

2018

Management of Postoperative Pain in the Total Joint Replacement Patient

Angela Washington
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Walden University

College of Health Sciences

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Angela Washington

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Walden University

2018

Abstract

Management of Postoperative Pain in the Total Joint Replacement Patient

by

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MS, Bowie State University, 2000

BS, Hampton University, 1988

Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Nursing Practice

Walden University

August 2018

Abstract

Managing postoperative pain continues to be a challenging public health problem. The organization under study was experiencing a prolonged length of hospital stay (LOS) in the post-total knee and hip replacement surgery population that was causing system-wide patient flow issues. The purpose of this quality improvement project was to educate patients through an established education class on pain expectations, strategies on managing pain, discharge planning, and physical therapy expectations with a goal of reducing pain and LOS. The health belief model was used as a guide to incorporate new content into the educational program that addressed patient knowledge on pain, concerns, fears, and misconceptions related to surgery. New content was added to the class on strategies to improve postoperative pain to help the organizational need to meet 2- to 3-day LOS. The project compared differences in pain levels and LOS in participants who completed the preoperative education and those who did not. The project methodology was a retrospective nonexperimental pretest and posttest design, and a quantitative analysis was used to compare pain levels measured by visual analog scale in documented charts during hospital stay. LOS was measured from data collected from chart review. The findings revealed lower pain levels during the hospital stay of those who completed the educational program. The patients who did not attend the class had an average mean LOS of 5 days as compared to 3 days LOS for those who attended the preoperative class. The project impacts social change on an organizational level by demonstrating that patients undergoing joint replacement surgery benefit from the revised educational plan, which results in early mobility, better pain control, and decreased LOS.

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Dedication

I would like to dedicate this DNP project to my husband, Craig, for his love and support in my journey to reach the pinnacle of my nursing degree. To my children, Terrence and Phillip, for their unconditional love, support, and understanding throughout my season of educational discovery to obtain my doctoral degree. To my parents for the inspiration and spiritual reminders that kept me moving forward to reach my goal. To my sister, Fran, whose words of encouragement kept me focused and moving forward even when I felt overwhelmed and discouraged.

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Section 1: Nature of the Project

Introduction

With the Affordable Care Act (ACA) requiring hospitals to cut costs to receive reimbursements, hospitals are creating new ways to provide quality care in the most efficient and effective way. Researchers have validated that under-treatment of postoperative pain is a national problem, contributing to prolonged length of hospital stay, slower recovery, increased risk for surgical complications, and progression to chronic pain conditions (Apfelbaum, Chen, Mehta, & Gan, 2003; Kruzik 2009). Preoperative education prior to surgery eases patients' worries and imparts knowledge on what to expect before, during, and after surgery related to management of pain, discharge expectations, and goals (Kruzik, 2009). I carried out a quality improvement (QI) project that enhanced an institutional issue of prolonged hospital length of stay (LOS) through a restructured educational program for orthopedic surgical patients undergoing total joint replacement (TJR) of their knee or hip. In Section 1, I will discuss the introduction, background, problem statement, purpose, practice focused question, objectives, framework, nature of the project, assumptions, delimitations and limitations of the project, and significance of the project.

Background and Context

The large, urban, medical center study site serving veterans used to offer a preoperative education class to patients having total knee or hip replacement surgeries. The class stopped being offered when one of the nurse practitioners retired and the other could not keep up with the administrative and logistical tasks for sustainability of the

class. Since then, an increase in LOS of orthopedic patients was identified by a social worker on the surgical floor. I initiated an institutional, QI project to address the new increase in the LOS of the orthopedic patients. The solutions I identified were to restart the preoperative education class and add more presenters to the class for education on discharge planning. I had the opportunity to address postoperative pain as one factor impacting LOS by modifying content in the class to inform the patients of pain expectations as well as the management and interventions used to control surgical pain.

Problem Statement

The large, urban, medical center serving veterans was experiencing a backup in surgery admissions because there was an increased length of hospital stay in the TJR patients being discharged from the floor to the acute care rehabilitation facility. There was a total of four acute care rehabilitation beds available at one time, and of those, two were available for TJR patients, while the other two were for stroke rehabilitation patients. The transfer of the TJR patients was often delayed as a result of the patient's lack of mobility due to uncontrolled pain and not meeting physical therapy goals to go home in 2 to 3 days.

The education class had not been offered since the nurse practitioner (NP) retired. In addition, another TJR surgeon started performing surgery so there were now two orthopedic surgeons. Each surgeon performed two surgeries per week with a total of 24 patients undergoing TJR surgery per month. As a result of the problems mentioned, the LOS for TJR patients ranged from 5 days to 2 weeks. The social worker who helped with home discharge and transfers voiced concern and reported being overwhelmed with the

situation because there was a shortage of acute rehabilitation beds for TJR patients available in the surrounding affiliated medical centers that serve veterans. The facility assembled a systems redesign team with key stakeholders to investigate new approaches to improve the patient flow on the surgery floor with the intent to decrease LOS from 5–14 days to the national average LOS of 2 to 3 days. The existing education class would provide education for patients. Results of the quality improvement project would provide data for future policy and show a cost-effective strategy in reducing hospital costs with early discharge from the hospital (Kettner, Moroney, & Martin, 2013). Although the medical center was responsible for reporting LOS data to the federal government, the medical center was also interested in monitoring and evaluating the preoperative education class to determine if the impact improved postoperative pain, facilitated early mobility, and resulted in discharge to home within 2 to 3 days after surgery.

Purpose Statement

To address the organizational problem of prolonged LOS and inadequate management of postoperative pain that contributed to delayed mobility and LOS in the TJR patient population, I used a multidisciplinary educational approach to improve organizational and patient outcomes. The purpose of this project was to educate patients through an established education class on pain expectations, strategies on managing pain, discharge planning, and physical therapy expectations in preparation for a 2 to 3-day discharge. Aligned with the organization's change toward patient-centered care, patients are empowered to take ownership in their care with shared decision making along with the health care team to meet their needs and wants for the best outcome. If patients are

aware of the expectations for postoperative pain following TJR surgery, which includes knowledge of surgical complications, consequences of not following recommended postoperative course, and discharge instructions to care for the surgical wound, then pain is better managed (McDonald, Page, Beringer, Wasiak & Sprowson, 2014). Being able to recover from surgery faster lessens the need for acute rehabilitation, reducing overall hospital costs. The purpose of this educational project was to restructure content in the education program on patient knowledge on pain, concerns, fears, and misconceptions related to surgery in addition to inform of institutional expectations on LOS and discharge planning.

Project Objectives

The overriding goal of the project was that it would lead to patients having adequate management of postoperative pain after TJR surgery for early mobility and faster recovery for discharge to home within 2 to 3 days postoperatively. The first objective was the patient would get out of the bed comfortably on postoperative Day 1, based on the physical therapy goal. The TJR patients on the surgical floor at the large, urban, medical center serving veterans receive multimodal pain medication during surgery that includes femoral nerve block, morphine sulfate intravenously (IV), and immediately after surgery, oxycodone and gabapentin by mouth that should last for 48 hours. The patient should be medicated with oral pain medicine every 3 to 4 hours when needed to experience less to tolerable pain when participating in physical therapy within 4 hours of TJR surgery (Halawi, Grant, & Bolognesi, 2015). The physical therapist notifies the surgical floor nurse of arrival 30 minutes prior to coming for patient to be

premedicated and mentally prepared to get out of the bed. The data collected from a chart review included LOS, the first day out of bed (OOB) after surgery, pain levels on the visual analog scale (VAS) at 0800 and 2000 every day until discharge, at discharge from hospital, and at 2-week postoperative appointment.

The second objective was that the patient's pain level would be between 2 and 4 on VAS at discharge. The third objective was that the patient's pain level would be between 2 and 4 on VAS at 2 weeks at the postoperative visit. By then, the patient should be more mobile at home, and the strategies learned from the preoperative class would be used by the patient to feel comfortable while doing the home exercise program outlined by physical therapy for rehabilitation (McDonald et al., 2014).

The TJR postoperative patients on the surgical floor would often ask for pain medicine from the nursing staff on a routine basis to manage their pain better and be comfortable enough to move comfortably to be able to take care of themselves at home with family support and be discharged from the hospital within 2 to 3 days of surgery. Their pain level was measured using the VAS collected from patient report on pain level from review of charts at 0800 and 2000 every day until discharge. If the patient was able to flex knee at least 90 degrees at 2 weeks postoperatively comfortably, then they were managing their pain well at home and mobility did not affect discharge from the hospital by Day 3 and at the 2-week postoperative visit. The patient would then continue to use strategies at home to help with pain management.

Project Question

The practice-focused question in population, intervention, comparison, and outcome format was: Will veterans who had knee or hip TJR surgery and attended a preoperative education class have pain levels measured at 2–4 on a visual analog scale (VAS) and a decreased length of stay (LOS) as compared to the veterans who do not attend a preoperative education class?

Theoretical and Conceptual Framework

The health belief model (HBM) was an appropriate model to use for this project on the management of postoperative pain in adults undergoing TJR surgery. When pain is not managed adequately, there is an increased incidence of deep vein thrombosis, pulmonary embolus, and pneumonia due to decreased mobility that may result in a prolonged LOS and increased hospital costs (Halawi et al., 2015). Patient and family education is most effective in managing postoperative pain through the discovery of patient's fears and expectations related to the surgery, pain expectations, and what it takes for a successful surgery outcome (Halawi et al., 2015). The six concepts of the HBM are perceived susceptibility, perceived severity, perceived benefits to taking action, perceived barriers to taking action, cues to action, and self-efficacy (Hodges & Videto, 2011). The concepts of the model are used and evaluated by assessing, educating, and motivating individuals on their knowledge, expectations, and preferences for pain management methods (D'arcy, 2005). Individuals may fear addiction from taking pain medicine or fear the side effects of opiate medicines and not use the medicine when needed. Clarifying misconceptions about management of postoperative pain may

increase the individual's perception of the benefits of the desired action in preventing and controlling pain. I will provide more information regarding the frameworks in Section 2.

Nature of the Project

In this quality improvement project, I used a retrospective chart review of the LOS and management of postoperative pain for the 3 months prior the education class. A retrospective chart review was also conducted 3 months after the education class to measure the outcomes of LOS and management of postoperative pain. LOS had become an institutional problem at the study site that needed to be addressed. As the project leader, I was able to use the existing preoperative education class as a vehicle to incorporate and provide information for the TJR surgery patients and their families. There was an opportunity to modify content in the already existing education class directed toward management of postoperative pain, physical therapy expectations related to mobility, and how to return to a functional level of mobility in minimal to no pain postoperatively. The thought behind this project was that providing the needed education to the patients and their families regarding how to manage postoperative pain and pain management strategies for mobility would help meet the LOS goal of 2 to 3 days. I will explain the methodology of the project in more detail in Section 3.

Definitions of Terms

Length of stay (LOS): The number of nights the patient remained in the hospital for his or her stay (Agency for Healthcare Research and Quality (AHRQ), 2011). AHRQ (2011) further explained by stating, "For example, a patient admitted and discharged on the same day has a length of stay equal to zero."

Patient education: Any set of planned educational activities designed to improve a patient's health behaviors, health status, or both such activities are aimed at facilitating the patient's knowledge base (Lorig, 2001; Oshodi, 2007a).

Perioperative: The period of time extending from when the patient goes into the hospital, clinic, or doctor's office for surgery until the time the patient is discharged home ("Perioperative", 2016).

Preoperative: Care given before surgery when physical and psychological preparations are made for the operation, according to the individual needs of the patient. The preoperative period starts from the time the patient is admitted to the hospital or surgery center to the time that the surgery begins ("Preoperative", 2016).

Visual Analogue Scale (VAS): Measures pain on a scale from 0 (no pain) to 10 (worst pain; Cabilan, Hines, & Munday, 2016).

Assumptions

My first assumption was that all veterans undergoing TJR surgery would experience postoperative pain and benefit from being educated through a preoperative education class on how to manage pain to have a more satisfying experience and journey through recovery and rehabilitation. Increasing knowledge on how to manage postoperative pain, pain medicine options, and physical therapy expectations through a preoperative education class was expected to better prepare the veteran to be discharged home within 2 to 3 days after surgery. My next assumption was that gaining knowledge of the importance of managing postoperative would encourage early mobility and reduce LOS.

Another assumption I made was that the preoperative education class would be sustainable because the class was needed to maintain an institutional average LOS of 2 to 3 days after TJR surgery. Administration was supportive in keeping the education because it has positively impacted LOS in the past. Through the education imparted by the preoperative education, the veterans and their families would also feel better prepared for care responsibilities postdischarge. When a program is sustainable, the institution provides better quality and continuity of care and it makes it easier to adopt the program to other medical centers serving veterans.

My final assumption was that the addition of a social worker and inpatient case manager as presenters in the preoperative education class would allow for better sharing of information to veterans and family members about discharge planning. Williams (2010) stated that “A multidisciplinary approach is necessary to increase awareness of issues that delay timely discharge after surgery” (p 34). When the patient’s concerns can be identified and addressed early in the surgical journey, there may be an avoidance of prolonged hospital stay and a reduction of hospital costs.

Scope and Delimitations

There had been excessive LOS of the orthopedic patients on the surgical floor of the study site, ranging from 5–14 days, which was impacting system-wide patient flow issues in the organization. I expected my re-initiation of the preoperative education class, addition of presenters to the class to discuss discharge planning, and addition of new content focusing on management of postoperative pain to decrease organizational hospital LOS, better manage postoperative pain and promote early mobility. The

outcomes of the multidisciplinary preoperative education class would also set clear expectations for patients with a nursing focus on timely delivery of pain medicine through an established pain protocol and collaboration with patients and physical therapy in administration of pain medicines. The multidisciplinary preoperative education class consisted of patients, a social worker, an inpatient case manager, a surgical floor nurse, orthopedic nurse practitioners (NP), an occupational therapist, a physical therapist, and a preoperative nurse. In addition, the orthopedic NPs had access to all participants scheduled for total knee or hip replacement surgery and scheduled the participants into a preoperative education class. The NPs would see the same participants from the class at the 2-week postoperative appointment. The orthopedic NPs were facilitators and presenters of the class and providers who care for orthopedic postoperative veterans at the institution where the project was conducted.

The results of the project could be replicated and generalized to other medical centers serving veterans because they have the same special population with the same complex medical comorbidities, social issues, and mental health issues such as posttraumatic stress disorder (PTSD), chronic pain, and opioid dependence. The results could also support the need for organizational policy change for mandatory preoperative education class in those having TJR surgery. Lastly, the outcome data from this project support need for sustainability of the preoperative education.

Limitations

I identified several limitations of this project. The first limitation was that there were TJR surgical patients who did not have family support at home to help with

activities of daily living and caring for the surgical incision. Another limitation was the refusal of certain patients to get out of bed because of postoperative complications such as nausea, vomiting, retention of urine, or pain. A third limitation was certain patients who could not get out of bed due to medical complications after surgery from pulmonary embolisms, wound or respiratory infections, or new medical symptoms. Some patients not having durable medical equipment available at home prior to discharge to have safe mobility at home was also a limitation because it is important to have the necessary equipment at home to avoid falls and readmissions to the hospital. Other limitations included transportation issues that prevented attendance of the preoperative education class to learn about the expectations of surgery and to learn of the opioid-intolerant patient undergoing surgery.

Significance of the Project

Research suggested that 80% of patients experience postoperative pain and of that 11% to 20% of patients describe the pain as severe (Apfelbaum et al., 2003). When pain is not adequately managed postoperatively, the immune system is suppressed causing the increased risk of surgical incision infection and slow wound healing (Apfelbaum et al., 2003). Surgical complications caused by poorly managed postoperative pain affects LOS and may cause hospital readmission increasing hospital costs (Apfelbaum et al., 2003). Patients manage postoperative pain better and experience less anxiety after surgery when provided with information pertaining to expected pain, how pain will be managed during hospitalization, and physical therapy expectations (Louw, Diener, Butler, & Puentedura, 2013; McDonald et al., 2014). If a person is anxious, physical recovery and well-being

may be affected, which can lead to a prolonged hospital stay and increased cost of care (Louw et al., 2013).

The large, urban, medical center study site serving veterans was experiencing excessive LOS on the surgery unit and Comprehensive Integrated Inpatient Rehabilitation Program (CIIRP) because of the orthopedic TJR patients causing institutional, system-wide, patient flow issues. The prolonged LOS at the study site was not meeting community or hospital standards of practice on LOS. The LOS on the surgery floor ranged from 5–14 days in contrast to the goal of 2 to 3-day LOS according to hospital performance measures. The LOS for CIIRP was 18 days; however, there was no current medical center hospital performance measure for LOS for CIIRP.

A preoperative education class prior to surgery could inform patients of what to expect before, during, and after TJR surgery and increase knowledge in management of postoperative pain. When patients are comfortable after surgery, expected activities, such as getting out of bed, will make the rehabilitation process start on time and avoid the institutional risk for surgical complications, prolonged LOS, and need for extended acute rehabilitation at the CIIRP. TJR surgery causes an enormous amount of pain postoperatively (Apfelbaum et al., 2003). By increasing the patient's knowledge related to surgical pain expectations, it decreases their anxiety, LOS, and postoperative pain to ignite a quicker return to preoperative functional status (Louw et al., 2013).

Reduction of Gaps

There was a preexisting preoperative education class at the study site that was offered once a month to all patients who would be undergoing surgery. The class was not

mandatory, and the content of the class did not include discharge planning, such as information regarding acute rehabilitation options and management of postoperative pain. During the class, each presenter discussed specific topics related to physical therapy; occupational therapy; what to expect during the preoperative history and physical visits; complications of surgery, such as deep vein thrombosis or infection; what to expect during hospitalization; and the care of the joint. Veterans who underwent TJR surgery had misconceptions about discharge planning, postoperative care, managing postoperative pain, and physical therapy goals. The gap in knowledge related to multiple factors such as veterans not attending education class, lack of communication, and misconceptions between the TJR surgeon and veteran. Information not given to veterans about discharge planning could have been addressed through the preoperative education class. Kruzik (2009) stated that “Preoperative teaching provides the surgical patient with pertinent information concerning the surgical process and the intended surgical procedures, as well as anticipated patient behaviors such as fear and anxiety, expected sensation; and probable outcomes” (p. 381).

The existing preoperative education class was a multidisciplinary approach to increasing knowledge in the TJR patient before surgery. Making the class mandatory for all TJR surgical candidates may address LOS by educating the patients on organizational expectations related to discharge planning and expected outcomes to recover successfully from surgery. There was an opportunity to use the preoperative education class to set clear expectations for patients, change the class content to focus more on information related to management of postoperative pain, and incorporate interventions and strategies

geared toward preventing uncontrolled pain management to assist in early mobility and faster recuperation for discharge to home. McDonald et al (2014) stated that “By ensuring full understanding of the operation and promoting physical recovery and psychological well-being through preparatory information, it was hypothesized that people will be less anxious, have a shorter hospital stay and better cope with postoperative pain” (p. 7).

My addition of the social worker and inpatient case manager to the existing preoperative education class allowed for the sharing of information related to discharge planning. The other presenters all have their own distinct roles in class as well. Physical therapy can initiate clearer expectations related to mobility and range of motion of joint. The occupational therapist can initiate assessment for the need for durable medical equipment for use at home for easier and safer mobility. The NP can focus content on patient communication related to pain management and the importance of asking for pain medicine and clarify misconceptions related to pain medicine along with their usual content already incorporated. I revised the course to include the addition of educational components from the new presenters and a change in the content to incorporate specific goals and expectations related to controlling postoperative pain for mobility for early discharge to home.

The preoperative education class is an effective method of reducing LOS and hospital costs by educating patients on their role in the recovery process. Hospitals must adapt to more efficient and effective delivery approaches to educating patients undergoing surgery to empower effective self-care. A multidisciplinary educational

approach to reduce LOS by informing patients of expected goals, discharge planning, rehabilitation, and pain management can aid in reducing length of stay (Jones et al., 2011).

Implications for Social Change

The orthopedic NPs had the vision 4 years ago to improve the process by which TJR surgical candidates were educated regarding the expectations of surgery. The delivery process took the form of a preoperative education class that occurred once a month to ensure cost effectiveness and efficiency. When the preoperative education class was not offered for 6 months due to the retirement of one of the orthopedic NPs, there was an increase in LOS in the TJR surgical patient on the surgical floor. The transformational change occurred through an organizational system redesign project involving upper management and leadership support to restart, revamp, and improve the method of educational delivery through the addition of expert staff presenters on discharge planning.

Working as an NP in the orthopedic department at the institution would facilitate the opportunity for transformational change through employing a multidisciplinary approach to improve LOS while educating and informing veterans and their families on how to manage postoperative pain for faster mobility through hospital stay to discharge to home. In this project, I oversaw the addition of new content to the class that would advise the veterans and their families on how to carry out and meet the expected goals of the surgeon, nurses, and therapist. This multidisciplinary approach to preoperative education provides good service and delivery of care.

This quality improvement project could also improve communication among the physical therapists and surgical floor nurses when caring for the veteran postoperatively. The physical therapist would inform the surgical nurse when the physical therapy (PT) and occupational therapy (OT) session were scheduled for every TJR veteran that day, and the nurse would inform the veteran about the pain medicine 30 minutes prior to session. In addition, the project would decrease LOS by managing postoperative pain through the knowledge gained from the preoperative education.

Summary

The study site orthopedic NPs created a preoperative education class 4 years ago to inform veterans and their families about what to expect before, during, and after TJR surgery. The institution noticed an increase in LOS in the orthopedic veterans undergoing TJR surgery that did not attend the education class. A gap existed in knowledge exchanged between the veterans who did and did not attend the education class related to discharge planning, mobility expectations, and management of postoperative pain. Ensuring that all TJR surgery candidates and their families attend the existing preoperative education class by offering it to all provides an opportunity for consistent and clear expectations about surgery. Additionally, there was an opportunity to add content to the class related to strategies and knowledge in management of postoperative pain to meet physical therapy goals in mobility for faster recuperation and early hospital discharge.

I developed this project with the belief that preoperative education and the knowledge gained from it will help the veterans manage postoperative pain enough to get

out of bed when expected and be discharged to home in 2 to 3 days after surgery. My assumption was that the study site orthopedic department would offer a multidisciplinary preoperative education class to every veteran undergoing knee and hip replacement surgery. My other assumption was that through the education class, the veterans would learn of the expectations required for a comfortable, safe, and speedy recovery when discharged home in 2 to 3 days after surgery to meet the institution's LOS criteria. Section 2 of the paper discussed the project's literature search strategy, theory used, review of literature related to this project, and my role in this project.

Section 2: Review of Literature and Theoretical and Conceptual Framework

Introduction

The organization's surgical floor and partnering inpatient rehabilitation facility unit had excessive LOS in their TJR patients impacting admissions. With the LOS ranging from 5–14 days, the organization initiated a QI project to decrease LOS in the TJR patients that had positive outcomes decreasing LOS to 2 to 3 days. The multidisciplinary preoperative education class that once existed and was then restarted allowed for the implementation of activities from multiple disciplines, such as physical therapy, occupational therapy, nursing, and social work, that attributed to decreased LOS and improved system flow. The activities of interest for this project included having all TJR patients attend the education class and ensuring timely administration of pain medicine prior to physical therapy sessions postoperatively. The purpose of this QI project was to improve the existing multidisciplinary education preoperative education class by adding new content related to management of postoperative pain for the TJR surgical patient to ensure consistency of pain medicine administration prior to physical therapy sessions.

Effective postoperative pain management following a TJR surgery can be accomplished through a multidisciplinary approach with patient education, pain assessment, and the exchange of consistent information among health care providers involved in the patient's surgical journey (Gillaspie, 2010). Researchers have supported preoperative education in reducing and managing postoperative pain and reducing LOS with resultant reduction in cost of hospital care (Chou et al., 2016; Huang, Chen, & Chou,

2012; Johanansson, Nuutila, Virtanen, Katajisto, & Salanterä, 2005; Kruzik, 2009). In Section 2, I will discuss the search strategy for the literature review, the model used to inform the project, the literature review, and the background and context of the project.

Literature Search Strategy

For this literature review, I identified articles related to preoperative education for TJR patients on LOS, the effect of education on pain in the TJR patient, and general literature on education and LOS and education and pain. The identified articles came from scholarly, peer-reviewed, and evidence-based literature. I searched the CINAHL, Medline, and Ovid databases and the Thoreau multidatabase search tool to identify research articles published from 2000 through 2016. I used the following keywords with the Boolean operator of AND: *postoperative pain AND length of stay, preoperative education AND total joint replacement, education AND pain, and education AND length of stay*. After a comprehensive literature search, I found only limited research on patient education and pain in other surgical patients such as cardiac surgery or Lamaze classes for expectant mothers.

Concepts, Models, and Theories

Theory-guided practice gives nurses a framework to interpret the data collected to guide our actions (McCurry, Revell, & Roy, 2009). Being able to translate knowledge into nursing practice through studying the effectiveness of interventions is imperative to strengthen nursing practice and its outcomes. I chose the HBM for this project because the assumptions of the model allowed for the exploration of a person's behavior, perceptions, and beliefs into a health problem or condition and gave guidance on focusing

on concerns or beliefs to elicit actions to make the best decisions for the best outcome of their health. The model was a good fit for this project because the constructs of the model helped identify patient's fears related to the surgical process and the journey of TJR surgery.

Social psychologists developed the HBM to gain a better understanding of an individual's perceptions, attitudes, and beliefs about a particular medical condition and if educated on the benefits and consequences of the medical condition, what the likelihood was that a patient would change their behavior to engage in the recommended suggestions (Hodges & Videto, 2011). The constructs of the model are perceived susceptibility, perceived severity, perceived benefits of taking action, barriers to taking action, cues to action, and self-efficacy (Hodges & Videto, 2011). The constructs of the model provide a framework of variables for the clinician to use in educating individuals through increasing their awareness and perceptions of their susceptibility to uncontrolled pain if pain medicine is not taken and the severity of complications such as blood clots, immobility, uncontrolled pain, and prolonged hospital stays (Aghamolaei, Hasani, Travafian, & Zare, 2011). When the individual understands the risks and consequences associated with uncontrolled pain, the HBM suggested that the fear of not following recommendations becomes the motivating factor in becoming involved in their care and taking the appropriate action in changing behavior (Khorsandi, Fekrizadeh, & Roozbahani, 2017). If the individual understands what pain to expect after surgery and the activities that will occur during hospitalization that are necessary for recovery to prevent complications and they develop the belief that certain actions will benefit them,

the likelihood of their involvement in the behavior necessary for a speedy and uncomplicated recovery increases (Aghamolaei et al., 2011). Patient and family education is most effective in managing postoperative pain through a discovery of the patient's fears and expectations related to the surgery, pain expected, and learning what it takes for a successful surgery outcome (Halawi et al., 2015).

Eshah (2013) used the HBM in a study to restructure an education program for patients diagnosed with acute coronary syndrome (ACS) on addressing possible barriers and strategies to try to meet the goals of healthy eating and lifestyle changes. The researcher used the HBM in the education program by gearing information delivered in the class specific to each construct. When addressing perceived susceptibility, Eshah discussed ACS and how the disease affects the body in the content. The complications of having ACS were mentioned to the patients in the study for them to understand the severity of the disease. Goals from the American Heart Association on healthy eating, and lifestyle suggestions were also included to educate the patients on the benefits of engaging in the particular activities.

Literature Review Related to Methods

Based on the research I reviewed on the impact of preoperative education on management of postoperative pain and length of stay in the TJR patient, evidence revealed preoperative education decreases anxiety and pain contributing to reduced hospital LOS (see Sibling, Nordahl, Olofsson, & Asplund, 2003; Wong, Chan, & Chair, 2010). According to the American Pain Society (APS) and American Society of Anesthesiologist (ASA) 2016 guidelines on management of postoperative pain, patient

and family preoperative education is recommended (Chou et al., 2016). Preoperative education was found to reduce the amount of pain medicine used and anxiety and increase patient satisfaction helping to decrease hospital LOS (Chou et al., 2016). When patients were informed of the expectations of pain, treatment options, and discharge planning, they were more likely to participate in their care and decision-making (Chou et al., 2016).

Pain assessment has been identified by the American Nurses Association, in collaboration with the American Academy of Nursing Expert Panel on Quality Health Care, as a nursing sensitive indicator (Grove, Burns, & Gray, 2013). Grove et al. (2013) stated that “The demand for professional accountability regarding patient outcomes dictates that nurses be able to identify and document outcomes influenced by nursing care” (p. 305). Nursing practice plays a vital role in patient outcomes. With this project, I contributed to evidence-based research through an outcome evaluation of an already existing preoperative education class adding value to the need for and impact on how managing postoperative pain in the TJR patient would increase mobility and decrease hospital LOS.

Preoperative Education for TJR Patients on LOS

Jones et al. (2011) conducted a quasi-experimental design to test the validity of the findings from a systemic review that concluded that a single intervention of preoperative education was not an effective method in decreasing LOS in TJR patients. They found that the LOS decreased significantly from 7.0 to 5.7 days in the control group and from 5.0 to 3.2 days in the education group ($p < 0.01$) after the intervention. The

results of their study supported the structured educational content I employed in this project because the education will focus on providing consistent information to assist the patient in understand their role in the recovery from TJR surgery and alleviate their fears or concerns about surgery. The format I used and the content of the educational program played a role in the outcome of LOS.

In their study, Huang et al. (2012) focused on the effects of a preoperative rehabilitation and education program on knee pain, range of motion, and LOS in patients having unilateral total knee replacement surgeries. There were a total of 273 participants in their randomized, controlled trial from 2008 through 2010 in a large hospital with specialists in Taiwan. The control group in their study participated in usual rehabilitation care postsurgery without education prior to surgery. The intervention group in their study had usual postoperative rehabilitation care, plus group education class geared toward expectations during hospitalization, discharge planning, physical therapy expectations and exercises, and fall prevention information 4 weeks prior to their scheduled surgery. Their findings revealed knee pain and knee range of motion was similar in the control group and intervention group during hospitalization and discharge from the hospital. The LOS in their intervention group showed a statistically significant difference that was attributed to a reduction in medical costs for the hospital. The authors concluded that there was no impact in postoperative knee pain or range of motion of the knee in either group but showed a 1 to 2-day decrease in LOS in the intervention group. The results of their study supported this project by showing that patients who are better prepared for surgery are discharged home earlier, which results in a decreasing hospital LOS.

Preoperative Education Related to Pain in the TJR Patient

McDonald et al. (2014) conducted a systematic review that examined the outcomes of postoperative pain, mobility, quality of life, anxiety, surgical complications, and LOS in patients who attended a preoperative education class prior to total knee or hip replacement surgery compared to those that did not. Their population consisted of 1,463 patients from 18 randomized, controlled, and quasi-experimental trials of which 73% were scheduled for hip replacement surgery and 59% were women. The content of the information delivered in the preoperative education classes from the review varied among the trials, and all consisted of standardized and structured information about the surgery, the management of postoperative pain, strategies to keep pain at a tolerable level during mobility, knowledge on expectations of pain postsurgery, how to alleviate symptoms related to side effects from pain medicine, physical therapy expectation, and discharge planning (McDonald et al., 2014). Their findings revealed no significant difference in outcomes in pain, mobility, quality of life, surgical complications, and LOS in those who attended a preoperative education class compared to those who did not attend. There was, however, a reduction noted in anxiety levels in those patients undergoing total hip replacement surgery who attended the education class. The findings of their review from each outcome was of low quality evidence due to either insufficient data or too small of a sample size to determine if the intervention of patient education was beneficial in improving outcomes. McDonald et al. concluded that there was no benefit of an education class prior to TJR surgery on postoperative pain, functionality, quality of life, anxiety, surgical complications, and LOS. They recommended an education class as a

supplemental intervention for current best practices due to prior to systematic reviews revealing the same outcomes with low quality research evidence and the same recommendations. Their study supported this project by providing current best practices when delivering preoperative education prior to surgery.

General Literature

Louw et al. (2013) conducted a systematic review to identify preoperative education strategies for patients undergoing total knee or hip replacement surgeries that positively affected postoperative pain. The population consisted of 1,021 subjects of which 70 % were scheduled for total hip replacement (THR) surgery, and 30% were scheduled for total knee replacement (TKR) surgery. The subjects who attended a preoperative education class were compared to those who did not attend. The content delivered that addressed pain varied from mobility, range of motion, knowledge of expected logistics related to surgery, expectations on LOS, discharge planning, and coping strategies for pain taught in group or one on one sessions by either nurses or physical therapists. The findings showed no statistical significant difference in pain outcome in the intervention or control group. It was concluded that patient education provided prior to patients undergoing total knee or hip replacement surgeries did not decrease postoperative pain. However, the 13 randomized controlled trial studies in the systematic review used a variety of instruments based on multiple variables and outcome measures impacting data analysis needed for efficacy. The study supported my project in not only the need for adding new content to the class related to management of

postoperative pain, but provided evidence that nursing contributes to positive patient outcomes and quality of care.

Wong et al. (2010) examined the effectiveness of patient education that included pain expectations and breathing strategies on pain, anxiety, and LOS prior to orthopedic surgery. Bandura's self-efficacy theory was used to guide the intervention as it was assumed that subjects understanding the benefits of managing pain and using coping strategies such as breathing exercises to decrease anxiety and pain, would motivate participation in care. One hundred twenty-five subjects from 6 orthopedic clinics within 2 hospitals diagnosed with an orthopedic injury requiring surgery participated in the study. The findings revealed the pain management intervention was effective in managing postoperative pain, decrease anxiety, increase self-efficacy level for pain, and decreasing LOS. The study concludes that the experimental group who received patient education prior to surgery had better management of pain during hospitalization, and that the knowledge gained from the class may have decreased anxiety, and allowed participation in the care for a speedy recovery and decreased LOS. The study supported my project in adding new content geared toward management of postoperative pain and strategies in coping with pain in the already existing preoperative education class.

Background and Context

I along with my colleague developed an education program for TJR patients undergoing surgery 4 years ago because of patient interest in wanting to know what to expect when having TJR surgery. The education program was a preoperative education class designed to inform patients and their family members about the surgical process.

The class was composed of a variety of presenters such as orthopedic NPs, physical therapist, occupational therapist, preoperative NP and a patient willing to discuss his journey with having a TJR. There has been difficulty sustaining the education program over the past 2 years, because when my colleague retired, workload increased, and I was not able to perform the administrative tasks, and logistics to maintain the program. The administrative tasks included identifying the patients for the class on the orthopedic surgical schedule obtained from a book stored in chief resident's office, requesting orthopedic scheduler to schedule the appointment in the computer for each patient, addressing and mailing postcards with class information, reminder phone calls to patients 3 days prior to the class, contacting patients via phone, reminder e-mail, and phone calls to presenters when the class occurs. As a result of the educational program not being held, the organization noticed an increase in LOS, and a change in the culture of the TJR patients. The LOS increased to minimum of 5 days to 2 weeks on the surgical unit, and the inpatient rehabilitation unit, not only because of the need for further physical therapy, but also because of the patient's reporting entitlement to inpatient rehabilitation. The organization was no longer meeting the community standard of practice for LOS that was 3 days or less.

The organization initiated a systems redesign QI project in March 2016 to address the LOS in the patient population requiring TJR. The outcome from the systems redesign QI project identified barriers in the process affecting timely discharge within 3 days of surgery. Among the barriers identified were lack of education for patients about surgical process and discharge instructions, inconsistent pain management, delays in obtaining

equipment from prosthetic department necessary for safety at home, delay in ambulance service transporting to inpatient rehabilitation facility affecting incoming facility to accept patient at a certain timeframe, and not enough surgeons certified to sign orders in chart for home physical services when discharged home.

Organizational leadership supported reigniting and revamping the already existing educational program, and adding social work and inpatient case manager as presenters to help educate the patients on expectations related to discharge planning. To address the issue of delays in necessary equipment needed at home upon discharge, patient's received evaluation and training of the equipment on the same day the education class was offered, and was incorporated as an added activity in the process. Issues that arose when restarting the class included leadership mandating weekly classes, and instructing patients to sign a written contract confirming family support at home upon a 2 to 3-day discharge from the hospital, no committed full-time orthopedic inpatient case manager, inconsistency of presenters from nursing to teach the class, and no standardization of the content of the class. With the combination of ethical issues, logistical issues, and lack of resources such as staffing, there was opportunity to standardize the content delivered and addition of content on pain management. I identified that the content in the class needed to be changed for consistency and content for management of postoperative pain added to improve the quality of care delivered to meet the LOS goal. There was opportunity to translate evidence-based research of a QI project that would not only generate data for evaluation outcomes but would give data that adds to purposeful progress (White & Dudley-Brown, 2012). When the patient and family play a role in managing care

postoperatively, it not only saves the institution money, but offers the patient satisfaction that can translate into better outcomes for the patient (Terry, 2015).

Role of the DNP Student

During my practicum experience at the organization, I had the opportunity to participate in a systems redesign quality improvement project addressing LOS in the orthopedic population. The success of the organizational project in decreasing LOS was in large part a result of the orthopedic NPs restarting the class and using multiple disciplines such as physical therapy, occupational therapy, social work, surgical floor nurses, preoperative nurses, and case managers to educate patients on expectations related to surgery, and discharge planning. The organization asked to sustain this new delivery of care process. Being able to sustain the proposed change creates accountability for a nursing leader to provide quality of care. Over the past 20 years, the federal, state and local governments want accountability of organizations who are provided funding to be responsible in providing results that prove cost savings while ensuring quality delivery of care and sustainability (Kettner et al., 2013). As one of the creators of the already existing preoperative education class, I had a personal interest in sustainability of the class and keeping the momentum in all stakeholders executing the change to empower, stay engaged, and motivated. An opportunity was identified to not only improve the education class, but also to collect data for purposes of improvement and sustainability for the education class.

My role as a Doctorate of Nursing Practice (DNP) student for this project, required use of the American Association of Colleges of Nursing (AACN) Doctorate of

Nursing Practice (DNP) essential II organizational and systems leadership for quality improvement and systems thinking and DNP essential VI interprofessional collaboration for improving patient and population health outcomes (AACN, 2006). In order to lead practice improvement, the DNP student must possess the ability to be an effective team leader when working with multiple disciplines (AACN, 2006). The DNP student evaluates if the content in the education class meets the needs of the orthopedic patients, and organization goals while counteracting the best evidenced based strategies to use for the best patient outcome and organizational performance for sustainability (Kettner et al., 2013). With the need for an outcomes evaluation and ongoing monitoring of data, the organization continues to improve processes, I would be restructuring the already existing education class by adding content related to management of postoperative pain. I decided to focus on the management of postoperative pain content to give patients a better understanding of pain expectations and strategies to improve pain so that participation in PT, and getting out of bed in less pain would aid in decreasing LOS. The population at the organization is unique as they have mental issues, including anxiety, post traumatic stress disorder, opioid intolerance, homelessness, and depression that may interfere with learning. It would be necessary for the development of individualized pain control care plans, and recommendations from pain specialty service in managing postoperative pain.

Summary

The studies in the literature review had equivalent findings in that patient education prior to TJR surgery does not impact postoperative pain but, showed positive impact on decreasing LOS. The systematic reviews had insufficient evidence to make a

statement that patient education decreases postoperative pain. Patient's undergoing any type of surgical procedure will benefit from preoperative education including perioperative pain management planning as this not only communicates knowledge and expectations of surgery, but encourages patient and family participation in the decision-making process (Chou et al., 2016).

The organizations system redesign QI project for the orthopedic patients in decreasing LOS helped to ignite the preoperative education class and gave opportunity for nursing to play an integral role in patient and family education in the TJR surgical patient. With the project's focus on educating patients and families in managing postoperative pain better through patient knowledge gained in a multidisciplinary education class, acknowledges how nursing interventions synergistically with other disciplines such as PT play a role in outcomes. Both knowledge of patient and family education and management of pain are relevant outcome measures indicating effectiveness of a nursing intervention (Grove et al., 2013). The project served as an outcome evaluation study from the preoperative education class that added evidence to QI data contributing to evidence-based practice (EBP) that helped to decrease the gap between research knowledge, and practice through patient and family education (Grove et al., 2013). I transformed nursing delivery in the orthopedic patient's undergoing TJR surgery through use of orthopedic expertise and use of autonomy in using EBP through best practices. Section 3 of the paper discussed the project's methodology, population, data collection and an evaluation plan.

Section 3: Collection and Analysis of Evidence

Introduction

The purpose of the QI project was to evaluate the pain level and LOS in orthopedic patients having THR or TKR surgery who attended a preoperative education class as compared to those who did not attend the preoperative education class to determine the impact the class had on pain level and LOS. Outcome evaluations can show value to nursing with positive outcomes being influenced by the action nurses incorporate in practice (Grove et al., 2013). Researchers have supported patient education with the involvement of patient and family in the decision-making process prior to surgery because of the knowledge gained on strategies to cope with postoperative pain and mobility (Chou et. al, 2016). In Section 3, I will discuss the project design, target population, data collection, protection of human subjects, data analysis, and the evaluation plan.

Project Design and Methods

In this QI project, I used a retrospective, non-experimental, pretest and posttest design, and a convenience sample to compare pain level and LOS in those undergoing TKR or THR surgery who attended a preoperative education class versus those who did not attend the class. The design allowed for the evaluation of progress by measuring pain level from VAS and LOS from chart review extraction to determine if the preoperative education class had an impact on pain level and LOS (the intervention group) when compared to the pain levels and LOS of those who did not attend the education class (the control group). I used a quantitative analysis to compare pain levels measured by VAS in

documented charts at discharge and at 2 weeks postoperative visit and LOS was measured from data collected from chart review.

Population and Sampling

The setting for the project was a large, urban, medical center located in the northeast United States that provides healthcare to the veteran population. The orthopedic department in the medical center performs over 220 TKR and THR surgeries combined per year. The preoperative education class was offered to all orthopedic patients scheduled for TKR and THR surgeries, and the class was taught in a classroom located in the setting and facilitated by orthopedic NPs.

The target population were orthopedic patients of any ethnicity undergoing TKR and THR surgeries. A retrospective chart review allowed me to collect compiled data before and after revamping the preoperative education class from the electronic records of patients who had TKR and THR to measure the effect on pain level and LOS since the class started. The data were collected between 1/1/2015–11/30/2015 and 1/1/2017–11/30/2017. The convenience sample consisted of 30 participants for the pretest data who had TKR or THR surgery and did not attend the preoperative education class and 30 participants for the posttest data who attended the preoperative education class. Due to high volume of surgeries performed at the setting, I easily obtained a convenience sample of patients who met the inclusion criteria for the project. The exclusion criteria included patients who were on long-term opioids to manage chronic pain.

Data Collection

I obtained approval from the project site and Walden University Institutional Review Board (IRB) for the QI project prior to beginning the project initiative. A list of participants that had THR and TKR between 1/1/2015–11/30/2015 was obtained from the program manager of the surgical department for preintervention data. I chose this time frame because this was a period when the preoperative education classes were no longer offered due to the orthopedic NP retiring and the other NP not being able to handle the administrative tasks, and logistics necessary to sustain the class. From the list of patients who had THR and TKR surgery within the stated timeframe, the program manager selected the first 30 as participants in the preintervention group, de-identified them, and assigned them with an identification code prior to sending the list to me. The data collected from retrospective chart review included LOS, the first day OOB after surgery, pain levels on the VAS at 0800 and 2000 every day until discharge, at discharge from hospital, and at 2-week postoperative appointment. The data were organized on an Excel spreadsheet on a computer that was password protected and located in a private locked office (see Appendix A).

I collected the retrospective, chart review, postintervention data on participants who had THR and TKR between 1/1/2017–1/30/2017, after the preoperative education class was reinitiated at the study site. The convenience sample in the postintervention group was selected from scheduled group classes that were held on the fourth Monday of each month during the previously stated 2017 timeframe. The program manager obtained access to the group classes from the medical records, selected the first 30 participants, de-

identified their information, and assigned them an identification code prior to sending the information to me. The data collected from retrospective chart review included LOS, the first day OOB after surgery, pain levels on the VAS at 0800 and 2000 every day until discharge, at discharge from hospital and at 2-week postoperative appointment. I organized the data on an Excel spreadsheet on a computer that was password protected and located in a private locked office (see Appendix B). The pre- and postintervention data reflected information before the class was redesigned to compare outcomes of LOS and pain levels in those that did attend the preoperative education class with those who did not attend the class.

Protection of Human Subjects

I obtained approval for this project from the IRB of Walden University (Ethics Approval Number 09-22-17-0544103) and the study site, and the chief surgeon of the orthopedic department in the medical center prior to initiation of the project. Confidentiality of participant information was maintained by using de-identified information from the medical records and having each participant assigned a code number. The data collected was stored on a secure, password-protected computer that was located in a locked room. Since I used a retrospective chart review for the project, there were no risks to the participants. I completed the National Institutes of Health's web-based training course on "Protecting Human Research Participants" on 5/15/2015 (Certification Number 1751187) to ensure I met the qualifications to conduct a QI project with a proper understanding of patient safety.

Data Analysis

The project question was: Will veterans who have knee or hip TJR surgery and attend a preoperative class have pain levels measured at 2–4 on a VAS and a decreased LOS as compared to the veterans who do not attend a preoperative education class? The goal of the project was to evaluate if participants have lower pain levels and decreased LOS after attending the preoperative education class as compared to those participants who were not given the preoperative education class. I used descriptive statistics to analyze the data regarding the LOS and pain levels of patients when first OOB, 0800 hours and 2000 hours every day until discharge from hospital, at discharge and 2 weeks postoperatively as measured on the VAS for participants that did not have the education class compared to those who did attend the preoperative education class. The descriptive statistics of VAS for pain levels were analyzed using data from an Excel spreadsheet to compare pretest and posttest data on average mean pain level scores. The LOS was analyzed through descriptive statistics using data from an Excel spreadsheet to compare pretest and posttest data on the percentage of the population discharged from the hospital. The results determined if the preoperative education class was effective in allowing comfortable mobility during and after hospitalization by lowered pain levels and decreased LOS from participants who attended the preoperative education class using strategies learned in the class.

Project Evaluation

Outcome evaluations examine results to determine the impact of the intervention based on specific objectives to meet the overall goal of the project (Kettner et al., 2013). I

used summative data on pain level and LOS in the target population for outcome evaluation in this project. The purpose of this project was to explore if the content added to the existing preoperative education class on strategies to manage postoperative pain, and discharge planning had an impact on the pain level and LOS of those who attended the preoperative education class compared to those who did not attend the class. The overall goal of the project was to determine if patients undergoing TJR surgery had adequate management of postoperative pain that allowed early mobility and faster recovery for discharge to home within 3 days of surgery by comparing pain levels when first OOB with their physical therapist, at discharge, and at the 2-week postoperative visit.

Summary

This QI project was an outcome evaluation to determine the impact of attending the preoperative education class on the pain levels and LOS of patients who had TKR and THR surgery compared to those who did not attend the class. I used a nonexperimental, pretest-posttest design in this project. Using a convenience sampling from the target population, I conducted a retrospective chart review of preintervention and postintervention data from orthopedic patients who had TKR and THR surgery. The information was confidential and human rights were protected throughout the whole process. Descriptive analysis was used to analyze the results concerning the pain levels at various phases during hospitalization measured by the VAS for participants that did not have the preoperative education class compared to those who attended the preoperative education class. I then used a summative evaluation to detail the results of

the project. Section 4 of the paper discussed the project's findings, objectives of the project, implication of the project related to policy, practice, research, social change and strengths and limitations of the project.

Section 4: Findings, Discussion, and Implications

Introduction

The study site for this project, a large, urban, medical center serving veterans, was experiencing an increased length of hospital stay of the TJR patients being discharged from the floor to the VA acute care rehabilitation facility. The identified delays were due to the patient's lack of mobility because of uncontrolled pain, not meeting physical therapy goals to go home in 2 to 3 days, and patient requests for longer rehabilitation. The facility assembled a systems redesign team prior to my DNP project to investigate new approaches to improve the patient flow on the surgery floor to decrease LOS from the current state to the national average LOS of 2 to 3 days. The purpose of this QI project was to educate patients on how to manage postoperative pain after TJR by modifying content in an already established education class and to compare the pain level and LOS of those who attended the class with those who did not attend the class to determine the class's impact on pain level and LOS. In Section 4, I will provide a summary of findings related to project in the context of literature, policy, practice, research, social change, project strengths, limitations, and analysis of self.

Summary of Findings

The overall goal of the project was for patients to have adequate management of postoperative pain after TJR surgery to facilitate their discharge to home within 2 to 3 days. The practice-focused question was: Will veterans who have knee or hip TJR surgery and attend a preoperative education class have pain levels measured at 2–4 on a VAS and a decreased LOS as compared to the veterans who do not attend a preoperative

education class? The first objective was that the patient would get OOB comfortably for the first time postoperatively and on each postoperative day in the morning and evening until discharge from the hospital as measured by VAS that rates 0 (no pain) to 10 (worst pain). The second objective was that the patient's pain level would be between 2 and 4 on a VAS at discharge. The third objective was that the patient's pain level would be between 2 and 4 on a VAS at 2- weeks postoperatively. The institutional QI project addressing LOS in the orthopedic patient having total knee and hip replacement was initiated during the implementation of the DNP project. The content I added to the existing preoperative education class focused on information related to management of postoperative pain and interventions and strategies preventing uncontrolled pain management while educating patients on the organization's expectations related to discharge planning and expected outcomes from surgery. I analyzed the findings of this project using descriptive statistics to determine if the preoperative education class was effective in allowing comfortable mobility during and after hospitalization by lowered pain levels and decreased LOS from participants who attended the preoperative education class using strategies they learned in the class.

Objective 1

I collected the VAS pain level scores from a chart review of the cumulative vital signs tab in the computerized patient record system from patients who had TJR surgery in 2015 when a preoperative education class was not offered and compared them to VAS pain level scores of those who attended the preoperative education class in 2017. The findings from summative data revealed that those who attended the preoperative

education class experienced better pain control during hospitalization than those who did not attend preoperative education class (see Table 1). The mean average VAS pain score was 7 for those patients who did not attend the preoperative education class as compared to 4 for those who attended preoperative education class when first time OOB. The mean average pain level score in the morning of the postoperative Day (POD) 1 was 6 for the patients who did not attend the preoperative education class as compared to a score of 4 for those who attended the class. The patients who attended the preoperative education class were more comfortable at POD 1 of the hospital stay. The pain level score could not be accurately analyzed for comparison between the two groups on POD 1 because of missing data for evening VAS level scores in 8 out of 30 charts reviewed for those who attended the preoperative education class and who were discharged home. The average mean pain level score on POD 1 in the evening for those who did not attend the preoperative education class was 6. There was no missing data from this dataset. With the pain level score at 6 on a scale of 0 to 10 in the group with no preoperative education when they first got OOB and on POD 1, it can be concluded that they experienced moderate pain during mobility.

Table 1

Visual Analog Scale (VAS) Pain Scores 0–10 Pre- and Postintervention

	First Time OOB	POD 1		POD 2	
		0800	2000	0800	2000
Preintervention (<i>n</i> = 30)	6.83 (+/-2.96)	6.37 (+/-3.41)	5.57 (+3.18)	5.17 (+/-3.16)	4.58 (+/-3.01)
Postintervention (<i>n</i> = 30)	4.24 (+/-2.94)	4.10 (+/-3.01)	5.42 (+2.81)	3.50 (+/-3.36)	3.00 (+/-3.37)

The mean VAS pain level score on POD 2 for those that did not attend the preoperative education class in the morning and evening was 5 as compared to score of 3 in the morning and evening for those who attended the preoperative education class. It is important to mention that there were 10 out of 30 charts missing data in the morning and 19 out of 30 charts missing data in the evening of those patients who attended the preoperative education class because the patient was discharged to home within 1 to 2 days of surgery as expected. There was too much missing data and inconsistency to include POD 3 VAS pain levels in the data analysis. The findings indicated that the patients who attended the preoperative education class had adequate management of pain during hospitalization and the expected LOS goal was met, wherein an increased number of patients were discharged by POD 2 instead of on POD 3.

Objective 2

The mean average pain level score was 4 at time of discharge from the hospital for those who did not attend the preoperative education class, and the score was 3 for those who attended the preoperative education class. The results indicated that there was adequate management of pain between those who attended the preoperative education class and those who did not attend the preoperative education class when discharged from the hospital. The findings suggested that both groups tolerated adequate pain by the time of discharge from hospital regardless of their expectations of pain.

Objective 3

The mean average pain level score was reported to be 4 for those who did not attend the preoperative class as compared to a pain score of 3 for those who attended the preoperative class. The results indicated that there was better pain control during recovery at home for those who attended the preoperative education class. There was equal missing data from each group for this data set, suggesting that the patients either did not mention pain, had little pain, or the provider did not document the pain level because patient did not mention it during the 2-week visit.

Overall, the LOS for those who did not attend the preoperative education class was longer as compared to those who attended the preoperative education class (see Figure 1). Thirty-three percent of patients in the postintervention group were discharged home on POD 1 compared to zero patients discharged home on POD 1 in the preintervention group who did not attend the class. The patients who did not attend the preoperative education class had an average mean LOS of 5 days as compared to 3 days LOS for those who attended the preoperative education class. By POD 3, 80% of patients who attended the preoperative education class were discharged home. The findings were consistent with prior studies showing a positive impact on decreasing LOS with patient education (Huang et al., 2012; Wong et al., 2010).

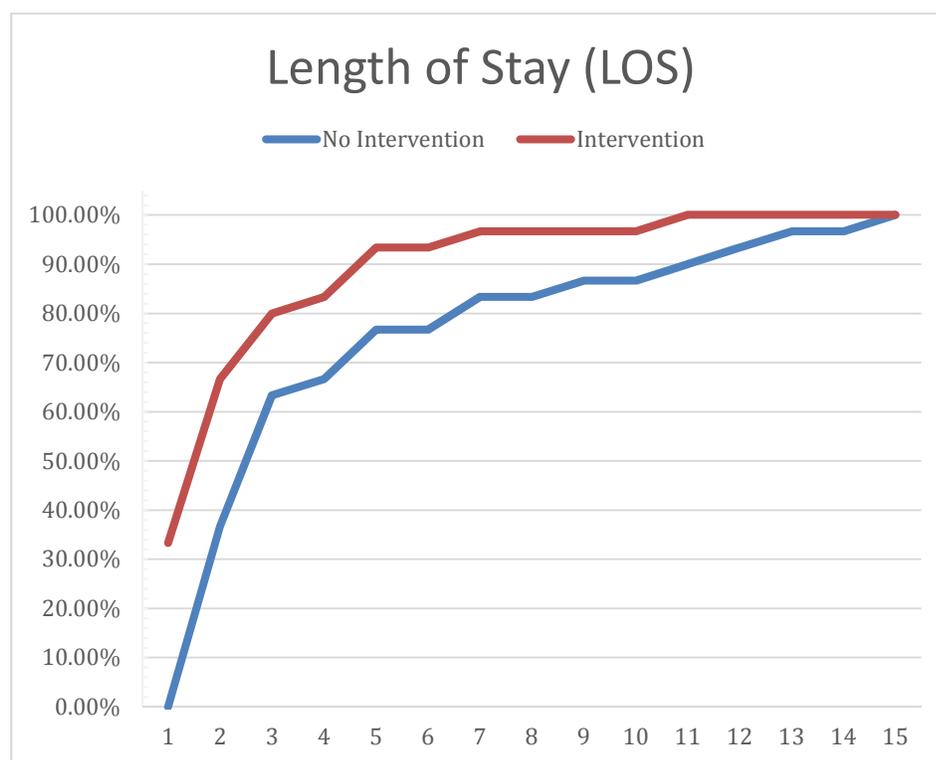


Figure 1. Percentage population discharged from hospital. The percentage is shown before intervention and after intervention measuring length of stay (LOS). $N = 30$.

Discussion of Findings in Context of Literature

My summative finding in pain levels for those who did not attend the preoperative education class revealed higher VAS pain level scores, indicating more pain when first time OOB, on POD 1, on POD 2, at discharge from hospital, and at the 2-week postoperative appointment when compared to those who attended the preoperative education class. From these results, it can be inferred that patient education prepared the patient on expectations of pain, physical therapy goals, discharge instructions, how to manage pain during and after hospitalization, and the organization's expectations on LOS. When informing patients of surgical expectations, anxiety is reduced allowing health behaviors to benefit outcomes (McDonald et al., 2014).

The findings from this project related to pain levels were not consistent with those from the literature review in that patient education does not impact postoperative pain (see Huang et al., 2012). Prior studies revealed the intervention and nonintervention groups related to pain levels during hospital stay after TJR surgery were similar (Louw et al., 2013; McDonald et al., 2014). The majority of studies recommended preoperative education because education prior to surgery has shown positive outcomes in reducing anxiety and the amount of analgesia used that all attribute to a decrease hospital LOS (Chou et al., 2016; Wong et al., 2010).

The outcome evaluation from this project adds evidence to already existing research supporting the need for patient and family preoperative education as contributing to a decrease in anxiety, pain, and shorter hospital stays (see Sibling et al., 2003; Wong et al., 2010). The new content that I added to the already existing preoperative education class gave consistency and standardization to the information and helped ease patient anxiety and misconceptions during the surgical journey, as evidenced by the findings in the preintervention and postintervention groups related to both pain and LOS. Education classes are the current best practice recommendation for improving patient outcomes (McDonald et al., 2014).

Implications

Policy

Undertreatment of postoperative pain has been a nation-wide problem for over 20 years, resulting in longer lengths of hospital stays and expensive hospital costs (Max, 1990). Preoperative education is a strategy used for the sharing of information to patients

and families about surgery and pain management (Chou et al., 2016; Kennedy et al., 2017). The APS in collaboration with the ASA developed evidenced-based practice guidelines to promote safe practicing in management of postoperative pain (Chou et al., 2016).

The large, urban, medical center serving veterans at the project site was involved in a systems redesign QI project to decrease LOS that evolved into an organizational policy for orthopedic patients undergoing total knee or hip replacement surgery to be discharged 2 to 3-days from the hospital. Preoperative education as recommended by the APS and ASA, suggests positive outcomes in management of postoperative pain and LOS. The findings of the DNP project support the need for an organizational policy to require that every orthopedic patient having total knee or hip replacement surgery attend the preoperative education class prior to surgery.

Practice

Evidenced-based projects that can strengthen a health care system by providing more effective and efficient methods to improve services, improves health care delivery and patient outcomes (White & Dudley-Brown, 2012). The organizational QI project to decrease LOS in the orthopedic patients undergoing total knee or hip replacement surgery gave opportunity for the nursing profession to play a pivotal role in transforming delivery of care while meeting and sustaining the needs of the organization. The reinitiation of the already existing preoperative education class helped decrease organization LOS by addition of presenters and content to the class that discussed discharge planning, how pain is managed postoperatively, mobility, and LOS expectations. In addition,

refinement in the content of the class set clear expectations with a nursing focus that helped with how pain was managed through timely delivery of pain medication and through collaboration with patients, physical therapist and, occupational therapist in administration of pain medications (Louw et al., 2013).

Research

The QI project had positive outcomes showing comfortable pain levels during and after hospitalization from TJR surgery in those that attended the preoperative education class indicating knowing how to manage pain can be of value in taking ownership in behavior that leads to positive outcomes. Wong et al. (2010) conducted a study that revealed the experimental group who received patient education prior to surgery, had better management of pain during hospitalization, and that the knowledge gained from the class may have decreased anxiety, and allowed participation in the care for a speedy recovery, and decreased LOS. The results of the project added evidence to QI data for the organization for sustainability and value of the class (Grove et al., 2013). The guidelines on management of postoperative pain recommends anyone having surgery would benefit from preoperative education because the information gained, benefits outcomes in the recovery of surgery (Chou et al., 2016). Further research could be done on the effectiveness of patient education classes focusing on the content used related to management of pain, and the impact on patient behaviors in encouraging patient and family participation.

Social Change

The QI project impacted social change on an organizational level by providing data that supported the benefits of preoperative education. The results added evidence that could make policy changes for the class to become mandatory for orthopedic patients undergoing joint replacement surgery. Filling the gap of knowledge needed to empower patient self-care, patient and family participation, and understanding organizational expectations of LOS through refinement in the content in the already existing preoperative education class on pain management, and discharge planning played a role in decreasing LOS, and better managed pain control in the TJR patient. Patients manage postoperative pain better and experience less anxiety after surgery when provided with information pertaining to expected pain, how pain will be managed during hospitalization, and discharge planning (McDonald et al., 2014).

Strengths and Limitations of the Project

Strengths

One of the strengths of the QI project was the organizational systems redesign QI project that reignited the already existing preoperative education class prior to the onset of this project. The added content on pain management and discharge planning advised the patient and family in how to carry out and meet expected goals of the surgeon, nurses, occupational therapist, physical therapist, and organization. The postintervention results added value to the effectiveness in the content of the class and outcome data because the class was restructured compared to the prior class. The results of the project revealed patients who attended training experienced less discomfort during hospitalization. In

addition, the organization has been able to maintain lengths of stay of 1 to 3 days in this population since restarting of the preoperative education class. Kennedy et al (2017) explored what information patients and their families would like to know prior to hip or knee replacement surgery. It was revealed that patients and families wanted to know more about pain management such as how much pain to expect after surgery and for how long, pain medication offered in addition to awareness of medication dosage, side effects, and how to taper pain medication to better manage pain during and after surgery. Furthermore, the patient valued the information given in the preoperative education class from the instructor and other patients asking questions resulting in self-confidence and being able to dispel fears of having surgery, and knowledge gained about expectations of rehabilitation.

A second strength of the QI project was that the information delivered in each preoperative education class was consistent because the lesson plan was developed by myself who is an orthopedic NP, facilitated and conducted by myself and another orthopedic NP at the project site. There was oversight in the preoperative education class by the orthopedic NPs to ensure all information was delivered so that the data collected on VAS pain levels during hospitalization would capture knowledge gained in the class. The consistency of the content delivered in the preoperative class appeared to influence the outcome intended as evidenced by the results of VAS pain levels showing patients who attended the preoperative education class were more comfortable during and after hospitalization as well as being discharged home earlier. Aghamolaei et al (2011) conducted a study of Iranian women using an educational program with tailored content

addressing self-breast exams (SBE) through use of the HBM. The information was delivered consistently by the same 2 midwives for the intervention group. The outcome of the research study revealed statistically significant improvement in intervention group in performing SBEs. Although the midwives did not conduct the study, their expertise in the subject matter may have played a valuable role in consistency and delivery of content because of their vested interest in wanting to improve the subjects understanding and attitudes toward SBE due to their specialty (Zaccagnini & White, 2011).

Limitations

One of the unforeseen limitations of the QI project were missing data from POD 2 evening and POD 3 in the postintervention group when collecting pain level scores from the chart review. The reason for this was due to patients being discharged home at 1 to 2 days postoperatively, due to the benefit of attending the preoperative education class. The findings in the postintervention group reflected how the organizational systems redesign QI project that occurred prior to this project, resolved backup in surgery admissions to the surgery floor, reduced wait time for transfer to acute rehabilitation facility from 5-14 days on the surgery floor to 2 to 3 days, and achieved national standard LOS of 2 to 3 days. The pain level scores collected in the preintervention group only represented 13% of the sample compared to 67% in the postintervention group. The impact of the findings were not generalized to equivocal sample in the project findings. The results were still important because they showed how patient and family education prior to surgery increased the quality of care and maintained organizational LOS at 2 to 3 days.

Another limitation of the QI project is only using the veteran sample population at one setting. The population consisted of any veteran aged 45-80 who underwent a total hip or knee replacement surgery at the project site. There were no demographic variables collected such as age, gender, body mass index (BMI), or previous joint replacement surgery. Including age and differentiating knee or hip replacement surgery in the project may have influenced pain level and LOS findings. Hofstede, Gademan, Stijnen, Nelissen, & Marang-van de Mheen (2018) examined pain levels, BMI, and age among those who had TKA and THA and found no statistically significant differences in pain levels among those who had TKA and THA. The results revealed higher BMIs and age had more pain and less mobility. Using only one project site for the QI project may not represent most surgical patients undergoing THA or TKA surgeries thus not representing the generalized population.

Recommendations for Remediation of Limitations in Future Work

Recommendations for future work would include better program design based on organizational and orthopedic department needs to include collecting data for outcome evaluations. Being able to measure improvement as a result of services provided is necessary for an organization to stay afloat financially to receive funding (see Kettner et al., 2013). Prior to the project, the organization was moving toward achieving the goal of 2 to 3 day LOS to meet the community hospital standards. There should have been more thought on my part about how the findings related to LOS would have impacted those patients who attended the education class and those who did not. Those patients who did

not attend the education class were expected to have a 2 to 3 day LOS. Future recommendations would be to inquire if any organizational changes are occurring.

Preoperative education classes are developed based on organizational needs intertwined with evidenced based literature giving guidance on important topics to cover for best surgical outcomes. The content and delivery in which the information is taught is based on the developers of the class, how the instructors teach it and how the class is facilitated. Another recommendation for future work would be to compare pain levels between those who had knee replacement surgery and those who had hip replacement surgery, including demographic data such as age, gender, and BMI. The results would give insight into the need to make finer adjustments to the program to enhance effectiveness for the individual patient.

Summary and Conclusion

The purpose of the QI project was to educate patients on how to manage postoperative pain after TJR surgery by restructuring an already established preoperative education class to compare pain level and LOS in those who attended the class as compared to those who did not attend the class using VAS pain level scores from a review of medical records. The objectives of the project were to determine if patients were comfortable during their hospital stay, at discharge and at the 2-week postoperative visit. The analysis of the findings from summative data showed that those who attended the preoperative education class had lower VAS pain level scores during the hospital stay and at the 2-week postoperative visit than those who did not attend the preoperative education class. There was no significant difference in VAS pain level among the groups

at the time of discharge from hospital. The QI project outcome was manageable pain control during hospitalization causing early mobility and decreased LOS through preoperative education class.

The findings support the need for organizational policy changes for a mandatory preoperative educational class that all patients who will be having TJR surgery will need to attend. Additionally, nursing involvement played a vital role in delivery of consistent information in the class and during hospitalization. The data on improvement in the effectiveness of the class helped support sustainability of the class and lowered hospital costs. The strengths of the project were the positive outcomes in decreasing LOS from the organizations systems redesign QI project prior to starting this project and oversight of myself and other orthopedic NP in ensuring consistent delivery of class content. The limitation of the project was using special population at one setting and not being able to generalize findings.

Section 5: Scholarly Product

In my project, I found that patients who attended the preoperative education class experienced less pain during hospitalization and decreased LOS compared to those who did not attend the preoperative education class. The outcome evaluation data is evidence that can be linked to the patient education provided with specific content related to management of pain and discharge planning. Evidence-based projects can strengthen a health care system by providing more effective and efficient methods to improve services, health care delivery, and patient outcomes (White & Dudley-Brown, 2012).

One method I plan on using to disseminate the findings of this DNP project is by oral presentation at the organizational level via Power-point presentations to various audiences including physicians, NPs, physical therapists, occupational therapists, nurses, and upper management. I will make a request, through departmental chiefs in surgery, medicine, nursing, and physical therapy, to present the project for the purpose of sharing the findings. Another method of disseminating findings on an organizational level would be to place the Power-point presentation on the website of organization for all to view. Lastly, I will disseminate the findings of this project by submitting a manuscript for consideration for publication to the *Orthopaedic Nursing Journal*. The journal is an appropriate place for publication for the QI project because of the target audience it serves and the content usually discussed in its pages.

Analysis of Self

As Scholar

The DNP program prepares the advanced practice nurse who works in the clinical arena to become an agent of change in the delivery of health care (Terry, 2015). DNP students learn through coursework, by application of the DNP Essentials and the practicum experience to evolve into the role of an advanced practice nurse (APN) with a DNP degree. Throughout the DNP program and project, my skills and knowledge have grown in the areas of leadership, advanced nursing practice, QI, improving health outcomes, and use of evidence-based research. The role I played in this DNP project was undergoing a transformation from an experienced NP in the specialty of orthopedics that worked as a clinician within a team of all physicians to a leadership role in assisting the organization and orthopedic patient population in decreasing LOS through the development of an education class that improved delivery of service. This project also allowed me to grow in terms of systems thinking, organizational leadership, interprofessional collaboration, clinical scholarship, analytical methods for evidenced-based practice, and advanced nursing practice (AACN, 2006). The knowledge gained improved my communication and collaboration skills and gave me confidence to lead QI projects in my area of specialty that will not only improve outcomes in my area of practice but also at the organizational level. One goal for the project moving forward would be to advocate for administrative staffing to help sustain the class because myself and the other orthopedic NP in the organization are conducting the class only once monthly due to the amount of tasks required to hold the class.

As Practitioner

When identifying practice, organizational, or process issues that affect the delivery of quality care, the approach taken should be a combination of systems thinking, evidence-based practice, and a leadership role (AACN, 2006). During the course of my journey as a DNP student, I learned to look at things differently when approaching opportunities for improving practice in my area of specialty in orthopedics. In my role as the project developer, I identified the need for change in delivery of service to sustain changes at the organizational level. As a result, I expanded my responsibility and accountability in providing care through evidence-based interventions and translating research into practice. My communication skills and collaborative skills improved through working with multidisciplinary teams. My ability to develop relationships with my patients, colleagues, and other professionals also increased due to the use of systems thinking and evidence-based interventions to improve patient outcomes. I learned how to use effective communication in practice changes in the orthopedic department that will help with QI, the delivery of healthcare services, and/or process changes. I learned the importance of being involved in organizational committees to stay abreast of changes and to be a part of the movement, along with other APNs, to communicate changes to APNs in other service departments so change can occur throughout the healthcare system. I continue to mentor, guide, and support my orthopedic colleagues and have been a resource for other NPs within the organization (see AACN, 2006).

As Project Developer

During my practicum experience, I had the opportunity to play an active role in an organizational QI project from beginning to end. I started as a key stakeholder, and then became a project team member, and through my practicum experience was able to rise as a team leader for my own DNP project. My DNP project taught me to approach program design based on specific population needs for the purpose of providing more useful and effective services (see Kettner et al., 2013). I gained knowledge in designing, planning, implementing a program, outcome evaluation, and how to disseminate evidence-based findings. Through this process, my communication skills, computer skills, time management skills, and writing skills improved. As project developer, I gained knowledge in all the components necessary to develop and implement a program that may improve a health care delivery system.

What Does This Project Mean for Future Professional Development

The DNP-prepared nurse is educated to bring evidence-based practices to patient care (AACN, 2006). Nurse scholars who work in a specialized clinical area use expertise to identify problems affecting patient and organizational outcomes (AACN, 2006). Additionally, nurse scholars conduct extensive literature reviews and use scientific evidence and theory to apply knowledge through use of nursing interventions to improve quality of care to patients (AACN, 2006). The outcome of this DNP project had positive results that showed patient education played a large role in managing postoperative pain in the patients undergoing TJR surgery resulting in decreased hospital stays. I would like to expand the preoperative education class to other surgical services, such as spinal

surgery and colorectal surgery, at the project site. Patient education programs are evidenced-based practice interventions that can help hospitals keep hospital costs down. One future type of professional development that I would like to complete would be the submission of manuscripts for publication to the *Orthopaedic Nursing Journal*. My writing skills have improved through my years in DNP school, and I have a desire to gain more knowledge and skills in writing through publishing and exposure to editing of articles, manuscripts, and abstracts.

Summary

This QI project contributed to and helped sustain an organizational decrease in LOS in the orthopedic patient population undergoing total knee or hip replacement surgery through a restructuring of content in the already existing preoperative education class. Sharing the results of this project on an organizational level through oral presentations and on a national level through publication are my selected pathways for dissemination. During my journey in the DNP program, I learned a lot about myself and feel I have developed the necessary knowledge and skillset to lead and advocate for improvement in health care outcomes. I am excited about my new role as a DNP-prepared, advanced practice nurse and will continue to look for ways to translate evidence-based research into practice.

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Appendix A: Data Collection Form 0 = Before Intervention

			Pain Level								
Code	Participant Number Assigned	LOS	1 st Time OOB	POD 1		POD 2		POD 3		Discharge from Hospital	2 weeks post op visit
				0800	2000	0800	2000	0800	2000		
0	1										
0	2										
0	3										
0	4										
0	5										
0	6										
0	7										
0	8										
0	9										
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0	26										
0	27										
0	28										
0	29										
0	30										

Developed by Angela Washington

Appendix B: Data Collection Form 1 = After Intervention

			Pain Level								
Code	Participant Number Assigned	LOS	1 st Time OOB	POD 1		POD 2		POD 3		Discharge from Hospital	2 weeks post op visit
				0800	2000	0800	2000	0800	2000		
1	31										
1	32										
1	33										
1	34										
1	35										
1	36										
1	37										
1	38										
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1	60										

Developed by Angela Washington