of visits-telemedicine (IV1) and in-person visits (IV2). The dependent variable was surgery cancellation (DV1). As requested by the research and scholarly projects review committees, a secondary dependent variable, patient satisfaction, was looked at to further evaluate the practice change's value.

Demographic Data

Demographics used included age, race, gender, ASA level I or II, and surgery type. Data access was through the Dataline link on the MSKCC computers with data security in place according to PHI guidelines.

Analysis

The data used for the descriptive statistical analysis were nominal and ordinal qualitative data. Nominal, race, gender, and day of surgery cancellation had labels, while the ordinal data, ASA level, and age range had gradation (Yadav et al., 2019). The mean age was ordinal data, while gender, race, surgery type, surgery cancellation, and ASA physical status were the nominal

data. The mean and median values of the age interval were calculated for each visit option. Student T-test was used to compare means. For gender, race, surgery type, surgery cancellation, and ASA physical status, each percentage was calculated based on the confidence interval for a proportion (95% of confidence intervals). Surgery cancellation comparison among both visit groups (telemedicine or in-person visit) was calculated with 95% confidence intervals. Chi-square testing calculated the relationship between demographics (cofounder to the outcome) for each visit type and comparison. Statistical significance (p-value) was calculated for each demographic and visit group.

Budget

Using activity-based costing to identify the expenditure and reimbursement of telemedicine initiatives must be drafted in a business plan for the program's success and the business impact of the institution. The revenue over-cost calculation was necessary for the successful funding of this project. However, each 60-minute visit involved using resources, including APRN, care coordinators, tele helpdesk support, devices, computers with electronic health record systems, and care technicians during in-person visits. A telemedicine program can be a costly initiative due to the cost of resources, including software that meets the PHI requirements. A project's revenue must break even or generate interest in the program's sustainability (Antoniotti, 2021).

The program estimation was six weeks; however, it was a practice change being implemented to adopt a new visit option. The budget estimate was for three years, the program's estimated lifetime which would allow the organization to see the project's actual value. As the budget shows, the total provided increased over months of implementation. The attached budget estimated the expense incurred during the project's length (see Appendix E). All resources and

equipment were products of MSKCC. Stakeholders and interdisciplinary team members that were part of the project's success were employees of MSKCC, the current employer of the DNP student and project manager.

Ethical Considerations

QI programs in the healthcare setting aim to use outcomes to improve cost-effective and efficient healthcare delivery. The intervention must not harm the patient population while using scientific methods to investigate the outcome of an intervention on the population. The QI project entailed the comparison of two cohort groups, and it was important to seek approval from the institution's IRB, which was responsible for protecting the rights and welfare of the intended human research subjects (Antoniotti, 2021).

With the guidance of the project advisor and course instructor, a Human Subjects Review Committee (HSRC) application was submitted, and a waiver was received from the Wilmington University HSRC board. An IRB application was submitted to MSKCC's Department for Scholarly Projects Review Committee (SPRC). The feedback was that a review by the IRB was not required, and a waiver was issued. See Appendices B and C for the MSKCC IRB waiver and Wilmington University HRSC approval.

Chapter Summary

Chapter three discussed the context of the project, the organizational structure, and the culture that supports EBP and QI projects for improving healthcare delivery. It discussed how surgery cancellations might affect the institution's ROI. It reviewed the project barriers and interventions to address barriers that may interfere with the project's success, potentially affecting its sustainability. It discussed the project facilitation, organization support, and the role the stakeholders and interdisciplinary team within the institution play in providing subject matter guidance for the benefits of telemedicine for pre-anesthetic. Finally, it highlighted and examined the budget, measures, surgery data collection and analysis, and ethical considerations. Chapter four will have a detailed discussion of the project execution, assessment, interpretation of analyzed data, and a review of the project implication.

CHAPTER FOUR

RESULTS

Sample Characteristics

The demographics of the project participants included race, gender, day of surgery cancellation, age, and ASA level. Frequencies and percentages were calculated for race, age at the time of surgery, sex, surgery cancellation, ASA level, and type of PST visit split by telemedicine or in-person visit. As shown in Table 1, the most frequently observed race category was white (n = 44, 88.00%). The most frequently observed age categories were 45-64 years and >65 years of age, each with an observed frequency of 22 (44.00%). All the observed categories of sex were female (n = 50, 100.00%). Most patients (94%) did not cancel their surgery appointment (n = 47, 94.00%). The most frequently observed category of ASA level was II (n = 50, 100.00%). The two types of PST visits were in-person and telemedicine cohorts with an observed frequency of 25 each (50.00%).

The most frequently observed age category within the in-person cohort category of type of PST visit was >65 (*n* = 14, 56.00%). The most frequently observed age category within the telemedicine cohort category of type of PST visit was 45-64 (*n* = 11, 44.00%). The most frequently observed race category within the in-person cohort category of type of PST visit was white (*n* = 21, 84.00%). The most frequently observed race category within the telemedicine cohort category of type of PST visit was white (*n* = 23, 92.00%). The most frequently observed category of sex within the in-person cohort category of type of PST visit was female (*n* = 25, 100.00%). The most frequently observed category of sex within the telemedicine cohort category of type of PST visit was female (*n* = 25, 100.00%). The most frequently observed category of ASA level within the in-person cohort category of type of PST visit was II (*n* = 25, 100.00%).

The most frequently observed category of ASA level within the telemedicine cohort category of type of PST visit was II (*n* = 25, 100.00%).

Result

Chi-square testing calculated the relationship between each demographic (race, age, surgery cancellation, type of PST visit), and the results obtained revealed that age (p=0.022) and type of PST visit (p<0.001) showed a significant relationship (see Table 4). In contrast, others were not significant (p>0.05). The p-value for race (p=0.317) and day of surgery cancellation (p=0.317) was insignificant, while the age (p=0.025) and type of visit were significant (p<0.01).

Age

The mean and median age of the overall data was calculated (m=61.64, md= 62), and the mean and median values of the age interval were calculated for each visit option in Table 2. The mean and median for the in-person cohort (m= 65.64, md=66) were higher than the mean and median for the telemedicine cohort (m=57.64, md=58). As evidenced by the boxplot in Figure 1, the in-person cohort had a higher age at surgery than the telemedicine cohort. Also, the in-person cohort had a slight outlier at age 45.

A two-tailed independent samples *t*-test was conducted to examine whether the mean age at surgery significantly differed between the in-person and telemedicine cohort categories of type of PST visit. In Table 3, the student *t*-test was used to compare the mean age of the telemedicine cohort, and the result of the two-tailed independent samples t-test was significant based on an alpha value of .05, t (42.34) = 2.33, p = .025. This finding suggested that the mean age at surgery significantly differed between the in-person and telemedicine cohort categories of type of PST visit.

Race

The two-tailed Wilcoxon signed rank test for the in-person and telemedicine cohorts' races was performed, and the results were insignificant based on an alpha value of .05, V = 2.50, z = -1.00, p = .317. This indicated that the differences between the race of the in-person cohort (*Mdn* = 3.00) and the race of the telemedicine cohort (*Mdn* = 3.00) were explainable by random variation.

Gender and ASA level

For these demographics, all the patients were female (100%). All patients (100%) belong to the ASA II.

Surgery Cancellation

The surgery cancellation comparison among both visit groups (telemedicine and in-person) was developed using a two-tailed Wilcoxon signed rank test. The result was not significant based on an alpha value of .05, V = 2.50, z = -1.00, p = .317, indicating that the differences between the surgery cancellation of the in-person cohort (*Mdn* = 2.00) and surgery cancellation of telemedicine rt (*Mdn* = 2.00) were explainable by random variation. A linear regression analysis was conducted to assess whether the type of PST visit significantly predicted surgery cancellation. The linear regression model F (1,48) = 3.27, p = .077, $R2$ = .06, indicated that the type of PST visit did not explain a significant proportion of variation in surgery cancellation. Since the overall model was insignificant, the individual predictors were not examined further. Table 5 summarizes the results of the regression model.

Figure 1

Boxplot of Age at Surgery by Type of PST Visit

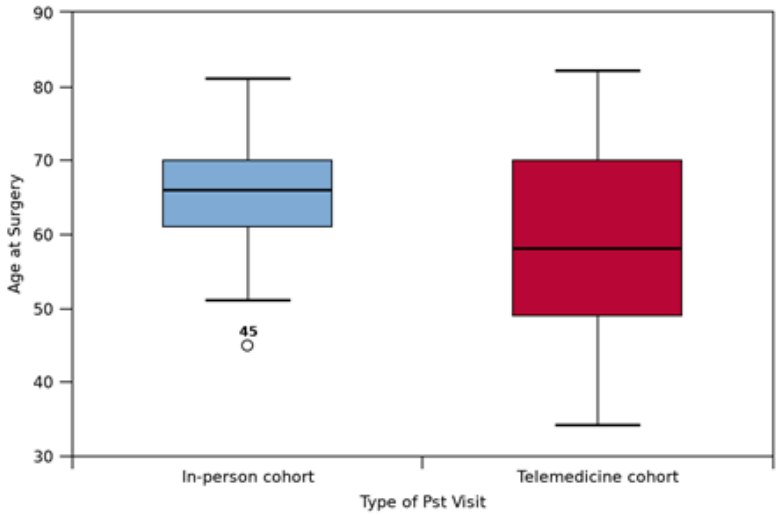


Table 3

Overall Descriptive Statistics

Variable		N
Age	50	50
Mean	61.64 (12.69)	
Median	62[34,82]	
Race		50
Black Or African American	6(12%)	
White	44(88%)	
Age		50
26-44	6(12%)	
45-64	22(44%)	
>65	22(44%)	
Sex		50
Female	50(100%)	
Surgery Cancellation		50
Yes	3(6%)	
No	47(94%)	
ASA		50
II	50(100%)	
Type of PST Visit		50
In-person	25(50%)	
Telemedicine	25(50%)	

Table 4

Telemedicine versus In-person Comparisons

	Type of PST Visit		
Variable	**In-person**	**Telemedicine**	**p**
Age			0.025
Mean	65.64 (9.68)	57.64 (14.20)	
Median	66 [45,81]	58 [34, 82]	
RACE			.317
Black Or African American	4 (66.67%)	2 (33.33%)	
White	21 (47.73%)	23 (52.27%)	
AGE			.007
26-44	0 (0.00%)	6 (24.00%)	
45-64	11 (44.00%)	11 (44.00%)	
>65	14 (56.00%)	8 (32.00%)	
SEX			
Female	25 (50.00%)	25 (50.00%)	
SURGERY CANCELLATION			.317
Yes	3 (12.00%)	0 (0.00%)	
No	22 (88.00%)	25 (100.00%)	
ASA			
	25 (50.00%)	25 (50.00%)	
TYPE OF PST VISIT			<0.001
In-person	25 (100.00%)	0 (0.00%)	
Telemedicine	0 (0.00%)	25 (100.00%)	

Table 5

Two-Tailed Independent Samples T-Test for Age at Surgery by Type of PST Visit

	In-person cohort			**Telemedicine cohort**					
Variable	***M***	***SD***	***n***	***M***	***SD***	***n***	***t***	***p***	***d***
Age_At_Surgery	65.64	9.68	25	57.64	14.20	25	2.33	.025	0.66
Note. N = 50. Degrees of Freedom for the *t*-statistic = 42.34. *d* represents Cohen's *d.*									

Table 6

Results for Significance Testing Against the Levels of Type of PST Visit Using t-Tests and Chi-square Tests

Variable	**n**	**Statistic**	**df**	***p***
Race	50	0.758[b]	1	.384
Age_At_Surgery	50	32.933[b]	24	.105
Age_Code	50	7.636[b]	2	.022
Sex	-	-[b]	-	-
Cancellation_Code	50	-1.809[a]	24	.083
Surgery_Cancellation	50	3.191[b]	1	.074
ASA_Code 1651	-	-[b]	-	-
Type Of PST Visit	50	50.000[b]	1	< .001
Note. a = *t*-Test and b = Chi-square test; '-' indicates that the test could not be conducted (i.e., only 1 observed level, duplicate data).				

Table 7

Results for Linear Regression with In-person vs Telemedicine Cohort Predicting Surgery Cancellation

Variable	***B***	***SE***	**95.00% CI**	**β**	***t***	***p***
(Intercept)	1.88	0.05	[1.79, 1.97]	0.00	40.08	< .001
In-person vs Telemedicine cohort	0.12	0.07	[-0.01, 0.25]	0.25	1.81	.077
Note. Results: F (1,48) = 3.27, p = .077, R^2 = .06 Unstandardized Regression Equation: Surgery Cancellation = 1.88 + 0.12*In-person vs Telemedicine						

Chapter Summary

Chapter four discussed the descriptive statistical analysis of the project findings. The result revealed that 94% of all 50 patients seen in person or via telemedicine did not cancel their surgery. Statistical analyses of both visit options potentially affecting surgery cancellation were calculated using the two-tailed Wilcoxon signed rank test and linear regression. Chapter five will interpret these results and staff and patient qualitative comments about the project. Project limitations, dissemination plans, DNP essential application, and sustainability strategies will also be discussed.

CHAPTER FIVE

DISCUSSION

Interpretation

Key Findings

The descriptive analysis showed that the mean and median ages differed between the in-person and telemedicine cohorts. The two-tailed independent samples t-test indicated a significant difference in the mean age at surgery between the visit options. The telemedicine cohort had a lower mean age compared to the in-person cohort. The chi-square test explored the relationship between demographics, visit options, and surgery cancellation. It found a significant relationship between age and visit options, indicating that different age groups were associated with different visit options. However, race, gender, ASA classification, and day of surgery cancellation did not significantly correlate.

The descriptive analysis showed that the mean and median ages differed between the in-person and telemedicine cohorts. The two-tailed independent samples t-test indicated a significant difference in the mean age at surgery between the visit options. The telemedicine cohort had a lower mean age compared to the in-person cohort. The chi-square test explored the relationship between demographics, visit options, and surgery cancellation. The test found a significant relationship between age and visit options, indicating that different age groups were associated with different visit options. However, race, gender, ASA classification, and day of surgery cancellation did not significantly correlate with visit options. Regarding surgery cancellation, the overall cancellation rate was 6% for the telemedicine group and 0% for the in-person group. However, the difference in cancellation rates between the two groups was not statistically significant based on the Wilcoxon signed rank test and linear regression analysis.

The study found that age and visit options were significantly associated, with different age groups more likely to choose or be offered a particular visit option. However, the telemedicine and in-person groups had no significant difference in surgery cancellation rates. The analysis highlights the importance of considering various factors and potential limitations in interpreting the study's findings. Both visit options demographics included all female patients, gynecological surgery patients, and ASA II patient classification. It is important to note that both visit groups followed the same PST guidelines for screening which would further entail the same surgery risk allocation and indicated testing grids.

A similar cancer center, Moffitt Cancer Center's PAT Clinic, implemented a telemedicine program among high volumes of complex surgical populations. Their results revealed that despite the in-person group with higher average age and ASA status than the telemedicine group, cancellations were not statistically significant (Aldawoodi et al., 2021). The authors pointed out that despite both groups following the same screening guidelines but differed in the surgical service and risk allocation among both categories, preoperative telemedicine evaluations were successful (Aldawoodi et al., 2021). Moreover, between the study and the practice reviewed, patient groups differed in age, possibly due to the exclusion and inclusion criteria defined for the telemedicine group which may have led to patients with increased age and more comorbidities not meeting the criteria for telemedicine consult. However, all 50 patients underwent low-risk surgeries under the same surgical service.

Project's Strength

The project's strength was that the institution updated the PST policies. Specifically, MSRR 506 and MSRR 214 have been updated and approved by legal and regulatory reviewers. Telemedicine visits are now an option for patients who qualify for the visit based on the

inclusion/exclusion criteria. The organization received positive feedback from the staff and patients on using telemedicine for preoperative evaluation. Among 20 patients asked, 19 reported benefits in terms of cost savings because it allows them to receive preoperative evaluation remotely, saving travel time and the cost of toll, gas, and parking in the city. All 20 patients and PST staff members expressed satisfaction as the visit options improved accessibility and convenience. Telemedicine enabled patients to have virtual consultations from their homes. This accessibility eliminated barriers like travel time to the city, distance traveled, and the need to take time off work. It reduced the likelihood of last-minute cancellations due to unforeseen complications.

A retrospective study by Aldawoodi et al. (2021) revealed the usefulness of telemedicine for PAE in terms of time, distance, and financial savings without increasing surgery cancellations among the oncology population with frequent healthcare visits. A systematic review of 24 studies revealed improved clinical outcomes for diagnostic purposes, accuracy with preoperative assessment, unnecessary transfers, and medication adherence with telemedicine use for preoperative evaluation. The study also revealed that 95% of patients reported improved patient satisfaction and saved money by avoiding unnecessary hospital trips and reducing days missed from work (Asiri et al., 2018). A difference in the rate of case cancellations between patients who had a telemedicine-only preoperative evaluation and a telemedicine visit followed by an in-person was observed by Bovonratwet et al. (2022). The result revealed no difference in case cancellations and patient-reported outcome measures between 61% of patients who had telemedicine visits before surgery and 39% of patients who had a telemedicine visit followed by an in-person evaluation. Telehealth PAE is as reliable as in-person visits, with advantages in areas where access to healthcare can be difficult, with high patient satisfaction rates, and the

further holdings benefits in saving time and cost compared with in-person evaluations (Schoen & Prater, 2019).

Clinical Significance

Qualitative data of patient and staff comments were collected to examine the project's clinical impact since implementation. The statements from the staff revealed that telemedicine improved the visit flow of the PST clinic by reducing appointment cancellations and accommodating more patients needing in-person visits. Statements from the patients included "improved communication, convenience, travel, and cost savings." Telemedicine visits eliminated the need for patients to incur travel expenses, accommodation costs, and potential loss of income due to time away from work. This financial relief can positively impact patient compliance and commitment to scheduled surgeries, ultimately reducing cancellation rates. In a similar clinical setting among 34,760 patients, studies revealed that the no-show rate for pre-admission testing appointments significantly dropped to 2% with the implementation of teleconsultation (Duckworth et al., 2022).

A two-year retrospective study based on a patient's clinical experience in a large urban city revealed an outcome of 0.28% lower case cancellation rate with telemedicine, savings of about $67 per patient visit, and 63 miles of median round trip driving distance with telemedicine visits (Kamdar et al., 2020). An assessment of the use of telemedicine in outpatient surgical care from the clinician and patients' perspective revealed reduced lost income due to time missed from work in four studies, high patient satisfaction in 27 studies, and clinician satisfaction in five studies (McMaster et al., 2021). Another study of n=1,041 revealed that 89% of patients reported satisfaction with surgical telehealth consultations, 81% preferred telemedicine due to distance, and 66% reported out-of-pocket savings (Wiadji et al., 2021).

The feedback received revealed that the telemedicine visit mode could offer several clinical and organizational benefits. While it was important to note that the impact of telemedicine on surgery cancellation rates may vary depending on specific factors, such as the type of surgery and patient population, overall, telemedicine offered significant benefits in mitigating cancellations and enhancing surgical care. Improving clinic flow was a crucial organizational significance of the telemedicine visit because it contributed to efficient appointment scheduling, improved communication, and coordination, eliminated bottlenecks associated with traditional in-person visits, which involve multiple steps, such as check-in, waiting rooms, and room transitions, and optimized resource utilization to help clinics better manage their capacity.

On the patient's end, telemedicine reduced surgery cancellations by contributing to a streamlined preoperative assessment, preoperative education, and preparation. It also improved patient-provider communication, flexibility, and scalability associated with access to care, wait times reduction, and reduced the need for patients to come to the clinic physically. These improvements can lead to more efficient clinic operations, better patient management, and enhanced surgical outcomes (McMaster et al., 2021).

Furthermore, while telemedicine offered convenience and cost savings, other factors beyond the visiting mode contributed more significantly to the likelihood of surgery cancellations. This project result revealed that age at the time of surgery has a significant relationship with surgery cancellation because of the substantial difference in the age groups among both visit options.

Costs and Strategic Trade-offs

The strategic trade-off of telemedicine as a new visit option for preoperative evaluation in a hospital system can impact cost and quality metrics, specifically surgery cancellation and patient satisfaction rates. Other factors that can directly influence ROI, as described by Manatt's proposed ROI framework, are the measurable impacts of the program (2019). Other nonfinancial advantages include acuity level, remote access, and better quality of care (Manatt, 2019). These factors can increase patient retention rates and the influx of patients to a large healthcare institution like MSKCC, ultimately increasing ROI. Telemedicine can reduce surgery cancellations by providing convenient and timely preoperative assessments, allowing for early identification of any issues that may lead to operating room cancellations.

It is crucial to implement telemedicine protocols carefully, considering factors such as the complexity of cases, the reliability of telemedicine platforms, and clear communication with patients about the limitations and benefits of telemedicine evaluations. To identify its influence on quality metrics, leadership should study the outcomes using the framework measures recommended by the NQF; healthcare access to care, cost, experience, and effectiveness (Li et al., 2022). Regular monitoring and evaluation of surgery cancellation rates and patient satisfaction can help identify areas for improvement and ensure the management of the trade-off between telemedicine and quality metrics. Properly scheduled and completed telemedicine visits can improve access, support a positive patient experience, and provide effective care (Powell et al., 2018).

Limitations

On the other hand, there may be limitations in accurately assessing certain conditions or conducting physical examinations through telemedicine, leading to an increased risk of surgery

cancellations if essential factors are not included or adequately evaluated. The convenience and accessibility of telemedicine can influence patient satisfaction rates, as it eliminates the need for patients to travel to the hospital for preoperative evaluations. However, patient satisfaction may be lower if patients perceive the providers still need to address their concerns or if they prefer face-to-face interactions with healthcare providers due to difficulty with the technicality of telemedicine device connection. Efforts implemented to overcome this were chart review before the visit, retrieving patients outside records from their primary care providers' health information system through MSKCC exchange, and a thorough patient evaluation to ensure surgical optimization. Connecting patients with technical or operational challenges to teletech support staff and using easy access to telemedicine platforms using a one-click virtual room connection can address technical difficulties and barriers.

A standalone study by Wienhold et al. (2021) assessed the technical, medical feasibility, and procedure-associated adverse events of the teleconsultation approach replacing the in-person consultation. Over six months of implementation, the analysis revealed 5.4% of incomplete teleconsultations visits due to technical issues and 4.8% of case cancellations due to medically feasible visits, 98.2% of patients reported satisfaction due to convenience of use, and 97.9% of patients would choose it again. Patients reported saving a median travel time of about 60 minutes (Wienhold et al., 2021).

This practice change was intended to improve clinical outcomes and access to healthcare for all patients. However, sustainability should be a priority advances with telemedicine are taken concerning preoperative evaluation. As the study site plans to extend telemedicine to other surgical services proceeding for low-risk procedures, it is important to note that the outcome of telemedicine implementation may vary by surgical service. An orthopedic service-specific study

of a large cohort of patients examining the relationship between the mode of visits and patient satisfaction aggregate (PSA) score and the predictors of PSA score revealed no association between PSA score and mode of visit with other factors affecting patient responses (Bisson et al., 2021). Experts' opinions and recommendations for patients preparing for surgical interventions during the COVID-19 pandemic were that preoperative assessment through telemedicine visits can be successful with accurate data supporting its effectiveness, evaluating individualized basis, and weighing the potential risks and benefits (Mihalj et al., 2020). Continued improvement in training and operational issues in telemedicine can lead to its success (Orrange et al., 2021).

Factors Contributing to Limited Internal Validity

The result revealed that the two PST visits did not explain a significant proportion of variation affecting surgery cancellation; several factors might have limited the study's internal validity. There may have been confounding variables that were not adequately accounted for in the study design or analysis. All patients were ASA II, so comorbidities or severity of the condition could influence the relationship between visit options (telemedicine versus in-person) and surgery cancellation. Selection bias might have occurred because patients were not randomized to the two visit options but self-selected or assigned based on the inclusion or exclusion criteria. Selection could introduce systematic differences between the groups that could affect the outcome. The study design or methods may have needed more precision, leading to potential inaccuracies or variability in the measurements or data collected. The statistical analyses used, such as the Wilcoxon signed rank test and linear regression, may have sample size limitations that could affect the accuracy of the results. Telemedicine, as a common practice, is still in its infancy. Too small a sample size might increase the likelihood of type II error, meaning that an actual difference between the groups may not be detected.

Future Projects

Projects with larger sample sizes have shown a positive impact of telemedicine compared to in-person visits. Future projects should analyze patient satisfaction regarding cost and distance saved, provider satisfaction, and medical feasibility as it affects Press Ganey scores. These outcomes can be analyzed based on data collected after 6 to 12 months of project implementation with a larger sample size. Of 38,609 clinic encounters at a large medical center, the Press Ganey patient satisfaction scores of telehealth versus in-person visits revealed higher scores for telehealth visits than in-person visits (Ramaswamy et al., 2020). A standalone study by Wienhold et al. (2021) revealed that replacing the in-person consultation teleconsultation approach over six months, which focused on technical, medical feasibility, and procedure-associated adverse events, revealed high satisfaction rates of 98.2%, medical and technical feasibility reported by providers. Exploring these other factors, such as advanced age, could be valuable to develop strategies for reducing cancellations and improving surgical outcomes, such as overcoming obstacles that may result in incomplete visits and cancellations due to a lack of knowledge about device use or access to interpreter services among older adults (Le et al., 2022).

Implications for Advanced Nursing Practice

Developing and implementing an advanced practice nurse-driven telemedicine project for preoperative evaluation can have enhanced accessibility allowing the APRNs to reach a broader patient population, including those in remote or underserved areas. The COVID-19 pandemic has shaped the healthcare system, increasing the need for telehealth platforms for patient consultation (Cooling et al., 2021). The skill and talent of the nurse practitioner allows for their adaptation in roles such as initiating digitally driven healthcare delivery. Telemedicine facilitates

ongoing communication between APRNs and patients, enabling better continuity of care throughout the preoperative period.

Digitally driven healthcare in the PST practice improves access to preoperative evaluation services and reduces geographical barriers, promoting patient safety, collaboration, and education, ultimately improving patient healthcare outcomes. APRNs can collaborate with other healthcare professionals, such as surgeons or anesthesiologists, through telemedicine platforms during consultation, enabling efficient consultation and multidisciplinary decision-making and ensuring comprehensive preoperative care. Telemedicine will continue to grow to accommodate the requirements of the subsequent generation (Kamdar et al., 2020). Telemedicine will thrive by bridging the gaps in healthcare access, and the perioperative APRN must move with the current trend and be updated with the latest research on telemedicine, its effectiveness in preoperative assessments, and any specific considerations related to oncology or surgical patients.

Plan for Sustainability

The project's sustainability is expanding the telemedicine service as a PST visit option to other low-risk surgical and intermediate-risk surgeries. Securing buy-in and support from hospital leadership and key stakeholders is crucial in a large oncology hospital. The teams and PST leadership have highlighted the benefits of telemedicine for preoperative evaluation in oncology, such as improved patient outcomes and cost savings to stakeholders and hospital administration. Establishing a robust telemedicine infrastructure is essential, and the PST Guidelines MSRR 506 and MSRR 214 have been updated and approved by legal and regulatory reviewers to include telemedicine as a visit option.

The hospital used Microsoft Teams for all telemedicine consultations and held regular maintenance, updates, and technical support to ensure uninterrupted telemedicine services. Clear communication channels and protocols for virtual consultations with the surgical team were established including case discussions and interdisciplinary decision-making for patients needing optimization for surgery as per PST guidelines to avoid surgery cancellation. Continuous education and support will be available to address any technical or operational challenges that may arise. The team developed a post-teleconsultation survey sent to the patients and a REDcap survey for patients and provider feedback on telemedicine use. Other measures are in place to streamline processes, enhance user interfaces, address privacy and confidentiality concerns, and ensure clear communication regarding appointment scheduling and follow-up care.

In a systematic review of 13 studies by Smith et al. (2021) during the COVID-19 pandemic, patients' perceptions of telehealth's sustainability showed 80 to 100% patient satisfaction with telehealth use and no difference in satisfaction with other visits and telehealth. Patients reported the service as satisfactory and the potential for future continuous use (Smith et al., 2021). Another study reported patient satisfaction with fulfilling expectations in the care received with promising telemedicine sustainability (Umiati et al., 2021).

Application of the AACN DNP Essentials

The Application for the DNP Essential discussed the eight Essentials of DNP Education recommended by the American Association of Colleges of Nursing.

Essential I: Scientific Underpinnings for Practice

The DNP-prepared nurse practitioner graduate is equipped with knowledge of scientific underpinnings and can use EBP principles to guide the telemedicine approach for reducing healthcare disparities and ensuring access to high-quality healthcare (Rosa et al., 2020).

Essential II: Organizational and Systems Leadership

DNP-prepared nurses should provide leadership in implementing telemedicine by developing protocols, policies, and guidelines for telemedicine use, ensuring proper training of healthcare professionals involved, and advocating for the integration of telemedicine into the organization's workflow.

Essential III: Clinical Scholarship and Analytical Methods for EBP

The COVID-19 pandemic placed DNP-prepared nurses in positions such as developing and evaluating program protocols and policies applying evidence-based guidelines (Cariaso-Sugay et al., 2021).

Essential IV: Information Systems/Technology and Patient Care Technology

The DNP-prepared nurse can deeply understand telemedicine technologies, data security, and privacy considerations. They can assess the compatibility of telemedicine platforms with existing health information systems, ensure effective utilization of patient care technologies and address any technological challenges that may arise during telemedicine preoperative evaluations.

Essential V: Health Policy and Advocacy

Evaluating the utilization of digital forms of healthcare delivery is essential to ensure satisfaction and patient-centered outcomes (Manatt, 2019). DNP graduates should critically analyze research related to telemedicine for preoperative evaluation, assess its validity, and determine its applicability to advocate for specific patient populations.

Essential VI: Interprofessional Collaboration

DNP-prepared nurses can facilitate collaboration among healthcare professionals involved in preoperative evaluations through telemedicine. They can promote effective communication,

coordination, and shared decision-making among surgeons, anesthesiologists, radiologists, and other team members involved in the preoperative process.

Essential VII: Clinical Prevention and Population Health

The DNP-prepared nurses can incorporate population health principles into telemedicine preoperative evaluations using collaborative care. They can assess and address broader health determinants that may impact surgical outcomes, provide patient education on preoperative care and risk reduction, and promote strategies for improving patient health beyond surgical intervention.

Essential VIII: Advanced Nursing Practice

The DNP essential eight embodies the APRN's role in developing and implementing projects to improve access to care, streamline processes, and enhance patient outcomes. They are equipped with the education to analyze current literature critically, identify the population and setting, engage, and collaborate with stakeholders, and develop clinical protocols and guidelines to establish outcome measures. The APRN should contribute to advancing evidence-based practice by disseminating findings through scholarly publications, presentations, and peer review platforms for improvement in the healthcare community.

Funding Sources

The hospital provided the funding for the telemedicine project for preoperative evaluation at MSKCC. All project managers, staff, and stakeholders involved in the project implementation were employees of the hospital. The equipment, resources, and telemedicine platforms used for the project were resources of the hospital. However, external contributors, like the statistician and editor, provided specialized expertise based on fee-for-hire service funded by the student, the project leader.

Conclusion

In conclusion, after six weeks of implementation, with improvement in the number of telemedicine visits, the study used analytical methods for EBP to generate evidence on the effectiveness, efficiency, and outcomes of the telemedicine project to analyze its impact on sensitive quality indicators metrics to determine the organizational and clinical impact. With support from the hospital leadership, MSKCC integrates telemedicine seamlessly into its existing clinic workflows by designing a workflow that guides providers and patients from surgical consultation through the completion of the telemedicine visit. MSKCC will continue quality assurance and outcomes evaluation to assess the impact of telemedicine on preoperative evaluation on clinical outcomes, patient experience, resource utilization, and cost-effectiveness. The goal of this DNP EBP project will be to publish findings, share success stories, and disseminate knowledge about the benefits of APRN-driven telemedicine within the hospital and the oncology healthcare community.

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Appendix A

Search Strategy

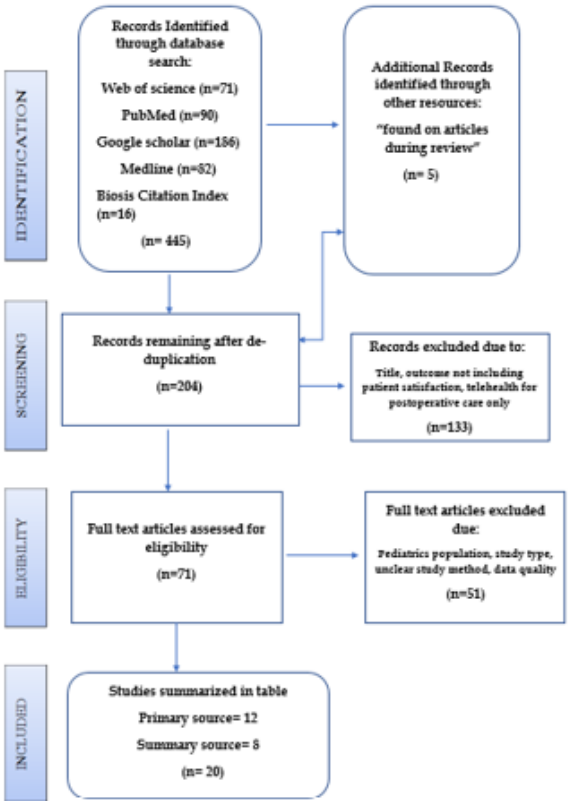
EBP question: Does the use of telemedicine for preoperative evaluation affect surgery cancellation?

Keywords: Telemedicine, patients undergoing surgery, preoperative evaluation, surgery cancellation.

Secondary Search terms: Telehealth, pre-surgical testing, pre-anesthesia evaluation, case cancellation.

Years: 2018-2023.

Limiters: English only, academic journals, human research, peer review, full text.



Appendix B

Memorial Sloan Kettering Cancer Center Institutional Review Board (IRB) Application Waiver

Memorial Sloan Kettering Cancer Center™

Scholarly Projects Review Committee

TO: **Omotara Adewale, NP**

FROM: Kristen Fessele, PhD, RN
Chair, Scholarly Projects Review Committee (SPRC)

DATE: **December 1, 2022**

RE: **Institutional Review Board (IRB) Application Not Required at This Time**

Thank you for your submission. The SPRC reviewed your Screening Form for the project entitled "Telemedicine program for Preoperative evaluation" at our meeting on **December 1, 2022.** We determined that based on the information shared in your application, review by the IRB is not required at this time. The committee suggested that you consider how you might incorporate measures of patient satisfaction with telehealth pre-surgical care in future expansions of this program to further document value.

Because major changes to your project design may alter the determination, please contact us at nuronr@mskcc.org to discuss any updates that would lead you to change the answers you originally selected on the Screening Form. This will ensure that new elements do not unintentionally alter the need for IRB review. We will be happy to provide feedback and consultation at any point in your project development and implementation. Also, if you require documentation of this review in the future, such as at the request of a journal during publication of a future project report, we can provide a letter of verification on request.

Thank you for your scholarly work at MSK – and please feel free to contact me with any questions.

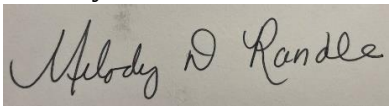
Appendix C

HSRC Final Application and Approval Letter

November 21, 2022
Omotara Adewale
Dear Omotara,
Wilmington University's Human Subjects Review Committee (HSRC) is pleased to inform you that your
Doctor of Nursing Practice project proposal ***Development and Implementation of an Advanced Nurse Driven Telemedicine Program for Preoperative Evaluation*** was reviewed on ***November 18, 2022***. The project was categorized as **Exempt** and meeting the requirements of a quality improvement intervention. Your signed HSRC form is attached.
Now that your DNP project has been approved by the HSRC, there are multiple elements with which you must comply. Wilmington University adheres strictly to these regulations:

1. You must conduct your DNP project exactly as it was approved by the HSRC.
2. Any additions or changes in procedures must be approved by the HSRC before they are implemented.
3. You must notify the HSRC promptly of any events that affect the safety or well-being of subjects.
4. You must notify the HSRC promptly of any modifications to your DNP project or other responses that are necessitated by any events reported in items two or three.
5. Your approval is provisional if you require Institutional Review Board approval from your organization. Once organizational approval has been obtained, please submit your signed approval and completed IRB application to DNP Administrative Assistant via email.

The HSRC may review or audit your project at random or for cause. In accordance with Wilmington University policy, the HSRC may suspend or terminate your DNP project if your project has not been conducted as approved and/or if other difficulties are detected.
While not under the purview of the HSRC, DNP students are responsible for adhering to US copyright law when using existing scales, survey items, and other works in the conduct of research/DNP projects.
In conclusion, you have developed an interesting evidence-based practice project aligned with the AACN DNP Essentials (2006). This is an important project for healthcare practices now and in the future. Best wishes for continued success.
Sincerely,



Kathryn Leach, DNP, CPNP-BC

Melody Randle, DNP, NP-C, RN, CNE
Chair, DNP Program
HSRC Committee Representative
College of Health Professions and Natural Sciences
Assistant Professor, FNP Program

College of Health Professions and
Natural Sciences

WILMINGTON UNIVERSITY
WILMINGTON UNIVERSITY
HUMAN SUBJECTS REVIEW COMMITTEE (HSRC) HSRC-10

PROTOCOL REVIEW

This section is to be completed by the HSR Committee.

DNP Student: Adewale Omotara

Date Submitted: 11/9/2022

The protocol and attachments were reviewed:

The proposed DNP project is approved as:

☒ Exempt ☐ Expedited ☐ Full Committee ☐ Provisional (see External Projects section)

The proposed DNP project was approved pending the following changes:

☐ See attached letter

☐ Resubmit changes to the HSRC chairperson

The proposed DNP project was disapproved:

☐ See attached letter for more information.

	YES	N/A
The HSRC representative sent a copy of the HSRC Protocol to the VP of Academic Affairs for research requiring access to Wilmington University students, employees, or data.	☐	☒

HSRC Chair or Representative: Melody D. Randle (Printed Name)

Melody D Randle (Signature) Date 11/18/2022

HSRC Chair or Representative: Click here to enter text. (Printed Name)

(Signature) Date Click here to enter a date.

Appendix D

Budget

Development And Implementation of An Advanced Nurse Driven Telemedicine Program for Preoperative Evaluation 2023-2025

Income

Item	Per Unit	Proposed 2023 (1000 visits)	Proposed 2024 (3000 visits)	Proposed 2025 (4500 visits)
Preop office Visit - Mod. Complexity	$180.04	$180,040.00	$540,120.00	$810,180.00
Pre-Op EKG	$8.96	$8,960.00	$26,880.00	$40,320.00
Pre-Op Phlebotomy bundle	$38.13	$38,130.00	$114,390.00	$171,585.00
Total Income	$227.13	$227,130.00	$681,390.00	$1,022,085.00

Expenses

Item	Per Unit	Proposed 2023	Proposed 2024	Proposed 2025
Nurse Practitioner (30min)	$36.00	$36,000.00	$108,000.00	$162,000.00
Patient care technician (30 min)	$12.00	$12,000.00	$36,000.00	$54,000.00
Care coordinator/tech support	$8.00	$8,000.00	$24,000.00	$36,000.00
Cardiologist (MD) EKG Overread	$15.00	$15,000.00	$45,000.00	$67,500.00
Lab Supplies	$1.50	$1,500.00	$4,500.00	$6,750.00
EKG Supplies	$1.00	$1,000.00	$3,000.00	$4,500.00
Capital Equipment Costs	$21.20	$21,200.00	$0.00	$0.00
Overhead/Office Expenses	$23.20	$26,200.00	$78,600.00	$117,900.00
Staff training	$8.00	$15,000.00	$0.00	$0.00
Expenses	$125.90	$135,900.00	$299,100.00	$448,650.00
Total Profit	$101.23	$91,230.00	$382,290.00	$573,435.00

Appendix E

Human Subject Research Citi Program Certificate

Appendix F

Memorial Sloan Kettering Cancer Center Project Approval Letter

Memorial Sloan Kettering Cancer Center

October 17, 2022

To Whom It May Concern,

Omotara Adewale is permitted to implement her quality improvement project at Memorial Sloan Kettering Cancer Center. Please let me know if you have any questions.

Sincerely,

Dr. Stacey Cuomo, DNP, FNP-C

Dr. Stacey Cuomo, DNP, FNP-C
APP Manager, Pre-Surgical Testing
Memorial Sloan Kettering Cancer Center
160 East 53rd Street, New York, NY 10022
212.610.0488

Dear Omotara

Your application for the project titled "Telemedicine for Preoperative Assessment" was reviewed by the APP Quality and Research Committee and has been approved to move forward. We were glad to hear you have met with Dr. Kelly Haviland for guidance.

Your next steps should include applying to the Scholarly Project Review Committee (SPRC) who will guide you on IRB process (if needed). The link is here: https://redcap.mskcc.org/surveys/?s=MNW9PM9MLF (you can copy and paste the link into the browser). Attached is a sample of the form and examples on language to be used that may direct IRB requirements.

The APP department wants to support your efforts with this project. Attached is the updated algorithm for scholarly work that may guide you in the next steps. If you need additional information or guidance please do not hesitate to reach out.

Thank you!

APP Quality and Research Committee