

University of Louisville

ThinkIR: The University of Louisville's Institutional Repository

Doctor of Nursing Practice Papers

School of Nursing

7-2020

Preoperative opioid education: total knee and total hip arthroplasty.

Brittany Durbin

Follow this and additional works at: <https://ir.library.louisville.edu/dnp>



Part of the [Nursing Commons](#)

Recommended Citation

Durbin, Brittany, "Preoperative opioid education: total knee and total hip arthroplasty." (2020). *Doctor of Nursing Practice Papers*. Paper 68.

Retrieved from <https://ir.library.louisville.edu/dnp/68>

This Doctoral Paper is brought to you for free and open access by the School of Nursing at ThinkIR: The University of Louisville's Institutional Repository. It has been accepted for inclusion in Doctor of Nursing Practice Papers by an authorized administrator of ThinkIR: The University of Louisville's Institutional Repository. This title appears here courtesy of the author, who has retained all other copyrights. For more information, please contact thinkir@louisville.edu.

**Preoperative Opioid Education:
Total Knee and Total Hip Arthroplasty**
by
Brittany L. Durbin

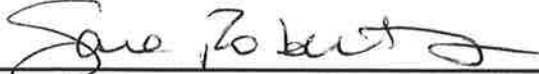
Paper submitted in partial fulfillment of the
requirements for the degree of
Doctor of Nursing Practice

School of Nursing, University of Louisville

July 29, 2020


Signature of DNP Project Chair 07/29/2020
Date


Signature of DNP Project Committee Member 07/29/2020
Date


Signature Program Director 8-5-2020
Date


Signature Associate Dean of Academic Affairs 8-5-2020
Date

Acknowledgements

I would like to acknowledge my family for believing in me as I sought to pursue my doctoral degree in nursing. My mother, Jan, and my father, Byron, have always pushed me to be the best person I can be. Without the self-discipline they instilled in me as a child, I would not be where I am today. A special salute to my brother, Michael: I promise to make you proud as you continue to watch my journey from your seat in Heaven. My friends, who have understood my inability to participate in social events and celebrations over the past several years, thank you for your patience and unwavering support. My project advisor, Dr. Whitney Nash, and project team member, Dr. Debra Anderson for their professional guidance with this project. Finally, my fellow classmates: we started as nurses sitting next to each other, anxious for the what the next three years would consist of. Now we are ending this program as true friends, and I will be forever grateful for the experiences we have shared.

Dedication

To those personally affected by addiction and the opioid epidemic.

Table of Contents

Manuscript Title Page.....	1
Acknowledgements.....	3
Dedication.....	4
Introduction.....	8
Recommended Practice Change	9
Conceptual Framework.....	10
Review of the Literature	11
Opioid Consumption.....	11
Knowledge	12
Proper Opioid Disposal.....	15
Procedures.....	15
Setting and Organizational Assessment.....	15
Purpose.....	17
Participants.....	17
Intervention.....	18
Provider Process.....	18
Patient Process	19
Opioid Risk Tool.....	21
Data Collection & Ethical Considerations	22
Results.....	23

Provider ANOVA and post-hoc Test..... 23

Patient Descriptives 24

Discussion..... 25

 Interpretation..... 25

 Limitations 26

 Conclusion 27

References..... 29

Appendix..... 32

Abstract

Opioids are commonly prescribed for the treatment of acute pain symptoms such as surgical pain. The United States is struggling to deal with abuse, misuse, and accidental death associated with prescription opioids. Lack of knowledge regarding safe opioid use is partly to blame for this crisis. The purpose of this evidence-based quality improvement project is to implement a dual-modality (written and spoken) opioid educational intervention to both health care providers and patients. Intended outcomes include increased opioid knowledge for providers yielding more effective opioid education to patients. A pre- and post-test design was used to evaluate provider knowledge and intent to implement, and a one-way repeated analysis of variance was used to analyze this data. Secondary outcome measures were gathered via a follow-up telephone survey to patients to evaluate their satisfaction of the opioid education and whether there was a successful transfer of increased knowledge relative to safe opioid use behavior. This education protocol was implemented to all pre-admission testing providers and adult patients scheduled for total knee arthroplasty (TKA) or total hip arthroplasty (THA) at a large acute care hospital system in the Midwest/south. Increasing safe opioid use knowledge among health care providers and TKA/THA patients can promote the appropriate use of prescription opioids and reduce the misuse and abuse that continues to contribute to the current opioid epidemic.

Keywords: opioids; education; total knee arthroplasty; total hip arthroplasty; epidemic; addiction

Preoperative Opioid Education: Total Knee and Total Hip Arthroplasty

Total knee arthroplasty (TKA) and total hip arthroplasty (THA) are two of the most common elective surgical procedures performed to treat osteoarthritis (Goesling et al., 2017). According to Sloan et al. (2018), the number of TKAs are projected to grow 85%, to 1.26 million procedures, and THAs by 71%, to 635,000 procedures by 2030. An important aspect to ensure successful surgical intervention is postoperative pain management. Opioids are considered the most effective form of pain analgesia for moderate to severe pain, but come with inherent risks (Costello et al., 2016), such as adverse effects (i.e. respiratory depression), tolerance, dependence, addiction, and accidental death (Casey, 2018; CDC, 2016). The term “opioid” refers to all drugs that act primarily on the opioid receptors in the body providing an analgesic or pain-relieving effect. Commonly prescribed opioids include hydrocodone (or Vicodin), oxycodone (or Oxycontin), tramadol (or Ultram), morphine, codeine, and fentanyl, among several others (Casey, 2018).

There is a non-discriminatory, 50-state epidemic of abuse, misuse, and diversion of prescription opioids. Many factors contribute to this problem, including the current aggressive culture of pain management, lack of prescribing guidelines, and inadequate education (Kim et al., 2016). Among healthcare specialists prescribing opioids, orthopedic surgeons are in the top five (Lovecchio et al., 2017), allowing this population to inadvertently contribute to illegal drug diversion on the streets (Leopald & Beadling, 2017). The term “drug diversion” is defined as the unlawful transfer of a legally prescribed controlled substance from the individual of whom it was prescribed to another individual whom it was not prescribed for; diverted drugs are most often sourced from a family member or friend and is often times unintentional due to inadequate storage practices (Wood, 2015). In a research study by Huang and Copp (2019), prescribed pain

medications for total joint arthroplasty postoperative pain management was significantly overprescribed by more than 34% in TKA and 140% in THA patients, allowing for a gross excess of opioids available for potential abuse or diversion.

Anyone who takes prescription opioids can become addicted. According to Wilson et al. (2020) in the *Morbidity and Mortality Weekly Report*, 70,237 drug overdose deaths occurred in the U. S. in 2017, 68% of which involved an opioid. In 2017, Kentucky was among the states with the highest rates of death due to drug overdoses at 37.2 overdose deaths per 100,000 persons (CDC, 2019). The CDC (2019) estimates a total economic burden of prescription opioid misuse alone in the U.S. at \$78.5 billion a year. Lack of safe-use opioid knowledge increases patient's risk of abuse, misuse, and diversion of prescription opioids (Costello et al., 2016) and this public health crisis requires further evaluation and leadership from our community (Seymour et al., 2017).

Recommended Practice Change

Improving nurses' knowledge on topics of safe opioid use, alternative pain management modalities, proper storage, and recommended disposal of excess opioids will increase their ability to educate patients and improve safe postoperative opioid practice (Costello et al., 2016). Encouraging prescribers and consumers to make safe choices about prescription opioids and raising awareness of the risks of these medications is a major priority in response to the opioid crisis (NIH, 2019). Several studies support the need for preoperative opioid education for surgical patients discharged with opioid prescriptions, and the orthopedic population plays a critical role as orthopedic surgeons represent one of the highest prescribing specialties (Syed et al., 2018).

The intervention related to this Doctor of Nursing Practice (DNP) quality improvement project was the delivery of an educational session for preadmission testing (PAT) providers, who then later educated TKA and THA patients prior to their surgical procedure. The educational session utilized recommendations from the CDC in regard to safe prescription opioid use, including proper storage and disposal of these medications. The goals of the education were to increase provider knowledge so they could effectively educate the surgical patients on the safe use of prescription opioids.

Conceptual Framework

Kurt Lewin's Change Theory (1951) guided this quality improvement project. The Lewin Change Theory is a three-step model which gives a leader guidance for successful implementation of a change within practice. A change in practice is necessary when expecting a behavior change among staff. The three phases of this model consist of: (a) unfreezing, or readying the change of an existing situation, (b) changing, or the implementation of movement to a new level of equilibrium, and (c) refreezing, or making the change that has been implemented the new standard (Lewin, 1951).

Using this model to guide the implementation process of this educational intervention helped to ensure a sustainable project. Step one, recognizing the need for the change and preparing for the change, has been taking place since the opioid epidemic became so prevalent. The Opioid Taskforce of the participating healthcare system has been assessing the needs of the community and their patients on the pressing topic of opioids. This project was approved by the involved stakeholders as they recognized the need to improve the current knowledge deficit among staff and patients on the safe use of prescription opioids. Step two, the implementation of opioid education, began in February 2020, first focusing on provider education so they could

effectively educate the target population of this project. Step three is the creation of a permanent change in practice, making preoperative opioid education for all TKA and THA patients a new standard of care at the participating facilities. With key stakeholders' support of this project and successful integration of an evidence-based education protocol, preoperative opioid education can and should eventually be provided to every patient discharged home with an opioid prescription.

Review of the Literature

Opioid Consumption

In a similar study with a randomized controlled trial, Syed et al. (2018) found the implementation of a simple preoperative opioid education tool significantly decreased the number of narcotics consumed postoperatively and allowed for earlier opioid use cessation after arthroscopic rotator cuff repair (ARCR). Patients were randomized with a computer-generated scheme to the study group or the control group; all participants were blinded to the reason for the study and told the purpose was to characterize pain control following an ARCR. The study group received an educational intervention, which consisted of a narrated two-minute video and a handout detailing the risks of narcotic use and recommended discontinuation of narcotics within two weeks of surgery. The control group received the standard of care, which did not include an educational intervention. Outcome measures were compared between the groups using an independent t-test for continuous outcomes. With a sufficient sample size of 140 patients, the study group patients (n=68) were 2.2 times more likely than control group patients to discontinue postoperative narcotics (OR, 2.19; 95% CI, 1.10-4.39; $p=.03$). Patients in the study group who were taking narcotics preoperatively were 6.8 times more likely than control group patients to discontinue narcotics at the three-month follow-up visit (OR, 6.8; 95% CI,

1.57-29.43; $p = .008$); the education had a significant impact on narcotic use for patients with and without a history of narcotic use.

Yajnik et al. (2018) conducted a non-randomized intervention study, testing the hypothesis that more informed patients would use fewer opioids following a TKA. This pre- and post-intervention study had a small sample size of 40 patients. A two-sided patient education card was designed by medical staff and included a list of scheduled and as-needed analgesic medications prescribed and each medication's indication and frequency of availability, as well as a numeric and pictorial pain rating scale. All healthcare personnel involved in studying patients' care were educated on the implementation of the patient education card and expected to review the card with patients during routine hospital events. The primary outcome of this study was opioid consumption based on morphine milligram equivalents (MME) from post-op days (POD) 1 and 2. Statistical analysis was performed using NCSS Statistical Software (NCSS, LLC, Kaysville, UT, USA) and IBM® SPSS Statistics Version 23 (IBM Corp., Armonk, NY, USA). Total two-day MME was 71 (32-285) for the pre-education card patients, and 38 (1-117) for the post-education card patients. This represented a difference [mean (95% CI, $p = 0.001$)] of 67 MME. Educating TKA patients with a simple tool which defined pain medications, dosing schedules, side effects, and suggestions for use of opioids decreased the amount of total MME.

Involving surgical patients in opioid reduction strategies through education can increase patient knowledge and lead to alternative non-opioid strategies for postoperative pain. Syed and colleagues (2018) believe their intervention has broader applications in elective orthopedic surgery and should be studied in further settings. The results of these two studies support the implementation of a similar educational intervention for TKA and THA patients.

Knowledge

Costello et al. (2016) evaluated whether an educational intervention improved nurses', and subsequently, patients' knowledge of safe opioid use in a quasi-experimental pretest-posttest study. The researchers used an education tool which included the following: (a) Food and Drug Administration (FDA) recommendations for safe use, disposal, and storage of opioids; (b) The Joint Commission recommendations for potential risks of tolerance, addiction, physical dependence, and withdrawal; and (c) American Pain Society (APS) recommendations for tapering analgesics after discharge. Nurses who participated in this study (N= 53) took a pretest which consisted of 11 demographic questions and 10 questions about knowledge of safe opioid use. A 40-minute educational presentation was provided to nurses and immediately followed by a posttest. A sample of 193 patients who were discharged from the hospital after surgery were contacted via a follow-up phone call by a research assistant. The patients who were contacted after the nurses had received opioid education (n=100) were more likely to be properly educated on safe storage of opioids (increased 36%), safe storage and disposal of opioids (increased 36%), decreased use of opioids with decreased pain (increased 46%), avoidance of opioid use other than for pain (increased 48%), and not sharing opioids (increased 49%). Data was analyzed using IBM® SPSS version 21.0 (IBM Corp.; Armonk, NY); Chi-square statistical analysis was used to compare pre- and post-patient knowledge of opioids on the following topics: (a) safe storage of opioids, (b) no crushing long-acting opioids, (c) how to dispose of unused opioids, (d) tapering opioids as pain improves, (e) using opioids for surgical pain only, and (f) no sharing of opioids with others. For all questions, the *p*-value (0.000) indicated a significant difference in knowledge between patients who were educated before and after the nurse education intervention.

Increased nurse knowledge is strongly related to increased patient knowledge about their opioid prescriptions. This was the first study to evaluate the effect of nurse education on patients' understanding of safe use of opioids. The results of this study suggest nurses are more likely to educate patients about opioid prescriptions during discharge if they have increased knowledge themselves. There is a current knowledge gap in nurses' understanding of safe opioid use, which highlights the importance of education for both nurses and patients. Patients who do not receive sufficient instruction regarding the safe use of opioids may be at an increased risk for misuse of prescription opioids following discharge (Costello et al., 2016).

In an RCT, McCarthy et al. (2015) implemented a dual-modality education intervention consisting of a one-page information sheet about hydrocodone-acetaminophen, which was given to the patients and read aloud by the research assistant while the patient was in the emergency department (ED). The written intervention used plain language, incorporating health literacy best practices (less than 8th grade readability standard), and included drug name, indication, purpose/ benefit, how to take, how long to take, when to stop taking, and to call his/ her doctor if necessary. A follow-up phone call was conducted four to seven days after the ED visit. The intervention group had 110 patients and the control group had 100 patients who participated in the follow-up call (80% and 70%, respectively). Bivariate analyses (chi-square test, Fisher's exact test, and t-tests) were conducted for all of the outcomes of interest using STATA® software version 13.1 to assess if patients' responses differed by exposure to the intervention. Patients in the intervention group had better knowledge of medication side effects ($p < 0.0001$), were more likely to remember precautions about taking additional acetaminophen (difference= 27.6, 95% CI of difference= 21.5 to 33.7; $p= 0.001$), and participated in safe use of the study

medications, measured by self-report of having driven a vehicle within six hours of taking the opioid.

Proper Opioid Disposal

Rose et al. (2016) evaluated whether the use of an opioid information pamphlet would increase the rate of proper opioid disposal, storage, and weaning among TKA and THA patients. During postoperative week four, all participants were contacted by telephone to complete a survey on opioid medication use, practices, and pain management. With a sufficient sample size of 226 patients in the study, 120 patients received an opioid education pamphlet, including safe opioid storage, opioid weaning, and proper disposal information.

Follow-up survey completion rates were 86/106 (81%) in those who did not receive the pamphlet (standard care), and 86/120 (72%) in those who received the pamphlet. Chi-square tests were used to analyze categorical data including participant demographics, opioid storage practices, and yes or no survey responses; numeric variables were compared using independent t-tests. Mean opioid cessation time was the same between the study groups at the time of the follow-up; safe opioid storage and opioid weaning did not differ among the groups. Of those no longer taking opioids, the rate of proper disposal was more than five times greater in the intervention group than in those with standard care ($p=0.005$). Patient satisfaction was rated on a scale of 0-10 (0= unsatisfied and 10= satisfied). This outcome was greater in those who received the education pamphlet (7.8) compared to those with standard care (6.2) ($p=0.029$). This investigator emphasizes how a simple, low-cost educational pamphlet improved proper opioid disposal and increased satisfaction among postoperative patients (Rose et al., 2016).

Procedures

Setting and Organizational Assessment

The intervention took place at three different hospitals affiliated with a healthcare system in the Midwest/south region. The participating facilities received The Joint Commission's Gold Seal of Approval for knee and hip replacement for their commitment to the highest standards of care and service.

This project heavily relied on the preadmission testing (PAT) providers involved in TKA and THA patients' care, as their participation in this intervention determined how effective the opioid education was for the patients. PAT providers consisted of mostly registered nurses (RNs) and several Advanced Practice Nurses (APRNs). As discussed previously in this paper, increased nurse knowledge coincides with increased patient knowledge, so it was important to gain staff support for this project to be successful. PAT staff completed tests at different points in this project (pre-, post-1, and post-4).

Patient participation was also critical for this project. In order to get descriptive data that was needed for secondary outcomes of this project, patients had to be available by telephone to answer a series of follow-up questions. This portion of the project was important for sustainability and creating a new standard of care at the participating facilities, as patient satisfaction is of utmost importance when it comes to healthcare delivery. With the approval and continued support from key stakeholders including the CNO and PAT managers from each of the facilities, orthopedic surgeons, and the Opioid Taskforce team, this project was sustainable.

This project was submitted to the University of Louisville Institutional Review Board (IRB) on December 16, 2020 for review as a quality-improvement project and was deemed not to meet the "Common Rule" definition of human subject's research, ultimately determined to be quality improvement and approved. The Leadership Review Board for the healthcare system the

intervention took place also approved this quality-improvement project on January 31, 2020. Each of these approval processes took place prior to implementation of the intervention.

Purpose

The purpose of this DNP evidence-based quality improvement project was to improve the knowledge on the safe use of prescription opioids. Objectives included: (a) development of an educational intervention for PAT providers to improve provider knowledge about prescription opioids, (b) pilot the use of dual-modality patient education in the PAT setting specifically to lower extremity total joint surgical patients, (c) screen patients for their risk of opioid misuses, (d) assess for change in practice by comparing providers' pre- and post-tests regarding their prescription opioid knowledge and intent to implement, and (e) follow-up with patients to evaluate their satisfaction with the education and whether there was a successful transfer of increased knowledge relative to safe prescription opioid use behavior. The purpose of this quality improvement project followed the expectations set by the participating facilities and aligned with the goals of the local Opioid Taskforce team.

Participants

The provider population who received education included nurses and APRNs employed in PAT at the participating facilities. In the PAT setting, these providers counsel patients and families over a one-hour scheduled appointment approximately one week prior to surgery. A total of 20 PAT staff members (17 RNs and 3 APRNs) participated in the opioid education. The patient population who received education from the above providers included all patients older than 18 years who were clinically indicated and scheduled for a primary total knee arthroplasty (TKA) or total hip arthroplasty (THA) at a participating facility with a PAT appointment scheduled during March 2020. Exclusion criteria were as follows: (a) patients scheduled for a

bilateral lower extremity arthroplasty, (b) patients scheduled for a revision of a previous TKA or THA, (c) patients scheduled for a bipolar or hemiarthroplasty due to a fracture, and/or (d) patients with an inability to communicate verbally by telephone. The goal was to collect descriptive statistics on 50 patients total.

Intervention

Provider Process

Prior to the intervention, goals of the project were discussed and planned at length with key stakeholders. A dual-modality, verbal and written, prescription opioid educational intervention was delivered to PAT providers by the DNP student. The education included a 10-minute multimedia PowerPoint presentation created by the DNP student and a written brochure created by the participating healthcare system entitled *Managing Your Pain*, which was recently updated in August 2019 to include the safe use of prescription opioids. PAT provider education took place during the February 2020 staff meeting for each of the facilities; the PowerPoint presentation was presented to each of the participating staff members at this time. Prior to receiving the education, providers completed a pre-test to assess their baseline knowledge.

Objectives of the provider PowerPoint education included the following: (a) common prescription opioid medications, (b) common symptoms and adverse effects associated with opioids, (c) alternative pain modalities following surgery, (d) safe opioid use practices including proper storage of prescription opioids and proper disposal of excess prescription opioids when they are no longer needed, and (f) review of a screening tool used to assess patients for risky opioid behavior. The brochure highlights the topics of: (a) acute versus chronic pain, (b) a combined faces and numeric pain scale, (c) non-pharmacologic methods to manage pain, and (d) pharmacologic methods to manage pain including the use of opioids, the risks of opioid use, and

safe storage and disposal of opioids. Immediately following the dual-modality education, providers completed a post-test, referred to as “post-1”, which assessed their understanding of the objectives covered during the education in addition to their intent to implement. Providers completed the same test four weeks following the initial education, referred to as “post-4”, which assessed if the learning objectives had been retained and therefore more likely to be implemented into practice.

The tool used to assess provider knowledge and intent to implement included a 10-question test created by the DNP student. This tool was comprised of questions that were adapted from other pre-/post-tests used in similar evidence-based research and also specifically followed the objectives of the provider prescription opioid education. The test included five knowledge items to assess their knowledge of prescription opioids and five intent to implement questions using a five-point Likert scale. The knowledge items were scored as one (1) point if the provider chose the correct answer, and zero (0) points if the provider chose the incorrect answer. The behavior items were scored on a five-point Likert scale from zero to four (0-4) points.

The pre-, post-1, and post-4 tests were identical, assessing provider knowledge and intent to implement at different times of the process. Providers were assigned a unique ID to keep the results anonymous and ensure appropriate comparison of pre-, post-1, and post-4 test data. To ensure PAT providers’ confidentiality, demographic data was not included in analysis. The pre-, post-1, and post-4 tests were printed on different colors of paper (pre-test was printed on pink paper, post-1 test was printed on yellow paper, and post-4 test was printed on green paper) to ensure separation of the results.

Patient Process

PAT providers began implementing dual-modality prescription opioid education to TKA and THA surgical patients during scheduled PAT appointments in March 2020. Patients received verbal education regarding their prescription opioid as well as the same written brochure, *Managing Your Pain*, that the providers previously received. The objectives of the patient education included the following: (a) common prescription opioid medications, (b) common symptoms and adverse effects associated with opioids, (c) alternative pain modalities following surgery, and (d) safe opioid use practices, including proper storage of prescription opioids and proper disposal of excess prescription opioids when they are no longer needed.

Following prescription opioid education, PAT providers reviewed the Patient Information Sheet with the patient, briefly explaining the project and gathering a good call back number and the best time of day for the DNP student to call to complete the follow-up survey. Patients were made aware that a nurse practitioner student would be following up with them one week postoperatively to ask questions regarding their pain management and prescription opioid use. Patients then completed the Opioid Risk Tool (ORT) with the PAT provider. This tool was filled out on a paper copy for each patient and stapled to the filled-out Patient Information Sheet with a patient sticker. The DNP student obtained the unidentified patient data from the completed forms to include in the results of this project, protecting identified patient information.

A follow-up telephone survey was attempted for each of the TKA and THA patients one-week following their procedure to evaluate the effect of the educational intervention. The DNP student purchased a pre-paid cell phone to complete the patient follow-up survey in order to not expose her personal contact information to each of the participating patients. Participants were considered unavailable if they could not be reached in three telephone call attempts; a voicemail was left on the first and second missed attempt if applicable.

The tool used to assess patient satisfaction and knowledge included a 10-question survey created by the DNP student and followed the objectives of the patient education. This self-report survey included a question assessing whether the patient did or did not receive the dual-modality education, in addition to four satisfaction items using a five-point Likert scale and five knowledge items to assess the patients' learning. If the patient answered "yes" to receiving the dual-modality education, it was scored as one (1) point, "no" was zero (0) points. The knowledge items were scored as one (1) point if the patient chose the correct answer, and zero (0) points if the patient did not know the answer. The satisfaction items were scored on a five-point Likert scale from zero to four (0-4) points. Measures needed for patient evaluation include demographic data (i. e. age in years, gender, and race) as well as physical measures of height (in feet and inches), weight (in pounds), scheduled procedure and laterality, the patients' pain score prior to surgery on a scale of zero to ten (0-10), and whether the patient was opioid naïve or opioid tolerant. Research suggests that preoperative opioid use may contribute to decreased pain relief following a TKA, leading to an increased use of prescription opioids (Smith et al., 2017).

Opioid Risk Tool

The Opioid Risk Tool (ORT) was used to assess TKA and THA patients' risk for prescription opioid abuse. This tool was created by Lynn R. Webster in 2005 and is available as a free public resource by the National Institute on Drug Abuse. The ORT should be administered to patients upon an initial visit prior to beginning opioid therapy for pain management.

The ORT is a brief, self-report screening tool for use with adult patients to estimate risk of prescription opioid-related aberrant behaviors based on patients' family and personal history. Patients categorized as high-risk have an increased likelihood of future abusive drug-related

behavior. The ORT can be administered and scored in less than 1 minute and has been validated in both male and female patients. A score of three or lower (≤ 3) indicates low-risk for future opioid abuse, a score of four to seven (4-7) indicates moderate-risk for opioid abuse, and a score of eight or higher (≥ 8) indicates a high-risk for opioid abuse (Webster, 2005). Should a patient score in the high-risk category, their surgeon was made aware and they could modify the prescription as they saw appropriate.

This tool was chosen for the project since it is brief and has been proven to be scientifically sound (Webster & Webster, 2005; Lawrence et al., 2017). Other tools have moderate or even limited support and are meant to be used during opioid therapy versus prior to the initiation of opioid therapy, or the focus tends to be on the risk of polysubstance abuse. The main limitation with this tool is the item “age”; the most common age to receive a total joint arthroplasty is 50 to 80 years, which will leave very few patients selecting age between 16 to 45 years as a risk for opioid misuse. It is proven that older adults are more susceptible to the actions of opioids, leaving this population more vulnerable to these drugs’ adverse effects (Casey, 2018). This limitation could lead to a slightly lower risk score for this patient population.

Data Collection & Ethical Considerations

There were no risks to the providers who participated in the educational intervention or the patients who were educated and whose charts were reviewed for this project. Providers were asked to participate in this project by their leaders in management as the goals of the project aligned with the company’s goals for providing the best patient care. Unique IDs were assigned to providers to ensure anonymity and appropriate comparison of pre- and post-test data. Patient participants were provided with a brief description of this project at the beginning of their PAT appointment and asked if they would like to participate. If they agreed to participate, they

provided the best time of day to be contacted by the DNP student and contact information. Unique IDs were also assigned to patients to ensure confidentiality of personal health information. Patient electronic health records were accessed using the participating facilities' documentation system EPIC™ (Verona, WI), gathering information on the participants' scheduled procedure, date of the procedure, laterality, and demographic variables.

Throughout the entirety of this project, HIPAA policy and procedures were followed, and provider and patient confidentiality was maintained. All project data records were identified by ID number only. Data with participant identifiers was stored on an encrypted and password-protected project laptop. All hard-copy project data was kept in a locked file cabinet in the project leader's locked office at the Health Sciences Campus, Suite 3019, office 3042. An identifier key with a list of ID numbers corresponding to participants' names and phone numbers was kept in a separate locked drawer from the project data.

Results

This project included a repeated-measures design utilizing quantitative data analysis to assess practice change following an educational intervention. The null hypothesis assumes there was no difference among provider test scores with the implementation of the educational intervention. Descriptive statistics summarized quantitative data collected from the patient follow-up in regard to the satisfaction of the educational intervention and improved knowledge with the safe use of prescription opioids following surgery, along with some qualitative variables to describe the population. Statistical analysis was performed with the use of IBM® SPSS Statistics Version 26 (IBM Corp., Armonk, NY).

Provider ANOVA and post-hoc Test

A total of 20 PAT providers (N=20) received the educational intervention and completed the pre-, post-1 and post-4 tests. A one-way analysis of variance (ANOVA) with repeated measures was conducted to evaluate the effect of the educational intervention on providers' knowledge of prescription opioid safe use and intent to implement the intervention to participating patients. Pre- and post-tests completed by the provider participants at three separate times during this project were compared. Baseline, or pre-test, (possible range 0 – 25) had a mean score of 13.35 ($SD = 2.56$), post-1 test had a mean score of 17.05 ($SD = 2.48$), and post-4 test had a mean test score of 22.05 ($SD = 1.64$). Refer to the linear diagram in the Appendix, which illustrates the increase in providers' average test scores over time. Mauchly's test resulted in $X^2(2) = 2.84, p = .24$, therefore the assumption of sphericity was not violated. Results of the one-way repeated measures ANOVA indicated there was a significant difference amongst provider test score averages following education and time, $F(2, 38) = 140.96, p < 0.05$, therefore the null hypothesis can be rejected as there was a statistically significant difference between at least two of the groups. Pairwise comparisons were conducted using a modified Bonferroni post hoc test to examine for differences between the three compared test score averages. This analysis revealed that test score averages had significantly improved each time the test was administered, ($p = < 0.05$). From baseline to post-1 test, scores increased on average by 3.70 ($SE = .42$) points; from baseline to post-4 test, scores increased on average by 8.70 ($SE = .60$) points. The measure of effect size was calculated using partial eta squared, ($\eta^2 = 0.88$), indicating 88% of the total variance of test scores were attributed to the educational intervention.

Patient Descriptives

A total of 26 patients (N= 26) received the educational intervention and participated in the follow-up phone survey. This sample was comprised of 50% males and 50% females. All

but one patient was Caucasian ($n = 25$). The average age of patients was 65.04 years ($SD = 11.60$) ranging from 38 to 87 years. Five patients (19.2%) underwent a TKA and 21 patients (80.8%) underwent a THA. In reference to the follow-up survey, 24 patients were completely satisfied with the verbal and written prescription opioid education implemented by the PAT providers, and two patients were mostly satisfied (on a five-point Likert scale from mostly dissatisfied to completely satisfied). Nineteen patients were mostly satisfied with the pain reduction from the prescription opioid following surgery. Unwanted side effects were never experienced by 7 patients ($n = 7$), sometimes by 9 patients ($n = 9$), often by 9 patients ($n = 9$), and almost always by 1 patient ($n = 1$). The most common unwanted side effects reported by patients included constipation, nausea and vomiting, and dizziness. All of the patients (100%) were able to recall common side effects while on opioids, activities to avoid while on opioids, and alternative pain modalities to opioids; 92.3% of patients were appropriately storing their prescription opioids following their surgical procedure while they were still needed for pain management; and 88.5% of patients were aware of the correct way to dispose of their prescription opioids when they were no longer needed.

The ORT scores varied among the patient participants, with 76.9% scoring three or lower indicating a low risk for future opioid abuse; 15.3% scoring between four to seven indicating a moderate risk for opioid abuse; and 7.7% scoring eight or higher indicating a high risk for opioid abuse.

Discussion

Interpretation

The findings of this project indicated that there was a significant increase in knowledge and intent to implement among the provider participants. Implementation of the educational

intervention provided by the DNP student to the PAT providers showed an increase in average test scores by almost nine points when comparing the baseline total test scores to the post-test four weeks following the education total test scores. These findings were consistent with the supportive data from the review of evidence-based literature review on the effect of implementing an educational intervention on the safe use of prescription opioids first to staff and then to patients. Similarly, the patient follow-up survey also showed positive results, supporting the use of verbal and written education materials on the safe use of prescription opioids and allowing for patients to make more informed decisions regarding their pain management.

Limitations

The sample size for this quality improvement project was small, including 20 providers (N = 20) and 26 patients (N = 26). This sample size does not allow for generalization beyond the sample of this project. The small patient sample size can be largely attributed to the current SARS-CoV-2 global pandemic which created unprecedented times, especially in the healthcare setting. SARS-CoV-2 is a novel virus that can result in a COVID-19 infection. The participating facilities ceased all elective surgical procedures (including TKA and THAs) on March 18, 2020. Elective procedures were defined as any surgery that could be postponed 30 days or greater without causing harm to the patient. The participating facilities remained compliant with government recommendations and executive orders to protect their patients and limit the spread of COVID-19. Elective surgeries resumed in a three-phase timeline: May 6, 2020 outpatient elective surgeries resumed, May 13, 2020, inpatient elective surgeries resumed at 50% capacity, and May 27, 2020 all elective procedures and normal operations returned as long as hospital and surgical capacity for ill COVID-19 patients was able to occur. While protecting patients is of utmost priority, a more robust sample could have better supported this

project and allowed for greater sustainability, reliability, and validity. Another limitation was the use of the partial eta squared for sake of simplicity when determining the overall effect size of variance for the provider test scores; the effect size for the repeated-measures data is slightly overestimated as the partial eta squared was used instead of the omega squared for repeated-measures ANOVA.

A barrier of this project was an increased workload for the PAT providers associated with the implementation of the educational intervention for TKA and THA patients and the expectation that patients be screened with the ORT. The DNP student created a script for the PAT providers to use as a reference while they educated patients, attempting to decrease the workload; the script was short and could be read aloud in two to three minutes.

Conclusion

Opioids are necessary for TKA and THA postoperative pain management, yet opioid misuse and diversion can result in addiction, overdose, and death (Rose et al., 2016). With the implementation of a low-cost opioid educational intervention, first to providers then to patients, TKA and THA patients can make more informed decisions regarding their care and participate in safer opioid use practices (McCarthy et al., 2015; Rose et al., 2016; Syed et al., 2018; Yajnik et al., 2018). Opioids are high-risk, potentially addictive medications. While this project can set precedent and lay the groundwork for all surgical patients discharged with prescription opioids to receive dual-modality education on the safe use of these potentially lethal medications, more robust solutions could include the development of an intervention for prescription opioid tapering and cessation following a TKA or THA.

Results of this quality improvement project will be shared with those within the administrative and leadership teams of each participating facility, the local Opioid Taskforce

team, and at the DNP poster session prior to graduation. The final manuscript will be submitted to the Journal of the American Society for Pain Management Nursing, ensuring confidentiality of the facility, staff, and participants.

References

- Casey, G. (2018). Understanding opioids. *Kai Tiaki Nursing New Zealand*, 24(8), 20-24.
- Centers for Disease Control and Prevention. (2016). *Prescription opioids: What you need to know*. CDC. <https://www.cdc.gov/drugoverdose/pdf/AHA-Patient-Opioid-Factsheet-a.pdf>
- Centers for Disease Control and Prevention. (2019). *Drug overdose deaths*. CDC. <https://www.cdc.gov/drugoverdose/data/statedeaths.html>
- Costello, M., Thompson, S., Aurelien, J., & Luc, T. (2016). Patient opioid education: Research shows nurses' knowledge of opioids makes a difference. *MEDSURG Nursing*, 25(5), 307-333.
- Goesling, J., Moser, S. E., Zaidi, B., Hassett, A. L., Hilliard, P., Hallstrom, B., Clauw, D. J. & Brummett, C. M. (2016). Trends and predictors of opioid use following total knee and total hip arthroplasty. *Pain*, 157(6), 1259-1265. <http://dx.doi.org/10.1097/j.pain.0000000000000516>
- Huang, P. S. & Copp, S. N. (2019). Oral opioids are overprescribed in the opiate-naïve patient undergoing total joint arthroplasty. *Journal of the American Academy of Orthopaedic Surgeons*, 27, e702-e708. <http://dx.doi.org/10.5435/JAAOS-D-18-00404>
- Survey on Drug Use and Health*. NSDUH. <http://www.samhsa.gov/data/>
- Kim, N., Matzon, J. L., Abboudi, J., Jones, C., Kirkpatrick, W., Leinberry, C. F., Liss, F. E., Lutsky, K. F., Wang, M. L., Maltenfort, M. & Ilyas, A. M. (2016). A prospective evaluation of opioid utilization after upper-extremity surgical procedures: Identifying consumption patterns and determining prescribing guidelines. *The Journal of Bone and Joint Surgery*, 98-A(20), e89 (1-9). <http://dx.doi.org/10.2106/JBJS.15.00614>

Leopold, S. S. & Beadling, L. (2017). Editorial: The opioid epidemic and orthopaedic surgery—
No pain, who gains? *Clinical Orthopaedics and Related Research*, 475, 2351-2354.

<http://dx.doi.org/10.1007/s11999-017-5454-y>

Lewin, K. (1951). *Field theory in social science: Selected theoretical papers*. Harper & Row.

Lovecchio, F., Derman, P., Stepan, J., Iyer, S., Christ, A., Grimaldi, P., Kumar, K., Ranawat, A.

& Taylor, S. A. (2017). Support for safer opioid prescribing practices: A catalog of
published use after orthopaedic surgery. *The Journal of Bone and Joint Surgery*, 99-
A(22), 1945-55. <http://dx.doi.org/10.2106/JBJS.17.00124>

National Institutes of Health. (2019). *Opioid overdose crisis*. NIH.

<https://www.drugabuse.gov/drugs-abuse/opioids/opioid-overdose-crisis>

McCarthy, D. M., Wolf, M. S., McConnell, R., Sears, J., Chevrier, A., Ahlstrom, E., Engel, K.

G., Cameron, K. A., Adams, J. G. & Courtney, D. M. (2015). Improving patient
knowledge and safe use of opioids: A randomized controlled trial. *Official Journal of the
Society for Academic Emergency Medicine*, 22(3), 331-338.

<https://doi.org/10.1111/acem.12600>

Rose, P., Sakai, J., Argue, R., Froehlich, K., & Tang, R. (2016). Opioid information pamphlet
increases postoperative opioid disposal rates: A before versus after quality improvement
study. *Canadian Journal of Anesthesia/Journal canadien d'anesthésie*, 63, 31-37.

<http://dx.doi.org/10.1007/s12630-015-0502-0>

Seymour, R. B., Ring, D., Higgins, T., & Hsu, J. R. (2017). Leading the way to solutions to the
opioid epidemic. *The Journal of Bone and Joint Surgery*, 99-A(21), e113(1)-(10).

<http://dx.doi.org/10.2106/JBJS.17.00066>

- Sloan, M., Premkumar, A., & Sheth, N. P. (2018). Projected volume of primary total joint arthroplasty in the U.S., 2014 to 2030. *The Journal of Bone and Joint Surgery*, 100-A(17), 1455-60. <https://doi.org/10.2106/JBJS.17.01617>
- Smith, S. R., Bido, J., Collins, J. E., Yang, H., Katz, J., N., & Losina, E. (2017). Impact of preoperative opioid use on total knee arthroplasty outcomes. *The Journal of Bone and Joint Surgery*, 99, 803-808. <https://dx.doi.org/10.2106/JBJS.16.01200>
- Syed, U. M., Aleem, A. W., Wowkanech, C., Weekes, D., Freedman, M., Tjoumakaris, F., Abboud, J. A. & Austin, L. S. (2018). Neer award 2018: The effect of preoperative education on opioid consumption in patients undergoing arthroscopic rotator cuff repair: A prospective, randomized clinical trial. *Journal of Shoulder and Elbow Surgery*, 27, 962-967. <http://dx.doi.org/10.1016/j.jse.2018.02.039>
- Webster, L. R. & Webster, R. M. (2005). Predicting aberrant behaviors in opioid-treated patients: Preliminary validation of the Opioid Risk Tool. *Pain Medicine*, 6(6), 432-442. <https://doi.org/10.1111/j.1526-4637.2005.00072x>
- Wilson, N., Kariisa, M., Seth, P., Smith, H. & Davis, N. J. (2020). Morbidity and mortality weekly report. *CDC*. <https://www.cdc.gov/mmwr/volumes/69/wr/mm6911a4.htm>
- Wood, D. (2015). Drug diversion. *Australian Prescriber*, 38(5), 164-166. <https://doi.org/10.18773/austprescr.2015.058>
- Yajnik, M., Hill, J. N., Hunter, O. O., Howard, S. K., Kim, T. E., Harrison, T. K. & Mariano, E. R. (2019). Patient education and engagement in postoperative pain management decreases opioid use following knee replacement surgery. *Elsevier*, 102(2), 383-387. <https://doi.org/10.1016/j.pec.2018.09.001>

Appendix

Mean Provider Test Scores

