An Educational Module on the Use of Dexmedetomidine as a TAP Block Adjuvant to Reduce Postoperative Pain and Opioid Prescribing for the Abdominal Surgical Patient: A Quality Improvement Project

A DNP Project 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

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Abstract

Background: Abdominal surgery is considered to be major surgery, as it potentiates a great deal of pain and initiates a systemic inflammatory response. Substandard pain protocols before, during, and after surgery can prevent patients from returning to baseline function and may predispose them to the need for rescue analgesia or opioids. A balanced anesthetic targets pain receptors before painful surgical stimuli occurs, and regional anesthesia has been recognized as a promising technique to accompany general anesthesia for abdominal procedures. TAP blocks can be administered preoperatively and intraoperatively to reduce postoperative pain yet are time-sensitive without the inclusion of adjuvants. Dexmedetomidine and its limited side effect profile has proved to be a beneficial medication when used as a TAP Block adjuvant to extend the quality and life of this block and reduce the amount of opioid consumption in post anesthesia units.
Objectives: The purpose of this quality improvement project was to enhance anesthesia provider knowledge on the benefits of selecting Dexmedetomidine as a TAP adjuvant to reduce postoperative pain and opioid consumption for abdominal surgical patients.
Methods: The primary methodology for this quality improvement project was to administer an educational module to anesthesia providers, providing knowledge and research on the prescribing of Dexmedetomidine as a TAP block adjuvant to aid in abdominal surgical patients' postoperative pain. A pre- and post- assessment survey was utilized to measure the value of this educational intervention. This project was developed in a level 1 trauma center and distributed online to anonymous participants in survey format.
Results: Dexmedetomidine was found to be an effective selection for adjuvant use in TAP blocks by reducing the need for postoperative opioid prescribing. Dexmedetomidine's subtle side effect profile proves it is a frontrunner for inclusion with local anesthetics to enhance TAP blocks.
Conclusion: This quality improvement project enhanced anesthesia providers' knowledge and perspective on the inclusion of regional anesthesia when caring for abdominal surgical patients. The module also prompted a discussion on how to enhance regional blocks.

Keywords: Anesthesia, abdominal surgery, regional, regional anesthesia, TAP block, opioid, pain, resection, abdomen procedure, anesthesia implications

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Introduction

The purpose of this quality improvement project was to offer alternate and additional anesthetic pain relief modalities for the abdominal surgical patient. These measures provide comfort, quality care, and ensure patients return to baseline level of function after surgery. This project also provided research and education on the benefits of reducing opioid prescribing in the postoperative period.

Purpose and PICO Question

The following PICO (Population, Intervention, Comparison, and Outcome) question was postulated according to Dang and Dearholt elements with the intent to appraise this topic:

Population (P): Patients receiving regional anesthesia undergoing abdominal procedures

Intervention (I): The use of Dexmedetomidine as a local anesthetic adjuvant in transversus abdominis plane (TAP) blocks

Comparison (C): Alternative adjuvants such as Decadron and Epinephrine

Outcome (O): Reduce opioid prescribing in the post anesthesia unit while prolonging the analgesic effects of surgical anesthetics

The target population was patients undergoing abdominal surgical procedures. The intervention noted was using Dexmedetomidine as an adjuvant to local anesthetic in TAP blocks. To compare, research was conducted on alternate adjuvants such as Decadron. The outcome of such adjuvant mixtures allowed for a reduction in opioid prescribing and a faster return to baseline post-abdominal surgery.

Problem Statement

Problem Identification

Abdominal surgical procedures, both open and laparoscopic, can potentiate pain at all ends of the perioperative spectrum. A systemic inflammatory response occurs due to surgery, deemed the cause and effect of tissue damage.[1] Anesthesia, inept pain receptor saturation, and untreated pain can compound the issues of delayed healing and prolonged patient discomfort.[1] Regional anesthesia using a localized approach is a favorable addition to the anesthetic plan to achieve multi-modal abdominal pain relief and help reduce the need for prescribed postoperative opioids. There are a multitude of adjuvants that have been studied and used; however, this project focused on the incorporation of Dexmedetomidine (DEX) as a favorable adjuvant.

A substandard pain protocol can prevent patients from performing daily activities and returning to baseline function.[2] A primary focus for postoperative abdominal surgical patients is early ambulation. The refusal to ambulate leads to a cascade of complications to include lung infection, bloating, and nausea and vomiting.[2] An enhanced recovery and controlled pain profile will set patients up for optimal healing postoperatively.

Background

Single injection nerve blocks are time-sensitive without the inclusion of adjuvants.[3] Adjuvants can prolong the effects of local anesthetics and reduce the total amount of local anesthetic used to eliminate potential adverse effects.[3] Examples of adjuvants that have been studied include alpha-2 agonists such as DEX and clonidine, dexamethasone, midazolam, and non-steroidal anti-inflammatory drugs (NSAIDs).[3] Each adjuvant carries a different safety and efficacy profile when used in conjunction with local anesthetics.[1,3] This PICO question and research project provided background knowledge on the use of DEX as an adjuvant to gauge

whether it is a favorable complement to regional anesthesia using TAP Blocks.

Current literature proposes that the concomitant use of regional anesthesia with other anesthesia modalities has an opioid-sparing effect for patients in the perioperative setting.[1-4] The administration of specific adjuvants eliminates the potential for cardiovascular and central nervous system toxicities that would otherwise occur with increased local anesthetic dosing.[4] The drug-specific side effect profile often determines adjuvant selection.[4] Research shows that adjuvant drugs used in TAP blocks are promising in postoperative pain reduction, block prolongation, and a bridge to chronic pain treatment.[4]

Scope of the Problem

Abdominal surgery, whether open or laparoscopic, carries a fair share of postoperative pain. A balanced anesthetic targets pain receptors before painful surgical stimuli occur. Regional anesthesia is a promising approach to laparoscopy by utilizing TAP blocks preoperatively for pain management. Adjuvants should be carefully considered to extend the duration of nerve blocks. Epinephrine, which has been long used as an adjuvant, may also pose toxicity risks, decrease peak plasma concentrations of local anesthetic, and have little effect on sedation and postoperative nausea and vomiting (PONV).[5] DEX is a highly selective alpha-2 adrenergic agonist often used as an adjuvant to local anesthetics and reduces anesthetic and opioid requirements during and after procedures.[6] Decadron, which has anti-inflammatory and antagonistic nociceptor C fiber properties, is also used as adjuvant therapy in TAP blocks. Combining the latter 2 adjuvants hits more receptors than Epinephrine alone. This solution indicates a smoother transition from the immediately post-surgical environment to the postoperative days ahead.

Consequences of the Problem

Pain is a subjective experience that, when untreated or inadequately managed, can trigger a cascade of undesirable problems for the patient. Pain, distress, nausea, vomiting, and delayed recovery are experienced by the post-surgical patient relative to how well we deliver our anesthetics. Opioids have long been the treatment for postoperative pain management until the opioid epidemic shed light on their negative side effects to such prescriptive use.[7] These include addiction, respiratory depression, impaired cognition, reduced gastric motility, and nausea and vomiting, which are all byproducts of continued opioid use.

The unfortunate occurrence of uncontrolled pos-toperative pain can also pose detrimental patient complications in a cause and effect fashion. Hospital resources are subject to this causation as patients with increased postoperative pain may have delayed recovery and longer hospital admissions.[2] When viewed from a more global perspective, this can tie up hospital beds and resources and accrue more preventable expenses to the patient and medical facility.[2]
A wide spectrum of variables also contribute to a patient's recovery profile. These include age, co-morbidities, social support, cognitive function, type of surgery, surgical approach, and duration of surgery.[2] By considering all of these factors when developing an anesthetic plan, providers can address potential complications before they arise and allow for optimal pain relief throughout the intraoperative experience.[2]

Knowledge Gaps

Facilities have adopted different enhanced recovery after surgery (ERAS) protocols since its conceptual introduction in 2001.[8] The concept was developed to combat the surgical insult that occurs to the human body and to improve the value of recovery.[8] The incorporation of regional anesthesia into these protocols has since followed suit.[8] TAP blocks can be easily

performed, are cost-effective to both patient and facility, and have opioid-sparing properties in conglomeration with reduced patient morbidity.[8] Gaps in current literature relate to different techniques used for TAP blocks. Also, the timing of TAP blocks is crucial for data collection whether they are performed pre-operatively, post-induction, or even post-procedure.

A limitation of TAP blocks is their short duration of action, usually providing 4-12 hours of post-surgical pain relief.[9] Postoperative pain is said to last well beyond the effects of a nerve block.[9] This research problem addresses the need for prolongation of block with additional beneficial drug pharmacodynamics during abdominal surgery. DEX and Decadron, when used as adjuvants, have different mechanisms of action that allow for a prolonged neural blockade and reduction in pain signaling.[9]

Proposed Solution

A balanced anesthetic targets pain receptors before painful surgical stimuli occur. Regional anesthesia is a promising technique to accompany general anesthesia for abdominal procedures. A TAP block can be performed preoperatively for pain management and even after induction to target pain receptors before surgical stimulation. Adjuvants should be carefully considered to extend the duration of nerve blocks as they may pose toxic risks, decrease peak plasma concentrations of local anesthetic, and have little effect on sedation and postoperative nausea and vomiting (PONV).[10] DEX is a highly selective alpha-2 adrenergic agonist often used as an adjuvant to local anesthetics and reduces anesthetic and opioid requirements during and after procedures.[7] Decadron has anti-inflammatory and antagonistic nociceptor C fiber properties and is also used as adjuvant therapy in regional anesthesia.[7] Both drugs, when appropriately executed, provide a positive effect. The goal is a smooth transition from the immediate post-

surgical environment to the postoperative days ahead. This PICO will delve into these 2 medication profiles while examining the pros and cons of each to decipher which is the more advantageous adjuvant.

Objective

This literature review summarizes and appraises relevant research that uses regional anesthesia in the form of TAP blocks as a part of multimodal anesthetic pain plan for patients undergoing abdominal procedures. This review provides current evidence on the use of such techniques and serves to educate all anesthesia providers on the risk versus benefit of incorporating TAP blocks with considerate adjuvant selection into their current practice for favorable patient outcomes.

Literature Review

Methodology

The author deemed that post-abdominal surgical pain holds merit when developing a focused research effort. There are benefits to both patient and provider when efforts are made to emphasize post-surgical comfort and consequently prescribe fewer opiates. The opioid epidemic gave rise to this thought process, and since then, healthcare teams have developed strategies and care plans that hope to stray from routine opioid prescribing. The PICO question was framed as such to guide research efforts and determine if any gaps existed in the current literature. The surveyed literature focuses on all abdominal surgical procedures and the incorporation of regional anesthesia as part of the anesthetic management of the patient. A more balanced anesthetic will facilitate patient recovery profiles and safeguard positive outcomes by decreasing opioid consumption.

Numerous literature searches were conducted between 2018 and 2023 via online

resources Cumulative Index to Nursing and Allied Health Literature (CINAHL), Embase, MEDLINE, and PubMed. These databases were selected due to their medical and health-related wealth of articles. The key terms used consisted of "anesthesia," "abdominal surgery," "regional," "regional anesthesia," "TAP block," "opioid," "pain," "resection," "abdomen procedure," "anesthe," "systematic review," OR "randomized control trial." All literature met a level 1 or level 2 evidence requirement by selecting presets on 2 search databases that included this type of evidence. At a level 1 and 2 evidence, the information is filtered to include critically valued studies. All articles included in this appraisal are referenced in the Appendix.

Eligibility Criteria

The inclusion criteria for this research search strategy formulation were first and foremost related to relevance, both by title and date. The procedure and patient population underwent some form of abdominal surgery and received regional anesthesia in conjunction with their general anesthetic. Adult patients over the age of 18 were preferred for this study population.

Articles at level 1 or 2 evidence were given preferential attention to warrant a high-level literature review. Other inclusion criteria included peer-reviewed articles, articles with measurable outcomes, and full-text articles.

Exclusion criteria for this search strategy encompassed the itemized selections based on the Polit-Beck evidence hierarchy pyramid. Participants younger than age 18, elderly patients unable to verbalize therapeutic relief from interventions, patients unable to consent, non-peer-reviewed literature, and studies unavailable in the English language were also part of the exclusion criteria. Articles were further excluded if outcomes were unable to be measured, and the incapability to view articles in full text was later added to exclusions due to the restricted access to some online journal databases.

Literature Appraisal and Literature Matrix

Current literature on the use of DEX in TAP blocks was appraised and extrapolated into table format to include features such as design and method, sample setting, variables, measurement and analysis, results, strengths and weaknesses, and finally, level of evidence. To include high-quality studies and aim for excellence in terms of best practices, the author selected Level 1 articles for appraisal.

This methodology models Dearholt and Dang's recommendation in seeking the highest evidence available for this researcher's topic.[11] This mirrors the John Hopkins Evidence-Based Practice rating system for appraisal purposes, allowing for high-quality and highly reliable sources.[12] It also guarantees that study participants were randomly allocated into groups and that a control group was utilized to conduct the study.[11]

Characteristics of the Included Studies

TAP Block with DEX Abdominal Aortic Surgery

The purpose of this first study was to assess the impact of adding DEX to levobupivacaine during TAP block in patients undergoing abdominal aortic operations.[12] Sample size consisted of 114 patients between the ages of 20 and 50 years, scheduled for abdominal aortic surgery under general anesthesia.[12] Patients were classified as Class I or II according to the American Society of Anesthesiologists (ASA) classification.[12] Patients were randomized into 2 intervention groups; the L group received levobupivacaine only, and the LD group received levobupivacaine plus Dexmedetomidine.[13] Results were favorable for the LD group in the following areas: time to sensory block was significantly earlier in Group LD (8.95 min. vs. 11.05 min in Group L – $p = 0.003$), the initial 4-hour pain scores following surgery did not show significant differences between the 2 groups, and DEX was associated with better pain scores for

the subsequent 12 hours when compared to the L group ($p < 0.05$).[12] Time until the first analgesic request showed a significant escalation in the LD group (13.3 hours vs. 11.09 hours in the L group – $p = 0.005$).[12] This also translated to a decrease in opioid consumption after surgery (48.95 μg in the LD group vs. 72.63 μg in the L group – $p < 0.001$).[12]

The adjuvant DEX showed a substantial benefit to postoperative pain relief profiles, as it enhanced the analgesic action of TAP blocks.[12] This intervention leads to less pain, less opioid consumption, and fewer resulting side effects.[12] Its use as an adjuvant to peripheral and neuraxial nerve blocks should be recommended in conjunction with existing enhanced recovery protocols.[12] A weakness noted was the relatively small sample size, which was collected and studied from a single healthcare facility.[12] A strength was the high level of evidence in support of existing literature.

TAP Block with DEX Cesarean Delivery

The purpose of the second study was to assess the effect of TAP block with levobupivacaine both with or without DEX and compared to the control group for postoperative analgesia following cesarean delivery.[13] Sample size consisted of 90 patients, both double-blinded and randomized to include routine, uncomplicated pregnancies (ASA 2).[13] Patient ages ranged from 21 to 40 years with a body mass index (BMI) of no more than 35 kg/m2.[13] Patients taking pain medications for chronic illness, taking alpha agonists/antagonists, or with a history of tolerance to opiates were excluded from the study.[13] Patients were randomly allocated into 3 intervention groups: the C group did not receive TAP block (control group), the L group received levobupivacaine only, and the LD group received levobupivacaine with DEX in TAP block.[13]

Results were favorable for the LD group regarding the time to the first analgesia request.[13] This was significantly longer in Group LD compared to Group L, and the control

group, Group C, had the shortest window to analgesia request.[13] The difference between Groups L and LD was significant ($p < 0.05$) at 12 hours.[13] The visual analog scale (VAS) rating on postoperative analgesia satisfaction score by patients in the first 24 hours was also evaluated, with Group C scoring 6.06 ± 1.79 (mean ± SD), Group L scoring 7.76 ± 1.27, and Group LD scoring 8.83 ± 0.69.[13]

To conclude, TAP block with levobupivacaine provides good immediate postoperative analgesia, and the addition of DEX to levobupivacaine prolongs the duration of analgesia even further, which subsequently improves the quality of care with better overall post-surgical patient satisfaction.[13] A limitation was stated as not utilizing patient-controlled analgesia, and therefore, unable to comment on the amount of analgesics used by patients from different groups.[13] Again, the high level of evidence used allowed for a high-quality appraisal of existing literature.

TAP Block with DEX Gynecological Laparoscopy

The third study aimed to investigate the recovery and analgesic effects of DEX combined with TAP block for gynecological laparoscopy and to provide guidance for its use in clinical practice.[14] Ninety patients were included in this sample, and the sample size was compiled between April and July 2014 in the First Affiliated Hospital of Wannan Medical College (Wuhu, China).[14] Patients aged 20 to 50 years with an ASA less than II scheduled for laparoscopic ovarian cyst resection under general anesthesia were considered and registered.[14] The sample were all randomly allocated into 3 intervention groups: Group I, received postoperative intravenous analgesia only after general anesthesia (control group), Group II received a TAP block with 20 ml 0.375% ropivacaine, and Group III received a TAP block with 20 ml of 0.375 ropivacaine and 1 μg/kg DEX after induction of general anesthesia.[14] Compared with those in Group 1, the dose of Propofol, time of wake-up, spontaneous breathing, and extubation were

significantly decreased in Group III ($p < 0.01$ and $p < 0.05$).[14] The occurrence of postoperative nausea and vomiting (PONV) in Groups II and III was significantly less when compared to Group I ($p < 0.05$).10 VAS scores were also assessed.[14] At 2 and 4 hours in Group II (both $p < 0.05$) and 2, 4 ($p < 0.01$), and 8 h ($p < 0.05$) in Group III after surgery were meaningfully lower compared to those of Group I.[14]

This study demonstrated that using DEX as an adjuvant to TAP block using ropivacaine significantly reduces the Propofol dosage.[14] The experimental dose studied was 1 µg/kg dexmedetomidine.[14] This combination also reduces the amount of anesthetic required.[14] Additional advantages include postoperative analgesia and a reduction of PONV occurrence.[14] A level I evidence again gives this study a high-quality rating to be included in this literature search.

TAP Block with DEX Gynecological Surgery

The fourth study included in this research effort compared the analgesic efficacy and recovery value after gynecological surgery by adding DEX or fentanyl as adjuvants to an ultrasound-guided TAP block.[15] The sample enrolled in this study included 100 patients between 18 and 60 years of age with an ASA less than II status and BMI less than 24 scheduled for open gynecological surgeries.[15] Patients with a bleeding diathesis, alcohol or drug abuse, opioid dependence, chronic pain, active infection, history of abdominal surgery or trauma, respiratory tract infection within 2 weeks, New York Heart Association class >II, and psychiatric illnesses that would interfere with perception of pain and assessment were all excluded from study enrollment.[15] Enrolled study applicants were randomly allocated into 4 groups: Group TAP (n = 25) received TAP blocks with 0.375% ropivacaine, Group TAP-DEX (n = 25) received 0.375% ropivacaine with DEX 1 µg/kg, Group TAP-FEN (n = 25) received 0.375% ropivacaine with

fentanyl 1 μg/kg, and Group C (control group, $n = 25$) received patient-controlled intravenous analgesia (PCIA).[15] Patients in the TAP-DEX group had the most effective analgesic response among the 3 TAP groups (9.86 hours in the TAP-DEX group, 8.79 hours in the TAP-FEN group, and 7.86 hours in the TAP group).[15] The TAP-DEX group were noted to have an additional 64 minutes (11.9%) of pain relief when compared to the TAP- FEN group ($p < 0.001$).[15] The control group requested corrective analgesia 6 hours earlier than the TAP groups ($p < 0.01$).[15] VAS scores were meaningfully lower in all TAP groups than in the control group at 1, 2, 4, and 8 hours postoperatively ($p < 0.05$), and there was a significant statistical difference between TAP-DEX and TAP-FEN groups only at 6 hours ($p < 0.01$).[15] The total number of PCIA boluses was significantly lower in the TAP-DEX group compared with the TAP-FEN and TAP groups at 24 and 48 hours ($p < 0.05$).[15]

This study showed the potential benefits of adding DEX to ropivacaine in TAP block with quality improvements to patient recovery, superior pain relief, and lower opioid requirements and consumption.[15] Limitations were recorded and stated that TAP block onset time was difficult to pinpoint due to the effects of general anesthesia.[15] A second limitation was that this study did not evaluate plasma concentrations of ropivacaine affected by DEX or fentanyl, which was stated as having an impact on this study's results.[15] The last limitation and area for improvement was described as not having an optimal dose for a result analysis.[15] This study did, however, provide high-quality data being a level I evidence.

TAP Block with DEX Hepatectomy

The purpose of the fifth study was to investigate the recovery and analgesic effects of DEX combined with TAP block for hepatectomy and to provide guidance for its use in clinical practice.[16] Study participants for inclusion were adults undergoing right donor hepatectomy for

liver transplantation in a gastroenterology surgical center in Egypt from March 2016 to December 2016.[16] Patients that were excluded had a known allergy to any of the study drugs and refused to participate.[16] Fifty patients were randomly allocated into 2 intervention groups: Group B received 20 ml of bupivacaine hydrochloride 0.25%, and Group BD received 20 ml of bupivacaine hydrochloride 0.25% with 0.3 μg/kg DEX.[16] Both groups had TAP blocks performed on bilateral sides of the abdomen after surgery and every 8 hours post-surgically for a total of 48 hours on the right side only through an inserted catheter.[16] Rescue morphine was significantly lower in the BD group when compared to the B group.[16] The total morphine consumption (B 4 ± 1.9, BD 1.5 ± 0.5, $p = 0.03$), numbers of morphine intake ($p = 0.04$), morphine requirement ($p = 0.03$), and first time of analgesia intake ($p = 0.04$) were all considred.[16]

This study concluded that adding DEX to bupivacaine in a surgically inserted catheter for TAP block in donor hepatectomy reduced morphine consumption.[16] It also improved gut motility and first oral intake without detectable anti-inflammatory effects.[16] A limitation in this study was noted in detecting serum levels of DEX, as this could be related to systemic absorption rather than local action.[16] Secondary outcomes were also not recorded, which could have added more value to this study.[16] This study did provide a high quality of evidence for best practices being a level I evidence, yet with more participants and larger sample size, results could be interpreted as more conclusive.

TAP Block with DEX Infraumbilical Surgery

The purpose of the sixth study was to evaluate the analgesic efficacy of DEX as an adjuvant to ropivacaine in TAP block for unilateral infra-umbilical surgeries in terms of duration and quality of analgesia, along with total analgesic consumption during a 24-hour period.[17] The

study sample included 60 adult patients between the ages of 18 and 65 years and scheduled for unilateral infra-umbilical surgeries under spinal anesthesia.[17] Patients were excluded for refusal, contraindications to regional block, allergies to studied drugs, psychiatric disorders, chronic opioid use, infection at block site, body mass index (BMI) > 30 kg/m2, and diabetes mellitus.[17] All 60 patients were randomly allocated into 2 intervention groups: Group A received 20 mL of 0.25% ropivacaine with 1 mL of normal saline, and Group B received 20 mL of 0.25% ropivacaine with 0.5 μg/kg (1 mL) DEX both delivered via ultrasound-guided TAP block.[17] The mean duration of analgesia was considerably longer in group B than in group A (842.50 ± 38.74 min and 435.17 ± 25.75min).[17] The total analgesic requirements and number of analgesics doses 24 hours post-surgery were also lower in group B.[17]

This study concluded that adding DEX as an adjuvant to 0.25% ropivacaine for TAP block significantly increases the duration and quality of analgesia without any significant adverse effects.[17] This study was limited in sample size and similar to other studies specifically mentioned not knowing whether the action of DEX was related to systemic absorption or purely a result of the local action.[17] This study recommended researching plasma levels.[17] This study was also a level I evidence, providing high-quality data.

TAP Block with DEX Laparoscopic Cholecystectomy

The purpose of this study was to evaluate whether the addition of DEX to ropivacaine in subcostal TAP block potentiates postoperative analgesia among laparoscopic cholecystectomy patients.[18] The participants for this study consisted of 60 patients with an ASA II or less, either sex, aged 18 to 65 years, and scheduled to undergo 4-port laparoscopic cholecystectomy.[18] Patients with a history of allergies to local anesthetics, psychiatric illness, substance abuse, opioid tolerance, any uncompensated systemic illness (cardiovascular, respiratory, metabolic,

neurologic, and endocrine), and pregnant women were all excluded from the study.[18] All patients were randomly allocated into 2 groups: Group R received 18 mL 0.375% ropivacaine and 2 ml of normal saline (n = 30), and Group RD received 18 ml. 375% ropivacaine with 0.5 μg/kg DEX 2 mL (n = 30).[14] The RD group had significantly lengthier postoperative analgesia (485.6 min) as compared to Group R (289.83 min).[18] The consumption of morphine over a 24-hour period was also significantly less in Group RD (14.5 mg) as compared to Group R (28.5 mg).[18]

This study concluded that the addition of DEX to ropivacaine in TAP block prolongs postoperative analgesia and reduces opioid consumption without any detrimental side effects.[18] This study could have benefited from a larger sample size. A limitation and ongoing theme is the lack of ability to assess a good block, as they are performed after induction of general anesthesia, and the patient is unable to verbalize its effect.[18] The level of evidence is again a factor when evaluating this data for quality and evidence-based practice change.

TAP Block with DEX Laparoscopic Surgery

The purpose of the eighth study included in this research effort was to see whether the addition of DEX into ropivacaine for ultrasound-guided TAP block could impede a stress response during laparoscopic surgery and to determine the optimal dose of DEX for use during block.[19] The sample for this study included 125 patients undergoing laparoscopic gynecological surgery and consisted of all women, ranging from 18 to 60 years, ASA II or less, and less than 3 hours for total procedure time.[19] Excluded patients were those with hypertension, heart disease, and diabetes.[19] Patients were also excluded for malignant tumors, adrenal gland disease, severe renal or hepatic disease, chronic pain, bradycardia, positive Hcg serum, chronic corticosteroid use, analgesic and adrenergic receptor agonist and antagonist, or if they were dependent on alcohol, nicotine or opioids.[19] Participants were randomly allocated into 3 intervention groups:

the Control group (without TAP block), Ropivacaine group (only receiving 0.2% ropivacaine), and Low, Medium, High DEX + ropivacaine groups (receiving 0.2% ropivacaine combined with 0.25 μg/kg, 0.5 μg/kg, 1.0 μg/kg DEX with total volume of 60 ml perineurally for TAP block).[19] All 125 patients completed the study and provided the following results: DEX added to ropivacaine for TAP block significantly reduced serum levels of cortisol, norepinephrine, epinephrine, interleukin-6, blood glucose, mean arterial pressure, and heart rate in a dose-dependent manner ($p < 0.05$), and there was a decreased anesthetic and opioid consumption during the operation ($p < 0.05$).[19] The high dose of DEX was noted to prompt higher incidences of bradycardia than the low or medium dose of DEX ($p < 0.05$).[19]

This study concluded that the addition of DEX at the dose of 0.5 μg/kg into ropivacaine for TAP block is the optimal dose to inhibit stress response and has a minimal effect on blood pressure and heart rate in patients undergoing laparoscopy gynecological surgery.[19] This study was limited with respect to demographics, as it only studied female patients.[19] A level I evidence demonstrates the high quality of data supplied in this study.

TAP Block with DEX Laparoscopic Colectomy

The purpose of the ninth study was designed to appraise whether DEX combined with ropivacaine for TAP block could improve analgesic quality and duration and promote recovery following laparoscopic colectomy.[20] The study sample included a total of 60 patients between the ages of 38 to 72, ASA II-III and scheduled for elective laparoscopic colectomy under general anesthesia between February 2017 and March 2018.[20] All 60 patients were randomly allocated into 2 intervention groups: Group R received 20 ml of 0.375% ropivacaine plus 2mL normal saline 0.9%, and Group RD received 20 ml of 0.375% ropivacaine plus 2mL DEX (0.5 μg/kg).[20] The hemodynamic statistics were not significantly different between the 2 groups during the

surgery.[20] The duration of analgesia was significantly longer in the RD group compared with the R group ($p < 0.05$).[20] VAS scores at 1, 2, 6, and 12 hours following surgery were significantly decreased in the RD group compared to the R group ($p < 0.05$).[20] PONV incidences in the RD group were significantly lower than in the R group in the first 24 hours postoperatively ($p < 0.05$).[20] There were no serious adverse events in either group.[20]

This study demonstrated that adding DEX to ropivacaine could significantly improve the analgesic quality and duration of TAP blocks, which in turn promotes recovery following laparoscopic colectomy.[20] A limitation noted by the study was that visceral and somatic pain components could not be separately assessed.[20] Also, the subjectivity of data collected came into question as a limitation, yet how a blinded investigator collected it allowed for quality results.[20] This study was also a level I evidence and yielded high-quality data for evidence-based practice.

TAP Block with DEX Open Inguinal Hernia Repair

The purpose of this final study was to evaluate the effects of adding DEX to ropivacaine on pain relief and quality of recovery in older patients for open inguinal hernia surgeries.[21] The sample consisted of 102 potential patients over 65 years who were scheduled to undergo unilateral hernia repairs at the Nanjing Drum Tower Hospital from January 2020 to December 2020.[21] After exclusions and withdrawals, 92 patients participated in the study and were divided into 2 intervention groups: Group R, $n = 47$, received 0.375% ropivacaine 20 ml, and Group RD, $n = 45$, received 0.375% ropivacaine with 1 μg/kg DEX in 20 ml.[21] Group RD had lower VAS scores at rest and on movement at the 8- and 12-hour marks during the postoperative period and a lower incidence of postoperative delirium on day one after surgery than Group R in both categories.[21] Episodes of momentary bradycardia were recorded more in Group RD than in Group R.[21]

This study concluded that adding DEX to ropivacaine in a TAP block for hernia repair both improved postoperative analgesia and quality of recovery without affecting chronic pain in older patients scheduled for open inguinal hernia repair.[21] A limitation of this study was the demographic category in which most participants fell, and that was male.[21] Due to the varying sensitivities to pain and postoperative PONV between men and women, these results could be slightly skewed.[21] A more diverse study population could have been beneficial. Also, increasing the postoperative timeline in which data was collected to 5 days could have yielded more well-rounded results. Also, studying whether or not patients had residual sedative effects from the DEX could be beneficial in explaining pain relief.[21] This study was a level I evidence and produced high-quality data for current research on the subject.

Synthesis of the Literature

Pain Relief in the Postoperative Period

According to the studies in this literature review, the addition of DEX used in regional anesthesia for TAP blocks produced an overwhelming positive result to postoperative analgesia in the setting of abdominal surgery.[12-21] In conjunction with the local anesthetic, this adjuvant prolonged the response time for the first opioid request to manage pain postoperatively.[12-21] Assessments were performed in the recovery units, with patients providing feedback on the quality of their pain relief. These studies consistently used the VAS scores as determinants for study results.[12-21] DEX allows for an extension of the TAP block effect, which in turn brings more pain relief to abdominal surgical patients.[12-21]

Different local anesthetics, including Levobupivacaine, Ropivacaine, and Bupivacaine, were all used as primary medications for post-induction TAP blocks.[12-21] Each study used varying doses of DEX as an adjuvant to study the quality and duration of TAP blocks. According

to Abdallah and Abdallah and similar studies, pain control in the immediate postoperative period (within 4 hours) is identical with and without DEX as an adjuvant.[12] DEX starts to show promising results is in the subsequent period around the 8- to 12-hour mark, when patients state their pain is still controlled.[12] This recurring theme of better pain management reduces the number of opioids being prescribed all while eradicating opioid-related side effects that are often seen in the postoperative patient.[12] These side effects include more extended hospital stays, delirium from opioid prescribing, constipation, delayed ambulation, and prolonged bedrest. These studies all showed similar recovery profiles where pain relief was notable during the 8- to 24-hour mark.[12-21] This is important since postoperative pain is usually most significant during the first 24 hours following a surgical procedure.[14] Given these statistics and being such a crucial timeframe for recovery and return to baseline function, DEX as an adjuvant has proved safe and beneficial to patients for enhanced recovery. Another noteworthy occurrence is that DEX can reduce the amount of anesthetics required for surgery, such as Propofol, and even lower the incidence of PONV.[14]

Rescue analgesia, or opioid use, was significantly higher in the control groups of all included studies that delivered a sole local anesthetic without the inclusion of any adjuvant.[12-21] VAS scores being higher in the control groups was a clear indication that the length of blocks was notably less in these same control groups.[12-21]

The Limited Side Effect Profile of DEX

DEX is a highly selective α2 agonist with minimal effect on vasoconstriction when delivered at low concentrations.[15] The most prominent adverse effects seen with this medication would be hypotension, bradycardia, and sedation.[17] Each study prefaces these potential side effects if systemically absorbed, yet when reviewing results, hemodynamics were maintained for

the study populations in each trial.[12-21] Excessive sedation postoperatively is also a concern expressed by researchers, yet when reviewing results for multiple studies, this was not indicated as being problematic in the recovery areas.[12-21]

Doses were studied in 1 particular trial that allowed for margins to be evaluated in terms of side effect profile. This study determined that 1 μg/kg DEX in combination with 0.2% ropivacaine was too high and produced a prolific inhibition of the stress response and more instances of low heart rate.[19] This study concluded that the addition of 0.5 μg/kg DEX was the ideal dose to regulate surgical stress and minimize hemodynamic swings.[19]

One study explained that the analgesic effect could be a result of local vasoconstrictor action and, in turn, lead to less systemic absorption.[12] The analgesic profile of DEX is facilitated through hyperpolarization of interneurons and inhibition of nociceptive neurotransmitter release.[12] Also, DEX carries antiemetic properties as it controls pain, which can be a significant risk factor for PONV.[20] The favorable and minimal side effect profile of DEX in small doses makes it an ideal choice for adjuvant selection.

Definition of Terms

- Regional anesthesia: afferent nerve blockade and as such modulates surgical stress response[1]
- Transversus abdominis plane block (TAP): provides analgesia of the anterolateral abdominal wall by blocking the intercostal nerves (T7–T11), the subcostal nerve (T12), the ilioinguinal and iliohypogastric nerve (L1–L2)[1]
- Sociodemographic information: information on gender, age, nationality, religion, education level, career, status and lifestyle.[2]

- Multimodal analgesia: pain management approaches involving pharmacological and non-pharmacological techniques to provide pain relief[1-3]
- Adjuvant: an ingredient in a medicine that increases or modifies the activity of the other ingredients.[3] Adjuvant drugs for nerve blocks are a promising solution to acute postoperative pain and the transition to chronic pain treatment.[3] They can extend the duration of local anesthetics and reduce the dose-dependent adverse effects of local anesthetics.[3]

Conclusion

A balanced anesthetic targets pain receptors before painful surgical stimuli occur.

Regional anesthesia, specifically TAP blocks, is a promising technique to accompany general anesthesia for abdominal procedures. A TAP block can be performed preoperatively for pain management and even after induction to target pain receptors before surgical stimulation, which can then provide relief well into the postoperative period for patients. Adjuvants should be carefully considered to extend the duration of nerve blocks as they may pose toxic risks, decrease peak plasma concentrations of local anesthetic, and have little effect on sedation and PONV.[5] DEX is a highly selective alpha-2 adrenergic agonist often used as an adjuvant to local anesthetics and reduces anesthetic and opioid requirements during and after procedures.[6] Decadron has anti-inflammatory and antagonistic nociceptor C fiber properties and is also used as adjuvant therapy in regional anesthesia.[3,9] Both drugs, when appropriately executed, provide a positive effect. The goal is a smooth transition from the immediate post-surgical environment to the postoperative days ahead. DEX holds significance in the intraoperative experience as it poses beneficial results to extended block time and patient relief. The safety profile for DEX as an adjuvant allows for incorporating into best practices for enhanced recovery after surgery

protocols. Its use can facilitate healing and reduce patient complications after abdominal surgical procedures.

Organizational Assessment

The author's practice site, a local Level I Trauma Center in Broward County, consists of multiple facilities that all have variations in the way in which they deliver their ERAS protocols and anesthetics. Some institutions perform a great deal of abdominal cases, both open and laparoscopic, and currently utilize TAP blocks for their patient population. The attending anesthesiologists perform these TAP blocks after induction. This hospital system has a complex and acutely ill patient population with a Level 1 Trauma Center. The rapid nature of cases and quick turnover in this 20-bed operating room perhaps does not allow for TAP blocks to be utilized as often. There are a large number of nurse anesthetists at each facility, yet the anesthesiologists are the ones to perform all regional anesthesia. Nurse anesthetists are perfectly capable of performing TAP blocks, but the culture would have to change. More time is needed on the induction side of the surgery to provide better results in the postoperative setting.

Primary DNP Project Goal

Pain management in the intraoperative setting not only plays an important role in patient satisfaction; it also swings the pendulum in terms of how nurse anesthetists deliver their anesthetics.[22] ERAS protocols have become standard in the clinical setting, and regional anesthesia has shown positive results playing a pivotal role in multi-modal pain management.[22] The sequelae that can follow for untreated postoperative pain can pose challenges for patients in the recovery setting. Untreated pain can predispose patients to pulmonary and cardiac impediments, delayed healing, and longer hospital stays.[22] Additionally, the associated anxiety and worry exists and carries over into the next surgical experience the patient has.

The primary goal of this quality improvement (QI) project was to focus on pain related to both laparoscopy or laparotomy procedures.[23] It utilized regional anesthesia and addressed pain in this anatomical area by preemptively treating with Dexmedetomidine (DEX) as an adjuvant to local anesthetics in the Tranversus Abdominis Plane (TAP) block. This is a nerve block that is performed after induction to deliver an analgesic effect well into the postoperative period to the anterolateral wall of the abdomen.[23] The use of DEX enhances this modality of regional anesthesia by extending the quality of the blockade and lengthening the pain-free period. Practitioners are, therefore, able to prescribe and deliver less narcotics to their patients throughout the perioperative experience and facilitate a quicker return to baseline function.

The author proposed to utilize TAP blocks more frequently in the perioperative setting at their clinical site to combat the issue of postoperative pain. The author also proposed to administer DEX as an adjuvant to the existing local anesthetics that have been used and studied as this mixture delivers a more quality analgesic effect. It was suggested that TAP blocks and regional anesthesia are under-utilized at the author's clinical site due to time restraints, urgency, and surgical time restrictions.

The current literature showed that TAP blocks are favorable in the pre-treatment of intra- and postoperative pain, and additional measures can prolong these effects even further. TAP blocks can be time sensitive, and with the omission of adjuvants, are the benefits then overshadowed by their time restraints?[3] DEX is a highly selective alpha-2 adrenergic agonist that can be used as an adjuvant to local anesthetics.[6] This drug profile allows for a reduction in anesthetic and opioid requirements during and after surgical procedures with minimal side effects.[6]

The project sponsor served as a resource for the author and was able to give valuable

feedback as it related to the project's trajectory and see it through until its completion. Key stakeholders were the anesthesia providers at the target clinical site as the project introduced best practice ideals to enhance their anesthetic delivery.

The project sought to reach a total of 10 anesthesia providers for its total sample size. The demographic consisted of both male and female in equal equivalents to dismiss any bias, and included any and all adult-aged anesthesia providers able to consent and commit to the project requirements. Participants first received a pre-educational questionnaire to assess their knowledge of TAP blocks, the use of adjuvants such as Dexmedetomidine, and the basic pathophysiology on treating pain for the abdominal surgical patient. Participants then were provided with an educational video and PowerPoint presentation via email on the aforementioned information. Once the educational module is completed, participants completed a post-test questionnaire on the provided presentation to assess knowledge retention.

SMART Objectives

The SMART acronym will be used to direct the course of action for this project and guide the researcher's efforts to deliver all objective goals. This SMART model stands for specific, measurable, achievable, realistic, and time-sensitive goals, and following these will allow the researcher to achieve each goal at completion.[24,25] For this DNP project the following SMART objectives are identified:

Specific

Anesthesia providers had a standardized, evidence-based regional anesthetic protocol utilizing DEX as an adjuvant in TAP blocks for abdominal procedures to minimize postoperative pain and remedy the over-prescribing of opioids.

Achievable

The anesthesia providers collaborated when discussing anesthesia plan for those undergoing abdominal surgery. They assessed the need for regional anesthesia utilizing TAP block with DEX as a part of the ERAS protocol. The patient also participated, giving vital feedback on pain levels and the need for supplemental medication at the conclusion of surgery while in the recovery area.

Realistic

Anesthesia providers were educated on this recommendation and proper training commenced to recruit more resources for project rollout.

Organizational SWOT Analysis

The strengths, weaknesses, opportunities, and threats (SWOT) assessment tool was used to aid in identifying internal and external factors that enhanced or hindered the success of this project. For clarity, this tool detected potential roadblocks that may arise and also steered the project in a direction that allows for transparency and solutions to problems for all stakeholders involved.

Strengths

Currently and at this clinical site, there is no standardized anesthesia plan of care for abdominal surgical patients to receive TAP Blocks. It is a mere supplement if the time permits, and on an as-needed basis. The research shows that the incorporation of DEX as an adjunct to regional anesthesia plans shows promise in pain management, as it is a cost-effective intervention to both patient and facility, and additionally provides opioid-sparing qualities to enhance surgical care.[8]

It is anticipated that a strength for developing and employing an adjunct-specific TAP

block protocol for abdominal surgical patients is a harmonious effort to reduce opioid prescribing and a modality that holds this facility's mission and values at the highest regard. The hospital system's mission for providing quality healthcare is parallel to this project's goal of providing a quality block for pain relief postoperatively. By developing a protocol and utilizing this technique, it allows for a streamlined approach to pain relief and delivers a higher echelon of care which speaks to the vision of Broward Health.

A developed educational module identifying the need for higher quality pain management postoperatively allowed all members of the surgical team to work collectively to provide a better perioperative experience for their patients. This project provided the communication needed to all members in hopes of increasing workflow and ensuring all checks and balances are in place. The researcher has noted that due to the infrequent occurrence of regional anesthesia at this facility, there is usually a breakdown in communication when the surgeon requests such tasks and this leads to surgical delays. This educational module sought to provide knowledge to all surgical team members, including surgeons, to provide the most optimal conditions for surgery and in the immediate post-surgical period. The patient's best interest and positive outcomes were the end goal.

Weaknesses

Weakness can be identified as poor organizational workflow, patient dissatisfaction, and a lack of resources.[5] All of these have been identified as organizational measures for improvement within this facility as they relate to the use of TAP blocks. Given that some surgeons and providers do in fact want TAP blocks on board for these patients, the duration of action is a limitation that needs to be considered when deciding on medication and dosing.[9] Postoperative pain lasts well beyond the effects of a peripheral block.[9] Additives that provide a

more ideal pharmacodynamic profile, adding quality and prolongation of neural blockade should be a consideration when contemplating the inclusion of TAP blocks.[9] Combating the negative stigma associated with additional procedures, such as requiring more time for set-up and the need for additional equipment and resources in the room, can be alleviated by providing education and knowledge on the benefits of this block. Knowledge deficits can be overcome with proper training and education.

An additional organizational weakness was overcoming different practice techniques. Practitioners deliver their anesthetics in a different fashion depending on when they were trained and perhaps some are not current with best practices. Identifying these barriers allowed for proper education and providing updates in what current literature states. This project boasted an excellent learning opportunity to all anesthesia providers. Acceptance by all stakeholders was imperative for this initiative to take shape and see it through until its completion.

Opportunities

Implementing an ERAS protocol to include TAP blocks with DEX as an adjuvant allows for the opportunity to train more anesthesia providers in this skill. The scope of nurse anesthetists at this facility is underutilized as attending anesthesiologists are the ones to perform all blocks.

This project provided those interested in increasing their scope to become trained experts on the use of this block and give them the knowledge base to make sound choices when deciding on adjuvants to extend the life of the block. By providing background knowledge and hands-on training, it gave all anesthesia providers the tools they need to deliver an all-inclusive anesthetic for abdominal surgeries. It also empowered anesthesia providers to be integral members of the surgical team as they were involved in follow-up as well. Tailoring an anesthetic to the needs of certain patient populations is what we as providers set out to do. This project facilitated the entire

process from needs assessment to post-anesthesia continuum of care.

Another opportunity for growth within this field and facility was the ongoing assessments for continuity and extend the rapport between patient and provider. Anesthesia providers often meet their patients in the pre-holding area and may or may not have an interaction with them in the recovery units depending on how they metabolize our anesthetics. By continuing our assessments well into the post-anesthesia care timeframe, we extend their level of comfort and security all while keeping the patient's best interest in mind.

This initiative required education and intervention champions, selected on behalf of the chief anesthesiologist and chief nurse anesthetist, to assist with implementing this project. Tools were supplied for educational purposes, training, and assessments so that all data could be collected and analyzed.

Threats

A solid foundation backed by evidence-based practice (EBP) and standardized care results in quality patient care and the most optimum outcomes.[10] Organizations know the benefits of such standardized care, yet the consistency is not where it should be.[10] Implementing EBP at the ground level becomes challenging in this regard, and requires organizational change in a cultural sense before incorporation of these best practices can occur.[10] Overcoming these threats, or barriers to change, is vital in order to sustain change and fully implement improvement projects. A key component was to identify potential roadblocks and address head on as to keep forward momentum with change initiation. One example included the negative feelings or pushback from current employees on the request to change their practice. They may not see the need for changing something that is not completely broken or may have fine-tuned their anesthetic and fear this will interfere with the way in which they practice. To spearhead these

issues, the project needs to stress the importance of the larger global picture, which is longer period of pain relief for the patient. When there is a cohesive understanding of why a change is suggested, then providers can justify the extra time spent on the front end of surgery. A few extra steps can yield longer relief and even contribute to delivering less intraoperative anesthetics.

Theoretical Framework/Conceptual Underpinning

Theory Overview

Theoretical frameworks are essential to advanced nursing practice as they are based on critical thinking and an all-encompassing understanding of patients and their health needs.[26] To conceptualize, advanced level practitioners must be well versed on fostering human health on a social level.[26] This level of theoretical knowledge gives healthcare professionals an edge to deliver a higher quality of care, draw and learn from different philosophical perspectives, and maintain an ethical approach to the different cultures we care for.[26] Middle range theories provide this foundation and further delineate how interventions should be ascertained.[24] This project assumed underpinnings from Kurt Lewin's Change Theory, a middle range theory, as inflicting change at the organizational level can pose its challenges.

Kurt Lewin's 3-step change theory model describes change as being able to navigate a dynamic balance between opposing forces.[27] This theory has 3 major concepts: the driving forces that initiate change, the restraining forces that initiate resistance, and equilibrium when both forces meet equally and no change occurs.[27] The 3 important stages that take place during this effort are unfreezing, change, and finally refreezing.[27] With change, the process must be "unfrozen" first to allow stakeholders the opportunity to let go of old patterns and habits.[27]

These counterproductive attitudes and practices are the threats and barriers in which were mentioned earlier in this text. The change stage, or "movement" stage, must involve a change in

thoughts, feelings, and behaviors to move in a direction towards productivity.[27] In the final "refreeze" stage, the change is reestablished and the new normal or new habit, and this is how standardization occurs.[27] If the refreezing does not commence, the change is easily influenced to move back to previous practice. This change theory has all of the underpinnings needed for this project to be successful. It is a model for change to occur in healthcare and allows organizations the means to grow and modify their best practice processes.[28] For improvement projects to be successful, these underpinnings from Lewin's change theory are fundamental stepping stones, yet specifics must be tailored to the organization in which change is suggested. There are individual adaptations that need to occur in order for a change to be fully implemented, but having a theoretical framework acts as a guide for this process to take shape.

To overcome threats and weaknesses that may hinder improvement projects, the application of this change theory must be incorporated into the project. It magnifies the vision set forth by the change, provides a guideline for best practice change, and identifies existing perceptions regarding the use of TAP blocks and the inclusion of DEX as an adjuvant medication. The crucial steps of "unfreezing" and "refreezing" norms are paramount to change sustainability and favorable outcomes.

Clinical Fit and Evaluation

Lewin's change theory mirrors the objective goals of this quality improvement project. As anesthesia providers, the goal is to stay current and evolve with the ever-changing needs of patients as advances in healthcare are made evident. To renew an organization's processes, there must be a willingness to adapt in order to stay relevant. As this project hoped to serve this need of organizational relevance, Lewin's theory is most applicable to the actual change process. Planning, involvement of leadership, and total transparency are vital aspects of Lewin's model

that will be incorporated into this improvement project.[28] Calling on leaders to have an active role in change not only encourages participation but also gains trust and support by all other stakeholders as value is added back to the organization.[28] A trickle effect takes place, and the hope is that anesthesia providers will feel empowered in authority and their responsibilities as they deliver their anesthetic art.[28] As more providers become involved in the project, knowledge sharing becomes more evident, and with that, momentum and change are more likely to come full swing.[28]

This study's development, implementation, knowledge sharing, training, educational tools, data collecting, and overall satisfaction utilized key elements from Lewin's Change Theory. Current literature and change processes that have been successful using this model have identified all vital components with theoretical frameworks laying the groundwork. Outlining the key components to unfreeze current attitudes as described in Lewin's model created a receptive environment that is open to the idea of change. This was imperative in the success of this project.

Methodology

Settings and Participants

The setting for this DNP quality improvement project was a large Level I Trauma Center in Broward County. This facility provides 24-hour care and anesthesia services to a vast patient population. The primary study participants included anesthesia providers at this particular facility. This includes nurse anesthetists and anesthesiologists, all recruited voluntarily via email, and the sample size included an estimated 10 participants. The educational module was distributed to a total of 53 anesthesia providers via email.

Procedures

The principal design of this project was intended to be educational in nature and was

conducted to collect data in the form of pre- and post- intervention design by providing and online teaching module. The pre-test assessed current knowledge on the topic, and the post-test evaluated new knowledge attained from a PowerPoint educational module. The participants were given time to complete both assessments, no more than 5 minutes each. The educational module consisted of audio-visual tools, and all participant were able to complete this portion in 10 minutes. The results of these assessments were able to provide feedback on how influential this learning tool is for incorporating TAP blocks using Dex into anesthesia providers' anesthetic plan moving forward and whether or not additional information may be required to implement such a protocol.

Participant Recruitment

Participants were randomly and voluntarily recruited for a pre- and post-intervention assessment related to the topic of Dexmedetomidine and its advantages when used as a TAP block adjuvant. Potential participants were emailed a link that includes an educational module with both pre- and post-assessments to gauge knowledge and potential for quality improvement. The educational module was presented in a 10-minute audio-visual format. The pre- and post-assessments will take no more than 5 minutes each to complete for an overall participation commitment of 20 minutes.

Data Collection

The primary tool for data collection to demonstrate efficacy of this DNP project included a survey containing both a pre- and post-educational module assessment. Qualtrics provided the platform to conduct this anonymous survey, and yield results and data from both pre- and post-tests. Demographic information was also voluntarily requested in the pre-test survey. Following consent, participant knowledge will be recorded through a pre- and post-test survey. The survey

will evaluate whether or not the educational module was effective to learners. Eleven questions were compiled that focus on the etiology of pain, characteristics of Dex, TAP block fundamentals, and the benefits of using such alternate pain modalities in the post-surgical setting to reduce opioid consumption.

The pre-test assessed basic knowledge on this topic, while the post-test evaluated for continued interest and aptitude for learning and incorporating this idea into their own practice. The validity and reliability of this study and data collection were measured in relation to the educational module and the influence it has on the studied anesthesia providers. All participants remained anonymous, and confidentiality was maintained throughout the duration of the project. Subject identifiers were omitted from this project, and all data was extrapolated and generalized into chart form to maintain confidentiality.

Protection of Human Subjects

Participant rights were protected and maintained throughout the project by keeping all patient information confidential and anonymous. The project purpose, timeline, and optional participation were evidently stated in the project agreement consent giving patients full disclosure as to what they can expect and what their rights are. It was also stated that participation is 100% voluntary and if at any moment a participant must withdraw, they may do so at their disclosure. Patients' needs and their best interest were prioritized in this project setting. Basic demographic information was asked of participants in their initial surveys, yet if they are unwilling to provide this background data they may decline. These statistics were visually displayed in chart form. Permission by the Institutional Review Board (IRB) was attained prior to project initiation to guarantee all subjects' rights were protected and that this project maintains ethical standards.

Data Management and Analysis Plan

The doctorate anesthesia nursing student was the co-investigator of this project and was the one responsible for data extrapolation from the administered survey. The Qualtrics survey link and database were password protected, and only the project author had access to all data collected. No participant identifiers were collected or associated with any data extrapolated. At the completion of this improvement project, all stored information will be eliminated from any saved files, and proper precautions will be taken to guarantee no patient information was leaked. A comparative analysis was utilized with assistance from Microsoft Excel to help differentiate previous knowledge and post-intervention knowledge on the project topic.

Results

Demographics

The demographics of participants surveyed are illustrated in Table 1 below. A total of 52 emailed invitations were dispersed to anesthesia providers for the intention of participating in an educational module with a pre- and post-test. Of the 52 invitations, 13 providers consented to participate in this quality improvement project. The demographics of participants were as follows: male (*n* = 7, 54%), female (*n* = 6, 46%), age 25 – 35 (*n* = 2, 15%), age 36 – 45 (*n* = 4, 31%), age 46 – 55 (*n* = 3, 23%), age greater than 56 (*n* = 4, 31%). Hispanic (*n* = 5, 38%), African American (*n* = 1, 8%), Caucasian (*n* = 5, 38%), Other (*n* = 2, 15%). Eleven participants were CRNAs (*n* = 11,92%), and 1 anesthesiologist participated (*n* = 1, 8%). Highest level of education for participants was as follows: Master's degree (*n* = 5, 38%), DNP (*n* = 7, 54%), and MD (*n* = 1, 8%). Providers experience ranged from less than 5 years of experience (*n* = 4, 31%), to 6-10 years (*n* = 2, 15%), to 11-15 years (*n* = 1, 8%), and then greater than 16 years (*n* = 6, 46%).

Table 1. Pre-Test Participant Demographics

Participants (N=13)	%	Number
Gender		
Male	**54.00**	**7**
Female	**46.00**	**6**
Non-binary	**0.00**	**0**
Prefer not to say	**0.00**	**0**
Total	**100.00**	**13**
Age in years		
25-35	**15.00**	**2**
36-45	**31.00**	**4**
46-55	**23.00**	**3**
Greater than 56	**31.00**	**4**
Total	**100.00**	**13**
Ethnicity		
Hispanic	**38.00**	**5**
African American	**8.00**	**1**
Caucasian	**38.00**	**5**
Other	**16.00**	**2**
Total	**100.00**	**13**
Position/Title		
CRNA	**84.00**	**11**
Anesthesiologist	**16.00**	**2**
Total	**100.00**	**13**
Level of Education		
Bachelors	**0.00**	**0**
Masters	**38.00**	**5**
DNP	**46.00**	**6**
MD	**16.00**	**2**
PhD	**0.00**	**0**
Total	**100.00**	**13**
Years of Experience		
Less than 5	**31.00**	**4**
6 – 10 years	**15.00**	**2**
11 – 15 years	**8.00**	**1**
Over 16 years	**46.00**	**6**
Total	**100.00**	**13**

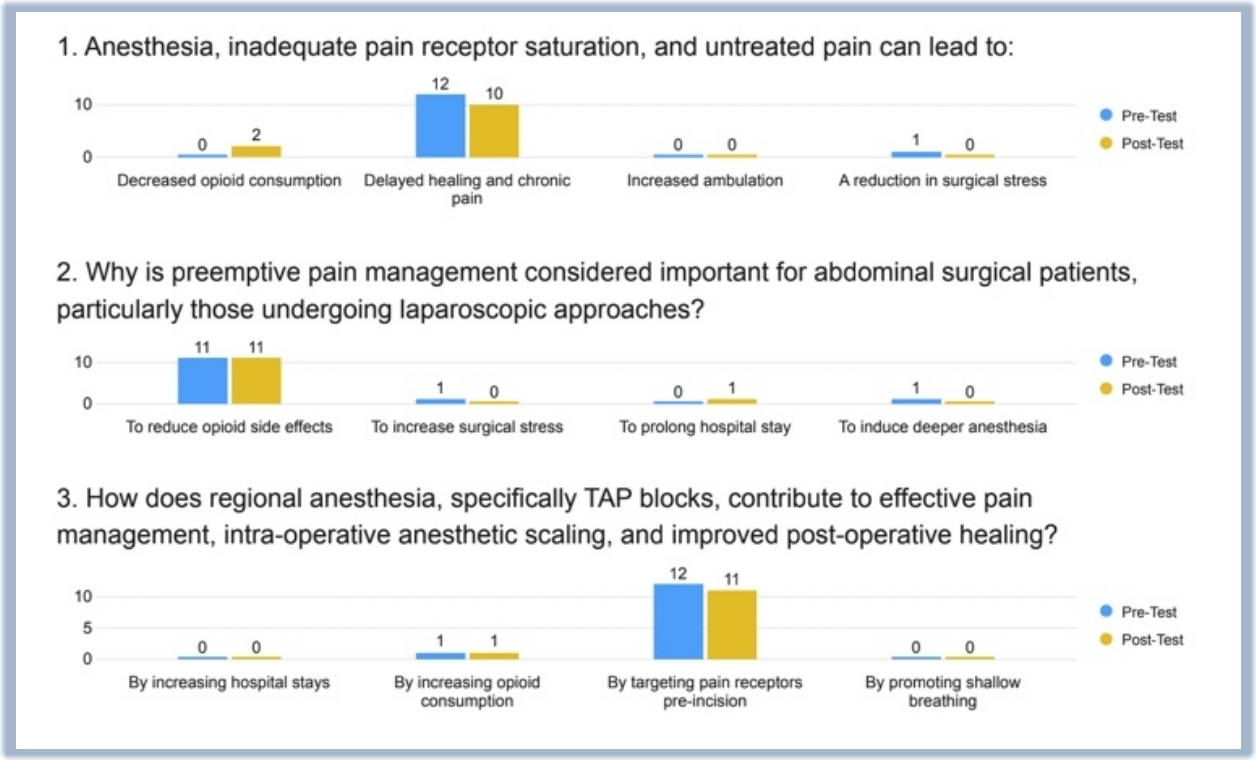
Pre-Test Knowledge on Preemptive Treatment of Pain, Targeting Pain Receptors Pre-Incision

The beginning series of questions in the survey focused on questions that assessed participants' knowledge of preemptively targeting pain receptors prior to surgical stimulation in order to keep pain at bay in the post-surgical areas. The majority of providers answered correctly with the exception of a few providers answering incorrectly. Scores for the pre-test survey questions 1-3 assessing pain knowledge were 92.3%, 91.6%, and 92.3%, respectively.

Post-Test Knowledge on Preemptive Treatment of Pain, Targeting Pain Receptors Pre-Incision

Project participants missed some of the post-test questions in which they answered correctly on the pre-test survey. This survey was administered after the educational module to assess knowledge gain from the information provided. The overall consensus for this series of questioning was that providers were competent in the arena of preemptive pain treatments pre-test, yet changed their answers on the post-test. Scores for the post-test survey were 83.3%, 91.6%, and 91.6%, showing areas for improvement delivering this information to providers.

Figure 1. Pre- and Post-Test Knowledge on Pain Management and Receptors



Pre-Test Knowledge on Nerve Blockade and Local Anesthetic Adjuvants

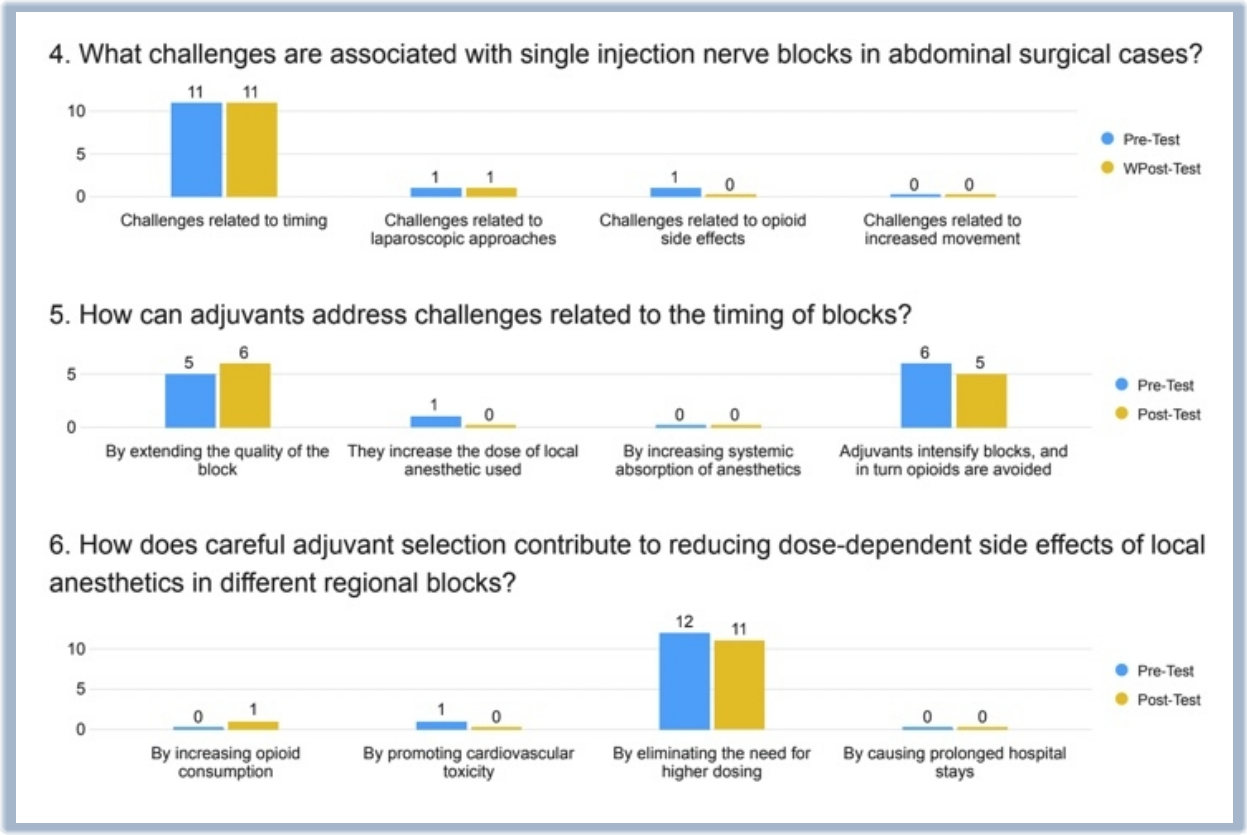
The next series of questions explored the topic of nerve blockade and the use of local anesthetic adjuvants. These questions assessed providers' knowledge on what challenges may arise when utilizing regional anesthesia, how adjuvants may be of assistance, and how they also contribute to lowering local anesthetic dosing. In the pre-test, participants knew that nerve blockades were limited based on the half-life of local anesthetics, with 91.6% of participants scoring correctly. When answering how adjuvants contribute to the challenge of timing, the provider response was much lower in terms of correct answer. Only 5 of 12 providers answered this question correctly, which was 41.6%. All but 1 participant answered the last question on the topic of adjuvant benefits correctly, scoring 92.3% correct. Overall, the anesthesia providers' knowledge on adjuvants and benefits showed room for improvement. This section of the learning

module aimed to provide foundational knowledge on how one can extend the life of a block and how advantageous adjuvants can be.

Post-Test Knowledge on Nerve Blockade and Local Anesthetic Adjuvants

In the post-test questioning for the above section, responses were identical to the pre-test question regarding timing restrictions on blocks. Eleven of 12 participants answered appropriately, similar to the pre-test at 91.6% correct. For the second question on adjuvants and their ability to extend the quality of a block, the correct answer response went up by 1, coming in at 54.5% correct which was higher than the pre-test. On the last question, 11 of 12 responses were correct in terms of reducing local anesthetic dosing. This was similar to pre-test responses, showing competence on this topic. The overall difference between pre- and post-tests was minimal although improvement was noted. Knowledge gain on this topic proved to be effective from the educational module provided.

Figure 2. Pre- and Post-Test Knowledge on Nerve Blockade and Local Anesthetic Adjuvants



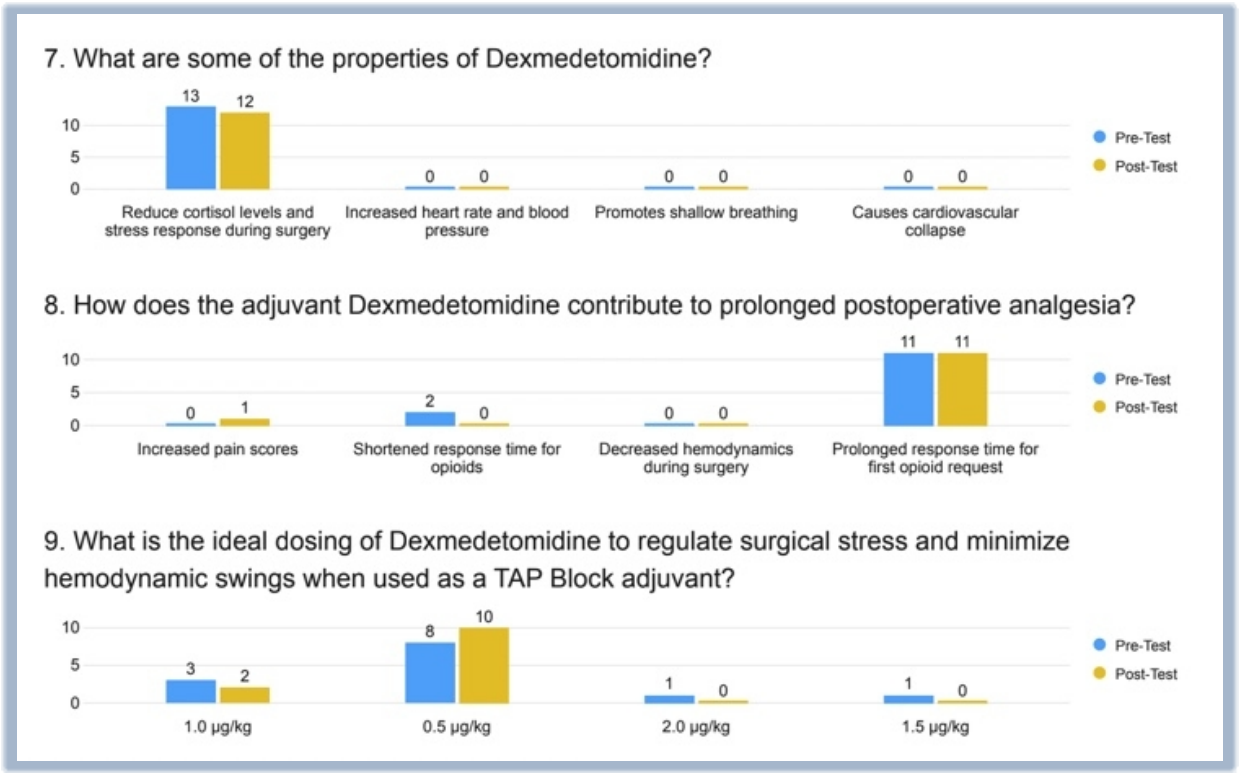
Pre-Test Knowledge on the Characteristics of Dexmedetomidine

Pre-test knowledge on the characteristics of Dexmedetomidine was assessed with a series of 3 questions. Participant knowledge regarding specific characteristics of the drug was high with 100% of participants answering correctly. All providers knew that Dex had the ability to reduce cortisol levels and the stress response during surgery. In the second question assessing knowledge of Dex, 84.6% of participants knew that Dex can in fact delay response time to first opioid request in the post anesthesia care units. Finally, when assessing proper dosing to elicit a reduction in surgical stress and minimize hemodynamic swings, 61.5% of participants answered this question correctly.

Post-Test Knowledge on the Characteristics of Dexmedetomidine

In the post-test series on Dex qualities, 100% of the submitted responses were correct when prompted what some beneficial properties of Dex are. This category in both pre- and post-tests showed that providers were proficient on this topic. In the second question on prolonged response time for opioids, all but 1 participant answered correctly at 91.6%. The greatest improvement in scores was shown in the last question on Dex dosing where 83.3% of participants answered correctly. This response proved the module to be beneficial guiding participants to the correct answer choice. Overall this post-test showed positive results from the educational module provided.

Figure 3. Pre- and Post-Test Knowledge on the Characteristics of Dexmedetomidine



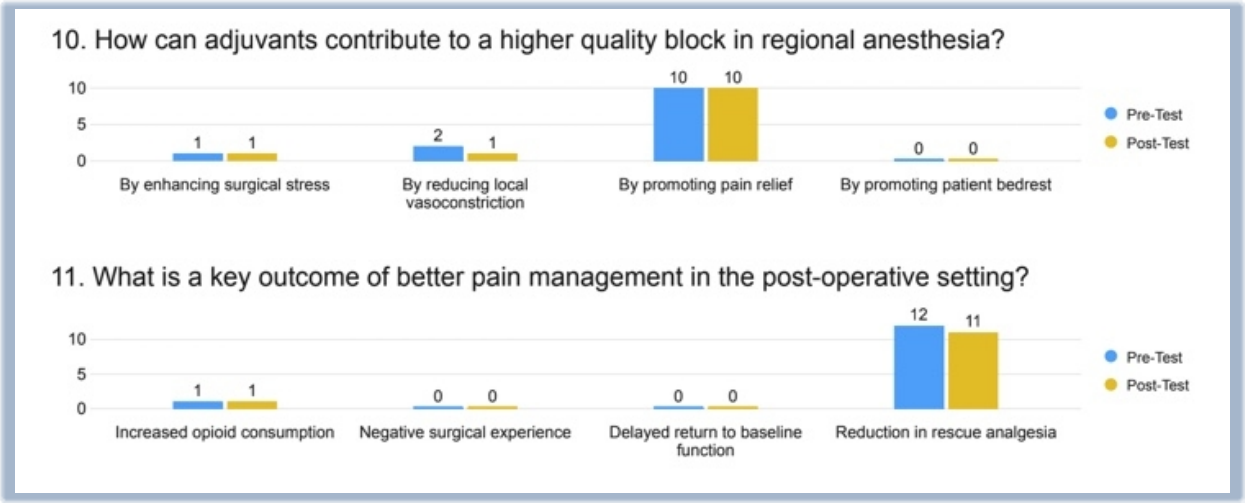
Pre-Test Knowledge on Key Outcomes for Better Pain Control

In the final series of questions that tie the overall presentation together, 2 questions assessed participant knowledge on the topics of block quality and key outcomes to the suggested intervention. In the question that assessed user knowledge on how adjuvants can contribute to a higher quality block, 76.9% of providers answered correctly by selecting promoting pain relief. In the last and final question on what the overall goal is for this quality improvement project, 92.3% of participants answered correctly. Appropriate pain management aids in reducing the need for rescue analgesia postoperatively and most providers answered this question appropriately.

Post-Test Knowledge on Key Outcomes for Better Pain Control

Post-test responses to pain control and key outcomes was nearly identical to the pre-test survey responses. Adjuvants contributing to higher quality blocks by promoting pain relief was answered correctly by 83.3% of participants, showing similar results. In the final question assessing what the key outcome is for this suggested intervention, 91.6% of participants answered correctly showing similar results. The overall consensus for these questions showed competence and similar scores both before and after the educational module provided. This proves there is still room for growth and educational opportunities still available on the topic of utilizing adjuvants in regional anesthetic plans.

Figure 4. Pre- and Post-Test Knowledge on Key Outcomes for Better Pain Control



Discussion

Limitations

Limitations of the study included a small sample size of 13, and 1 participant not completing a post-test survey question. A larger sample size would have yielded more complete surveys and a better statistical analysis on the effectiveness of the project. It was noted that some providers may not have finished the second series of questions, therefore deeming timing as a limitation to this study. Distribution lists were sent via email, therefore limiting a larger audience as not all invites were received. Aside from these limitations, the overall findings of the project were in favor of enhancing participant knowledge on the issue of using Dex as a TAP block adjuvant to enhance recovery after abdominal surgery.

Future Implications for Advanced Nursing Practice

Appropriately managing pain for surgical patients is a skill that anesthesia providers have established over the course of many years, yet there are always improvements and new techniques that deserve further research and investigation. As caretakers, we want to see our

patients free of anxiety, pain, and stress. While no surgery, surgeon, or anesthesia provider can guarantee a pain-free experience, we have techniques and medications that can mitigate pain and keep symptoms at bay. The sequelae that follows when pain is inadequately treated has the potential to create lasting anxieties and delayed healing for patients. [29] This is why the concept of multimodal means to manage pain is so important. It is a widely accepted and practiced skill to incorporate regional anesthesia into an anesthetic plan of care.[29] The types of blocks, medication dosing, coordination, and timing may be daunting to anesthesia providers.[29]

To implement regional techniques and specifically what this project highlights in terms of using DEX to supplement local anesthetic in TAP blocks, it will take more than learning the fundamentals of the block. Successful implementation in a clinical setting requires a team-based approach with defined goals for success.[29] Ultrasound training, needs assessments for both patient and provider, what supplies are needed, as well as determining what groundwork are essential for implementation startup.[29] The need for consistency is also of utmost relevance to provide checks and balances, as well as statistical data for the success of this approach to pain management. The success of such a program has the potential for giving patients a positive surgical experience.

Currently in the South Florida area, most regional techniques are performed by anesthesiologists. The hope is that regional anesthesia continues to gain forward momentum and that more anesthesia providers, including CRNAs, are able to receive proper training to incorporate this pain management modality into their own personal practice. If enough providers show interest and are willing and able to perform these blocks safely, there is great potential for these techniques to be incorporated into standardized surgical and anesthetic plans. [29]

Conclusion

The intent for this quality improvement project was to evaluate whether or not the educational module presenting DEX as an adjuvant to TAP blocks served as an effective learning modality to propel providers into incorporating this pain management intervention into their own practice. The aim was to collect valid, voluntary, and quality data to conduct an unbiased quality improvement project that may educate providers on a topic that may not have otherwise been presented in their clinical setting. This project delivered background information to inform all anesthesia providers of the benefits and risks to this intervention. The researcher used current literature with reliable studies for interpretation, and supplied this as background information to enhance this improvement project. This project hoped to inspire anesthesia providers to deliver the most current, quality anesthesia care to its abdominal surgical patient population by reducing the amount of opioids prescribed in the post-anesthesia care unit. This project also intended to engage anesthesia practitioners in a conversation about current regional anesthesia literature and the potential to bring a more well-rounded anesthetic plan to light for their patients. Patient safety, comfort, and overall satisfaction are at the forefront of this DNP project's design. The positive response from providers solidifies the research efforts in providing alternate anesthetic excellence to patients.

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Appendix A: Literature Matrix

Citation	Design/Method	Sample/Setting	Major Variables Studied and Their Definitions	Measurement and Data Analysis	Findings	Results	Conclusions	Appraisal: Worth to Practice/ Level
Abdallah et al,[1] 2022	Prospective Randomized Controlled Trial In this study, 114 patients were randomized into 2 intervention groups: 1. L group received levobupivacaine only 2. LD group received levobupivacaine plus dexmedeto-midine.[1] The purpose of this study was aimed to assess the impact of adding dexmedeto-midine to levobupivacaine during TAP block in patients undergoing abdominal aortic operations.	Eligible for study (n = 126) Patients with a higher ASA class, uncontrolled systemic comorbidities, bleeding diathesis, psychiatric disorder, drug abuse, or chronic pain syndromes were excluded from study.[1] Also, absent pinprick test was considered "block failure," and the patient was excluded from the study.[1] Six patients dropped out in each group. Randomized (n = 114) Allocated and received L intervention (n = 57) Allocated and received LD intervention (n = 57) Total that participated in study after attrition (total sample size = 114). Patients were aged between 20 and 50 years, scheduled for abdominal aortic surgery under general anesthesia. Included patients were classified as Class I or II according to the American Society of Anesthesiologists (ASA) classification. No location was designated for the study, but it was approved by Mansoura University Institutional Review Board. Procedures were performed in the operating room with surgical and anesthesia teams.	The Independent variables, or presumed cause in this study, were the 2 intervention groups. (IV 1= the L intervention group) (IV 2= the LD intervention group) The dependent variable, or presumed outcome variable, was a reduction in opioid prescribing in the postoperative period and a better analgesic profile.	The required sample size was estimated using the Statistical Package for the Social Sciences (SPSS) statistics for Windows .[1] Collected data were tabulated and analyzed through the SPSS software program IBM's Statistical Package for the Social Sciences (SPSS) statistics for Windows.[1] The categorical data were expressed as numbers and percentages and then compared using the Chi-square test. The continuous data were expressed as mean and standard deviation if normally distributed, or median and range if abnormally distributed. The former data were compared through the one-way ANOVA, while the latter were compared through the Kruskal–Wallis test. Any $p < 0.05$ was considered statistically significant. Reliability information was not reported on in this study. The reviewer could not find any supporting data showing whether or not reliability was in fact reported.	Primary findings were that postoperative pain scores were lower.[1] Secondary outcomes were of equal benefit to include favorable hemodynamic changes, the time to sensory block, the time to the first analgesic request, postoperative opioid consumption and complication.[1]	The time to sensory block was significantly earlier in Group LD (8.95 min vs. 11.05 min in Group L – p = 0.003).[1] For the initial 4 h following the surgery, pain scores did not express significant differences between the 2 groups. However, adjuvant dexmedetomidine was associated with better pain scores for the subsequent 12 h compared to the L group ($p <$ 0.05).[1] The duration till the first analgesic request showed a significant increase in the LD group (13.3 vs. 11.09 h in the L group – p = 0.005).[1] In the same group, it showed a significant decline in their opioid consumption after the operation (48.95 µg vs. 72.63 µg – $p <$ 0.001).[1]	Adjuvant dexmedeto-midine has a significant beneficial impact on postoperative analgesic profile as it enhances the analgesic action of TAP block leading to less pain, analgesic consumption, and opioid side effects.[1] Its use as an adjuvant to peripheral and neuraxial nerve blocks should be recommend-ed in pain management practice. [1] The current investigation has some limitations, including the relatively small sample size, which was gathered from a single institution.[1]	*A strength of the study was the subject matter being studied. It is an area in need of more data to support the preexisting literature. *The authors stated that the study was underpowered with regards to the sample size. *Effects on chronic pain using adjuvant therapy should be studied. *This study would benefit patients and surgical outcomes. *This being an RCT, or level 2 evidence (L-II) gave the study strength and confidence to act on data. It provides valuable supporting literature to those studies previously completed, yet the execution of this study could be improved with more detail and a stronger design.

Citation	Design/Method	Sample/Setting	Major Variables Studied and Their Definitions	Measurement And Data Analysis	Findings	Results	Conclusions	Appraisal: Worth to Practice/Level
Varshney et al,[2] 2019	Prospective Randomized Controlled Trial In this study, 90 patients were randomized into 3 intervention groups: 1. C group did NOT receive TAP block (control group) 2. L group received levobupivacaine with US guided TAP block. 3. LD group received levobupivacaine with US guided TAP block and Dexmedetomidine . The purpose of this study was aimed to assess the impact of TAP block with levobupivacaine or without dexmedetomidine compared to the control group for postoperative analgesia following cesarean delivery.[2]	Eligible for study (n = 90) Double Blind Randomized (n = 90) Attrition (n = 0) Total that participated in study after attrition (n = 90). Normal uncomplicated pregnancies (ASA 2) and age between 21 and 40 years with body mass index (BMI) 18.5 to 34.9 kg/m^2 were considered as inclusion criteria. Patients who did not meet the above criteria or with chronic use of pain medications, alpha agonists/ antagonists, history of tolerance to opiates were excluded from the study.[2] Double-blind randomized control trial conducted over a period of 1 year and 9 months from October 2015 to July 2017 in a tertiary center.[2]	The independent variables, or presumed cause in this study, were the 3 intervention groups. (IV 1= the C intervention group) (IV 2= the L intervention group) (IV 3= the LD intervention group) The dependent variable, or presumed outcome variable, was the postoperative analgesic efficacy of 0.25% levobupivacaine with and without addition of dexmedetomidine in ultrasound-guided TAP block for women undergoing cesarean delivery under spinal anesthesia.[2]	The Mann–Whitney U test and Kruskal–Wallis test were used for statistical analysis.[2] In the postoperative period, all the women were observed in the high dependency unit (HDU) for first 24 h and an investigator who was unaware of the group allocation noted the observations.[2] Patients were assessed at 1h, and every second hour, thereafter for the first 12h and 24 h for pain at rest and on movement using the visual analogue scale (VAS).[2]	The women who received TAP block had prolonged analgesia in the postoperative period and their first request for analgesia came much later compared to patients who did not receive TAP block. Women who got TAP block using levobupivacaine with dexmedeto-midine had significantly longer duration of analgesia compared to TAP block with only levobupivacaine.[2]	The time for first request for analgesia was significantly longer in Group LD when compared to Group L (median 600 min with Q1 240 min and Q3 1110 min vs 362.5 min with Q1 168.75 min and Q3 487.5 min) and control group, Group C had shortest period.[2] Comparing the data, there was significant difference between Group C versus Group L and Group LD ($p < 0.05$), however, there was no difference between Groups L and LD.[2] At the end of 12 h all the 30 women in Group C, 25 women in Group L and 16 women in Group LD requested for rescue analgesia. The difference between Groups L and LD were significant ($p < 0.05$) at 12 h.[2] At the end of 24 h, 30 women from Group C, 27 women in Group L and 24 women in Group LD requested for analgesia. There was no difference between the groups at 24 h.[2] On enquiring about the VAS rating of postoperative analgesia satisfaction score in the first 24 h, Group C women gave a score of 6.06 ± 1.79 (mean ± SD), Group L women gave 7.76 ± 1.27 and Group LD women gave a score of 8.83 ± 0.69.[2]	In conclusion, TAP block with levobupi-vacaine provides good immediate postoperative analgesia and addition of dexmedeto-midine to levobupi-vacaine prolongs the duration of analgesia and improves quality with better patient satisfaction.[2] There were some limitations. Patient-controlled analgesia was not provided to patients so we were not able to comment on the amount of analgesics used by patients belonging to different groups.[2]	*A strength of the study was the subject matter being studied. It is an area in need of more data to support the preexisting literature. *The study could have benefited from a higher sample size in each of the 3 groups. *Effects on chronic pain using adjuvant therapy should be studied. *This study would benefit patients and surgical outcomes. *This being an RCT, or level 2 evidence (L-II) gave the study strength and confidence to act on data. It provides valuable supporting literature to those studies previously completed, yet the execution of this study could be improved with more detail and a stronger design.

Citation	Design/Method	Sample/Setting	Major Variables Studied and Their Definitions	Measurement And Data Analysis	Findings	Results	Conclusions	Appraisal: Worth to Practice/Level
Xue et al,[3]2018	Prospective, Randomized, Double-blinded Controlled Trial In this study, 90 patients were randomized into 3 intervention groups: 1. Group I, received post-operative intravenous analgesia only after general anesthesia (control group)[3] 2. Group II, which received a TAP block with 20 ml 0.375% ropivacaine[3] 3. Group III, which received a TAP block with 20 ml of 0.375% ropivacaine and 1 μg/kg dexmedetomi-dine after induction[3] The aim of the present study was to investigate the recovery and analgesic effects of dexmedetomi-dine combined with TAP block for gynecological laparoscopy, and to provide guidance for its use in clinical practice.[3]	Eligible for study (n = 90) The randomization scheme was generated using the table of random sampling numbers. Patients were blinded to the treatment allocation, and the recorder was blinded to the study groups. Attrition (n= 0) Total that participated in study after attrition (n = 90). Included 90 patients and was performed between April and July 2014 in the First Affiliated Hospital of Wannan Medical College (Wuhu, China).[3] Patients aged 20–50 years with ASA of I or II, who were scheduled for undergoing laparoscopic ovarian cyst resection under general anesthesia were enrolled.[3]	The independent variables, or presumed cause in this study, were the 3 intervention groups. Patients in Group I received postoperative intravenous analgesia only after the surgery; Group II received a TAP block with 20 ml 0.375% ropivacaine prior to the surgery, following the induction of anesthesia; and Group III received a TAP block with 20 ml 0.375% ropivacaine and 1 μg/kg dexmedetomidine prior to the surgery, following the induction of anesthesia.[3] The dependent variable, or presumed outcome variable, was the postoperative analgesic efficacy of 0.25% levobupivacaine with and without addition of dexmedetomidine in ultrasound-guided TAP block for women undergoing cesarean delivery under spinal anesthesia.[2]	Continuous variables were expressed as the mean ± standard deviation. Normally distributed continuous variables were compared between multiple groups using one-way analysis of variance for inter-group comparisons. Categorical variables were compared using the Chi-square test or Fisher's exact test as appropriate. All analyses were 2-tailed, and $p <$ 0.05 was considered to indicate a statistically significant difference. The operative time, propofol dosage, time to awakening (the time from the cessation of propofol administration until the patients can open eyes after calling their name), time to spontaneous breathing (measured from the cessation of propofol administration), extubation time (the time from the cessation of propofol administration to the remove the laryngeal mask airway) were recorded.[3] Nausea and vomiting, as well as respiratory depression were also recorded.	The women who received TAP block had prolonged analgesia in the postoperative period and their first request for analgesia came much later compared to patients who did not receive TAP block. Women who got TAP block using levobupivacaine with dexmedetomi-dine had significantly longer duration of analgesia compared to TAP block with only levobupivacaine.[2]	Compared with those in Group 1, the dose of propofol, as well as the time of awakening, spontaneous breathing and extubation were significantly decreased in Group III ($p <$ 0.01 and $p <$ 0.05, respectively).[3] The incidence of nausea and vomiting in Groups II and III was significantly decreased compared with that in Group I ($p < 0.05$).[3] VAS score at 2 and 4 h in Group II (both $p < 0.05$) and 2, 4 ($p <$ 0.01) and 8 h ($p < 0.05$) in Group III after the surgery were significantly lower compared with those in Group I.[3]	The present study demonstrated that combination of dexmedetomidine with a TAP block by ropivacaine significantly reduces the propofol dosage.[3] In the present study, 1 μg/kg dexmedetomidine was selected as the experimental dose.[3] TAP block by ropivacaine combined with dexmedetomidine reduced the amount of anesthetic required.[3] However, there are further advantages, including post-operative analgesia, as well as the reduction of nausea and vomiting.[3]	*The study could have benefited from a higher sample size in each of the 3 groups. *This study did not reflect all differences between the 3 groups encompassing all aspects of anesthesia and postoperative analgesia. *Further comprehensive evaluation using a systematic research is therefore required. *This study would benefit patients and surgical outcomes. *This being an RCT, or level 2 evidence (L-II) gave the study strength and confidence to act on data. It provides valuable supporting literature to those studies previously completed, yet the execution of this study could be improved with more detail and a stronger design.

Citation	Design/ Method	Sample/Setting	Major Variables Studied and Their Definitions	Measurement And Data Analysis	Findings	Results	Conclusions	Appraisal: Worth to Practice/Level
Chen et al,[4] 2018	Prospective, Randomized, Double-blinded Controlled Trial. In this study, randomly assigned 100 elective gynecological patients into 4 groups: 1. Group TAP (n = 25), TAP group received TAP blocks with 0.375% ropivacaine[4] 2. Group TAP-DEX (n = 25), received 0.375% ropivacaine with dexmedetomi-dine 1 μg/kg[4] 3. Group TAP-FEN (n = 25), received 0.375% ropivacaine with fentanyl 1 μg/kg[4] or 4. Group C (control group, n = 25), received patient-controlled intravenous analgesia (PCIA) *TAP blocks were performed postoperatively The aim of this study was to compare the analgesic efficacy and recovery quality after gynecological surgery by adding dexmedeto-midine or fentanyl into an ultrasound-guided TAP block.[4]	Eligible for study (n = 100) Patients were randomly allocated to 4 groups by using a computer-generated random number table.[4] The group allocation information was concealed in sealed opaque envelopes, which were opened after patient's arrival to the operation room. Postoperative follow-ups were carried out by the third author (XZ).[4] Attrition (n = 0) Total that participated in study after attrition (n = 100). One hundred patients aged 18–60 years, with American Society of Anesthesiologists (ASA) class I–II status and body mass index (BMI) of 18.5–23.9, who were scheduled for open gynecological surgeries were enrolled in this study.[4] Exclusion criteria were as follows: bleeding diathesis, alcohol or drug abuse, opioid dependence, chronic pain, pain medication prior to surgery, infection at injection site, history of abdominal surgery or trauma, respiratory tract infection within 2 weeks, New York Heart Association class >II, and psychiatric illnesses that would interfere with perception and pain assessment.[4]	The independent variables, or presumed cause in this study, were the 4 intervention groups. The dependent variable, or primary outcomes were the first request time for PCIA bolus and quality of postoperative recovery assessed using the QoR-40 questionnaire 2 days after surgery.[4] The secondary outcomes were the visual analog scale (VAS) scores at rest across the different time intervals, the total number of PCIA boluses required in 24 and 48 hours postoperatively, and associated complications.[4]	The sample size estimation was based on QoR-40 assumed scores.[4] Normally distributed interval data (age, weight, height, BMI, and time of TAP block) were reported as mean ± SD values and were evaluated using one-way ANOVA.[4] Non-normally distributed interval and ordinal data (VAS scores, cumulative of remedial fentanyl bolus, and QoR-40 scores) were reported as median values and were compared among groups using Kruskal–Wallis H test.[4] Post hoc analysis was performed using Mann–Whitney U test with Bonferroni correction for multiple comparisons (4 groups). Statistical analysis was performed using SPSS.[4] Statistical significance in this study was set at $p < 0.05$.[4] Statistical inference was evaluated at 5% level of significance.[4]	This study found that dexmedeto-midine as an adjuvant to TAP blocks enhanced analgesia, reduced total systemic opiate consumption, and improved the quality of recovery without increasing postoperative complica-tions.[4]	Patients in TAP-DEX group had the longest effective analgesia among all 3 TAP groups (9.86 hours in TAP-DEX group, 8.79 hours in TAP-FEN group, and 7.86 hours in TAP group); TAP-DEX provided an additional 64 minutes (11.9%) of analgesia time compared with the TAP-FEN group ($p < 0.001$) and an additional 118.8 minutes of pain relief which is a relative increase of 25.2% compared with the TAP group ($p < 0.001$), whereas the control group required remedial analgesia 6 hours earlier than the TAP groups ($p < 0.01$).[4] VAS scores at rest across the different time intervals and reveals that the VAS score was significantly lower in all TAP groups than in the control group at 1, 2, 4, and 8 hours postoperatively ($p < 0.05$) and there were significant differences in scores between TAP-DEX and TAP-FEN groups only at 6 hours ($p < 0.01$).[4] Total number of PCIA boluses was significantly lower in TAP-DEX group compared with TAP-FEN and TAP groups at both 24 and 48 hours ($P<0.05$).[4] QoR-40 score was lowest in the control group and highest in the TAP-DEX group, with a significant difference between these 2 groups ($p < 0.05$).[4]	The addition of dexmedetomidine to ropivacaine in TAP block has potential benefits for improving the quality of patient recovery, with better analgesia but lower analgesic consumption.[4] Several limitations were noted. The study was unable to measure the onset time of TAP block because the patients did not fully recover from general anesthesia.[4] Second, it did not assess the concentration-effect curves of dexmedetomidine and fentanyl.[4] And third, it did not analyze the plasma concentration of ropivacaine affected by dexmedetomidine or fentanyl.[4]	*The study could have benefited from a higher sample size in each of the 4 groups. *Despite this study showing promising results with the use of dexmedeto-midine, the optimal dosage still needs to be further explored.[4] *This study would benefit patients and surgical outcomes. *This being an RCT, or level 2 evidence (L-II) gave the study strength and confidence to act on data. It provides valuable supporting literature to those studies previously completed, yet the execution of this study could be improved with more detail and a stronger design.

Citation	Design/Method	Sample/Setting	Major Variables Studied and Their Definitions	Measurement And Data Analysis	Findings	Results	Conclusions	Appraisal: Worth to Practice/Level
Aboelela et al,[5] 2018	Randomized Controlled Trial In this study 50 patients were randomized into 2 intervention groups: 1. Group B, received 20 ml of bupivacaine hydrochloride 0.25%[5] 2. Group BD, received 20 ml of bupivacaine hydrochloride 0.25% and 0.3 µg/kg dexmedetomi-din$_e$[5] Both groups had TAP blocks performed on both sides at the end of surgery and every 8 h for 48 h at right side only through inserted catheter.[5] The aim of the present study was to investigate the recovery and analgesic effects of DEX combined with TAP block for hepatectomy, and to provide guidance for its use in clinical practice.[3]	Eligible for study (n = 50) Participants were adults undergoing right donor hepatectomy for liver transplantation in gastroenterology surgical center-Mansoura faculty of medicine, Egypt, from March 2016 to December 2016.[5] The randomization scheme was generated using the table of random sampling numbers. Patients were blinded to the treatment allocation, and the recorder was blinded to the study groups. Attrition (n = 0) Total that participated in study after attrition (n = 50). Random number generator with closed envelope technique randomized patients into 2 groups (25 patients each) based on the postoperative analgesic drugs used for TAP block.[5] A Bupivacaine group (Group B, n = 25) with the injection of bupivacaine hydrochloride 0.25% only and dexmedetomidine group (Group BD, n = 25) with the injection of both bupivacaine hydrochloride 0.25% and 0.3 µg/kg dexmedetomidine.[5] Exclusion criteria were known allergy to any of the study drugs and patient's refusal for participation.[5]	The independent variables, or presumed cause in this study, were the 2 intervention groups. The dependent variable, or presumed outcome variable, Primary outcome objective was morphine consumption at first 72h. Secondary outcome objectives were morphine requirement, numbers of intake, time to first intake, pain score numerical analog scale (NAS), postoperative analgesia related complications, recovery of intestinal motility, and inflammatory markers.[5]	For sample size calculation, G*Power version 3.1.9.2 was used.[5] Mean postoperative morphine consumption was adopted as a primary variable and power of 80 was achieved accepting an effective size of 30%, if the total sample size of 50 was included in the study (25 patients in each group).[5] Data were collected, tabulated, and statistically analyzed using SPSS program, version 16.[5] Continuous data were tested for normality and expressed in mean ± standard deviation if normally distributed, median (interquartile range) if not.[5] Categorical data were presented as proportions. ANOVA test was used to detect the statistical significance between the studied groups considering a $p <$ 0.05 as statistically significant.[5]	The women who received TAP block had prolonged analgesia in the postoperative period and their first request for analgesia came much later compared to patients who did not receive TAP block. Women who got TAP block using levobupivacaine with dexmedetomi-dine had significantly longer duration of analgesia compared to TAP block with only levobupivacaine.[2]	Rescue morphine analgesia was significantly lower in (BD) group compared with (B) groups as considering total morphine consumption (B 4 ± 1.9, BD 1.5 ± 0.5, P = 0.03), numbers of morphine intake (p = 0.04), morphine requirement (p = 0.03), and first time of analgesia intake (p = 0.04).[5] NAS was significantly lower in group (BD) compared with group (B) group in the first 12 h (NAS 0 - p = 0.001, NAS 1 - p = 0.03).[5] Adding dexmedetomi-dine improved gut motility, first oral intake without detectable anti-inflammatory effect.[5]	Adding dexmedeto-midine to bupivacaine in a surgically inserted catheter for TAP block in donor hepatectomy reduced morphine consumption without detectable anti-inflammatory effect.[5] A limitation in this study was detecting serum level of dexmedeto-midine, as this effect may be related to systemic absorption of the drug rather than local action, use of infusion technique instead of boluses as it provides superior analgesia, limited number of cases to detect secondary outcomes.[5]	*The study could have benefited from a higher sample size in each of the 3 groups. *This study would benefit patients and surgical outcomes. *There is a need for more studies on hepatectomy to reflect consistent results. *This being an RCT, or level 2 evidence (L-II) gave the study strength and confidence to act on data.

Citation	Design/Method	Sample/Setting	Major Variables Studied and Their Definitions	Measurement And Data Analysis	Findings	Results	Conclusions	Appraisal: Worth to Practice/Level
Gupta et al,[6] 2022	Prospective, Randomized Clinical Trial In this study, 60 patients were randomized into 2 intervention groups: 1. Group A, received 20 mL of 0.25% ropivacaine with 1 mL of normal saline[6] 2. Group B, 20 mL of 0.25% ropivacaine with 0.5 µg/kg (1 mL) dexmedetomi-dine was given in ultrasound-guided TAP block.[6] The aim of the present study was to evaluate the analgesic efficacy of dexmedetomi-dine as an adjuvant to ropivacaine in TAP block for unilateral infra-umbilical surgeries in terms of duration and quality of analgesia along with total analgesic consumption during 24 hours.[6]	Eligible for study (n = 60) The randomization scheme was generated using the table of random sampling numbers. Patients were blinded to the treatment allocation, and the recorder was blinded to the study groups. Total that participated in study after attrition (n = 60). 60 adult patients with the age of 18–65 years, who were planned for unilateral infra-umbilical surgeries under spinal anesthesia.[6] Exclusion criteria involved patient's refusal, any contraindication to regional block, history of allergy to the studied drugs, psychiatric disorders, chronic opioid use, infection at block site, body mass index (BMI) > 30 kg/m^2, and diabetes mellitus.[6]	The independent variables, or presumed cause in this study, were the 3 intervention groups. Patients in Group I received post-operative intravenous analgesia only after the surgery; Group II received a TAP block with 20 ml 0.375% ropivacaine prior to the surgery, following the induction of anesthesia; and Group III received a TAP block with 20 ml 0.375% ropivacaine and 1 µg/kg dexmedetomidine prior to the surgery, following the induction of anesthesia.[3] The dependent variable, or presumed outcome variable, is the postoperative analgesic efficacy of 0.25% levobupivacaine with and without addition of dexmedetomidine in ultrasound-guided TAP block for women undergoing cesarean delivery under spinal anesthesia.[2]	Postoperatively, all patients were observed for vital parameters and quality of analgesia at every hour for the first 8 hours, then at 12, 16, 20, and 24 hours.[6] Quality of analgesia was assessed by using 4-point VNRS as 0 = no pain, 1–3 = mild pain, 4–7 = moderate pain, and 8–10 = severe pain.[6] Rescue analgesia was given to the patient, who showed VNRS > 3, in the form of injection tramadol 50 mg IV If the patient still had VNRS > 3, second rescue analgesic drug injection of diclofenac 75 mg IV was given.[6] The total of analgesic consumption and the number of rescue doses given during the first 24 hours after surgery were recorded.[6] Duration of analgesia as the primary outcome of this study was noted and defined as the time from the completion of injection to the request of first rescue analgesia.[6] Patient satisfaction score was measured with a 5-point numerical scale (1 = very satisfied, 2 = satisfied, 3 = undecided, 4 = dissatisfied, 5 = very dissatisfied) at the end of 24 hours after surgrey.[6] Any adverse effects, such as nausea and vomiting, hypotension, sedation, and block related complication, were noted and managed accordingly.[6] The sedation score was recorded on the modified Ramsay Sedation Score (RSS) Duration, quality of analgesia, and total analgesic consumption were noted. Statistical analysis was performed with SPSS software version 21.0 (IBM Corp., Armonk, NY, USA) by using student's t-test and chi-square test.[6]	The present study found that the addition of 0.5 µg/kg dexmedetomidine to 20 mL of 0.25% ropivacaine for TAP block had prolonged the duration of analgesia with better quality of analgesia in view of low VNRS pain score and less total analgesic consumption during 24 hours after surgery in patients undergoing infra-umbilical surgeries.[6] VNRS scores remained persistently lower than 3 for the initial 6 hours in group A and 12 hours in group B, which correlates well with the duration of analgesia.[6]	The mean duration of analgesia was significantly longer in group B than group A (842.50 ± 38.74 min and 435.17 ± 25.75 min, respectively). Verbal numerical rating scale was persistently low in both groups, except at the 7th hour and 20th hour in group A and the 12th hour in group B. Total analgesic consumption and number of analgesics doses during 24 hours after surgery were also lower in group B.[6]	The addition of dexmedeto-midine as adjuvant to 0.25% ropivacaine for TAP block significantly increases the duration and quality of analgesia without any significant adverse effects.[6]	*The study could have benefited from a larger sample size. *This study's limitations: Whether the action of dexmedetomidine was related to systemic absorption or pure local effect was not fully elucidated.[6] *Further research is necessary to determine the plasma levels of dexmedetomidine. *This study would benefit patients and surgical outcomes. *This being an RCT, or level 2 evidence (L-II) gave the study strength and confidence to act on data. It provides valuable supporting literature to those studies previously completed, yet the execution of this study could be improved with more detail and a stronger design.

Citation	Design/Method	Sample/Setting	Major Variables Studied and Their Definitions	Measurement And Data Analysis	Findings	Results	Conclusions	Appraisal: Worth to Practice/Level
Sarvesh et al,[7] 2018	Prospective, Randomized, Controlled Trial Sixty patients undergoing laparoscopic cholecystectomy were randomized into 2 groups to receive either bilateral ultrasonography -guided subcostal TAP blocks with 18 mL 0.375% ropivacaine and 2 ml of normal saline (n = 30, Group R) or 18 ml. 375% ropivacaine with 0.5 µg/kg dexmedetomi-dine 2 mL (n = 30, Group RD). The aim of the present study was to evaluate whether the addition of DEX to ropivacaine in subcostal transversus abdominis plane block potentiates postoperative analgesia among laparoscopic cholecystectomy patients.[14]	Eligible for study (n = 60) Patients were randomly allocated to receive TAP block with either ropivacaine and normal saline or ropivacaine and dexmedetomidin.[7] Total that participated in study after attrition (n = 60). Sixty patients of physical status ASA Class I and II of either sex, aged 18–65 years, scheduled to undergo 4-port laparoscopic cholecystectomy were enrolled in this trial.[7] Patients with a history of LA allergy, psychiatric illness, substance abuse, opioid tolerance, any uncompensated systemic illness (cardiovascular, respiratory, metabolic, neurologic, and endocrine) and pregnant women were excluded from the study.[7]	Numerical rating scale was measured postoperatively to primarily assess the pain severity and analgesic requirement for the first 24 h, hemodynamic parameters, and adverse effects were recorded.[7]	Normally distributed numerical data were presented as mean (standard deviation) and between-group differences were compared using the independent-samples Student t-test. Skewed data were presented as median (interquartile range), and intergroup differences were compared nonparametrically using the Mann–Whitney U-test.[7] Categorical data were presented as ratio and intergroup comparison was performed using the Pearson Chi-square test or Fisher's exact test.[7] The Statistical software, namely, SAS 9.2, SPSS 15.0, Stata 10.1, MedCalc 9.0.1, Systat 12.0, and R environment ver. 2.11.1, was used for the analysis of the data. $p < 0.05$ was considered as statistically significant.[7] Categorical data were analyzed using Chi-square test/Fisher's exact test and quantitative data were analyzed using Student's t-test and the Mann–Whitney U-test.[7]	The important outcome of this study is that the addition of dexmedetomidine to ropivacaine in subcostal TAP block provides prolonged postoperative analgesia and better pain control than ropivacaine alone, without any untoward adverse effects.[7] The duration of postoperative analgesia was prolonged; NRS was lower, and the need for rescue morphine doses was less when dexmedetomidine was added to ropivacaine.[7] The addition of dexmedetomidine to ropivacaine in ultrasound-guided bilateral subcostal TAP block led to prolongation of postoperative analgesia, less requirement of rescue morphine and lower NRS pain scores.[7] Similar to our study, many researchers reported that the addition of dexmedetomidine to various types of local anesthetic agents in various types of peripheral nerve blocks resulted in prolongation of analgesic effect.[7]	The study group (Group RD) had significantly prolonged postoperative analgesia (485.6 min) as compared to Group R (289.83 min). Moreover, consumption of morphine over 24-h period is significantly less in Group RD (14.5 mg) as compared to Group R (28.5 mg).[7]	Addition of dexmedeto-midine to ropivacaine in TAP block prolongs postoperative analgesia and reduces opioid consumption without any major adverse effects.[7]	*The study could have benefited from a larger sample size. *This study's limitations: lack of correct assessment of success rate of TAP block procedure as it was performed after induction of general anesthesia, but we relied on the skills of the investigators and the use of USG for accurate placement of blocking needle.[7] *Another limitation is that dexmedetomidine plasma concentration was not measured in the study population to determine whether its action was related to systemic absorption or local effect. *This study would benefit patients and surgical outcomes. *This being an RCT, or level 2 evidence (L-II) gave the study strength and confidence to act on data. It provides valuable supporting literature to those studies previously completed.

Citation	Design/Method	Sample/Setting	Major Variables Studied and Their Definitions	Measurement And Data Analysis	Findings	Results	Conclusions	Appraisal: Worth to Practice/Level
Qin et al,[8] 2019	Prospective, Randomized, Double-blinded Study In this study, 125 patients were randomized into 3 intervention groups: 1. Control group (without TAP block)[8] 2. Ropivacaine group (only receiving 0.2% ropivacaine with total volume of 60 ml perineurally for TAP block)[8] 3. Low, Medium, High DEX + ropivacaine groups (receiving 0.2% ropivacaine combined with 0.25 μg/kg, 0.5 μg/kg, 1.0 μg/kg DEX with total volume of 60 ml perineurally for TAP block, respectively)[8] The aim of the study was to investigate whether single-injection bilateral TAP block using ropivacaine combined with DEX as an adjuvant inhibits the stress response in patients undergoing gynecological laparoscopic surgery, and determined the optimal dose of DEX in it.[8]	Eligible for study (n = 125) The randomization scheme was generated using the table of random sampling numbers. Patients were blinded to the treatment allocation, and the recorder was blinded to the study groups.[8] Total that participated in study after attrition (n =125). One hundred and twenty-five patients undergoing laparoscopic gynecological surgery were included in this prospective and randomized double-blind study.[8] Inclusion criteria consisted of women, ranging in age from 18 to 60 years, American Society of Anesthesiologists (ASA) physical status of I or II, gynecological laparoscopic surgery under general anesthesia, and less than 3 h operation duration. Subjects didn't suffer from hypertension, heart disease and diabetes.[8] They had no medication history including regular beta-blocker, ACE-inhibitors, other cardiovascular medications and steroids.[8] Included procedures were myomectomy, ovarian cystectomy and diagnostic procedures.[8] Subjects were excluded if they had malignant tumors, hypertension, diabetes, heart disease, adrenal gland disease, severe renal or hepatic disease, a history of chronic pain, bradycardia, pregnant, a long history of systemic corticosteroid, analgesic and adrenergic receptor agonist and antagonist, or dependent on alcohol, nicotine or opioid.[8]	A total of 5 ml whole vein blood sample was collected to detect the levels of serum cortisol (Cor), norepinephrine (NE), epinephrine (E), interleukin (IL) -6 and blood glucose (Glu) at predetermined time intervals including prior to induction (T_0, baseline), prior to pneumo-peritoneum (T_1), prior to the end of pneumo-peritoneum (T_2), and at the end of surgery (T_3), respectively.[8] *Continuous variables Consumption of propofol and remifentanil were recorded at the end of operation. The duration from the completion of anesthesia to awakeness of patient was also recorded. At the same time points, mean arterial pressure (MAP) and HR were recorded, respectively.[8] Patients were followed up at 1 (H_1), 6 (H_6), 12 (H_{12}), and 24 (H_{24}) hours after surgery. During the assessment, patients were asked to rate their pain at rest and with movement on a 0 to 10 numeric rating scale (0, no pain; 10, pain as bad as you can imagine), respectively. The total consumption of dezocines within 24 h after surgery were recorded.[8]	The anticipated difference of 30% in the intraoperative stress marker levels between the control and treated groups as being clinically meaningful.[8] A sample size of 22 subjects per group was estimated necessary to detect such a difference with a power of 80% at an alpha level of 0.05 based on the results of our pilot study, which was calculated using PASS software version 15.0 (NSCC, USA).[8] We planned to include 25 patients each group to account for the potential dropouts.[8] Kolmogorov-Smirnov test was used to examine the normality of distribution of continuous outcomes. Normally distributed continuous variables, such as serum Cor, NE, E, IL-6, and Glu changes, MAP and HR over time, and postoperative pain scores at rest and with movement, were expressed as mean ± standard deviation (SD) and were compared using repeated-measures analysis of variance followed by a post hoc Tukey multiple-comparisons test where appropriate. Whereas comparisons to baseline were analyzed by a post hoc Dunnett multiple-comparisons test, and intergroup comparisons were analyzed by Tukey multiple-comparisons test, as indicated. The demographic characteristics, consumption of propofol, opioid, atropine and ephedrine during the operation and rescue analgesics after surgery, and anesthesia recovery time were compared using repeated-measure analysis of variance, whereas a post hoc Tukey multiple-comparisons test compared values between the 5 groups. Categorical data (including the ASA status and the incidence of bradycardia) were described as frequencies and proportions, and were analyzed by using Chi-square test. Data analysis was performed using IBM SPSS 19.0 (IBM Corp. Released 2010. IBM SPSS Statistics for Windows, Version 19.0. Armonk, NY: IBM Corp), and 2-tailed $P < 0.05$ was considered statistically significant.	The intraoperative levels of serum Cor, NE, E, IL-6 and Glu were lower from prior to pneumo-peritoneum (T1) to the end of surgery (T3) in Ropivacaine, Low, Medium, and High DEX + ropivacaine groups than in Control group ($P < 0.05$).[8] The consumption of propofol and remifentanil during the operation were lower in Ropivacaine, Low, Medium, and High DEX + ropivacaine groups than in Control group ($p < 0.05$), though there were no significant differences among the Ropivacaine, Low, Medium, and High DEX + ropivacaine groups ($p > 0.05$).[8] The pain scores at rest and with movement at 1 h after surgery (H_1) in Ropivacaine, Low, Medium, and High DEX + ropivacaine groups were significantly decreased compared with Control group ($p < 0.05$).[8]	One hundred and twenty patients completed the study protocol. Dexmedetomidine added to ropivacaine for transversus abdominis plane block significantly reduced serum levels of cortisol, norepinephrine, epinephrine, interleukin-6, blood glucose, mean arterial pressure and heart rate in a dose-dependent manner ($P < 0.05$), accompanied with decreased anesthetic and opioid consumption during the operation ($P < 0.05$), but the high dose of dexmedetomidine induced higher incidences of bradycardia than low or medium dose of dexmedetomidine ($p < 0.05$).[8]	The addition of dexmedetomidine at the dose of 0.5 μg/kg into ropivacaine for ultrasound-guided transversus abdominis plane block is the optimal dose to inhibit stress response with limited impact on blood pressure and heart rate in patients undergoing laparoscopy gynecological surgery.[8]	*This study's limitations: only investigated the female subjects. Perhaps there is a gender bias.[8] *Second, it is difficult for patients to be totally blind to random allocation because there is a blank control group (no TAP block).[8] * If a measurement was included shortly after pneumo-peritoneum, it would provide more perfect change trend of stress level induced by pneumo-peritoneum. It perhaps was another limitation in this study.[8] *This study would benefit patients and surgical outcomes. *This being an RCT, or level 2 evidence (L-II) gave the study strength and confidence to act on data. It provides valuable supporting literature to those studies previously completed.

Citation	Design/Method	Sample/Setting	Major Variables Studied and Their Definitions	Measurement And Data Analysis	Findings	Results	Conclusions	Appraisal: Worth to Practice/Level
Pan et al,[9] 2020	Prospective, Randomized, Double-blinded Clinical Trial In this study, 60 patients were randomized into 2 intervention groups: 1. Group R, 20 ml of 0.375% ropivacaine plus 2 ml normal saline 0.9%[9] 2. Group RD, 20 ml of 0.375% ropivacaine plus 2 ml Dex (0.5 µg/kg)[9] The aim of the present study was designed to evaluate whether dexmedetomidine (Dex) combined with ropivacaine for tranversus abdominis plane (TAP) block could improve analgesic quality and duration, and promote recovery following laparoscopic colectomy.[9]	Eligible for study (n=64) A total of 4 patients were excluded from the study as 2 patients refused to participate and 2 surgeries were cancelled.[9] The randomization scheme was generated using the table of random sampling numbers.[9] Patients were blinded to the treatment allocation, and the recorder was blinded to the study groups.[9] Total that participated in study after attrition (*n* =60). A total of 60 patients (aged 38-72 years; weighing 52-83 kg) at American Society of Anesthesiologists, with a physical status score (ASA) II-III grade and were scheduled for elective laparoscopic colectomy under general anesthesia, were recruited between February 2017 and March 2018.[9] Patients were excluded from the present study due to the following reasons: A history of allergic reactions to ropivacaine, treatment with other amino-amide LAs or dexmedetomidine, psychological disorders, infection at the injection site or any other contraindications to TAP block, tolerance to opioids or the use of opioids within 2 days prior to the start of the current study.[9]	Visual analogue scale (VAS) score for pain, sedation level, length of hospital stay (LOS), and bowel function recovery time and associated complications were recorded.[9] Overall patient satisfaction with postoperative pain management was also assessed.[9]	The patients and all staff involved in patient management and data collection were blind to the group assignment until the end of the study.[9] All TAP blocks were performed by experienced anesthesiologists who were not involved in data collection.[9] All data in the present study were analyzed using SPSS version 16.0 (SPSS, Inc.).[9] Data are presented as the mean ± standard deviation, and count (%).[9] Patient parameters, including age, weight, body mass index (BMI), operation time, blood loss, infusion volume, urine output, duration of sensory block and analgesia, time of bowel function recovery and LOS were compared using an unpaired Student's t-test. HR and mean BP at different time-points were compared between the 2 groups using a one-way ANOVA, followed by Bonferroni's post hoc test.[9] The male/female ratio, ASA grade, incidence of adverse events and degree of satisfaction were analyzed using the χ^2 or Fisher's exact test. The Mann-Whitney U-test was performed to compare pain and sedation scores between the groups.[9] To achieve a statistical power of at least 90% using ANOVA with a significance level of 0.05 and a predicted dropout of ~15%, at least 32 subjects were recruited in each group.[9]	Dex has been described as an effective adjuvant for regional anesthetic agents.[9]	The hemodynamic variables were not significantly different between the 2 groups during the surgery.[9] The duration of analgesia was significantly longer in the RD group compared with the R group ($p < 0.05$).[9] VAS scores at 1, 2, 6 and 12 h following surgery were significantly decreased in the RD group compared with those in the R group ($p < 0.05$).[9] Postoperative nausea and vomiting in the RD group was significantly decreased compared with those in the R group in the first 24 h ($p < 0.05$).[9] There were no serious adverse events in any group.[9] 90.0 and 66.7% patients were satisfied with the postoperative pain management in the RD group and R group.[9] The postoperative first bowel movement time was significantly shorter in the RD group compared with the R group ($p < 0.05$).[9] However, the LOS was not significantly different between the 2 groups.[9]	The present study demonstrated that the addition of Dex to ropivacaine could significantly improve the analgesic quality and duration of TAP block, which in turn promotes recovery following laparoscopic colectomy.[9]	*This study's limitations: The onset time of TAP block was not assessed in the current study, since the procedure was performed when patients were under general anesthesia.[9] * Also, visceral and somatic pain components were not separately assessed.[9] *The majority of postoperative parameters assessment were subjective; however, all parameters were assessed by an investigator blinded to the group allocation.[9] *Finally, a relatively low dosage of Dex was used in the present study.[9] Therefore, there is a possibility that a prolongation may be observed if the dosage of Dex had been higher.[9] *This study would benefit patients and surgical outcomes. *This being an RCT, or level 2 evidence (L-II) gave the study strength and confidence to act on data. It provides valuable supporting literature to those studies previously completed.

Citation	Design/Method	Sample/Setting	Major Variables Studied and Their Definitions	Measurement And Data Analysis	Findings	Results	Conclusions	Appraisal: Worth to Practice/Level
Zhang et al,[10] 2023	Prospective, Randomized Clinical Trial In this study, 102 patients were randomized into 2 intervention groups: 1. Group R, *n* =37, 0.375% ropivacaine 20 ml[10] 2. Group RD, *n* = 45, 0.375% ropivacaine combined with 1 μg/kg dexmedeto-midine 20 ml[10] A prospective and randomised clinical trial of 102 patients aged over 65 years who received an ultrasound-guided transversus open mesh herniorrhaphy abdominis plane (TAP) block.[10] The aim of the present study was to evaluate the effect of adding dexmedeto-midine to ropivacaine on pain relief and quality of recovery in older patients undergoing open inguinal hernia repair surgeries.[10]	Eligible for study (*n* = 102) 102 patients aged over 65 years who received an ultrasound-guided transversus open mesh herniorrhaphy abdominis plane (TAP) block with either 0.375% ropivacaine 20 ml (Group R, *n* = 47) or 0.375% ropivacaine combined with 1 μg/kg dexmedetomidine 20 ml (Group RD, *n* = 45) in the pre-anesthesia care unit before elective open inguinal hernia surgeries.[10] Four patients were excluded because of mental illness (*n* = 2) or refusal to participate (*n* = 2).[10] Total that participated in study after attrition (*n* = 92). Clinical significance was set at differences>2 on an 11-point scale. A mean difference of 2 for VAS scores with a standard deviation (SD) of ±3 and an alpha error of 0.05 revealed that a minimum of 36 patients in each group was required to produce a power of 80%.[10] Considering an expected dropout rate of approximately 20%, 44 patients per group were required.[10] In the pre-anesthesia unit, the patients were randomized in a 1:1 ratio according to numbered envelopes to receive either a 0.375% ropivacaine block (group R) or a combined 0.375% ropivacaine+1 μg/kg dexmedetomidine block based on the Ideal Body Weight (male: 50 + 2.3 kg for each inch over 5 feet; female: 45.5 + 2.3 kg for each inch over 5 feet, (Group RD).[10]	The primary outcome measure was Visual Analogue Scale (VAS) pain scores at rest and on movement at 2, 4, 8, 12 and 24 h and at 1 and 3 months' postoperatively.[10] The secondary outcome measures were the incidence of postoperative delirium (POD), nausea and vomiting and the occurrence of side effects or complications on postoperative day 1.[10] The primary outcome variable was the VAS pain scores, an 11-point pain scale, with 0 indicating no pain at all and 10 indicating the worst possible pain.[10] The secondary outcome measures were the incidence of POD, nausea and vomiting and side effects or complications on postoperative day 1.[10] Patients were interviewed in the hospital at 2, 4, 8, 12 and 24 h postoperatively, and their VAS pain scores (at rest and on movement) and PONV were assessed by nurses blinded to the group assignment.[10] To assess the incidence of chronic pain, 2 investigators assessed VAS scores at 1 and 3 months postoperatively by telephone interview.[10] The POD on the 1st postoperative day was evaluated by the 2 investigators according to the Chinese version of the Confusion Assessment Method (CAM-CR) Scale.[10]	Normally distributed interval data (age; weight; BMI; Hb; Alb; WBC; time of surgery; total dose of propofol, remifentanil, fentanyl, and vecuronium; the amount of intraoperative fluid and intraoperative mean arterial pressure, heart rate and BIS) were reported as mean ± SD and compared using the Student's t-test.[10] VAS scores were analyzed using repeated-measures analysis of variance.[10] Between-group comparisons of qualitative data (ASA scores, sex, smoking, other combined diseases, incidence of POD and PONV and incidence of postoperative complication and side effects) were performed using the Chi-square test or Fisher's exact test.[10] The comparison of intraoperative bleeding amount, ondansetron and flurbiprofen axetil consumption after operation between the groups was performed using the rank-sum test.[10]	VAS scores at rest and on movement were significantly lower in GroupRD than in GroupR at 8 and 12h postoperatively. There were no significant differences in VAS scores at 2, 4 and 24 h and at 1 and 3 months postoperatively.[10] With respect to the incidence of chronic pain (VAS scores>0 at 1 and 3months postoperatively), there were no significant group differences at 1 month.[10] The rate of POD on day 1 was significantly different between the 2 groups (Group R, 8 patients vs. Group RD, 1 patient; p = 0.03, PPA; p = 0.04, ITT).[10] The incidence of nausea was lower in Group RD than in Group R at 2–4 h (PPA: P = 0.045; ITT: p = 0.045) and at 4–8 h postoperatively (PPA: p = 0.02; ITT: p = 0.04).[10] Bradycardia was more common in Group RD than in Group R during the first 6 h postoperatively (p = 0.03, ITT).[10]	Group RD had lower VAS scores at rest and on movement at 8 and 12 h postoperatively and a lower incidence of POD on the postoperative day 1 than Group R. Transient bradycardia was more frequent in Group RD than in Group R, and side effects or post-operative complications were reported in either group.[10]	The addition of dexmedetomidine to ropivacaine in a TAP block enhances postoperative analgesia during hospitalization and improves the quality of recovery without affecting chronic pain in older patients undergoing open inguinal hernia repair surgery.[10]	*This study's limitations: most of the patients enrolled were male. Males and females differ in their sensitivity towards pain, nausea and vomiting.[10] * Also, POD mostly occurred within 5 days postoperatively, but we only assessed POD in postoperative day 1, which may have led to missing data and a low incidence of POD, as some patients may develop POD from postoperative day 2 to postoperative day 5.[10] Also, this study did not explore how dexmedetomidine acts, specifically whether through peripheral nerve or systemic responses.[10] *Lastly, the study did not evaluate postoperative sedation scores. Further studies could investigate the mechanism by which dexmedetomidine relieves pain.[10] *This study would benefit patients and surgical outcomes. *This being an RCT, or level 2 evidence (L-II) gave the study strength and confidence to act on data. It provides valuable supporting literature to those studies previously completed.

Appendix B: FIU IRB Exemption

FLORIDA INTERNATIONAL UNIVERSITY

Office of Research Integrity
Research Compliance, MARC 430

MEMORANDUM

To:	Dr. Vicente Gonzalez
CC:	Ali Adams
From:	Kourtney Wilson, MS, IRB Coordinator KMW
Date:	March 7, 2024
Protocol Title:	"An Educational Module on the Use of Dexmedetomidine as a TAP Block Adjuvant to Reduce Post-Operative Pain and Opioid Prescribing for the Abdominal Surgical Patient: A Quality 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-24-0094 **IRB Exemption Date:** 03/07/24
TOPAZ Reference #: 114068

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.

KMW

Appendix C: Recruitment Letter

Nicole Wertheim College of Nursing & Health Sciences

An Educational Module on the Use of Dexmedetomidine as a TAP Block Adjuvant to Reduce Postoperative Pain and Opioid Prescribing for the Abdominal Surgical Patient

Dear **Healthcare Performance Anesco** Perioperative Providers:

My name is Ali Adams, and I am a student from the Anesthesiology Nursing Program Department of Nurse Anesthesiology at Florida International University. I am writing to invite you to participate in my quality improvement project. The goal of this project is to increase health care providers' awareness on the use of Dexmedetomidine as a TAP Block adjuvant to reduce postoperative pain and opioid prescribing for patients undergoing abdominal surgery. You are eligible to take part in this project because you are a part of the **Healthcare Performance Anesco** perioperative provider.

If you decide to participate in this project, you will be asked to complete and sign a consent form for participation. Next, you will complete a pre-test questionnaire, which is expected to take approximately 5 minutes. You will then be asked to view an approximately 15 minutes long educational presentation online. After going through the educational module, you will be asked to complete the post-test questionnaire, which is expected to take approximately 5 minutes. *No compensation will be provided.*

Remember, this is completely voluntary. You can choose to be in the study or not. If you'd like to participate or have any questions about the study, please email or contact me at Ali Adams 954-270- 5261/aadam094@fiu.edu.

Thank you very much.

Sincerely,

Ali Adams
954-270-5261 / aadam094@fiu.edu

Appendix D: QI Project Consent

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SUMMARY INFORMATION
Things you should know about this study:

- **Purpose:** Educational module to increase providers' awareness on the use of Dexmedetomidine as a TAP Block adjuvant to reduce postoperative pain and opioid prescribing for patients undergoing abdominal surgery
- **Procedures**: If the participant chooses to participate, they will be asked to complete a pre-test, watch a voice PowerPoint, and then a post test
- **Duration:** This will take about a total of 20 minutes total.
- **Risks**: There will be minimal risks involved with this project, as would be expected in any type of educational intervention, which may include mild emotional stress or mild physical discomfort from sitting on a chair for an extended period.
- **Benefits:** The main benefit to you from this research is increase the participants' knowledge on opioid sparing practices and the importance of selecting regional adjuvant anesthetics
- **Alternatives:** There are no known alternatives available to the participant other than not taking part in this quality improvement project.
- **Participation:** Taking part in this quality improvement project is voluntary.

Please carefully read the entire document before agreeing to participate.

NUMBER OF STUDY PARTICIPANTS:

If the participant decides to be in this study, they will be one of approximately #10 people in this research study.

PURPOSE OF THE PROJECT

The participant is being asked to be in a quality improvement project. The goal of

this project is to increase providers' knowledge on the benefits of using Dexmedetomidine as an adjuvant to local anesthetics in the administration of TAP blocks, to include a reduction in opioid prescribing in the post-anesthesia care units. If you decide to participate, you will be 1 of approximately 10 participants.

DURATION OF THE PROJECT
The participation will require about 20 minutes

PROCEDURES
If the participant agrees to be in the project, PI will ask you to do the following things:
1. Complete an online 10 question pre-test survey via Qualtrics, an Online survey product for which the URL link is provided
2. Review the educational PowerPoint Module lasting 15 minutes via Qualtrics, an Online survey product for which the URL link is provided.
3. Complete the online 10 question post-test survey via Qualtrics, an Online survey product for which the URL link is provided.

RISKS AND/OR DISCOMFORTS
The main risk or discomfort from this research is minimal. There will be minimal risks involved with this project, as would be expected in any type of educational intervention, which may include mild emotional stress or mild physical discomfort from sitting on a chair for an extended period.

BENEFITS
The following benefits may be associated with participation in this project: Increase the participants' knowledge on the benefits of selecting Dexmedetomidine as a TAP Block adjuvant, and as a result, promote this opioid sparing approach to enhance pain control in the postoperative period for abdominal surgical patients. The overall objective of the program is to increase the providers' knowledge based on the current literature.

ALTERNATIVES
There are no known alternatives available to the participant other than not taking part in this project. However, if the participant would like to receive the educational material, it will be provided to them at no cost.

CONFIDENTIALITY
The records of this project will be kept private and will be protected to the fullest extent provided by law. If, in any sort of report, PI might publish, it will not include any information that will make it possible to identify the participant. Records will be stored securely, and only the project team will have access to the records.

PARTICIPATION: Taking part in this quality improvement project is voluntary.

COMPENSATION & COSTS
There is no cost or payment to the participant for receiving the health education and/or for participating in this project.

RIGHT TO DECLINE OR WITHDRAW
The participation in this project is voluntary. The participant is free to participate in the project or withdraw the consent at any time during the project. The participant's withdrawal or lack of participation will not affect any benefits to which you are otherwise entitled. The investigator reserves the right to remove the participant without their consent at such time that they feel it is in their best interest.

RESEARCHER CONTACT INFORMATION
If you have any questions about the purpose, procedures, or any other issues relating to this research project, you may contact Ali Adams at 954-270-5261/ aadam094@fiu.edu and Dr. Vince Gonzalez 305-348-0062/ vince.gonzalez@fiu.edu.

IRB CONTACT INFORMATION
If the participant would like to talk with someone about their rights pertaining to being a subject in this project or about ethical issues with this project, the participant may contact the FIU Office of Research Integrity by phone at 305-348-2494 or by email at ori@fiu.edu.

PARTICIPANT AGREEMENT
I have read the information in this consent form and agree to participate in this study. I have had a chance to ask any questions I have about this study, and they have been answered for me. By clicking on the "consent to participate" button below I am providing my informed consent.

Appendix E: Educational Module

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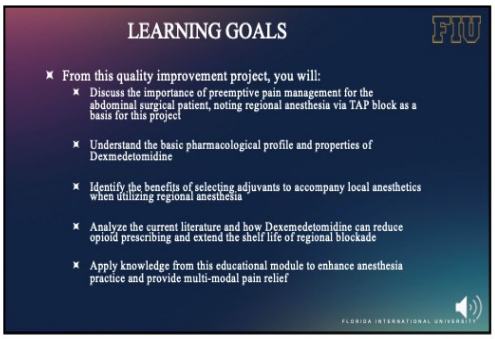

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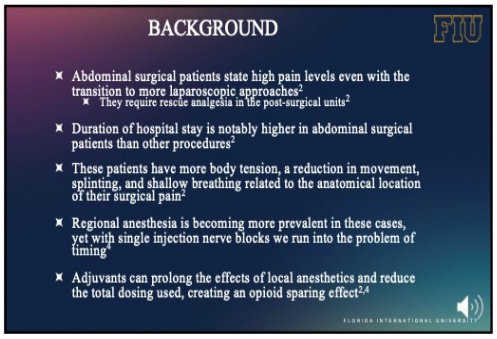

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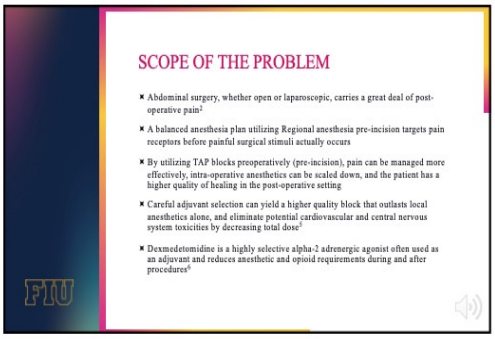

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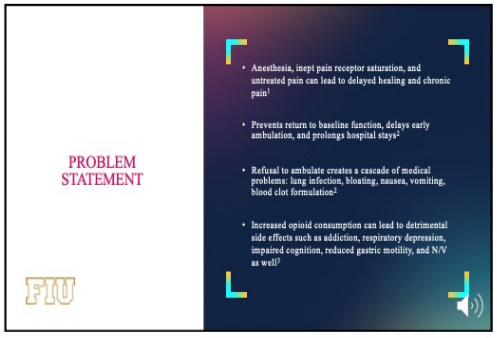

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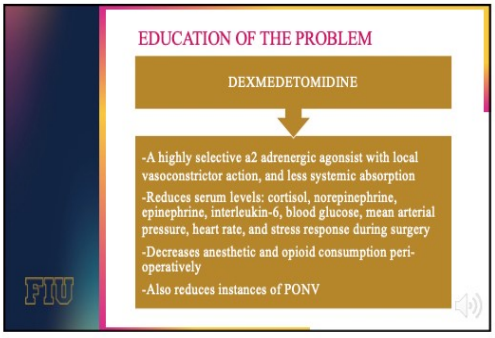

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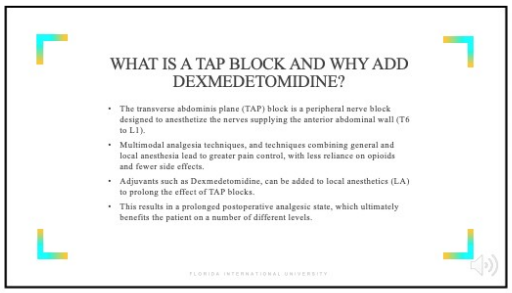
WHAT IS A TAP BLOCK AND WHY ADD DEXMEDETOMIDINE?
• The transverse abdominis plane (TAP) block is a peripheral nerve block designed to anesthetize the nerves supplying the anterior abdominal wall (T6 to L1).
• Multimodal analgesia techniques, and techniques combining general and local anesthesia lead to greater pain control, with less reliance on opioids and fewer side effects.
• Adjuvants such as Dexmedetomidine, can be added to local anesthetics (LA) to prolong the effect of TAP blocks.
• This results in a prolonged postoperative analgesic state, which ultimately benefits the patient on a number of different levels.
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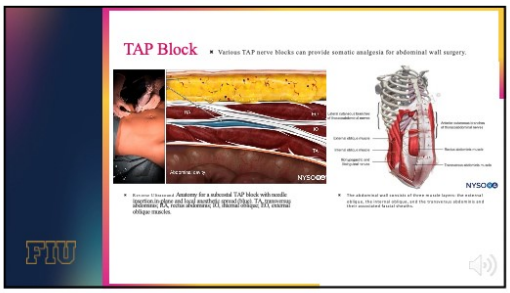
TAP Block
Various TAP nerve blocks can provide somatic analgesia for abdominal wall surgery.
NYSORA
FIU

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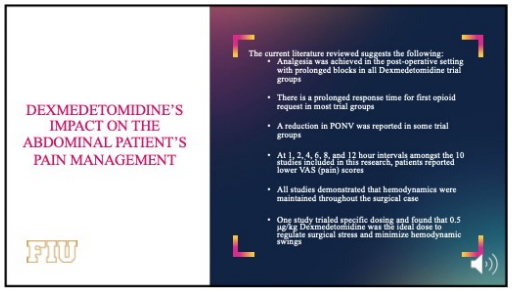
DEXMEDETOMIDINE'S IMPACT ON THE ABDOMINAL PATIENT'S PAIN MANAGEMENT
FIU
The current literature reviewed suggests the following:
• Analgesia was achieved in the post-operative setting with prolonged blocks in all Dexmedetomidine trial groups
• There is a prolonged response time for first opioid request in most trial groups
• A reduction in PONV was reported in some trial groups
• At 1, 2, 4, 6, 8, and 12 hour intervals amongst the 10 studies included in this research, patients reported lower VAS (pain) scores
• All studies demonstrated that hemodynamics were maintained throughout the surgical case
• One study trialed specific dosing and found that 0.5 µg/kg Dexmedetomidine was the ideal dose to regulate surgical stress and minimize hemodynamic swings

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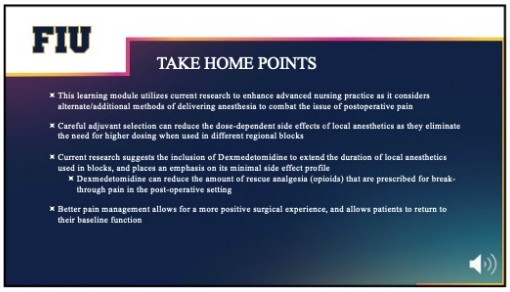
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TAKE HOME POINTS
This learning module utilizes current research to enhance advanced nursing practice as it considers alternate/additional methods of delivering anesthesia to combat the issue of postoperative pain
Careful adjuvant selection can reduce the dose-dependent side effects of local anesthetics as they eliminate the need for higher dosing when used in different regional blocks
Current research suggests the inclusion of Dexmedetomidine to extend the duration of local anesthetics used in blocks, and places an emphasis on its minimal side effect profile
Dexmedetomidine can reduce the amount of rescue analgesia (opioids) that are prescribed for break-through pain in the post-operative setting
Better pain management allows for a more positive surgical experience, and allows patients to return to their baseline function

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Thank you for your time and participation!

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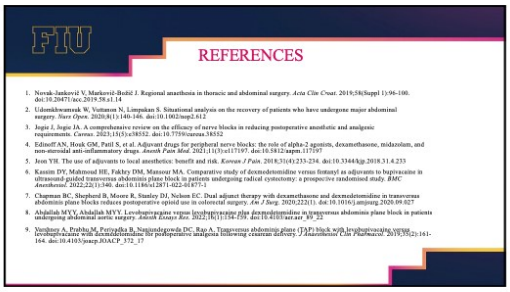
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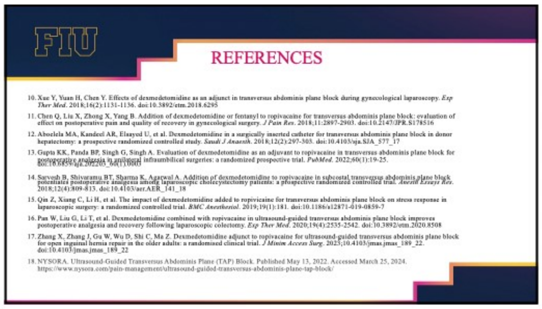
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Appendix F: Pre-Test and Post-Test Questionnaire

Pre-Test and Post-Test Questionnaire

An Educational Module on the Use of Dexmedetomidine as a TAP Block Adjuvant to Reduce Postoperative Pain and Opioid Prescribing for the Abdominal Surgical Patient

An Educational Module on the Use of Dexmedetomidine as a TAP Block Adjuvant to Reduce Postoperative Pain and Opioid Prescribing for the Abdominal Surgical Patient

INTRODUCTION

The primary aim of this QI project is to increase provider's awareness on the use of Dexmedetomidine as a Tap Block adjuvant to provide better pain management for patients undergoing abdominal surgery.

Please answer the question below to the best of your ability. The questions are either in multiple choice or true/false format and are meant to measure knowledge on the use of Dexmedetomidine as a TAP block adjuvant for abdominal surgeries.

PERSONAL INFORMATION

1. **Gender:**
    a. Male

   b. Female
   c. Non-binary
   d. Prefer not to answer

2. **Age in years:**
   a. 25-35
   b. 36-45
   c. 46-55
   d. Greater than 56

3. **Ethnicity:**
   a. Hispanic
   b. African American
   c. Caucasian
   d. Other

4. **Position/Title:**
   a. Certified Registered Nurse Anesthetist
   b. Anesthesiologist
   c. Other

5. **Level of Education:**
   a. Certificate Bachelors
   b. Masters
   c. DNP
   d. MD
   e. PhD

6. **How many years have you been a perioperative provider?**
   a. Less than 5
   b. 6-10 years
   c. 11-15 years
   d. Greater than 16 year

QUESTIONNAIRE

1. **Anesthesia, adequate pain receptor saturation, and untreated pain can lead to:**

a. Decreased opioid consumption

b. Delayed healing and chronic pain

c. Increased ambulation

d. Reduced surgical stress

2. **Why is preemptive pain management considered important for abdominal surgical patients, particularly those undergoing laparoscopic approaches?**

a. To reduce opioid side effects

b. To increase surgical stress

c. To prolong hospital stay

d. To induce deeper anesthesia

3. **How does regional anesthesia, specifically TAP blocks, contribute to effective pain management, intra-operative anesthetic scaling, and improved postoperative healing?**

a. By increasing hospital stays

b. By increasing opioid consumption

c. By targeting pain receptors pre-incision

d. By promoting shallow breathing

4. **What challenges are associated with single injection nerve blocks in abdominal surgical cases, and how can adjuvants address these challenges?**

a. Challenges related to timing

b. Challenges related to laparoscopic approaches

c. Challenges related to opioid side effects

d. Challenges related to increased movement

5. **How can adjuvants address challenges related to the timing of blocks?**

   a. By extending the quality of the block

   b. They increase the dose of local anesthetic used

   c. By increasing systemic absorpti0on of anesthetics

   d. Adjuvants intensify blocks, and in turn opioids are avoided

6. **How does careful adjuvant selection contribute to reducing dose-dependent side effects of local anesthetics in different regional blocks?**

   a. By increasing opioid consumption

   b. By promoting cardiovascular toxicity

   c. By eliminating the need for higher dosing

   d. By causing prolonged hospital stays

7. **What are some of the properties of Dexmedetomidine?**

   a. Reduce cortisol levels and stress response during surgery

   b. Increased heart rate and blood pressure

   c. Promotes shallow breathing

   d. Causes cardiovascular collapse

8. **How does the adjuvant Dexmedetomidine contribute to prolonged postoperative analgesia?**

   a. Increased pain scores

   b. Shortened response time for opioids

   c. Decreased hemodynamics during surgery

   d. Prolonged response time for first opioid request

9. **How can adjuvants contribute to a higher quality block in regional anesthesia?**

   a. By enhancing surgical stress

b. By reducing local vasoconstriction

c. By promoting pain relief

d. By promoting patient bedrest

10. What is the ideal dosing of Dexmedetomidine to regulate surgical stress and minimize hemodynamic swings?

a. 1.0 μg/kg

b. 0.5 μg/kg

c. 2.0 μg/kg

d. 1.5 μg/kg

11. According to the learning module, what is a key outcome of better pain management in the postoperative setting?

a. Increased opioid consumption

b. Negative surgical experience

c. Delayed return to baseline function

d. Reduction in rescue analgesia

Appendix G: Dissemination and Results

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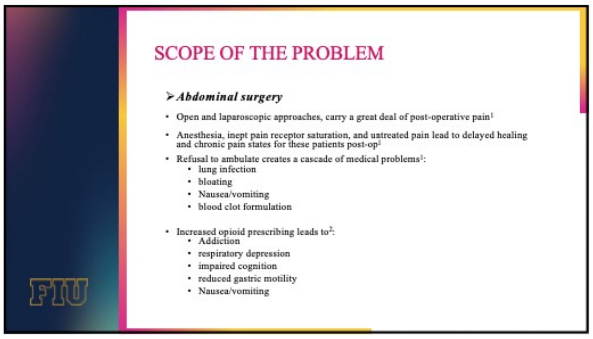

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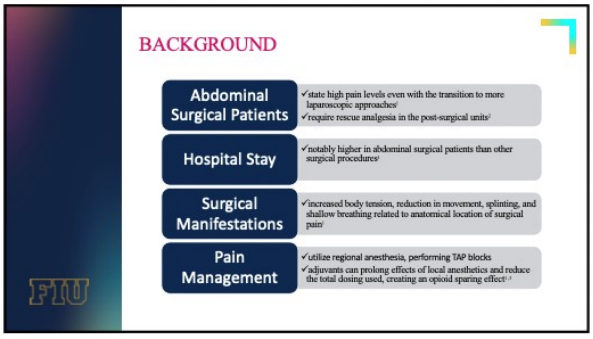

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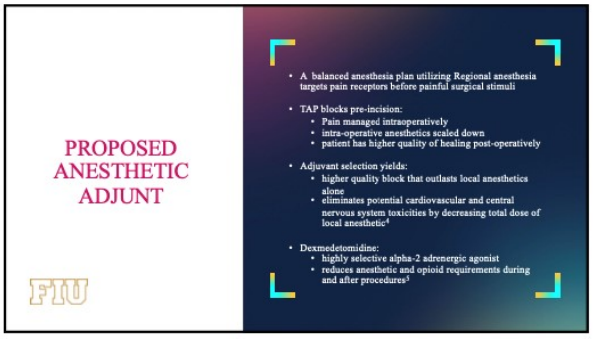

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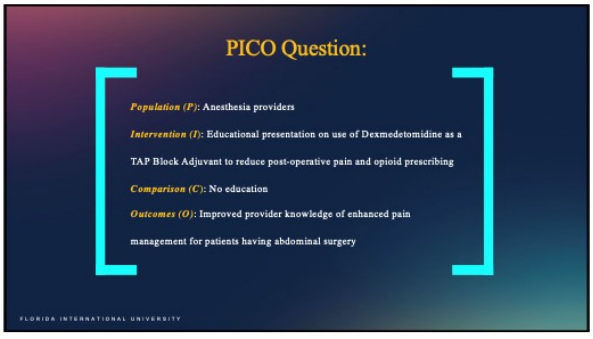

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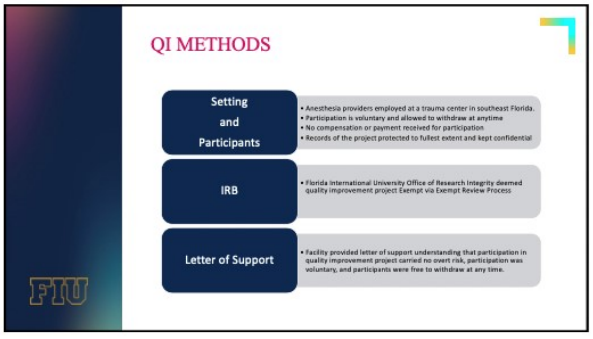

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QI METHODS

Pre-test	• Participants complete an online pre-intervention test, evaluating current knowledge of pain perception, TAP blocks, the use of adjuvants, and qualities of Dexmedetomidine
Online Educational Module	• After pre-test completion, participants then watch an online educational presentation on the use of TAP Blocks for abdominal surgical patients and the inclusion of Dexmedetomidine as an adjuvant to local anesthetic
Post-test	• After watching the online educational presentation, participants complete a post-intervention test to evaluate the knowledge gained from the educational module.
Data Collection & Analysis	• Both pre- and post-tests results recorded using Qualtrics • Data collected kept confidential, and no subject identifiers recorded • Statistical analysis performed to determine effectiveness of online educational module

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RESULTS *(demographics)*

52 invitations

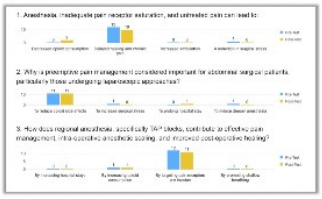
- 12 completed surveys
  - 7 male, 6 female
  - 5 Hispanic, 1 African American, 5 Caucasian (non-Hispanic), 2 other
  - 6 DNP, 6 MSN, 2 MD
  - (4) < 5 years experience, (2) 6-10 years, (1) 11-15 years, (6) > 16 years
- 1 incomplete surveys

8

RESULTS

Knowledge on Preemptive Treatment of Pain, Targeting Pain Receptors Pre-Incision

- Overall, providers were competent in the arena of preemptive pain treatments on pre-test, yet changed their answers on the post-test.
- Scores for the post-test survey were 83.3%, 91.6%, and 91.6%, showing areas for improvement



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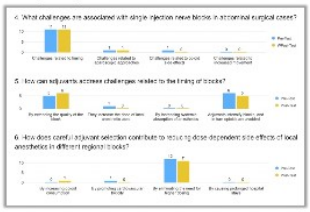
RESULTS

Knowledge on Nerve Blockade and Local Anesthetic Adjuvants

- Overall difference between pre- and post-tests was minimal, improvement was noted.
- An area for improvement was noted in terms of how adjuvants enhance blocks with only half of participants answering correctly.



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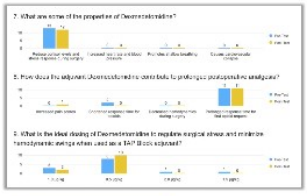
RESULTS

Knowledge on the Characteristics of Dexmedetomidine

- Pre- and post-tests showed that providers were proficient on this topic.
- The greatest improvement in scores on Dex dosing where 83.3% of participants answered correctly.
- Overall, post-test showed positive results from the educational module provided.



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RESULTS

Knowledge on Key Outcomes for Better Pain Control

- Similar scores on both pre-and post-tests
- Room for additional education on this topic

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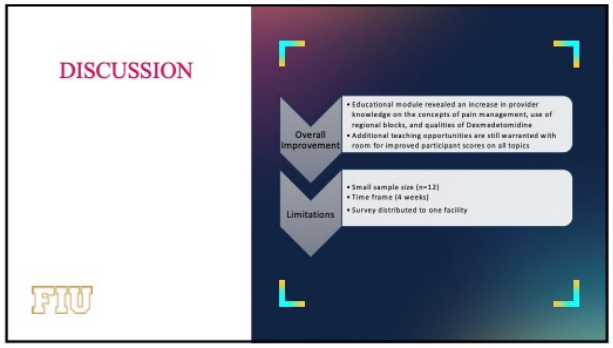
DISCUSSION
Overall Improvement
• Educational module revealed an increase in provider knowledge on the concepts of pain management, use of regional blocks, and qualities of Dexmedetomidine
• Additional teaching opportunities are still warranted with room for improved participant scores on all topics
Limitations
• Small sample size (n=12)
• Time-frame (4 weeks)
• Survey distributed to one facility
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DISCUSSION
• Future implications for advanced nursing practice
Incorporation into ERAS protocols for Abdominal Surgeries
An enhanced scope of practice for anesthesia providers, providing additional training to those interested
Continuous Research on the topic of utilizing regional anesthesia to reduce opioid prescribing
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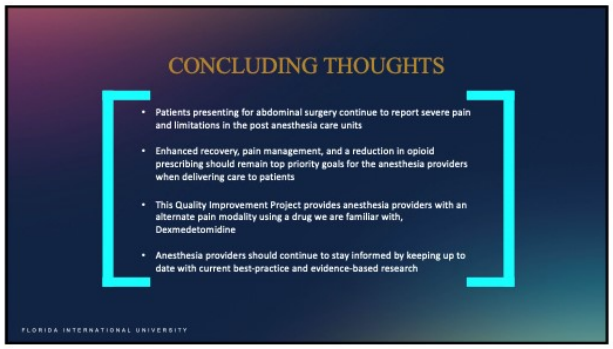
CONCLUDING THOUGHTS
• Patients presenting for abdominal surgery continue to report severe pain and limitations in the post anesthesia care units
• Enhanced recovery, pain management, and a reduction in opioid prescribing should remain top priority goals for the anesthesia providers when delivering care to patients
• This Quality Improvement Project provides anesthesia providers with an alternate pain modality using a drug we are familiar with, Dexmedetomidine
• Anesthesia providers should continue to stay informed by keeping up to date with current best-practice and evidence-based research
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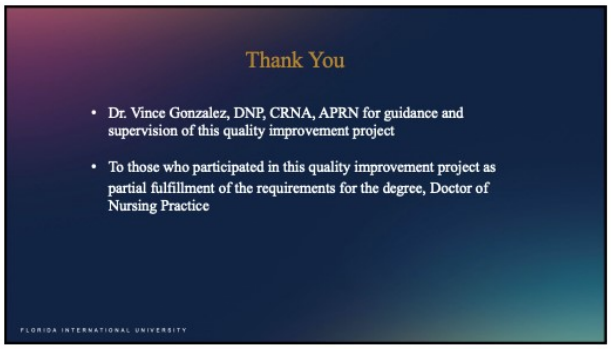
Thank You
• Dr. Vince Gonzalez, DNP, CRNA, APRN for guidance and supervision of this quality improvement project
• To those who participated in this quality improvement project as partial fulfillment of the requirements for the degree, Doctor of Nursing Practice
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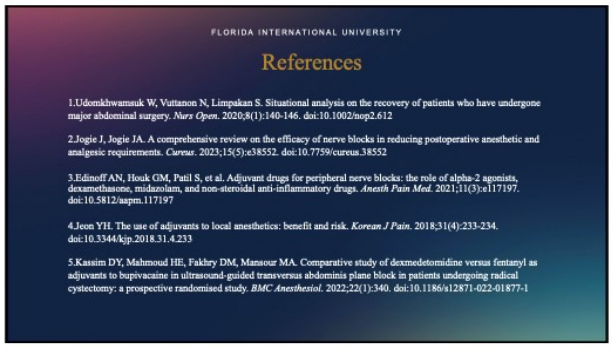
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