



A Novice Nurse's Knowledge of Orthopedic Pain Management

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Abstract

Orthopedic pain can be divided into two subgroups: acute and chronic pain. Acute pain is pain experienced immediately following injury and surgery lasting from a few days to a few months. Chronic pain lasts past the time of orthopedic injury healing. In the case of orthopedic pain, this can be several months depending on the nature of the injury. Orthopedic pain is often insufficiently managed and leads to complications ranging from chronic pain to added stress on the healthcare system. Pain is subjective and without the proper knowledge and experience, it can be difficult to manage and treat. The purpose of this honors capstone project was to explore a novice student nurse's knowledge and attitudes regarding pain and pain management with an examination of the best practices in pain management in the orthopedic setting. *The Knowledge and Attitude Survey* by City of Hope was administered at two different intervals to examine knowledge and attitude of pain as a student healthcare worker and provide data regarding areas of needed pain education. Following a three-month internship, the reflection of practice enhanced personal knowledge, and skills as reflective in an increase of score on the survey. Recommendations for practice to include pharmacological and nonpharmacological methods were explored and investigated during the internship to establish optimal pain control in clientele.

Key Words: Orthopedic Pain, Pharmacological, Internship, Reflective Practice

Introduction: A novice nurse's knowledge of orthopedic pain management

Pain management is an integral component of patient care within the orthopedic setting. Recent data gathered by Grzelak et al. (2022), says that “up to 70% of orthopedic patients still report moderate to severe pain at hospital discharge, and almost half of those treated surgically develop chronic pain, one of the highest percentages for any type of surgery” (p.385). Post-operative pain management is provided by nurses in a multitude of methods ranging from ice packs to opioid administration. Statistics have shown that the majority of post-operative

orthopedic patients report inadequate pain relief (Arkin, 2022), and according to Cui et al. (2018), poor pain management can lead to many other problems extending from patient injury to added stress on the healthcare system. Pain, often known as the fifth vital sign, is subjective to the patient which can make it difficult to manage and treat. It can be especially difficult without the proper knowledge and experience on pain management.

Literature Review

A review of the available literature to examine best practices in orthopedic pain management was conducted. The sources of evidence used were scholarly, peer-reviewed journal articles obtained from EBSCO database and Google Scholar. Inclusion criteria were articles that were written within the last five years (2017-2022) and peer reviewed. Key terms used to search were “pain;” “pain management;” “best practices.” After examination of the literature, nine articles met the criteria and were selected for review which reflect best practices in pain and pain management, as well as nursing attitudes and knowledge of pain management. The following themes emerged in the literature review: surgical pain, pain management, pharmacological and non-pharmacological pain management, and opioid and substance abuse.

Available research on surgical pain and pain management revealed that fewer than 50% of patients who underwent orthopedic surgery reported sufficient pain management (Arkin, 2022; Wooldridge & Branney, 2020). Similar research conducted showed that pain ratings in orthopedic patients post-operatively rate higher than any other type of procedure (Gonzalez et al., 2021). Additionally, data gathered by Taylor et al. (2017) found that post-operative pain is inadequately controlled, and the majority of patients report moderate to severe pain at rest. It is clear that orthopedic injuries and procedures are a significant risk factor for uncontrolled pain. The American Society for Pain Management Nursing (ASPMN) and the National Association of Orthopaedic Nurses (NAON) emphasize the importance of the nurses' role in personalizing care to optimize and implement adequate pain management interventions (ASPMN & NAON, as cited in Arkin et al., 2022). Due to the subjective nature of pain, and the individuality of each patient, nursing management of orthopedic pain continues to present nurses with challenges.

Pharmacological and nonpharmacological nursing interventions for orthopedic pain management are implemented and assessed by nurses which makes nursing knowledge and attitudes vital components of patient care. Pain management protocols implemented by Cui et al. (2018) and Grzelak et al. (2022) found that nonpharmacological strategies improved pain outcomes, and that there was a direct correlation between nursing knowledge of pain management and appropriate implementation of sufficient pain control strategies. The most effective nonpharmacological pain control strategies were a cold pack, comfortable sleep environment, massage, sleep, and distraction methods (Cui et al., 2018; Grzelak et al., 2022). Pharmacological interventions were assessed in research conducted by Cui et al. (2018) and Taylor et al. (2017). Results revealed that nursing knowledge of pharmacological interventions were insufficient for optimal and adequate pain management. Taylor et al. (2017) found that results support the need for additional education on appropriate dosing and timing of opioid analgesics. Similarly, Wooldridge and Branney (2020) found that pain management education was a fundamental aspect of post-operative pain management. It is clear that nursing knowledge makes a substantial difference in the care provided to patients experiencing orthopedic pain. Future aims at improving pain management need to address pharmacological pain management

and overall treatment plans (Cui et al., 2018; Grzelak et al., 2022; Taylor et al., 2017; Wooldridge & Branney, 2020).

Taylor et al. (2017), Worley (2019), and Rucinski and Cook (2020) recognize opioids as the typical method of orthopedic pain treatment. It is important to note that opioids are schedule II drugs and have a high potential for abuse and dependence. Repeated use and misuse of opioids leads to dependence and alters mental functioning. It is the nurse's duty to provide pharmacological treatment with opioids while being mindful of the signs, symptoms and risks for substance use disorders in order to proactively combat the opioid crisis. The nurse has a responsibility to make decisions about the administration and dosage of opioid analgesics as appropriate for each individual patient based on their assessment, and this flexibility in drug administration and dosage allows for individualized nursing care which is important for the care of patients with orthopedic pain. Youngcharoen (2017) found that nursing education should be aimed at younger nurses with a focus on improving nurses' awareness of pain management benefits, and their confidence in their ability to manage patient pain with opioids. Research conducted by Rucinski and Cook (2020) and Worley (2019), indicate that opioid education, screening, and naloxone education were successful in reducing the risks of substance use disorder (SUD), and improving pain control.

The research findings from this review of the literature showed that there is a wide range of orthopedic pain management interventions and recommendations to be utilized in nursing practice that range from education to nonpharmacologic methods, and pharmacological intervention. Nonpharmacological pain control interventions are the most effective in controlling pain when used in conjunction with pharmacological interventions. Education should be aimed at the patient and the nurse to optimally maximize the effectiveness of each pain management strategy.

City of Hope Survey

The Knowledge and Attitude Survey by City of Hope (Ferrell et al., 1993) is a tool used to assess nurses and other healthcare professionals' attitudes on pain and pain management. It has been used since 1987 and adapted to current pain management protocols and healthcare practices. The internal reliability of the tool scores at 0.80 (Ferrell, 2014). The survey consists of 22 true or false questions, 15 multiple-choice questions, and two case studies. The intern completed this survey at two different points: before attending an internship and after the completion of a three-month internship as a nurse intern on an orthopedic unit to assess personal growth in knowledge and attitudes. Ferrell (2014) noted that to analyze the survey it is important to analyze the data in terms of percentages of complete scores as each item measures knowledge and attitude about pain management topics. The nurse intern's scores in knowledge and expertise increased by 10% after the internship experience from a baseline score of 64% to 74% (Ferrell, 2014).

Before Internship Experience

A three-month student nurse internship was completed by the author on an inpatient orthopedic unit at a level one trauma center. The position was labeled as nurse intern and all work was completed under a registered nurse preceptor. The tasks increased in complexity as the weeks progressed to include assisting with medication pass, dressing changes, monitoring vital signs, and charting. The majority of care was provided to orthopedic clientele with a variety of diagnoses ranging from knee, hip, and spinal fractures to amputations. Journaling was accomplished after each shift paying attention to the pain and pain management on each clientele

within the nurse intern's care. Evaluation of the notes were used as reference, analyzed for themes and referenced for improvements in nursing care. The intern scored a 64% on the Knowledge and Attitude Survey by City of Hope (Ferrell, 2014) pre-internship.

During Internship Experience

The orthopedic healthcare team on the unit has a pain management protocol for all patients experiencing orthopedic pain postoperatively (Table 1). There is one surgeon who does not follow the pain protocol because the provider does not prescribe opioids post-operatively to his patients. All other medical personnel adhere to the protocol as appropriate. Distraction techniques such as watching television, talking, food, and reading materials are encouraged by the staff. The nurse has a responsibility to notify the surgeon if pain is not controlled, and to plan PRN medication administration around times of strenuous and painful activities, such as dressing changes and physical therapy, in an effort to keep pain levels to a minimum. This protocol is modified at the doctor's discretion and based on the patient's type of injury and medical history.

Table 1: The Pain Protocol

The Pain Protocol		
	Pharmacological	Nonpharmacological
Level 1	<p>Nonsteroidal Anti-inflammatory Drugs (NSAID): Choice of Agent</p> <p>a) Acetaminophen</p> <ul style="list-style-type: none"> - 975mg - Q6Hours, around the clock for five days <p>[Maximum 4g/day, avoid in patients with severe hepatic impairments, coronary artery disease, renal impairments, caution with gastrointestinal anastomosis]</p> <p>b) Ketorolac</p> <ul style="list-style-type: none"> - 15mg intravenous push - Q6Hours (Max 48hrs) <p>[If patient is not on ASA, celecoxib, has NSAID allergy, CrCl <60, avoid in patients with severe hepatic impairments, coronary artery disease, renal impairments]</p> <p>c) Celecoxib</p> <ul style="list-style-type: none"> - 400mg once, post operative day one <p>[Contraindicated in setting of coronary artery bypass graft surgery, patient receiving ASA or ketorolac, CrCl <60, avoid in patients with severe hepatic impairments, coronary artery disease, renal impairments; reduce dose to 200mg by mouth if >65 years old]</p>	<ul style="list-style-type: none"> - Ice pack application - Hourly repositioning - Elevated positioning with pillow placement - Pain medication administration timing for strenuous/painful activities - Distraction techniques (Television, food, reading materials, talking)
Level 2	<p>Gabapentinoid: Choice of Agent</p> <p>a) Gabapentin</p> <ul style="list-style-type: none"> - 300mg - Three times a day for 14 days <p>b) Pregabalin</p> <ul style="list-style-type: none"> - 150mg 	<ul style="list-style-type: none"> - Ice pack application - Hourly repositioning - Elevated positioning with pillow placement - Pain medication administration timing for strenuous/painful activities

	<ul style="list-style-type: none"> - Twice a day for 14 days <p>[reduce doses for renal impairment, elderly, frail, demented, post cardiovascular accident; avoid use with each other; advance or titrate down as tolerated]</p>	<ul style="list-style-type: none"> - Distraction techniques (Television, food, reading materials, talking)
Level 3	<p>Tramadol</p> <ul style="list-style-type: none"> - 50mg - Q6 Hours PRN for mild, moderate and severe pain 	<ul style="list-style-type: none"> - Ice pack application - Hourly repositioning - Elevated positioning with pillow placement - Pain medication administration timing for strenuous/painful activities - Distraction techniques (Television, food, reading materials, talking) - Notify doctor if pain is not controlled
Level 4	<p>Oral Opioids for Breakthrough Pain: Choice of Agent</p> <p>a) Oxycodone</p> <ul style="list-style-type: none"> - 5mg moderate pain - 10mg severe pain - Q4 Hours PRN <p>b) Hydromorphone</p> <ul style="list-style-type: none"> - 0.5mg intravenous push - Q2Hours PRN <p>[if patient is unable to take oral oxycodone for mild, moderate, and severe pain]</p>	<ul style="list-style-type: none"> - Ice pack application - Hourly repositioning - Elevated positioning with pillow placement - Pain medication administration timing for strenuous/painful activities - Distraction techniques (Television, food, reading materials, talking) - Notify doctor if pain is not controlled

As a nurse intern, I treated a range of orthopedic injuries including knee and hip injuries, spinal injuries, traumatic fractures, and amputations. The pain management of knee and hip injuries following a complete joint replacement resulted in approximately 56% of patients reporting satisfaction with pain relief strategies utilizing the pain protocol. It is important to note that the majority of patients reported the worst pain during and directly after receiving physical therapy, and heightened pain upon position changes and dressing changes. Timing of opioid analgesics surrounding these painful events maximized pain control. Assessments of pain post administration of opioids were completed at 15 minutes, 30 minutes, one hour, and two hours. Additional PRN analgesics were administered as appropriate. Ninety-two percent of knee and hip patients accepted the use of nonpharmacological pain management methods, and 100% of those patients reported ice as the most effective method for pain relief. Seventy five percent of patients required supplemental pharmacological pain control. The supplemental medications varied based on the doctor assigned to that patient; however, commonality of medication included Ketamine, Morphine Sulfate or Percocet. Patient education included information on opioid safety, ice application timing intervals, safe positioning for knee and hip injuries, and the importance of around the clock analgesics during the first few days post-operatively.

During my third week of the internship, a client presented status post hip revision arthroplasty after traumatic dislocation who had a history of drug abuse. The client was receiving Acetaminophen and Gabapentin around the clock, as well as PRN Oxycodone per the protocol. It was important to monitor for signs of addiction as well as educate the patient on the proper use

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and dosage of Oxycodone for pain management. His pain was well controlled with this regimen of medications in conjunction with ice application, repositioning, and distraction with a television. The formulation of my nursing role was noted by treating this patient's pain according to the protocol, and without hesitation regardless of the patient's past history. I made sure to complete frequent assessments, and to care for this patient without personal bias and judgment. Ultimately the patient did not show any signs of abnormal behavior or signs of abuse, and I felt confident in my ability to manage his pain while being mindful of the risks for medication abuse and addiction.

Spinal fusion, spinal fracture, spinal stenosis, and herniated disc patients seemed to experience the greatest amounts of pain. One hundred percent of these patients received supplemental pain medication in addition to the pain management protocol. I applied ice for post operative day one through nine for my assigned patients. After and including postoperative day ten, I applied heat to the affected areas to help with pain and muscle spasms. Frequent repositioning and distraction techniques were successful methods of pain management for the majority of these patients. These patients often refused PRN pain medications until their pain was unbearable and uncontrolled. Patient education included the timing of ice and heat application, opioid safety, safe physical positioning for spinal injuries, and the importance of around the clock pain control. Patient education proved to be exceptionally important for the care of spinal injury patients given the nature of their injury and the severity of their pain, and I found it made a significant, positive difference in pain control outcomes.

The majority of patients with traumatic fractures and amputations were difficult to assess for pain because they had a lot of other pre-existing and contributing conditions. Pain assessment tools were extremely helpful because sometimes the patients were unable to express the level of pain that they were in. One hundred percent of these patients required additional pain medications for severe breakthrough pain. These medications included Morphine Sulfate, Percocet and/or a Lidocaine patch. Based upon my assessment, the most effective nonpharmacological pain management methods for these patients were ice and elevation of the affected body part. One hundred percent of these patients accepted the use of ice, repositioning, and elevation. A patient during the sixth week of the internship was admitted with a broken clavicle and deep lacerations to both shins. This patient also had dementia and was not able to express her pain well. I planned my care around daily position changes and dressing changes, however, podiatry visited the patient to drain a hematoma on the patient's leg without notifying myself or my nurse preceptor. We were not able to premedicate this procedure, and the patient experienced severe pain. I felt that communication between the healthcare team could have prevented this occurrence, and that communication within the healthcare team is just as important as communication with the patient regarding their pain management. For all future patients, I made an effort to reach out to other disciplines so that I was aware of upcoming appointments and procedures so that I could prepare to premedicate my patients when necessary.

After Internship Experience: Reflection and Recommendation

My nursing knowledge and confidence in my practice grew substantially during the three-month internship. Personal reflection revealed an increase in knowledge, skills, equality of care and time management. I feel that I am able to safely and confidently make decisions about the application of the pain management protocol and the administration of PRN opioids, as well as complete effective assessments before, during and after care. A nursing intervention I found very helpful to my patients was writing out the analgesic timing on the patient whiteboards in the

rooms. This open communication between the patient and myself allowed my patients to feel more informed and in control of their pain management plan. I also feel that I am able to ask my peers and preceptors questions appropriately when I am unsure of anything. Patient education was not my strongest nursing skill prior to the internship, but after completion, I have the experience and knowledge necessary to provide patient education on opioid use and safety, and nonpharmacologic pain management interventions. Patient education has proven to be a strong component of pain management in the orthopedic setting. Post-internship, I realize that it is my nursing duty to treat each patient's pain without judgment. Opioids are essential to pain control in orthopedic patients, and the safety measures in place such as frequent assessments, education, and screening allow for safe administration. It is my responsibility as the nurse to utilize these tools in order to safely control orthopedic pain.

As the weeks continued, and I gained more experience with orthopedic pain control, a few important concepts emerged. First, the use of ice application proved to be a vital piece of the pain protocol, and was the most effective nonpharmacological pain intervention. Second, most patients are afraid of opioids before they are educated about the use of them and the safety measures in place. The nurse has a responsibility to educate the patient, as well as respect their refusal after education. It is also imperative that the nurse remain informed and up-to-date on the latest evidence-based education and safety protocols regarding pain control. Third, my communication with the patient and the rest of the health care team is imperative to pain control. The nurse is the bridge between the patient and the rest of the health care team, and it is the nurse's responsibility to be the patient's advocate, teacher, educator and support. It is clear that with experience comes more knowledge and confidence in nursing practice, and this was exemplified in the 10% increase in scores on *The Knowledge and Attitude Survey* by City of Hope (Ferrell, 2014).

Conclusion

Nurse internships provide a valuable tool in my student nurse's development of knowledge, skills and attitudes. An enhanced understanding and application of pharmacological and nonpharmacological pain interventions on orthopedic clientele concepts was gained through experiential experience. Reflection on the experience and journaling revealed a 10% increase in my knowledge and attitudes regarding pain and pain management measured by *The Knowledge and Attitude Survey* by City of Hope (Ferrell, 2014).

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