

2022

An Educational Module on the Benefits of Telehealth Assisted Preanesthetic Evaluations

Anthony Gonzalez

Florida International University, agonzalez0525@yahoo.com

Vicente Gonzalez

Florida International University, vince.gonzalez@fiu.edu

Arturo Gonzalez

Florida International University, artgonza@fiu.edu

Michael Drossos

Broward Health Medical Center, mdrossos90@gmail.com

Follow this and additional works at: <https://digitalcommons.fiu.edu/cnhs-studentprojects>

Recommended Citation

Gonzalez, Anthony; Gonzalez, Vicente; Gonzalez, Arturo; and Drossos, Michael, "An Educational Module on the Benefits of Telehealth Assisted Preanesthetic Evaluations" (2022). *Nicole Wertheim College of Nursing Student Projects*. 136.

<https://digitalcommons.fiu.edu/cnhs-studentprojects/136>

This work is brought to you for free and open access by the Nicole Wertheim College of Nursing and Health Sciences at FIU Digital Commons. It has been accepted for inclusion in Nicole Wertheim College of Nursing Student Projects by an authorized administrator of FIU Digital Commons. For more information, please contact dcc@fiu.edu.

An Educational Module on the Benefits of Telehealth Assisted Preanesthetic Evaluations

A DNP Proposal Presented to the Faculty of the
Nicole Wertheim College of Nursing and Health Sciences

Florida International University

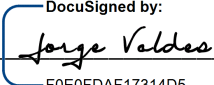
In partial fulfillment of the requirements
For the Degree of Doctor of Nursing Practice

By

Anthony Gonzalez

Supervised by

Vicente Gonzalez, DNP, CRNA, APRN
Arturo Gonzalez, DNP, APRN, ANP-BC, CWCN-AP

Approval Acknowledged:  _____, DNA Program Director
Date: 12/6/2022

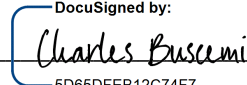
Approval Acknowledged:  _____, DNP Program Director
Date: 12/5/2022

Table of Contents

| | | |
|--------------|---|----|
| I. | Introduction | 4 |
| II. | Literature Review | 8 |
| III. | Primary DNP Project Goal | 19 |
| IV. | Program Structure | 20 |
| V. | Theoretical Framework | 21 |
| VI. | Definition of Terms | 23 |
| VII. | Methodology | 23 |
| VIII. | Results | 26 |
| IX. | Discussion | 33 |
| X. | Conclusion | 35 |
| XI. | References | 38 |
| XII. | Appendices | 41 |
| | Appendix A: Literature Matrix | 41 |
| | Appendix B: IRB Approval | 46 |
| | Appendix C: Letter of Support | 47 |
| | Appendix D: Proposed Method for Data Collection | 48 |
| | Appendix E: Educational Module | 52 |

Abstract

Title

An Educational Module on the Benefits of Telehealth Assisted Preanesthetic Evaluations

Impact Statement

Healthcare systems are always seeking new ways to increase efficiency, save on costs, and provide quality care for their patients. The use of telehealth in the preanesthesia setting is a tool that can help to further improve a healthcare system's ability to achieve these goals. This project will be a step towards determining the support for and viability of telehealth utilization in the preanesthesia setting.

Background/Purpose/Question

Surgery cancellations are a significant problem with the potential for far-reaching consequences. Unexpected day-of-surgery cancellations can be costly to both the patient and the health care team. Telemedicine and telehealth are readily available tools for overcoming obstacles to accessing health care. Their use can improve patient outcomes, primarily by reducing the transportation time and costs and increasing the access to physicians. However, there is relatively little data on provider attitudes on the use of telemedicine to reduce cancellations and surgical delays. This project aims to answer: Among anesthesia providers (P), is an educational module designed to improve knowledge of the effectiveness of telehealth-assisted PAE (I), when compared to face-to-face preoperative assessment (C), effective in increasing provider knowledge (O) that leads to an improvement in the quality of patient care, the experience of the patient, its effect on staff, productivity, and cost-savings potential?

Methods/Evidence Search

Using the keywords listed under "Eligibility Criteria," a search was conducted on CINAHL. Non-English, non-peer-reviewed articles were eliminated from the search, as well as articles older than 10 years. The same steps were taken with PubMed and Google Scholar. A total of 152 articles were found as potential evidence sources. Sources meeting criteria based on title were 44. Sources meeting criteria based on abstract were 13. Finally, sources meeting criteria based on full text were 8: a systematic literature review, a prospective randomized trial, a case-controlled study, a quasi-experimental study, a retrospective study, 2 descriptive studies, and a mixed-methods approach. A total of 7 of the studies were performed in the United States while 1 was done in Australia.

Synthesis of Literature/Results/Discussion

A systematic literature review was conducted by Schoen and Prater. The results of their systematic review found that PAE can be successfully performed using telehealth and that patients also reported satisfaction with utilization of telehealth when performing PAE. For this project, the pre-test and post-test assessed if the educational module enhanced the participants attitude and perception of the use of telehealth during the PAE. The results show that after an educational module was shown, perception of the technology improved. Future research should focus on creating experiments with larger sample sizes and implementing the technology to see what real-world benefits the technology can offer.

Conclusions/Recommendations for Practice

Telehealth is an increasingly relevant topic in the healthcare industry. It can provide many benefits to both the provider and the consumer. The project shows that presenting the topic and educating providers about the topic can make them more open to using the technology in their practice. Information gained from this project can be used to determine the feasibility of implementing this technology at health care facility where anesthesia providers practice.

An Educational Module on the Benefits of Telehealth Assisted Preanesthetic Evaluations

Surgery cancellations are a significant problem with the potential for far-reaching consequences. Unexpected day-of-surgery cancellations can be costly to both the patient and the health care team. They can result in a decrease in patient satisfaction, a waste of medical resources, and logistical issues that are a detriment to operating room (OR) flow and staff morale.¹ This is because a significant amount of work goes into getting a patient ready for surgery. A number of tasks must be performed to prepare a patient for surgery including instructing the patient on how they must prepare for their procedure, registering the patient, assessing the patient, prepping the patient, reserving an OR, ensuring that all equipment necessary is present in the OR, ensuring there is adequate staff for the procedure, and much more.² When cancellations occur, staff must quickly make adjustments to the schedule so that the OR can remain as efficient as possible. Not only is this stressful to the organization, but it can also be stressful to the patient as well. It can be extremely frustrating to someone who has waited for a procedure to take place that can potentially improve their quality-of-life, only for the procedure to be cancelled on short notice for reasons that are often entirely preventable.

Background

A surgery cancellation occurs when a surgeon assigns a case to a planned procedure date into the surgery schedule, the department of anesthesia approves the surgery, the medical resources and equipment are ready and prepared, but the surgery is cancelled on the day by either the patient or the hospital.³ The rate of surgery cancellations is a parameter used to assess the

quality of patient care within the system, as well as the quality of the management system. There are many reasons why a procedure would be cancelled, including scheduling errors, equipment shortages, inadequate patient optimization, patient refusal, or no-show. The most common cause of cancellation is a lack of OR time.²

Unexpected cancellations are not uncommon. Many institutions will seek to investigate the rate and cause of cancellations before implementing a strategy to reduce them. It is still unclear whether the causes of cancellations are the same for both inpatient and outpatient cases. A study by Xue et al,¹ determined that the most common cause for same-day cancellations among both groups was inadequate preoperative preparation. Examples of this kind of cause includes “High INR” and “not NPO” which were documented as reasons why the case could not proceed.¹ Due these conditions, the patients would need further workup before surgery, which caused delays and cancellations. It is possible that these causes could have been avoided had a provider had the opportunity to speak with the patient ahead of time to go over instructions such as which medications to take before surgery and the importance of NPO adherence. A change in medical condition was found to be the second most common cause in the study in both the inpatient and outpatient population.¹ This cause is more difficult to account for and can lead to unavoidable cancellations. However, closer monitoring and involvement by providers can mitigate the risk of cancellations due to this cause.¹

There are several factors that contribute to surgery cancellations. Many of these are patient-related and preventable. In a study conducted by Fayed et al,⁴ patient no-shows were responsible for 27% of cancellations, poorly optimized patients accounted for 24.1%, OR unavailability caused 19.3%, and patient refusal caused 8.8%. With the exception of lack of OR availability, a majority of these events are related to poor patient education and compliance.

Thus, there is potential room for improvement in these areas. Furthermore, the rate of cancellations varies among hospitals between 5% and 20%.³ This indicates that some organizations manage to maintain lower rates of cancellations, while others do not. An efficient OR should have a low rate of cancellations. Therefore, there is potential for hospitals with high rates of cancellations to search for causes and implement solutions to reduce these rates.

Significance

Operative care is a major portion of a hospital's spending and profit. Over 310 million surgeries are conducted yearly across the globe.⁵ When cancellations occur, they can cause a substantial loss of profit for the organization. A 2005 study showed that operating rooms charged an average of approximately \$60 per minute of use.¹ Another study⁶ estimated the amount of revenue lost per cancelled surgery at \$1730 to \$4550. These values do not include any potential losses that the surgeon might incur. Compounding cancellations can end up costing a hospital millions of dollars yearly.⁶

The most difficult factor to account for when avoiding cancellations is the patient. Research has shown that patients can contribute to the rate of cancellations, but the reasons why are still unclear. Reasons can range widely and can be attributed to a lack of transportation, fear and anxiety, or a failure for the patient to follow preoperative instructions.⁷ Numerous studies,⁷ unfortunately, do not categorize patient-related causes of cancellations, uniformly making it difficult to compare them. An assumption is made that sicker patients tend to be cancelled more often, but this has not been shown convincingly in the literature.⁷

Another factor that is still unknown is provider attitude and perception. Several solutions have been proposed in the literature on how to reduce surgical cancellations. However, there is relatively little data on provider attitudes on the use of telemedicine to reduce cancellations and

surgical delays. One study⁸ showed that anesthesia providers have a positive attitude about the use of smart devices as an adjunct to facilitate anesthesia. However, the study did not specifically use a telehealth preoperative anesthesia evaluation (PAE) and instead measured for acceptance of mobile apps in general. Additionally, the study was performed in Belgium and thus may not be applicable in other parts of the world.⁸

Telemedicine and telehealth are readily available tools for overcoming obstacles to accessing health care. Their use can improve patient outcomes, primarily by reducing the transportation time and costs and increasing the access to physicians. This is especially true for rural patients needing access to specialized physicians. Physician efficiency may also be improved resulting in overall reduction in health care costs.⁶ Early adopters in nearly all clinical specialties have had good results from telemedicine and telehealth, but many barriers to adoption remain.⁶

Problem Statement

There is a problem with the amount of same day of surgery cancellations that occur due to a lack of proper patient preparation and coordination with the hospital and staff. Despite the role anesthesia providers play in evaluating a patient to ensure they are optimized for surgery, preventable cancellations still occur. This problem has negatively affected both the patient's quality of care and the hospital's bottom line.¹ Possible causes of cancellations that can be prevented include a lack of patient understanding, failure of the patient to follow preoperative instructions, inability of the patient to acquire transport to the facility, labs or imaging that are needed but not available, clearance that was not received, and more.⁴

This project proposes a solution to reducing the number of patient-related surgery cancellations. The role of telehealth in patient care is being increasingly utilized in many areas of

health care.⁹ Using telehealth during the PAE can help to reduce surgery cancellations by allowing providers to initiate an interview with the patients before the day of surgery. This offers an opportunity for providers to go over multiple aspects of the procedure before the surgery. The anesthesia provider will have an opportunity to speak with the patient about their health history, determine what medications they are currently taking, instruct the patient on which medications are acceptable to take, go over any available lab work or imaging, perform a preliminary airway assessment, advise the patient of their NPO status on the day of surgery, and answer questions and alleviate fears the patient may have about the surgery.⁷ If at any point during the interview the provider identifies a potential problem that may delay surgery, there is now time to rectify the problem so that the scheduled surgery can be carried out in a timely manner.

The literature supports the use of preanesthetic evaluations through telehealth¹⁻²⁰. Several studies have concluded that telehealth based PAEs were not only as reliable as standard PAEs but allowed providers to prepare a safe anesthetic care plan for the patient. Surveyed patients have also stated a positive experience with telehealth PAEs.⁹ One study¹⁰ showed that patients were able to effectively remember key educational points and instructions delivered by the provider with the use of a post-survey questionnaire, indicating that patients understood what the provider was explaining to them. This method of performing PAEs not only has a high satisfaction rate among patients but can save time and cost compared to standard evaluations.⁶

Literature Review

Objective

This literature review aims to investigate research on provider knowledge, attitude, and skill in utilizing telehealth based PAE. Second, the review aims to examine the evidence evaluating the effectiveness of telehealth assisted PAE. These objectives are chosen with the

intention of developing an educational presentation that outlines the benefits of telehealth assisted PAE.

Methodology

Eligibility Criteria

Studies evaluated for this literature review were chosen based on the inclusion and exclusion criteria set to best discern the objectives. Inclusion criteria comprised only studies published within the past 10 years, written in English, and with full-text availability. Exclusion criteria included were commentary, periodicals, and studies that involved chronic pain management, robotic-assisted airway management, and remote anesthesia consultation during surgery.

Based on the clinical question, the following search keywords were identified using the appropriate Boolean operators and search symbols: anesthesia, preanesthesia evaluation, telehealth, telemedicine, surgery, and surgery cancellation. The databases utilized for the search included The Cumulative Index to Nursing and Allied Health Literature (CINAHL), PUBMED and Google Scholar. The literature review was further guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA).

Search Strategy

Using the keywords listed under “Eligibility Criteria,” a search was conducted on CINAHL. Non-English, non-peer-reviewed articles were eliminated from the search, as well as articles older than 10 years. The same steps were taken with PubMed and Google Scholar. A total of 152 articles were found as potential evidence sources. Sources meeting criteria based on title were 44. Sources meeting criteria based on abstract were 13. Finally, sources meeting criteria based on full text were 8: a systematic literature review, a prospective randomized trial, a

case-controlled study, a quasi-experimental study, a retrospective study, 2 descriptive studies, and a mixed-methods approach. A total of 7 of the studies were performed in the United States while 1 was done in Australia.

Results

Study Characteristics

The 8 articles chosen for review analyzed 2 concepts. The first concept explored the idea that delays and cancellations could be reduced with the use of telehealth techniques, with 6 of the studies investigating this concept. The second concept was how patients perceived the use of telehealth-based evaluations.

Results of Individual Studies

Role of Telehealth in Pre-anesthetic Evaluations

The first study was a systematic literature review conducted by Schoen and Prater.⁶ These researchers sought to evaluate the evidence of the effectiveness of utilizing telehealth for the PAE. The PICO question they used for their practice question was as follows: “For surgical patients (population), can telehealth (intervention) be used effectively to perform or supplement the PAE to decrease surgical risk and cancellations (outcome)?” The comparator of face-to-face PAE is implied for this PICO question.⁶ The researchers used several databases such as CINAHL, PubMed, Google Scholar, and online medical data. Inclusion criteria were not explicitly stated but exclusion criteria were robotic-assisted airway management, remote anesthesia provider consultation during surgery, and those dealing with chronic pain management. The researchers found 7 studies that met their research criteria.⁶

The results of their systematic review found that PAE can be successfully performed using telehealth and that patients also reported satisfaction with utilization of telehealth when

performing PAE.⁶ Authors of the study reveal that telehealth preoperative assessments were at least as reliable as face-to-face assessments. They also indicate that patients have a positive perception of virtual PAE, are accepting of the technology, and may prefer telehealth to traditional methods of assessment.⁶

Potential problems found during the literature review include patient's misconceptions about being on camera for the PAE. There were also concerns about privacy, third-party providers, and the lack of physical contact between the patient and provider. A final concern is the financial cost to maintain this method for performing PAE. The researchers conclude that telehealth has a distinct advantage in remote areas where access to healthcare can be difficult.⁶

Telemedicine Pre-anesthesia Evaluation

In a prospective randomized trial,¹¹ researchers sought to determine how inadequate evaluations caused surgical delay or cancellation. Secondary objectives included determining predictions of difficult airway management and concordance of physical examination.¹¹ The research was performed on 200 patients scheduled for head and neck procedures at a single surgical center. These patients were randomly assigned to in-person or telemedicine groups. The PAE was performed using video-conferencing software. Further, high-quality headsets were used to allow audibility of heart and lung sounds. The researchers determined that a sample size of 62 patients in each group was needed to allow detection of a 50% change in delay and cancellation rates ($P = 0.05$).¹¹

In total, 82 patients were placed in the telemedicine group.¹¹ At least half of the respondents lived greater than 25 miles away from the facility. The results of the study showed that an incomplete PAE caused a delay in only 1 of these patients. No other patients had a delay of surgery or cancellation due to incomplete PAE in this group. Airway management was

predicted and found equally in both groups. Overall, the differences between the in-person group and telemedicine group were not statistically significant. Providers reported high satisfaction in both groups, although the in-person group reported higher satisfaction with the ability to hear heart and lung sounds compared to the telemedicine group.¹¹

The researchers did note some limitations to their study.¹¹ The first is that travel distance to the facility was self-reported. The researchers also did not measure for costs of travel, childcare, or potential loss of income for time off work. Therefore, potential economic benefits of PAE to the patient can only be inferred. Finally, the patients involved in the study were all scheduled for head and neck surgery. The researchers admit that rates of delays and cancellations may be different in other specialties. Overall, the researchers conclude that telemedicine PAE can provide high patient satisfaction with the potential to save the patient time and money compared with in-person PAE.¹¹

Nurse-to-Patient Telephone Calls to Reduce Cancellations

In a case-controlled quantitative study,¹² researchers sought to determine how a change in the method of preoperative consultations affected cancellations and delays. The preoperative consultations were not specific to anesthesia. For the study, a nurse would call the patient 3 days before the scheduled procedure. The nurse would recite a script with the patient that delivered important preoperative information and would then address the patient's questions and concerns. The nurses were specifically targeting 3 reasons for surgery cancellations: no shows, NPO orders were not followed, and there was no responsible adult to accompany the patient after surgery. The study took place over 6 months. A total of 2124 patients received a preoperative telephone call.¹² The researchers found that the number of surgery cancellations dropped from 132 in the 6-month period before the intervention to 94 in the 6 months during the intervention. This was a

54% drop in the rate of cancellations when only considering the specific reasons being targeted. The nurses concluded that cancellations were not due to medical conditions but rather to patient education issues.¹²

Patient Perceptions in the Preoperative Anesthesia Clinic

In a descriptive study that used a cross-sectional survey which took place in Australia, researchers sought to determine patient perceptions of a virtual preoperative anesthesia evaluation clinic.⁹ Patients were given a preoperative anesthesia consultation facilitated by virtual technology. The patients were then surveyed using a 10-item, 5-point Likert scale questionnaire. Patients were also given the opportunity to write a qualitative response. A total of 35 patients were surveyed in the study over a 6-month period.⁹

The survey focused on 4 domains: technical quality, perceived efficacy, affective patient experience, and patient preference. Out of 35 patients scheduled to participate in the study, 27 returned the survey. The results showed general acceptance of the video-linked telemedicine preoperative anesthesia consultation. The researchers were surprised that there was a high “no-show” rate to the consultation. However, there were no indications to suggest that their failure to show was a result of issues with the technology.⁹

The qualitative results suggested that time and travel savings are the most beneficial part of the technique for the participants.⁹ This can be of particular interest for elderly or disabled populations where travel can be difficult or in regions where access to healthcare is limited. One limitation of the study was the small sample size despite the length of time over which the study took place. The authors noted that this is an expected challenge when working with remote locations. The authors concluded that patients accept the use of telemedicine for preoperative anesthesia consultations with positive perception in all 4 domains tested.⁹

Use of a Smartphone Application for Spine Surgery

In another study,¹³ researchers sought to further demonstrate the ability of a smartphone application to improve patient compliance with preoperative instructions and to decrease the number of last-minute surgery cancellations. The study took place at a neurosurgery and orthopedics center in Washington, D.C. Patients who were part of the study were asked to download an app on their smartphone. If the patients did not have access to a smart phone or the app, they were also followed as a control. The app contained specific pre- and postoperative instructions particular to the procedure scheduled. Patients were also prompted to send acknowledgements that they understood the material they were given through the app. The primary factors being measured were compliance with instructions regarding surgery and cancellation within 48 hours before surgery due to non-compliance with instructions before surgery, such as failure to maintain NPO status, failure to obtain specialty clearance, and failure to discontinue certain medications.¹³

There were 176 participants in the study; 85 were users of the app and 89 were non-users.¹³ Within the user group, there were no cancelled surgeries. Within the non-user group, there were 5 cancelled surgeries. Within this second group, 2 were cancelled due to uncontrolled hypertension, and 3 were cancelled due to failure to obtain the correct specialty clearance. The researchers concluded that the intervention improved adherence to preoperative instructions and reduced the number of cancellations. The authors noted that a larger, randomized study involving multiple institutions would be necessary to better determine the efficacy of the intervention along with potential cost savings.¹³

Telehealth Scheduled Video Visit Program

In a mixed-methods study¹⁴ that included a descriptive portion which studied the implementation of a telehealth scheduled visit program at a large urban academic-affiliated health system, researchers sought to report health system and patient experiences with implementation of a telehealth scheduled video visit program across a primary care health system. Additionally, there was a survey of the patients who participated in the study. The researchers implemented the use of an application named JeffConnect. All patients would sign up for a telehealth appointment the same way they would sign for an in-person appointment. On the day of their scheduled appointment, patients would log in to their account via the app on a laptop or desktop equipped with microphone and webcam. The meeting would then proceed as normal.¹⁴

A total of 746 providers were trained to use the telehealth visits.¹⁴ During an 18-month period, 3018 outpatient visits were performed using telehealth, and 764 of these patients returned a survey after the visit. A majority of these patients (84.8%) had never used telehealth before. A majority (86%) strongly agreed that use of the app made it easier to get care. Additionally, 5 patients reported that they did not like interacting on video, 91% stated they had enough time with the provider, and 82.7% stated that they perceived the same level of care as an in-person visit.¹⁴

The researchers did state that there were limitations. One issue noted was that this was the first time a majority of these patients had ever used telehealth visits for their healthcare. Results of this study may not correlate with the general population or with how people may perceive telehealth after multiple uses in the future. The researchers also noted that the study did not consider the perceptions of the providers and state that more research should be done on how providers are affected by utilizing this technology. Finally, the researchers could not measure the

financial aspects of telehealth visits. Telehealth visits were not covered by payers and patients were not billed for these visits. The researchers concluded that telehealth programs demonstrated promise and that video visits provide a positive experience for patients, as well as effective care.¹⁴

Retrospective Analysis of Patients Undergoing Telemedicine Evaluation

In a retrospective study, researchers sought to determine the effectiveness of telemedicine in terms of time, distance, and financial savings at a cancer center.¹⁵ The facility implemented telehealth-assisted PAE on June 29, 2020, for select patients.¹⁵ The study compared the first 120 consecutive patients who underwent preanesthetic evaluation using telehealth to the previous 120 patients who underwent an in-person preanesthetic consultation immediately before telehealth was implemented. All data was obtained through chart review.¹⁵

A majority of patients in the review were classified by the American Society of Anesthesiologists Physical Status Classifications (ASA) as either ASA 2 or ASA 3.¹⁵ Day-of-surgery cancellations were 1.67% in the telemedicine group versus 0% in the in-person cohort; the difference in cancellations between the 2 groups was not statistically significant (P value = 0.4979).¹⁵ Further, the 2 cancellations that occurred in the telehealth group were due to circumstances outside of the anesthesia provider's control.¹⁵ The median round trip distance and time saved by each patient was 80 miles and 121 minutes, respectively. The researchers estimated a median gas costs savings of \$46 per patient.¹⁵

The researchers found that virtual preoperative screenings for cancer patients at the chosen facility was feasible.¹⁵ There was no statistically significant difference in day-of-surgery (DOS) cancellations between the in-person and telehealth groups.¹⁵ Additionally, transit times and mileage were similar between these groups, which means that time and money was saved by

the telehealth group.¹⁵ Limitations noted by the authors were that there was no account for mode of transportation and other travel expenses such that they may have been underestimated.¹⁵

Telemedicine Preoperative Evaluation Initiative

In a descriptive, retrospective study,¹⁶ researchers sought to describe the implementation of a telemedicine-based anesthesia preoperative evaluation and report the program's patient satisfaction, clinical case cancellation rate outcomes, and cost savings in a large California metropolitan area. The purpose of the study was to determine the feasibility of implementation of telehealth-assisted PAE in a highly populated area.¹⁶ The outcomes measured were patient satisfaction, cancellation rates, and cost savings.¹⁶

A total of 419 telemedicine visits were documented over a 2-year period during this study. Patients were assigned an appointment date days before their surgery.¹⁶ Telehealth consultations were conducted by an anesthesiologist and an anesthesia resident.¹⁶ Consultations were conducted over Zoom, which offers a Health Insurance Portability and Accountability Act (HIPAA) compliant platform with point-to-point encryption for video conferencing.¹⁶ After the consultation ended, each patient was sent a survey via email.¹⁶ The surveys included 11 questions in a 5-point Likert scale format that were intended to measure patient satisfaction.¹⁶

During the study, there were 1785 in-person consults.¹⁶ These were compared to the telehealth group which was comprised of 419 consults. The total amount of DOS cancellations in the telehealth group was 19 out of 419 (2.96%). In the in-person group, the total amount of DOS cancellations was 97 out of 1785 (3.23%). Of the 419 patients that took part in a video PAE, 131 turned in a survey response. Fully 98% "agreed" or "strongly agreed" that they were satisfied with the use of video PAE.¹⁶ The researchers also estimated cost savings for the patient. Savings were based on median fuel costs in the area, fuel economy of vehicles, and the median hourly

wage in California.¹⁶ The total median estimated savings for each patient was \$67 per consultation.¹⁶ The researchers also noted limitations with their study. The first was that this was a retrospective, nonrandomized study.¹⁶ The second was that the method in which the video consults were conducted changed midway through the study from Zoom to an Epic-based product.¹⁶ Patient satisfaction rates may have been affected by this change.

Conclusion

The literature reviewed appears to support the use of telehealth during PAE. Not only can it lead to high patient satisfaction but shows potential to significantly save time and money for institutions, providers, and consumers. The evidence suggests that telehealth can be particularly advantageous in more rural areas where access to healthcare can be more difficult. This review confirms that telehealth based PAE can be a reliable and safe way to conduct a PAE. However, there are still challenges that must be overcome. Problems involving how to utilize telehealth while still protecting patients under the Health Insurance Portability and Accountability Act (HIPAA) still exist. Evidence also suggests that more research is needed on how telehealth visits are perceived by the providers who use it.

As healthcare further integrates technology into its infrastructure, telehealth will begin to play a much larger role in how providers interact with patients. Advancements in equipment such as smart phones, computers, and video-streaming cameras, along with faster internet speeds allow this form of communication to become easier, convenient, and more reliable. Telehealth will soon play a large role in healthcare as the quality of healthcare and technology continues to advance. It is important that institutions and providers remain at the forefront of this technology so that they can continue to advance the specialty of anesthesiology. Increased use of telehealth means that health care organizations and practitioners

need to develop guidelines for monitoring telehealth practitioners and sharing internal review information. Federal law requires that this shared information must include adverse events that result from a practitioner's telehealth services and complaints a health care organization receives about a practitioner.¹⁹ Practitioners must adhere to traditional clinical standards of care, and practice within the scope of practice authorized by law.

PICO Question or Purpose

Central to the process of translating evidence from the literature into a practice change is the development of a clinical question designed to address the issue. The PICO (Population, Intervention, Comparison, and Outcome) formula is the standard for evidence-based practice. Therefore, for the purposes of this project, the PICO question is:

- Among anesthesia providers (**P**), is an educational module designed to improve knowledge of the effectiveness of telehealth-assisted PAE (**I**), when compared to face-to-face preoperative assessment (**C**), effective in increasing provider knowledge (**O**) that leads to an improvement in the quality of patient care, the experience of the patient, its effect on staff, productivity, and cost-savings potential?

In breaking down this question into its individual elements, the following can be observed:

- P: Anesthesia providers
- I: An educational model on the effectiveness of telehealth for PAE
- C: face to face preoperative assessment

- O: Increased provider knowledge of the effectiveness of telehealth-assisted PAE.

Goals and Outcomes

To guide the development of the goal objectives for this project, the acronym SMART was utilized. SMART details that the objectives should be specific, measurable, achievable, realistic, and timely.¹⁷

Specific

Anesthesia providers will be given an educational presentation on the benefits of PAE and the ways in which it can be implemented in their practice.

Measurable

The effectiveness of the teaching will be determined through the data analysis of a questionnaire that will be provided to participants before and after an educational intervention. Outcomes will be measured by evaluating the variations in provider knowledge of telehealth-assisted PEA.

Achievable

Given the collaborative, multidisciplinary team nature of a specific health care system, OR staff, providers, and administration will work together towards the goal of less day-of-surgery cancellations using telehealth assisted PAE.

Realistic

The literature supports the idea that implementation of telehealth-assisted PAE can successfully lead to reduced day-of-surgery cancellations. An educational presentation of this information to providers can improve understanding of its benefits.

Timely

The creation and presentation of the information will be completed within a 6-month timeframe.

Program Structure

The development of a telehealth assisted PAE will require a collaborative, multidisciplinary team effort. An assessment will be performed to identify where opportunities exist and of the importance, value, and significance the project will have to all stakeholders. The strength, weakness, opportunities, and threats (SWOT) analysis assessment tool will be utilized to evaluate the ability for such a program to be utilized within the chosen healthcare system.¹⁷

Because the project aims to determine the provider's knowledge of clinical practice when delivering PAE utilizing telehealth, the first step will be to identify a team of expert stakeholders.¹⁷ These expert stakeholders will guide the logistical development of a telehealth protocol and the providers' educational intervention. The participants will first be provided with a questionnaire to measure their knowledge of PAE and how telehealth can be used to enhance it. Participants will then be provided with an educational presentation regarding the use of telehealth assisted PAE. This presentation will be given to providers through in-services, huddles, and observation by the researcher. After the intervention, participants will be asked to take a post-test survey that will analyze the variations in their knowledge before and after the educational course.

Theoretical Framework

A middle-range theory will be used to guide this process. Lewin's Change Theory is one that states that there are driving and restraining forces that cause people and organizations to act the way they do.¹⁸ If one can recognize and understand these forces, then it should be possible

to manipulate them to bring change within the organization.¹⁸ Bringing change within an organization is a 3-step process: unfreezing, change, and refreezing.¹⁸

In the unfreezing stage, there is a recognized need for change.¹⁸ Leadership determines what needs to be changed. Leaders then develop strong support for the change. This is done by creating a need for change and arguing for why the change is necessary.¹⁸ Doubts and concerns, which can be considered restraining forces, must be managed and controlled by those who wish to implement change.¹⁸

The second stage is the change stage. During this stage, change is actively occurring and must be directed so that it occurs in the desired manner. Communication is essential during this stage.¹⁸ A plan must be set that all stakeholders can follow. It is the responsibility of leaders to dispel rumors and misinformation that may inhibit change.¹⁸ Leaders must empower others to be driving forces towards change. Involving others in the change process can make people feel invested in the change.¹⁸

The final stage is refreezing. In this stage change has occurred. The goal now is to sustain that change and anchor it onto the culture of the organization.¹⁸ Stakeholders should also be involved in this stage as well. Training and support should be regularly performed to ensure understanding and implementation of change.¹⁸ Questions and concerns about change should be resolved promptly. Successes should be rewarded and celebrated.¹⁸

This project will be implemented in a facility with the goal of implementing telehealth assisted PAE in the OR. Currently, no such implementation exists at this facility. All PAEs are done on the day of surgery and in-person. Therefore, an unfreezing of this practice will need to take place to incorporate more telehealth. The unfreezing stage would begin with an educational presentation for providers which highlights the benefits of telehealth and includes provider

satisfaction, patient satisfaction, safety, and potential cost savings. For the final stage of refreezing, reinforcement of made changes will be conducted using super users who will be tasked with ensuring that the method is utilized when appropriate. Further, evaluations of its effectiveness will be conducted to determine user stakeholder satisfaction and cost effectiveness.

Definition of Terms

Telehealth

Telehealth is defined as “the use of electronic information and telecommunications technologies to support long-distance clinical health care, patient and professional health-related education, public health and health administration. Technologies include videoconferencing, the internet, store-and-forward imaging, streaming media, and terrestrial and wireless communications.”¹⁹ Telehealth is occasionally referred to as telemedicine. Although the terms are similar, they are not the same. Telehealth refers to a broader scope of health services than telemedicine does.¹⁹

Preanesthesia Evaluation

Preanesthesia evaluation is defined as “the process of clinical assessment that precedes the delivery of anesthesia care for surgery and for nonsurgical procedures.”²⁰ Several aspects are involved in the preanesthesia evaluation including the patient’s medical records, the interview, the physical exam, and results from diagnostic tests.²⁰ The assessments made during this evaluation can be used to develop a plan of care for the patient, organize resources for perioperative care, and educate the patient.²⁰

Methodology

Settings and Participants

This quality improvement (QI) project will occur at Broward Health Medical Center, located in Fort Lauderdale, Florida. The facility provides surgical interventions for a well-diverse population. There are 11 anesthesiologists and 24 CRNAs at this facility. Patients seen at this facility have an average ASA score of 3, frequently requiring anesthesia and surgical staff intervention. There are 16 ORs at this facility along with a catheter lab, gastrointestinal (GI) suite, and electrophysiology (EP) room. All these areas frequently utilize anesthesia services.

Description of Approach and Project Procedures

The approach to implementing this QI project will be through an educational module on telehealth-assisted PAE. The module will focus on educating providers with current practices and their fallbacks, how telehealth can be utilized in the preoperative setting, and the benefits of implementing telehealth during the PAE. The first portion of the quality improvement project will include a pre-assessment survey that will measure current provider knowledge and attitudes on utilizing telehealth during the PAE. The preassessment will also collect information regarding the level of experience of the provider, as well as if they have ever participated in prior education on telehealth.

For the next portion, the link for the module will be emailed to the providers who complete the pre-assessment survey. After completion of the module, participants will be provided with a post-assessment survey. The post-assessment survey will be compared to the answers given during the pre-assessment survey and identify providers' learned knowledge of the quality improvement project and their willingness to apply it to their current practice. This information will provide feedback on the impact of the educational module. Feedback on the program can be used to make any changes to the module in order to enhance its effectiveness in the future.

Protection of Human Subjects

All anesthesia providers at the chosen facility will be invited to participate in the study via email. The email link will be encrypted to protect the identity of the participants. No identifiable data will be collected during this study. It is possible for indirect identifiers to occur due to the small sample size of the participants. Providers can withdraw at any time and there will be no penalty for those who do not wish to participate. Benefits of participation will include increased provider knowledge of the telehealth assisted PAE.

Data Collection

Before a presentation is conducted, participants will be asked to complete a pre-test of questions based on their current knowledge of telehealth assisted PAE, demographic questions ascertaining the type of anesthesia provider and years of experience, and their current apprehension towards telehealth and current practice. After completing the educational presentation, participants will be asked to complete a post-test of the same questions and a 5-point Likert scale evaluating their attitudes on telehealth and the likelihood of their willingness to incorporate it into clinical practice, along with the perceived increase of knowledge following completion of the presentation. A HIPPA-compliant online database will allow for the storage of the questions and gathering of statistical information related to each question.

Data Management and Analysis Plan

Data will be stored in a protective database open to the co-investigator. No direct identifiers will be collected in this investigation, and all results will be reported collectively. Answers to the pre-and post-test questions will be compared after the intervention is complete. The impact of the intervention will be based upon the comparison of the results of the pre- and post- assessment survey. The results will be shared once the data has been analyzed. No data-

sharing agreement will be required. The research will be presented to the faculty of the Nicole Wertheim College of Nursing and Health Sciences at Florida International University as well as the providers who participated in the study.

Results

The module was distributed to anesthesia providers at a Level I trauma center in Ft. Lauderdale, Florida via email. 36 invitations to participate were sent. There were no interventions made for the duration that the module was made available. Once the surveys were completed, the data was exported into a document that displayed the results of the project. The data was used to create 6 tables showing the information extrapolated from the results. There were no unintended costs or failures associated with the intervention. Several providers who completed the project voluntarily came to the author to describe their feelings about the topic. They expressed that the inclusion of telehealth into the anesthesia process would be a great benefit to both providers and the patients.

Table 1

| Demographic | n (%) |
|---------------------------------------|-----------|
| Total Participants | 7 (100%) |
| Gender | |
| Male | 2 (28.6%) |
| Female | 5 (71.4%) |
| Ethnicity | |
| Caucasian | 3 (42.8%) |
| Hispanic | 3 (42.8%) |
| Other | 1 (14.3%) |
| Years of Precepting Experience | |
| Less than 1 year | 1 (14.3%) |
| 1 to 5 years | 1 (14.3%) |
| 6 to 10 years | 2 (28.6%) |
| Over 10 years | 3 (42.8%) |

There was a total of 7 participants. All participants participated in the pre-test and post-test. Most of the participants were female (n=5, 71.4%), as opposed to male (n=2, 28.6%). The ethnicities of the participants included Caucasian (n=3, 42.8%), Hispanic (n=3, 42.8%) and other (n=1, 14.3%). The participants were also asked about their years of precepting experience which ranged from less than 1 year (n=1, 14.3%), 1 to 5 years (n=2, 14.3%), 6 to 10 years (n=2, 28.6%), and over 10 years (n=3, 42.8%).

Pre-test Attitude and Perception-Based Survey Questions

Prior to receiving the educational module, the participants were first instructed to complete a pre-survey to gather a baseline assessment of attitudes about the topic. The pre-survey the provider to rate statements on a Likert scale from 1 to 5 with 1 being strongly disagree and 5 being strongly agree. There were 10 questions asked. The results are as follows:

Table 2

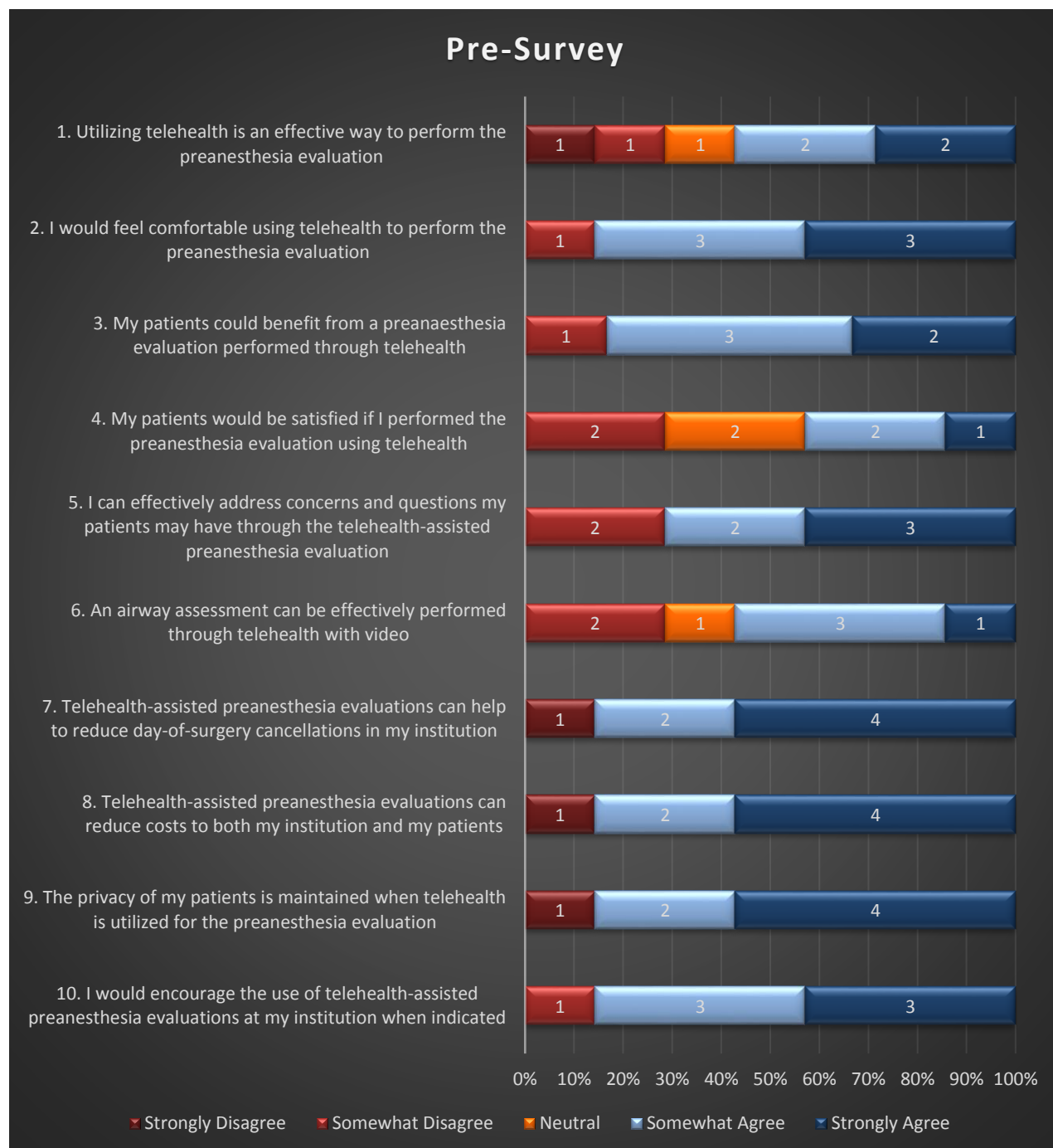


Table 3

The following table represents the response means for each item on the pre-module survey. The lowest possible score is 1 and the highest possible score is 5.

Pre-survey Mean

| Statement | Response Mean |
|---|----------------------|
| 1. Utilizing telehealth is an effective way to perform the preanesthesia evaluation | 3.43 |
| 2. I would feel comfortable using telehealth to perform the preanesthesia evaluation | 4.14 |
| 3. My patients could benefit from a preanaesthesia evaluation performed through telehealth | 3.43 |
| 4. My patients would be satisfied if I performed the preanesthesia evaluation using telehealth | 3.29 |
| 5. I can effectively address concerns and questions my patients may have through the telehealth-assisted preanesthesia evaluation | 3.86 |
| 6. An airway assessment can be effectively performed through telehealth with video | 3.43 |
| 7. Telehealth-assisted preanesthesia evaluations can help to reduce day-of-surgery cancellations in my institution | 4.14 |
| 8. Telehealth-assisted preanesthesia evaluations can reduce costs to both my institution and my patients | 4.14 |
| 9. The privacy of my patients is maintained when telehealth is utilized for the preanesthesia evaluation | 4.14 |
| 10. I would encourage the use of telehealth-assisted preanesthesia evaluations at my institution when indicated | 4.14 |

Post-test Attitude and Perception-Based Survey Questions

Once the pre-module survey was completed, the provider was directed to complete the educational module. After completion of the module, the provider then completed a post-module

survey. The post-module questions included the same questions from the pre-test to gauge if perception and attitudes changed after viewing the educational module.

Table 4

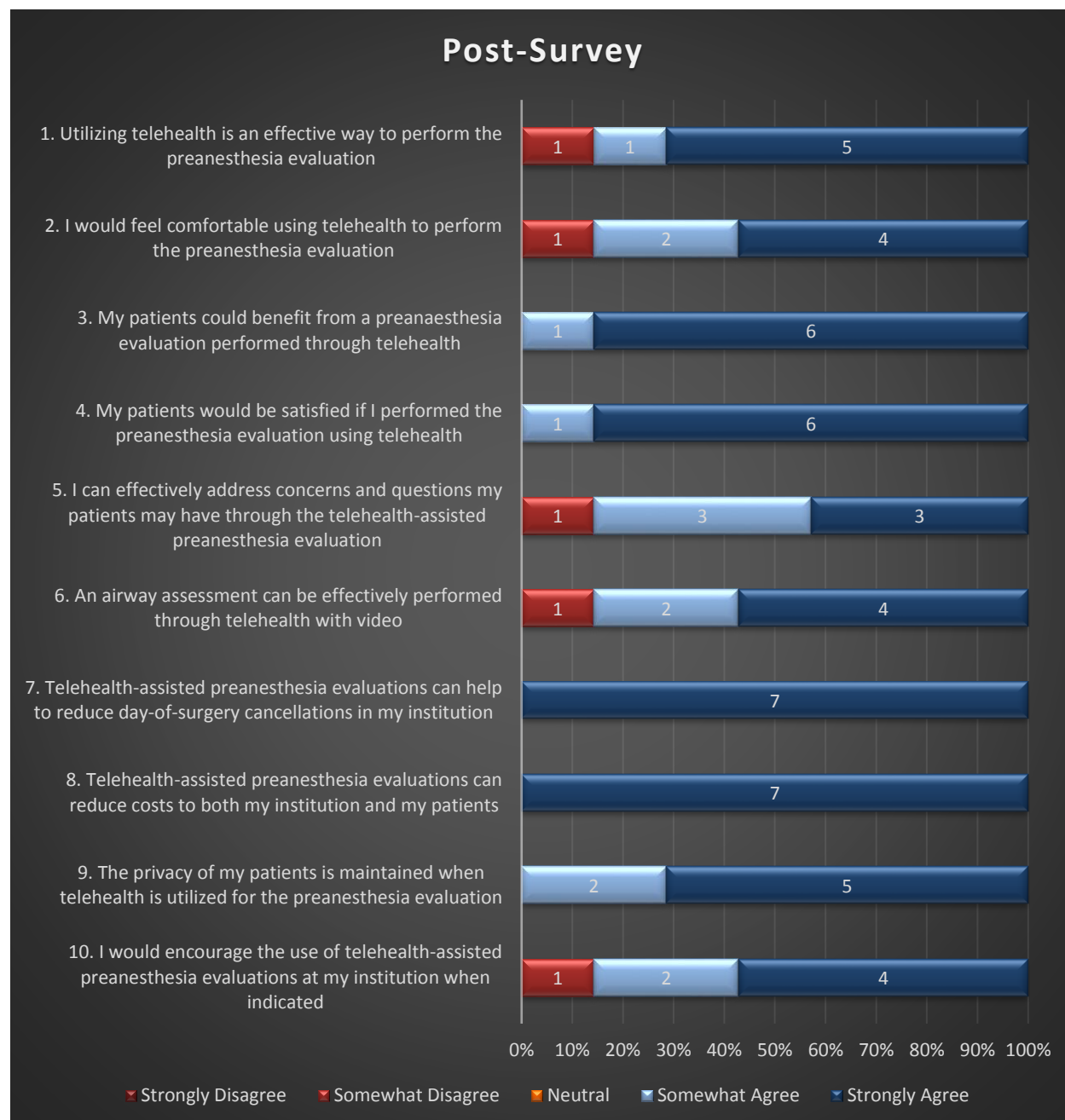


Table 5

Post-Survey Mean

| Statement | Response Mean |
|---|---------------|
| 1. Utilizing telehealth is an effective way to perform the preanesthesia evaluation | 4.43 |
| 2. I would feel comfortable using telehealth to perform the preanesthesia evaluation | 4.29 |
| 3. My patients could benefit from a preanaesthesia evaluation performed through telehealth | 4.86 |
| 4. My patients would be satisfied if I performed the preanesthesia evaluation using telehealth | 4.86 |
| 5. I can effectively address concerns and questions my patients may have through the telehealth-assisted preanesthesia evaluation | 4.14 |
| 6. An airway assessment can be effectively performed through telehealth with video | 4.29 |
| 7. Telehealth-assisted preanesthesia evaluations can help to reduce day-of-surgery cancellations in my institution | 5 |
| 8. Telehealth-assisted preanesthesia evaluations can reduce costs to both my institution and my patients | 5 |
| 9. The privacy of my patients is maintained when telehealth is utilized for the preanesthesia evaluation | 4.71 |
| 10. I would encourage the use of telehealth-assisted preanesthesia evaluations at my institution when indicated | 4.29 |

Table 6*Pre and Post-survey Mean Comparison*

| Statement | Pre-Survey Response Mean | Post-Survey Response Mean | Difference (%) |
|---|---------------------------------|----------------------------------|-----------------------|
| 1. Utilizing telehealth is an effective way to perform the preanesthesia evaluation | 3.43 | 4.43 | 29% |
| 2. I would feel comfortable using telehealth to perform the preanesthesia evaluation | 4.14 | 4.29 | 3.6% |
| 3. My patients could benefit from a preanaesthesia evaluation performed through telehealth | 3.43 | 4.86 | 42% |
| 4. My patients would be satisfied if I performed the preanesthesia evaluation using telehealth | 3.29 | 4.86 | 48% |
| 5. I can effectively address concerns and questions my patients may have through the telehealth-assisted preanesthesia evaluation | 3.86 | 4.14 | 7.2% |
| 6. An airway assessment can be effectively performed through telehealth with video | 3.43 | 4.29 | 25% |
| 7. Telehealth-assisted preanesthesia evaluations can help to reduce day-of-surgery cancellations in my institution | 4.14 | 5 | 21% |
| 8. Telehealth-assisted preanesthesia evaluations can reduce costs to both my institution and my patients | 4.14 | 5 | 21% |
| 9. The privacy of my patients is maintained when telehealth is utilized for the preanesthesia evaluation | 4.14 | 4.71 | 14% |
| 10. I would encourage the use of telehealth-assisted preanesthesia evaluations at my institution when indicated | 4.14 | 4.29 | 3.6% |

Table 6 shows a prominent increase in scores when comparing the pre-survey to the post-survey.

Discussion

Summary

The pre-test and post-test assessed if the educational module enhanced the participants attitude and perception of the use of telehealth during the PAE. The results from the pre-test showed that all participants already had a mostly neutral-to-positive attitude towards telehealth prior to viewing the educational module. After the educational module was presented, the post-survey results showed a noticeable increase in positive reception for every item asked. The results appear to confirm that providers are willing and ready to use telehealth during the PAE.

Interpretation

The educational module appears to have made a positive impact on the providers' attitudes and perceptions regarding telehealth-assisted PAE. Before viewing the module, providers seemed to have a neutral view about telehealth. The lowest scoring item related to whether they believed their patients would be satisfied with using telehealth for the PAE. After the module, perception noticeably improved for all items. The lowest scoring item became the one with the most significant change in attitude with an increase of 48%. The results of this project seem to align with findings in the Literature. Many studies sought to determine how patients would view using telehealth, but few looked at how anesthesia providers would perceive the technology. The findings of this study show that providers feel similarly to their patients about telehealth.

Limitations

One limitation was the small sample size. An email was sent out to all members of an anesthesia group; however, only 7 responses were received. A larger sample size would allow for a more accurate assessment on attitude and perception. Time was another limitation. The pre-test and post-test were only open for two weeks after being sent out. If more time was allotted, then possibly more responses would have been received. The delivery method also caused limitations. The email was sent out only one time making it easy for recipients to forget to respond. A reminder email could have helped to gain more participants.

Efforts were made to reduce limitations. As many invitations to participate as allowed were sent to maximize the sample size. An extra week was given to providers so that they had more time to complete the module. Providers were verbally reminded that the invitation was sent out and that they are welcome to participate in the project.

Moving Forward and Sustaining Change

This project has shown that providers respond positively to the concept of telehealth utilization in the anesthesia practice. Steps can be taken to further research not only patient and provider perception of the technology, but how to integrate it into anesthesia practice. Ideally, as research continues, the Literature will show more definitively that implementing the telehealth-assisted PAE into routine preoperative anesthesia care will be a benefit to stakeholders.

Telehealth's place in the PAE can use further study. There are several areas that can be further researched to determine its strengths and weaknesses. The financial impact of implementing the technology into a healthcare system must be considered. Studies showing the cost of implementing the technology could show whether implementing the technology is financially feasible. Additionally, these studies can determine how this technology can save time,

increasing the efficiency of the OR, as well as show how much money is saved by reducing the number of canceled or delayed surgeries.

In order to implement and sustain the utilization of telehealth-assisted PAE, several factors must be considered. Telehealth utilization requires that the correct hardware and software be acquired for its use. An information technology support system must be setup to help establish the technology and integrate it into the health system. A pilot program should be run to “test run” the new technology and make sure that it functions as expected within the organization. Once the pilot program runs successfully, implementation can be scaled up.

Providers and staff must be trained to use the devices and software. Feedback from users is important to determine what is working and what is not, and what changes can be made to further improve its use and efficacy. If users are not receptive to the technology, integration can be difficult, and adoption will be hindered. Problems can and will occur. Different providers adapt to changes in different ways. Some will embrace the change quickly, while others will be resistant. Continuous evaluation of its implementation is essential for a smooth and effective transition.

Discussion of Results with Implications to Advanced Nursing Practice

Telehealth is an increasingly relevant topic in the healthcare industry. It can provide many benefits to both the provider and the consumer. It allows for increased access to healthcare in rural areas, as well as for those with special needs or disabilities.²¹ Individuals with limited access to transportation can also benefit from telehealth assisted care.²¹ In this post-pandemic era, telehealth also has implications for the safety of both patient and provider. Telehealth is helping to change the way providers deliver care such that exposure to deadly disease is

reduced.²¹ Healthcare systems have begun to adjust the way they evaluate and care for patients to accommodate the changes caused by the pandemic.²¹

While telehealth is a concept that has been around for some time, widespread adoption of the technology by healthcare providers has been relatively slow. However, due to recent policy changes, barriers to telehealth access are being reduced and its utilization as a way to deliver acute, chronic, primary, and specialty care is being promoted.²¹ Professional societies across the globe are endorsing the use of telehealth services and encourage practitioners to use it where appropriate.²¹

With increased utilization of APRNs within the telehealth provider role, it is important that APRNs are cognizant of several professional practice issues, such as federal and state laws and regulations, credentialing and privileging, malpractice coverage, position statements by governing bodies, established guidelines, and reimbursement policies.²² The use of telehealth also has implications for how the advanced practice nurse (APN) conducts their practice. APNs have long been providing high-quality care in the United States and will likely continue to do so as the demand for access to healthcare rises.²² It is the responsibility of the nurse practitioner to know and meet the requirements necessary to provide telehealth services to their patients. Encouraging APNs to provide care via telehealth will further their ability as healthcare providers.²²

Patient outcomes and standards of practice apply to all patient encounters and do not vary based on the health care delivery method. Health care providers using telehealth should have access to and use appropriate peripheral equipment to complete examinations as indicated by the patient history. The equipment should be appropriate, sensitive, and specific to the purpose for which it is being used, and the audio or visual results should be sufficiently clear to assist in

making an accurate diagnosis. Additional telehealth quality considerations include avoiding unnecessary diagnostic ordering, appropriate IT support, and adequate internet connectivity.¹⁹

Conclusion

The goal of this project was to determine if an educational module would affect the perceptions and attitudes of anesthesia providers about telehealth-assisted PAE. The project appears to have been successful in positively impacting provider perception on the topic. The project shows that presenting the topic and educating providers about the topic can make them more open to using the technology in their practice. Information gained from this project can be used to determine the feasibility of implementing this technology at health care facility where anesthesia providers practice. Steps to improve on this research would be to conduct a larger study with more providers. Ideally, further research would involve a pilot study where telehealth-assisted PAE would be implemented at a facility for a significant period of time. During this study, certain outcomes would be monitored such as patient perception, provider perception, a comparison of telehealth-assisted versus traditional PAE, outcomes of patients, surgery cancellations, privacy concerns, and overall costs to the facility and the patient.

Project Tasks

Finally, in order to ensure completion of the proposed DNP project, a timeline of key activities related to the project is included below. All project components in the table will be completed over the next 6 months starting in January 2022 with a target completion date of July 2022.

1. Develop the education intervention
2. Choose an electronic database

3. Generate informed consent
4. Request IRB approval
5. Create and send “Invitation to Participate”
6. Administer pre-test questionnaires
7. Perform educational intervention
8. Administer post-test
9. Analyze data

Project Timeline

1. 12-month timeframe
2. Develop the education intervention – 3 months
3. Request IRB approval - 2 months
4. Analyze data - 1 month
5. Finalize research for submission – 3 months
6. Timeline margin of error – 3 months

References

1. Xue W, Yan Z, Barnett R, Fleisher L, Liu R. Dynamics of elective case cancellation for inpatient and outpatient in an academic center. *J Anesth Clin Res*. 2013;4(5):314.
2. Kumar R, Gandhi R. Reasons for cancellation of operation on the day of intended surgery in a multidisciplinary 500 bedded hospital. *J Anaesthesiol Clin Pharmacol*. 2012;28(1):66-69. doi:10.4103/0970-9185.92442.
3. Cho H-S, Lee YS, Lee SG, Kim JM, Kim TH. Reasons for surgery cancellation in a general hospital: a 10-year study. *Int J Environ Res Public Health* 2018;16(1):7 doi: 10.3390/ijerph16010007.
4. Fayed A, Elkouny A, Zoughaibi N, Wahabi HA. Elective surgery cancelation on day of surgery: an endless dilemma. *Saudi J Anaesth* 2016;10(1):68-73 doi: 10.4103/1658-354x.169479.
5. Turunen E, Miettinen M, Setälä L, Vehviläinen-Julkunen K. Financial cost of elective day of surgery cancellations. *Journal of Hospital Administration* 2018;7:30-36 doi: 10.5430/jha.v7n6p30.
6. Schoen DC, Prater K. Role of telehealth in pre-anesthetic evaluations. *AANA Journal* 2019;87(1):43-49.
7. Meyers N, Giron SE, Burkard JF, Bush RA. Preventing surgical delay and cancellation with patient-centered interventions. *Journal of PeriAnesthesia Nursing* 2021;36(4):334-38 doi: 10.1016/j.jopan.2020.10.008.
8. Carvalho H, Verdonck M, Forget P, Poelaert J. Acceptance of mhealth among health professionals: a case study on anesthesia practitioners. *BMC Anesthesiology* 2020;20(1):1-10 doi: 10.1186/s12871-020-00958-3.
9. Stewart JJ, Fayed I, Henault S, Kalantar B, Voyadzis J-M. Use of a smartphone application for spine surgery improves patient adherence with preoperative instructions and decreases last-minute surgery cancellations. *Cureus* 2019;11(3):e4192-e92 doi: 10.7759/cureus.4192.
10. Ferré F, Boeschlin N, Bastiani B, et al. Improving provision of preanesthetic information through use of the digital conversational agent "myanesth": prospective observational trial. *Journal of Medical Internet Research* 2020;22(12): doi: 10.2196/20455.
11. Applegate RL, 2nd, Gildea B, Patchin R, et al. Telemedicine pre-anesthesia evaluation: a randomized pilot trial. *Telemed J E Health* 2013;19(3):211-6 doi: 10.1089/tmj.2012.0132

12. Haufler K, Harrington M. Using Nurse-to-Patient Telephone Calls to Reduce Day-of-Surgery Cancellations. *AORN Journal* 2011;94(1):19-26 doi: <https://doi.org/10.1016/j.aorn.2010.12.024>
13. Roberts S, Spain B, Hicks C, London J, Tay S. Telemedicine in the northern territory: an assessment of patient perceptions in the preoperative anaesthetic clinic. *Australian Journal of Rural Health* 2015;23(3):136-41 doi: 10.1111/ajr.12140
14. Powell RE, Stone D, Hollander JE. Patient and health system experience with implementation of an enterprise-wide telehealth scheduled video visit program: mixed-methods study. *JMIR Med Inform.* 2018;6(1):e10. Published 2018 Feb 13. doi:10.2196/medinform.8479
15. Aldawoodi NN, Muncey AR, Serdiuk AA, et al. A retrospective analysis of patients undergoing telemedicine evaluation in the preanesthesia testing clinic at H. Lee Moffitt Cancer Center. *Cancer Control.* 2021;28:10732748211044347 doi: 10.1177/10732748211044347
16. Kamdar NV, Huverserian A, Jalilian L, et al. Development, implementation, and evaluation of a telemedicine preoperative evaluation initiative at a major academic medical center. *Anesth Analg.* 2020;131(6):1647-56 doi: 10.1213/ane.00000000000005208
17. Moran, K., Burson, R., & Conrad, D. The doctor of nursing practice project (3rd ed.). 2020. Burlington, MA: Jones & Bartlett Learning.
18. Cummings S, Bridgman T, Brown KG. Unfreezing change as three steps: rethinking Kurt Lewin's legacy for change management. *Human Relations.* 2016;69(1):33-60. doi:10.1177/0018726715577707.
19. What is telehealth? How is telehealth different from telemedicine? Health Resources Services Administration. Updated October 17, 2019. Accessed November 20, 2021. <https://www.healthit.gov/faq/what-telehealth-how-telehealth-different-telemedicine>.
20. Practice Advisory for Preanesthesia Evaluation. *Anesthesiology* 2012; 116:522–38. <https://doi.org/10.1097/ALN.0b013e31823c1067>

Using Telehealth to Expand Access to Essential Health Services During the Covid-19 Pandemic. Center for Disease Control and Prevention. Updated June 20, 2020. Accessed November 20, 2021. <https://www.cdc.gov/coronavirus/2019-ncov/hcp/telehealth.html>.

21. Garber K, Chike-Harris K. Nurse practitioners and virtual care: A 50-state review of APRN telehealth law and policy. *Telehealth and Medicine Today* 2019;4 doi: 10.30953/tmt.v4.136

Appendix A: Literature Matrix

| Author(s) | Purpose | Methodology/ Research Design | Interventions/ Measures | Primary Results | Conclusions |
|---|---|---|--|--|--|
| Schoen & Prater⁹ | Examine the evidence evaluating the effectiveness of using telehealth when performing the PAE. ⁹ | Systematic Literature Review Level 1 ⁹ | A computerized literature search (1974-2016) was conducted using the following online sources and search engines: PubMed, The Cochrane Library, Cumulative Index to Nursing & Allied Health (CINAHL), online medical data, ancestry approach, and Google Scholar. ⁹ | First, the title was examined for inclusion criteria followed by the abstract and then the full text of the source. search. The evidence was then critically appraised and assessed by level per the method described by Melnyk and Fineout-Overholt. 7 in total were included. ⁹ | The evidence suggested that telehealth has distinct advantages in remote and rural areas where access to healthcare can be difficult. ⁹ |
| Applegate II et al.¹⁰ | Investigate the impact of telemedicine pre-anesthesia evaluation on perioperative processes. ¹⁰ | Prospective Randomized Trial Level 2 ¹⁰ | The primary outcome measure was inadequate evaluation caused surgical delay or cancellation. ¹⁰ | Delay occurred in 1 telemedicine patient awaiting results performed outside our system. Missing documentation at the time of the visit | Telemedicine and in-person evaluations were equivalent, with high patient and provider satisfaction. ¹⁰ |

| | | | | | |
|--|---|--|--|--|---|
| | | | | <p>was less common for telemedicine. Difficult airway management was predicted equally but had low positive predictive value. Heart and lung examinations were highly concordant with day of surgery documentation.¹⁰</p> | |
| Haufler & Harrington¹¹ | Implement interventions to reduce day-of-surgery cancellations. ¹¹ | Case-controlled Quantitative Study Level 4 ¹¹ | <p>Initiate a policy that required an RN to call the patient three business days before the scheduled surgery to educate him or her, by using a script, about preoperative policies and preparedness.¹¹</p> | <p>Results showed a 54% decrease in the number of cancellations due to the specific causes targeted in the calls (ie, NS, NPO, RA) compared with cancellations in the previous year.¹¹</p> | <p>Scripting and advance calls by nurses are an effective way to communicate to patients the reasons for preoperative restrictions and the consequences of not following them.¹¹</p> |
| Stewart et al.⁴ | Demonstrate the ability of a smartphone app to improve patient compliance | Quasi-experimental Quantitative Study Level 3 ⁴ | Through the app, patients were prompted to acknowledge certain instructions and all | There were 85 app users compared to 89 non-app users. There were no canceled | The use of a perioperative care app with built-in reminders and a preoperative |

| | | | | | |
|------------------------------------|--|---|---|--|--|
| | with preoperative instructions and to decrease the number of last-minute surgery cancellations. ⁴ | | reminders. These acknowledgements were sent back to the web portal preoperative dashboard in order for the physician's staff to track compliance with instructions before surgery. ⁴ | surgeries in the group of app users compared to five canceled surgeries in the non-app user group. ⁴ | patient tracking dashboard improved compliance with instructions, while allowing physicians and their staff to track the patient's journey before surgery. ⁴ |
| Roberts et al.¹³ | Investigate patient perceptions of a virtual preoperative anaesthesia evaluation clinic ¹³ | Descriptive study, cross-sectional survey Level 6 ¹³ | a 10-item, 5-point Likert scale questionnaire given to patients ¹³ | Twenty-seven out of 35 patients (77%) completed the questionnaire. Ninety-eight per cent were in positive agreement on technical quality with a mean score of 1.35 ¹³ | Confirms the acceptability of telemedicine in the remote assessment of preoperative patients in the Northern Territory, with positive perceptions in all four domains. ¹³ |
| Powell et al.¹⁴ | The objective of this study is to report health system and patient experiences with implementation of a telehealth scheduled video visit program across a health | Mixed methods study including (1) a retrospective descriptive report and (2) a survey of patients who participated in scheduled telehealth visits | Report health system and patient experiences with implementation of a telehealth scheduled video visit program across a health system. ¹⁴ | Among survey respondents, 91.6% (728/795) reported satisfaction with the scheduled visits and 82.7% (628/759) reported perceived quality similar to an in-person visit. A total of | Patients found use of scheduled video visits made it easier to get care and the majority perceived time saved, suggesting that use of telehealth for scheduled |

| | | | | | |
|-------------------------|---|-----------------------------------|--|---|--|
| | system. ¹⁴ | Level 6 ¹⁴ | | 86.0% (652/758) responded that use of the scheduled video visit made it easier to get care. ¹⁴ | visits can improve potential access to care across a range of clinical scenarios with favorable patient experiences. ¹⁴ |
| Aldawoodi et al. | Determine ability for telemedicine assisted preanesthesia evaluation to decrease access disparities by minimizing commuting, time off work, and lifestyle disruptions from frequent medical visits. | Retrospective analysis Level 3 | Retrospective analysis of 120 patients seen via telemedicine for preanesthesia evaluation compared with an in-person cohort meeting telemedicine criteria had it been available. | 120 patients compared to 120 in-person evaluation. Day-of-surgery cancellation rate was 1.67% in the telemedicine versus 0% in the in-person cohort | Telemedicine preanesthesia evaluation results in time, distance, and financial savings without increased day-of-surgery cancellations. |
| Kamdar et al. | Describe the implementation of a telemedicine-based anesthesia preoperative evaluation and report the program's patient satisfaction, clinical case cancellation rate outcomes, and cost | Descriptive study Level 6 | This is a descriptive study of a telemedicine-based preoperative anesthesia evaluation process in an academic medical center within a large metropolitan area. | In a 2-year period, 419 patients were evaluated scheduled for surgery by telemedicine and 1785 patients who were evaluated in-person. | This study demonstrates the implementation of a telemedicine-based preoperative anesthesia evaluation from an academic medical center in a metropolitan area with high patient |

| | | | | | |
|--|--------------------------------------|--|--|--|--|
| | savings in a large metropolitan area | | | | satisfaction, cost savings, and without increase in day-of-procedure case cancellations. |
|--|--------------------------------------|--|--|--|--|

Appendix B


IRB Approval



Office of Research Integrity
Research Compliance, MARC 414

MEMORANDUM

To: Dr. Arturo Gonzalez
CC: Anthony Gonzalez

From: Maria Melendez-Vargas, MIBA, IRB Coordinator 

Date: April 29, 2022

Protocol Title: "An Educational Module on the Benefits of Telehealth Assisted
Preanesthetic Evaluations: A Qualitative Improvement Project"

The Florida International University Office of Research Integrity has reviewed your research study for the use of human subjects and deemed it Exempt via the Exempt Review process.

IRB Protocol Exemption #: IRB-22-0183 **IRB Exemption Date:** 04/29/22
TOPAZ Reference #: 111517

As a requirement of IRB Exemption you are required to:

- 1) Submit an IRB Exempt Amendment Form for all proposed additions or changes in the procedures involving human subjects. All additions and changes must be reviewed and approved prior to implementation.
- 2) Promptly submit an IRB Exempt Event Report Form for every serious or unusual or unanticipated adverse event, problems with the rights or welfare of the human subjects, and/or deviations from the approved protocol.
- 3) Submit an IRB Exempt Project Completion Report Form when the study is finished or discontinued.

Special Conditions: N/A

For further information, you may visit the IRB website at <http://research.fiu.edu/irb>.

MMV/em

Appendix C

Letter of Support



February 1, 2022

Arturo Gonzalez, DNP, APRN, ANP-BC, CWCN-AP
Clinical Assistant Professor,
Florida International University

Dr. Gonzalez,

Thank you for inviting Broward Health Medical Center to participate in the Doctor of Nursing Practice (DNP) project conducted by Anthony Gonzalez entitled "An Educational Module on the Benefits of Telehealth Assisted Preanesthetic Evaluations" in the Nicole Wertheim College of Nursing and Health Sciences, Department of Nurse Anesthetist Practice at Florida International University. I have warranted his permission to conduct the project using our providers.

Evidence-based practice's primary aim is to yield the best outcomes for patients by selecting interventions supported by the evidence. This project intends to evaluate if a structured education targeting providers will increase knowledge of the effectiveness of telehealth-assisted preoperative anesthesia evaluation (PAE) leading to an improvement in the quality of patient care and cost savings to the organization.

We understand that participation in the study is voluntary and carries no overt risk. All Anesthesiology providers are free to participate or withdraw from the study at any time. The educational intervention will be conveyed by a 15-minute virtual PowerPoint presentation, with a pretest and posttest questionnaire delivered by a URL link electronically via Qualtrics, an online survey product. Responses to pretest and posttest surveys are not linked to any participant. The collected information is reported as an aggregate, and there is no monetary compensation for participation. All collected material will be kept confidential, stored in a password-encrypted digital cloud, and only be accessible to the investigators of this study: Anthony Gonzalez and Dr. Gonzalez. We expect that Anthony Gonzalez will not interfere with normal hospital performance, behave in a professional manner, and follow standards of care.

Prior to the implementation of this educational project, the Florida International University Institutional Review Board will evaluate and approve the procedures to conduct this project. Once the Institutional Review Board's approval is achieved, this scholarly project's execution will occur over two weeks. We support the participation of our Anesthesiology providers in this project and look forward to working with you.

February 1, 2022

Edward Punzalan, DNP, CRNA, APRN
Administrative Director of Nurse Anesthesia
Healthcare Performance Anesco

Date

Survey

1. Utilizing telehealth is an effective way to perform the preanesthesia evaluation

1 – Strongly disagree 2 - Somewhat disagree 3 - Neutral 4 - Somewhat agree 5-Strongly agree

2. I would feel comfortable using telehealth to perform the preanesthesia evaluation

1 – Strongly disagree 2 - Somewhat disagree 3 - Neutral 4 - Somewhat agree 5-Strongly agree

3. My patients could benefit from a preanaesthesia evaluation performed through telehealth

1 – Strongly disagree 2 - Somewhat disagree 3 - Neutral 4 - Somewhat agree 5-Strongly agree

4. My patients would be satisfied if I performed the preanesthesia evaluation using telehealth

1 – Strongly disagree 2 - Somewhat disagree 3 - Neutral 4 - Somewhat agree 5-Strongly agree

5. I can effectively address concerns and questions my patients may have through the telehealth-assisted preanesthesia evaluation

1 – Strongly disagree 2 - Somewhat disagree 3 - Neutral 4 - Somewhat agree 5-Strongly agree

6. An airway assessment can be effectively performed through telehealth with video

1 – Strongly disagree 2 - Somewhat disagree 3 - Neutral 4 - Somewhat agree 5-Strongly agree

7. Telehealth-assisted preanesthesia evaluations can help to reduce day-of-surgery cancellations in my institution

1 – Strongly disagree 2 - Somewhat disagree 3 - Neutral 4 - Somewhat agree 5-Strongly agree

8. Telehealth-assisted preanesthesia evaluations can reduce costs to both my institution and my patients

1 – Strongly disagree 2 - Somewhat disagree 3 - Neutral 4 - Somewhat agree 5-Strongly agree

9. The privacy of my patients is maintained when telehealth is utilized for the preanesthesia evaluation

1 – Strongly disagree 2 - Somewhat disagree 3 - Neutral 4 - Somewhat agree 5-Strongly agree

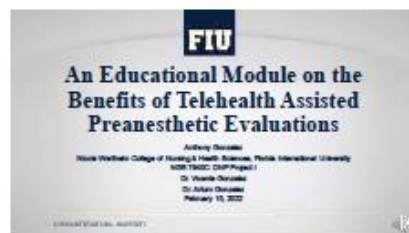
10. I would encourage the use of telehealth-assisted preanesthesia evaluations at my institution when indicated

1 – Strongly disagree 2 - Somewhat disagree 3 - Neutral 4 - Somewhat agree 5-Strongly agree

Appendix E

Educational Module

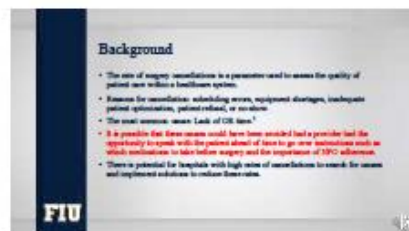
7/27/2022



1



2



3



4



5



6

7/27/2022

Benefits

- The evidence provider will have an opportunity to speak with the patient about their health history, determine what medications they are currently taking, review the patient on which medications are acceptable to take, go over any available lab work or imaging, perform a preliminary sensory assessment, advise the patient of their VOT status on the day of surgery, and answer questions and otherwise ease the patient's anxiety about the surgery.
- The literature suggests that face and hand coverage are the most beneficial part of the technology for the participants.
- The evidence suggests that telehealth use for particularly vulnerable or more rural areas where access to healthcare can be more difficult.

FIU

7

Question

- Centered in the process of providing evidence through telehealth is a positive change in the development of a clinical question designed to address the issue.
- The PICOT (Population, Intervention, Comparison, and Outcome) format is the standard for evidence-based practice.
- Using telehealth providers (T) is an educational module designed to improve knowledge of the effectiveness of telehealth-assisted PAB (I), when compared to face-to-face preoperative assessment (C), relative to increasing provider knowledge (O) that leads to an improvement in the quality of patient care, the experience of the patient, the effect on wait, productivity, and cost savings potential?

FIU

8

Current Knowledge

- Johnson et al. conducted a systematic review of literature of telehealth utilization during the COVID-19.
- Findings suggest that the PAB assessment is carried out using telehealth.
- Patients reported high satisfaction ratings with the utilization of telehealth.
- Studies confirmed that preoperative telehealth assessments are accurate, efficient, and can be successfully performed.

FIU

9

Implementation



The use of a personal smartphone for a portion of the test and work may be useful. When using computer workstation equipment to set up telehealth.

Using a patient's personal smartphone for an identity verification can allow for streamlining of the procedure in advance, resulting in a) shorter and better patient identification.

Other virtual identity verification may be achieved a step further by making a biometric. Multiple applications are available which allow for the videoconferencing to be done in a secure and safe manner.

FIU

10

Summary

- Telehealth is an increasingly relevant topic in the healthcare industry. It can provide many benefits to both the provider and the consumer.
- While widespread adoption of the technology by healthcare providers has been relatively slow, recent policy changes are creating barriers to telehealth access to be reduced. The technology is being more utilized to deliver acute, chronic, primary and specialty care.
- Individuals with limited access to in-person care can also benefit from telehealth remote care.
- Encouraging efforts to provide care via telehealth will further their ability as healthcare providers.

FIU

11

References

1. Green, D., Smith, J., & Jones, K. (2020). The implementation of telehealth in the era of COVID-19: A systematic review. *Journal of Telemedicine and Telecare*, 26(1), 1-10.
2. Johnson, L. M., Lee, M., Kim, M., Cho, Y. (2020). System for emergency telemedicine for general hospital with poor connectivity. *Journal of Telemedicine and Telecare*, 26(1), 1-10.
3. Wang, J., & Wang, J. (2020). The impact of telemedicine on patient satisfaction: A systematic review. *Journal of Telemedicine and Telecare*, 26(1), 1-10.
4. Practice Library for Preoperative Telehealth. *Journal of Telemedicine and Telecare*, 26(1), 1-10.
5. Kim, H., Lee, S., Kim, S., & Park, J. (2020). The impact of telemedicine on patient satisfaction: A systematic review. *Journal of Telemedicine and Telecare*, 26(1), 1-10.
6. Kim, H., Lee, S., Kim, S., & Park, J. (2020). The impact of telemedicine on patient satisfaction: A systematic review. *Journal of Telemedicine and Telecare*, 26(1), 1-10.
7. Kim, H., Lee, S., Kim, S., & Park, J. (2020). The impact of telemedicine on patient satisfaction: A systematic review. *Journal of Telemedicine and Telecare*, 26(1), 1-10.
8. Kim, H., Lee, S., Kim, S., & Park, J. (2020). The impact of telemedicine on patient satisfaction: A systematic review. *Journal of Telemedicine and Telecare*, 26(1), 1-10.

FIU

12