CHAPTER 1: INTRODUCTION

Pain following total joint replacement surgery affects patient functional mobility and outcomes. Inadequate postoperative pain management decreases participation in rehabilitation and activities of daily living, resulting in decreased patient satisfaction and increased potential for chronic pain. Pre-existing pain issues or the development of chronic pain following surgery complicates postoperative pain management. The struggle lies with adequate pain management because pain management is essential for optimal patient outcomes both from the perspective of the healthcare provider and the patient.

Background of the Problem

Inadequate postoperative pain management following total joint replacement surgery dramatically affects patient outcomes. Poor pain management decreases patient participation in activities and compliance with ambulation, resulting in increased risk for venous stasis, deep vein thrombosis, pulmonary embolism, lengthy hospital visits, decreased patient satisfaction, and potential for chronic pain (Morris, Benetti, Marro, & Rosenthal, 2010). According to the Centers for Disease Control and Prevention (2014), 719,000 total knee replacements and 332,000 total hip replacements were performed in the United States in 2010. Significant increases in total joint replacement surgeries have contributed to an increased number of patients with post-surgical pain management issues.

The International Association for the Study of Pain (2011) defines pain as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage” (p. 3). There are variations in each patient’s experience with pain and the ability to cope or deal with the “unpleasant sensory” perception
that the pain entails. Pain is subjective, eliciting different responses; however there is no set gold standard of care for treating pain in patients. Patients who undergo total joint replacement surgery experience pain as a result of tissue, muscle, nerve, and/or bone trauma. Traumas from surgery affect total joint replacement patients as a result of an initial bombardment of pain indicators that cause a subsequent inflammatory response; the pain indicators together with the inflammatory response significantly contribute to postoperative pain. Sustained changes to the peripheral and central nervous systems through pain signals lead to exaggerated and persistent postoperative pain (Reuben & Buvanendran, 2007). Reuben and Buvanendran (2007) described peripheral sensitization:

A reduction in the threshold of nociceptor afferent peripheral terminals is a result of inflammation at the site of surgical trauma. Central sensitization, an activity-dependent increase in the excitability of spinal neurons is a result of persistent exposure to nociceptive afferent input from peripheral neurons. (p. 1344)

The combined processes contribute to a state of hypersensitivity known as hyperplasia to the injured and surrounding tissue. Continued sensitization leads to permanent changes in the central nervous system, resulting in intractable pain unresponsive to various pain medications (Reuben & Buvanendran, 2007). Pain is subjective, requiring individualized approaches to care and assessment, indicating the need for further studies on the subject.

**Significance/Relevance**

Fewer than half of all postoperative total joint replacement patients receive ideal pain relief; they experience severe pain (Maheshwari, Blum, Shekhar, Ranawat, & Ranawat, 2009, p. 1418). Postoperative pain control is a significant
issue for orthopedic nurses and physicians. According to Pulido, Hardwick, Munro, May, and Dupies-Rosa (2010), “Orthopedic surgery is often cited as among the most painful of surgeries” (p. 92). Ghandi and Viscusi (2009) described postoperative pain as “the consequence of tissue injury, nerve irritation and the resulting cascade of neurohumeral events that follow” (p. 2). Underlying chronic pain issues often increase the complexity of postoperative pain management following total joint replacement surgery (Pasero & McCaffery, 2007).

Osteoarthritis is often responsible for pain and joint stiffness that result in the need for total joint replacement surgery. Understanding of the pathophysiology of osteoarthritis (OA) is limited. The cardinal feature of OA is progressive loss of articular cartilage with associated remodeling of subchondral bone. OA is defined as joint failure, a disease process that involves the total joint including the subchondral bone, ligaments, joint capsule, synovial membrane, periarticular muscles, and articular cartilage (Andreoli, Benjamin, Griggs, & Wing, 2010, p. 870).

A 2010 study indicated that pain following total hip replacement is most intense during the 1st postoperative day and gradually subsides with each additional day. The researchers, Joelsson, Olsson, and Jakobsson (2010), determined that “postoperative pain experience revealed two implications for rehabilitation that should be highlighted: insufficient pain management during the first postoperative days and a combination of pain and fear during the following postoperative days” (p. 2836).

Pain management has become a major issue, demanding a deeper understanding and awareness. Adequate pain management is vital in improved patient satisfaction and optimum clinical outcomes. The U.S. Congress called attention to the issue on January 1, 2001, when it enacted the Decade of Pain
Control and Research Act. The American Pain Society has developed a number of programs to raise awareness of pain and provide funding for continued research (American Pain Society, 2012).

Pain is considered the fifth vital sign, demonstrating its significance in patient care. California State Assembly Bill 791, signed into law by Governor Gray Davis in 2000, requires that registered nurses measure pain as the fifth vital sign in physiological assessments. Healthcare staffs are required to record pain assessments with other vital signs for each patient (California Board of Registered Nursing, 2009). Nurses have always monitored pain; however, pain management is now documented more consistently. It is recorded when monitoring vital signs, after procedures, when administering pain medication, and following administration of pain medication to monitor the effectiveness of the medication.

A number of studies have focused on postoperative pain management following total joint replacement surgeries. Peters, Shirly, and Erickson (2006) validated previous findings that multimodal peri-operative pain control has a significant place in postoperative pain management. The researchers established that “combining advances in surgical techniques, perioperative anesthesia, and pain management, as well as rapid mobilization, represents a more effective and safe means of reducing morbidity and accelerating functional recovery from total joint arthroplasty than any one aspect alone” (p. 138). Education about pain is essential in decreasing patients’ fear of moving and participating in physical therapy after surgery.

Multiple research studies involving postoperative pain management provide valuable information on new regimens utilizing various approaches to pain management. Multimodal pain management following total joint replacement procedures shows promising results. It involves combining different types of pain
management to decrease adverse side effects, decrease pain, and improve patient outcomes. Individual establishments use different pain management therapies to decrease postoperative pain. However, patient satisfaction with pain control has been shown to be dependent on more than medication alone: “Satisfaction with pain treatment is dependent on patient expectations, education, level of pain intensity, quality of interactions with healthcare professionals, and environment” (Jamison et al., 1997, p. 229). Healthcare staff should always consider the multiple factors that contribute to patients’ ability to cope with stress and pain after surgery.

Advances in postoperative pain regimens continue to take place, offering new therapies, including multimodal pain management. Yet approximately half of all postoperative patients have insufficient pain relief following total joint replacement surgery. Multidisciplinary orthopedic medical teams should consider multimodal pain management and additional issues affecting patient dissatisfaction with pain, including thorough preoperative and postoperative patient education. Continued research is imperative in cultivating successful outcomes.

Postoperative physical therapy remains vital after total joint replacement surgery. Physical therapy improves patients’ potential outcomes following total joint replacement surgery; physical therapy utilizes encouragement, increases strength, improves balance, improves functional outcomes, and decreases risk of chronic pain. Atatlay, Akkaya, Konukcu, Balci, and Sahin (2013, p. 76) identified significant improvements in pain, quality of life, patients’ self-assessment, and doctors’ assessment of the patient from following a physical therapy program. The researchers found that patients’ self-evaluation decreased when anxiety and depression scores increased. However, they found no correlation between anxiety
scores and patient results. Both preoperative and postoperative physical therapy has been shown to improve patient outcomes.

**Purpose and Research Hypotheses**

The purpose of the study was to determine if postoperative pain affects functional mobility following total joint replacement surgery. The researcher formulated the following hypotheses:

1. There will be a significant difference in joint knee pain between pre and post participation in outpatient physical therapy rehabilitation. That is, after participating in outpatient physical therapy rehabilitation, individuals will report significantly less joint knee pain.

2. There will be a significant difference in percent of mobility impairment between pre and post participation in outpatient physical therapy rehabilitation. That is, after participating in outpatient physical therapy rehabilitation, individuals will report significantly less mobility impairment.

3. There will be a significant negative correlation between joint knee pain and number of days an individual participates in outpatient physical therapy. The more days an individual participates in outpatient physical therapy the less joint knee pain that individual will report.

4. There will be a significant negative correlation between percent of mobility impairment and number of days an individual participates in outpatient physical therapy; the more days an individual participates in outpatient physical therapy the less percent of mobility impairment they will report. Patients elect to have total joint replacement surgery to improve mobility, decrease pain, and improve quality of life. Pain after surgery influences patient's progression and overall outcomes.
Definition of Terms

Some of the terms used in this research are defined below.

*Arthroplasty* is a surgical procedure that restores the integrity and function of a joint (Arthroplasty, n.d.).

*Functional mobility* is the ability to move from one position to another, to enable participation in normal activities of daily living such as walking, standing, sitting, and lying down (Victoria Department of Health, 2013, p. 1).

*Physical therapy* refers to healthcare services that help a person keep, restore, or improve skills and functioning for daily living that have been lost or impaired because a person was sick, hurt, or disabled. Physical therapy can include diagnosis, prognosis, and management of impairments as well as activity limitations and participation restrictions that enhance optimal health, performance, and quality of life (American Physical Therapy Association, 2013, p. 1).

*Postoperative pain* is a compilation of several unpleasant sensory, emotional, and mental experiences associated with autonomic, endocrine-metabolic, physiological, and behavioral responses following surgery (International Association for the Study of Pain, 2011, p. 1).

*Self-care deficit* is the relationship between persons’ therapeutic self-care demands and their powers of self-care agency in which constituent developed self-care capabilities within self-care agency are not operable or not adequate for knowing and meeting some or all components of the existent or projected therapeutic self-care demand (Orem, 2001, p. 522).

*Self-efficacy* is the belief in one’s capabilities to organize and execute the courses of action required to manage positive solutions. It is belief in one’s ability to succeed in a particular situation (Bandura, 1994, p. 71).
Total joint replacement surgery is the surgical removal of an arthritic or damaged joint and its replacement with an artificial joint, called a prosthesis (American Academy of Orthopaedic Surgeons, 2007, p. 1).

Total knee replacement is a surgical procedure in which damaged parts of the knee joint are replaced with a prosthesis. The surgeon separates the muscles and ligaments around the knee to expose the inside of the joint. The ends of the femur and tibia are removed, as is frequently the underneath of the patella. An artificial prosthesis is then cemented into place (Total Knee Replacement, 2013).

Total hip replacement is a reconstructive procedure to replace damaged bone and cartilage in the hip joint with an artificial prosthesis (Siopack & Jergesen, 1995, p. 243).

Theoretical Framework

The project is based on the theories offered by Dorothea Orem and Albert Bandura. Dorothea Orem’s self-care deficit theory and Albert Bandura’s self-efficacy theory are both significant and appropriate in orthopedic nursing. Orem’s nursing theory incorporates knowledge that enables patients to be independent, self-sufficient, and empowered in their own care to their maximum potential. Bandura’s self-efficacy theory views patients’ beliefs about their capabilities as the most significant factor in determining their ability to manage pain and successfully participate in physical therapy following surgery. These two theories have demonstrated their legitimacy; they have been validated through numerous research studies and are beneficial in orthopedic nursing and rehabilitation.

Dorothea Orem’s nursing theory works well with orthopedic nursing and physical therapy because it encourages patient independence and participation in care. Patients who are well educated prior to surgery demonstrate improved
outcomes and manage pain more effectively. When they are included in the plan of care, knowledgeable patients actively participate in physical therapy. Low levels of pain and high participation in rehabilitation decrease adverse outcomes and improve patient satisfaction.

The validity of Dorothea Orem’s nursing theory has been demonstrated through research studies as a testable hypothesis, although it has not been thoroughly tested in its entirety. Orem’s theory is one of the most widely used theories in nursing curricula (McEwen & Wills, 2011). It is highly regarded for its effectiveness in all aspects of nursing. The self-care model continues to be the organizing framework for many nurse researchers, educators, administrators, and providers of patient care (Bernier, 2002).

Many nursing theories have contributed to the development of nursing practice. Dorothea Orem’s early concepts provide a helpful focus for today’s nurses. The unique independent function of the nurse is to “stand with” patients/clients in helping them to attain, maintain, or regain health, well-being and functional ability. This is done by using the key holistic nursing concept of considering the basic human needs of body, mind, and spirit. Nurses can address the person’s lack of ability, knowledge, or motivation in meeting what Orem called a “self-care deficit” (Volgelberger, 2000).

Dorothea Orem’s theory of self-care is considered appropriate for present and future applications in healthcare. Her theory was originally introduced in clinical teaching of students and later used in nursing care. The Center for Experimentation and Development in Nursing at Johns Hopkins Hospital was one of the first sites where the theory was put into practice. Orem’s theory has been used as the basis of research in multiple situations including preoperative settings,
geriatric nursing, community health, a variety of areas of nursing practice, and numerous other settings (Berbiglia, 2006).

Initially, postoperative patients experience a decline in abilities and function following surgery. Their ability to provide self-care is limited, and they require training from nursing and physical therapy to restore and improve upon physical function. Rehabilitation requires patients’ involvement in their own necessary healthcare treatment, directed at accomplishing functional restoration, improvement, or compensation (Orem, 2001). It requires “deliberate action on the part of the patient and health workers to adapt or adjust to functioning to compensate for or overcome disorders that restrict human functioning in specific ways” (Orem, 2001, p. 202). With encouragement from nurses and physical therapists, patients can enhance their potential outcomes following total joint replacement surgery. However, patients need deliberate instruction and explanation to reach their greatest possible outcomes.

Orem’s theory relates well to postoperative pain management in orthopedics because it establishes patient desire for self-care. Although pain is a significant issue following total joint replacement surgery, research has shown preoperative patient education and multidisciplinary team approaches to be effective in reducing patients’ perception of pain. Studies indicate a multimodal approach of administering pain medication both preoperatively and postoperatively is also effective (Goyal, Parikh, & Austin, 2008). Adequate treatment of postoperative pain remains vital in improving functional ability following surgery and enhancing patient outcomes.

Aspects of Orem’s theory explain how patients can actively participate in their plans of care following total joint replacement surgery. According to Orem’s nursing theory, education gives the patient a realistic understanding of the healing
and the rehabilitation processes. Orem’s theory incorporates all aspects of care, illustrating that patients can be empowered to be independent and self-sufficient while receiving necessary assistance and education to enhance their outcomes.

Bandura’s self-efficacy theory points to the importance of convincing patients of what they are able to do, not the specific skills they have. Bandura (1997) defined self-efficacy not as “a measure of the skills one has but a belief about what one can do under different sets of conditions with whatever skills one possesses” (p. 31). Patients with reservations about their capabilities have less motivation to complete tasks and therefore less opportunity of optimizing functional mobility, decreasing pain, and enhancing desired outcomes.

Bandura (1997) observed, “If people are not fully convinced of their personal efficacy, they undermine their effort in difficult situations and readily abandon the skills they have been taught when they suffer reverses or fail to get quick results” (p. 287). Patients with poor self-efficacy have difficulty believing they have the capability of achieving successful outcomes. Healthcare professionals have the ability to either support or undermine restorative efforts for their patients through encouragement and education.

Patients with high self-efficacy are more inclined to participate in activities that are painful yet ultimately improve their condition and level of function. Their perceived efficacy promotes more active engagement in activities that can heighten the level and duration of pain. According to Bandura:

A strong sense of self-efficacy often increases engagement in pain-producing activities to the point that it can create stressful predicaments. Thus, self-efficacious people suffering from arthritis generate pain and discomfort when they first take on more vigorous activities. Activity
eventually reduces pain and distress in the short term. (Bandura, 1997, p. 270)

Resilient patients who believe they are able to tolerate pain and are active participants in their care have increased success after surgery. They have the ability to work through pain and not let pain restrict them from reaching their goals.

Patients use different approaches to adapt to stress and cope with pain following surgery. Individuals’ levels of self-efficacy determine their effectiveness in adapting to the significant changes that accompany surgery. Bandura states:

Perceived self-regulatory efficacy predicts the use of behavioral and cognitive strategies to relieve pain after controlling for pain severity and outcome expectations. Perceived efficacy can lessen the extent of which painful stimulation is experienced as conscious pain by diverting attention from pain sensations to competing engrossments. (Bandura, 1997, p. 268)

Patients who elect to focus on their ability to improve their quality of life after surgery will see the prospective benefit of surgery and avoid centering their attention on the initial discomforts that immediately follow surgery.

Patients require the exercise and encouragement of physical therapy following total joint replacement surgery to improve functional mobility and decrease pain. Patients’ perceived self-efficacy reveals itself in their ability to cope with pain during physical therapy. Bandura (1997) stated, “People who believe they can alleviate pain enlist whatever ameliorative skills they have learned and persevere in their efforts to reduce their discomfort” (p. 268). These patients effectively learn to adjust to the inevitable changes that follow surgery. By providing continued education and reassurance, physical therapists, nurses, and
physicians play a significant role in alleviating patients’ insecurity while improving their pain tolerance and outcomes.

Bandura’s self-efficacy theory explains how postoperative patients can control the extent of their perceived pain and its consequence on pain management and functional mobility. The belief people have about their ability to cope with pain affects the intensity of pain they experience after surgery. Patients with adequate self-efficacy use nursing and physical therapy assistance to reach optimal outcomes, improve functional abilities, and decrease pain.

**Summary**

The purpose of this study was to determine if postoperative pain affects functional mobility following total joint replacement surgery. Patients experience the most effective pain management following total joint replacement surgery when a multidisciplinary team approach is combined with patient education. Although postoperative pain management remains an issue, evidenced-based research has led to practices that have dramatically improved patient outcomes. Dorothea Orem’s nursing theory encourages patients to actively participate in their recovery through physical therapy following total joint replacement surgery. Patients’ perception of pain is significant in pain management and functional ability. Albert Bandura’s self-efficacy theory explains how patients’ beliefs in their abilities can hinder or enhance their participation in physical therapy and their ability to manage postoperative pain. Early ambulation following total joint replacement surgery is effective in decreasing pain and risk of deep vein thrombosis. Continued education and research remain necessary in providing improved patient care, greater patient satisfaction, and optimum patient outcomes.