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Implementing a Pain Resource Nurse Program on a Post-Operative Unit

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IMPLEMENTING A PAIN RESOURCE NURSE PROGRAM ON A POST-OPERATIVE UNIT

CAPSTONE PROJECT

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by

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ABSTRACT

Background: While exact numbers are not known, the prevailing belief is that a significant number of patients in pain are under-medicated and inappropriately managed. Current literature substantiates that nurses' knowledge and attitudes reflect a deficit in the management of post-operative pain. The Pain Resource Nurse program developed by Ferrell and Grant at the City of Hope was designed to prepare oncology staff nurses to improve pain management in cancer patients.

Purpose: To evaluate the implementation of a Pain Resource Nurse (PRN) program on a post-operative unit using relevant modules from the nationally recognized Pain Resource Nurse Program Curriculum and Planning Guide.

Theoretical Framework. Knowles Theory of Androgogy.

Methods. Volunteers recruited from a 40-bed post-operative unit attended a 16-hour advanced pain management course and participated in 2-hour follow-up visits. The Nurses' Knowledge and Attitudes Survey Regarding Pain by Ferrell & Grant was used to evaluate the nurse's knowledge pre and post implementation. Qualitative data was collected during the individual follow-up sessions.

Results: Pretest mean score (61.28) increased by 49% (91.40) at the conclusion of the implementation process. Participants perceived improvement planning, implementing, and evaluating pain management strategies including education, quality improvement, and consultation.

Conclusion: the program evaluation suggests that the pain resource nurse program may be successfully implemented in a post-operative unit. Further research is required to examine the long-term effects of the program on the knowledge level of nurses participating in PRN programs on post-operative units.

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DEDICATION

To all my family, friends, and colleagues who have given their guidance and support throughout this journey. Most of all I would like to dedicate this to, my friend, and partner who has always given me unconditional love and support.

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CHAPTER ONE

Nature of the Project and Problem Identification

Pain is a multifaceted and complicated phenomenon that is subjective, and individuals describe it based on their own unique perspectives. Pain is challenging to explore and difficult to measure. The most widely accepted definition by healthcare providers was coined by Margo McCaffery (1979) who supported the idea that pain is understood to be whatever the patient expresses it to be. In 1999, the Joint Commission (formally the Joint Commission on Accreditation of Healthcare Organizations) identified pain as an unmet need for many hospitalized patients (Joint Commission on Accreditation of Hospitals [JCAHO], 1999). While exact numbers are not known, the prevailing belief is that a significant number of hospitalized patients in pain are under-medicated and inappropriately managed (Yates et al., 2002; Makes & Sacher, 1973 as cited in Summers; Summers, 2001; Warfield & Kahn, 2005; U.S. Department of Health and Human Services [AHCPR], 1992)

The 2006 National Hospital Discharge Survey (Centers for Disease Control [CDC], 2009) recorded 46 million surgical and invasive procedures performed in in-patient, nonfederal short-stay hospitals. Patients undergoing invasive procedures are especially vulnerable to the potential complications and negative clinical outcomes that can result from ineffective pain management. Current research suggests that poorly managed acute pain increases the risk for deep vein thrombosis, pulmonary embolism, coronary ischemia, myocardial infarction, pneumonia, delayed wound healing, and surgical site infection (Carr & Goudas, 1999; Dunwoody, 2008). There are many psychosocial responses to pain; some patients experience anxiety, emotional suffering, and spiritual distress due to pain and the impact on their lives (Ljungqvist, Nygren, Soop, & Thorell, 2005; Pasero, Paice, & McCaffery, 1999).

A crucial skill required for effective pain management is the identification of those patients with primary or secondary pain. It has been suggested that a sizable number of nurses lack sufficient knowledge about the general aspects of pain, pain management, opioid analgesia, addiction, and dependence and that inadequacies in nursing education contribute to fears and misconceptions regarding the use of opioids (McCaffery, Ferrell, O'Neil, & Lester, 1990; Summer, 2001). Some studies indicate that knowledge alone is insufficient to sustain improvements in pain control (Camp-Sorrell & O'Sullivan, 1991). Paice, Barnard, Cremer, and Ormand (2006) assert that in addition to knowledge, clinicians' intent to treat and manage pain is also guided by a number of factors, including their beliefs about the experience of pain, their beliefs about pain management, and their attitudes toward patients in pain.

Optimizing pain management for patients with post-operative pain requires the nurse to sequence a number of factors serially. The nurse must have 1) knowledge of the physical and psychosocial effects of pain, 2) the ability to adequately assess and evaluate pain, 3) a clear understanding of the pharmacological and non-pharmacological interventions available, 4) a sense of individual attitudes and beliefs regarding pain, and 5) ultimately, the ability to synthesize this knowledge to deliver individualized care that best meets the patient's needs.

The Concept of Pain and Physiology of Pain

The International Association for the Study of Pain (1994) describes pain as an unpleasant sensory and emotional experience associated with actual or potential tissue damage. Physical pain begins with noxious events that result in tissue damage and activation of specialized peripheral sensory neurons called nociceptors. The damaged cells release a variety of neurotransmitters including histamine, bradykinin, prostaglandins, serotonin, and leukotrienes, which in turn relay information to the cerebral cortex through the nociceptors to elicit a response to the pain as well as heighten other physiological and autonomic responses (Woolf & Salter, 2000).

As universal as pain is, it can be difficult to describe in a manner that conveys exactly what a person feels. Pain has many valuable functions. Pain may be the catalyst to seek healthcare, undergo surgery, or make lifestyle changes. Previous experiences with pain will alert an individual to avoid certain actions or behaviors, which have resulted in pain in the past. Another important feature of pain occurs after injury. Pain may signal a need for rest to allow the body to heal. The nature of acute pain serves a specific purpose. Its presence can be considered adaptive and necessary for survival.

Pain can also be maladaptive when it has a profoundly negative effect on preventing the body's restorative functions. This may be seen if the intensity, duration, or frequency of the pain is extreme. Failure to manage pain effectively carries serious implications. It may interfere with a person's ability to participate in activities of daily living, sleep, and engage in social behaviors. Maladaptive pain typically serves no protective function. Uncontrolled pain is not only a symptom of serious pathology; it can also be considered an actual disease itself. Uncontrolled

pain creates a deviation from the normal structure or function of the body, manifested by diverse symptoms whose etiology, pathology, and prognosis may be known or unknown.

Pain can be described by its severity, duration, or pathophysiology, all of which may be a useful guide for clinical assessment and interventions. The severity of pain is usually described as mild, moderate, or severe. Factors that affect pain severity include the location within the body, the ability of the person to splint or limit the motion of the affected area, previous experiences with pain, psychological factors, and the resiliency of the individual.

Acute and persistent pain is not mutually exclusive; both forms of pain can be, and often are, experienced simultaneously. It is not uncommon for patients with persistent pain to develop acute pain in the presence of either a new physiologic process or a procedure. For these patients, adequate pain control may be defined differently than those with surgical pain. These patients require multimodal therapy and may only achieve partial pain control. Surgical procedures may add to or change the nature of the pain, such as in patients with pre-existing lower back pain who then undergo procedures that require extended bed rest.

Acute Post-Operative Pain

Patients who have undergone surgical or invasive procedures will typically experience some degree of pain. Apfelbaum, Chen, Mehta, and Gan (2003) suggest that 80% of all surgical patients receiving standard post-operative care experience severe to extreme pain after surgery. The risk-benefit ratio typically supports the need to undergo surgery despite the awareness of pain or discomfort. However, this does not mean that efforts to limit the pain experience should not be primary concerns of the healthcare team.

Acute pain is a response to an injury that is generally thought to be temporary and resolves as the body heals (American Pain Society, 2006; International Society for the Study of

Pain, 1994). The characteristics of acute pain include a sudden or recent onset with an obvious identifiable cause usually related to injury, disease, or an iatrogenic event such as surgery. Acute pain has a limited time frame of less than three months with variable intensity and diminishes with healing. Acute pain is more apt to have observable autonomic signs such as hypertension, tachycardia, diaphoresis, and pallor.

The sensory experience of acute pain is mediated by the nociceptive system, which extends from the periphery through the spinal cord through the brain stem to the parietal cerebral cortex where the sensory input is interpreted. Cervero & Laird (2004) and Julius & Basbaum, (2001) elucidate the four-stage process known as nociception. Transduction, occurs when afferent nerve endings translate noxious stimuli to electrical energy; transmission, is the process by which pain impulses are conducted to the somatosensory cortex (thought to be involved in the sensory aspects of pain such as intensity or character) and then to the frontal cortex (thought to be involved with the emotional response to pain). Modulation occurs when nerves release neurotransmitters such as serotonin and norepinepherine. These may alter ascending pain impulses by inhibiting, dampening, or amplifying the intensity of the signals. Other examples of modulation include medications, stress, suggestion, or additional injury. Perception is the final process, where the conscious person recognizes the painful stimulus.

Pain Assessment

The intent of the pain assessment is to gather pertinent information about the patient in order to determine the most effective pain modality(ies) while minimizing potential adverse affects. It is important to objectively quantify pain using a valid rating scale. Cork, Isaac, Elsharydah, Saleemi, Zavisca, and Alexander (2004) found that patients perceived greater control over their condition when objective rating scales were used. There is consensus among

clinicians that a patient's self-report of pain is the most accurate method of pain assessment and the best measure of outcomes for a given intervention. Some clinicians are reluctant to accept a patient's report in favor of their own observations (Dalton, Carlson, Mann, Blau, Bernard, & Youngblood, 1998).

In most healthcare institutions, nurses working in post-operative units are required to perform scheduled pain assessments usually in conjunction with vital signs and after interventions such as administering pain medications. In 1995, James Campbell declared pain to be "the fifth vital sign" (Reeves, 2007). This concept implies that pain should be assessed as frequently and with the same importance as heart rate, blood pressure, and respirations. In most acute care settings, assessing and recording a pain "value" with vital signs is now the standard of care.

Pain assessments require the nurse to develop specialized skills. Performing a comprehensive pain assessment challenges the nurse to consider multiple variables, including patient age, physical and psychological status, co-morbidities, the cause of the pain, and whether the pain is acute, chronic, or both. The nurse performing the pain assessment needs to be culturally appropriate and have an awareness of the individual patient's values and beliefs (Lasch, 2000).

The knowledge required to perform this level of assessment begins (but is not fully realized) during basic nursing education. In a study conducted by Plaisance and Logan (2008), baccalaureate nursing students were administered the Nurses' Knowledge and Attitude Survey Regarding Pain (Ferrell & McCaffery, 1993) to explore the level of knowledge acquired as part of their basic education and how the nurses would then apply this knowledge in the clinical setting. Knowledge of pharmacological interventions was lower than non-pharmacological

treatments. This was demonstrated when the nurses were asked to select an intervention based on their patient assessment in that a majority of the students responded incorrectly, indicating inadequate knowledge.

Pain Assessment Tools

Several reliable and valid tools are available to assess pain. The most commonly used tools are unidirectional scales that measure the intensity of pain and offer an easy way for the vast majority of patients to rate their pain and for healthcare provides to use as measures of intervention and evaluation of treatments. Multidimensional tools are frequently used in chronic pain practices because they are able to capture characteristics such as the effects of pain on mood, sleep, nutrition, social activity, and various other indicators. The use of standardized scales has several advantages: they are reliable in that they provide a consistent method for both patient and clinician, they are cost effective and easy to administer, and they engage the nurse and the patient in mutually defining goals and interventions (Williamson & Hoggart, 2005).

The literature offers a variety of valid and reliable tools used by nurses to evaluate pain. While a detailed discussion on the accuracy, development, or use of various pain assessment tools is beyond the scope of this paper, it is nevertheless important to mention that pain assessment tools are the instruments of choice used by most hospitals to identify and quantify pain. These tools are central to how nurses treat post-operative pain. Therefore, a brief description of the most widely used tools for non-cognitively impaired adults on post-operative units is appropriate.

Williamson and Hoggart (2005) conducted an unrestricted literature review to explore available data on the three most commonly used pain scales, the Verbal Rating Scale (VRS), the Visual Analog Scale (VAS), and the Numerical Rating Scale (NRS).

The VRS consists of a list of adjectives used to quantify pain intensity. The scale uses common words such as “no pain,” “mild,” “moderate,” “severe,” or “intense pain.” For ease of interpretation and documentation, each of the descriptors is assigned a number. The authors identified research findings supporting the reliability of the scale. However, the scale is limited to non-cognitively impaired patients. The scale is ordinal with no published data addressing the distribution of data obtained from the scale. A final limitation is the potential for misinterpretation of the responses when a clinician assumes a rank order between descriptors.

The NRS is an 11-point scale that asks the patient to rate his or her level of pain using a number from 0 (no pain) to 10 (the worst pain imaginable). Studies show that this scale is valid and reliable and can be used by almost all patient populations with the exception of neonates, pediatric patients, and the cognitively impaired (Breivic, Bjornsson, & Skovund, 2000; Onhaus & Adler, 1975).

The Visual Analog Scale is a 10-centimeter line with verbal descriptors from ranging from no pain to the worst pain imaginable. The patient is asked to mark a point along that line (divided in 100 millimeter spaces) that indicates his or her pain intensity. The scale is helpful in persons with language barriers once they understand how to use the scale. Multiple studies have identified limitations to using this scale. Onhaus and Adler et al. (1975) found that when the scale was presented to the patient horizontally, the data obtained was normally distributed. Conversely, the same results did not hold true when the scale was used vertically. Another significant limitation is that the scale must be presented visually to the patient either on paper or electronically, limiting its use in the visually impaired. Additionally, making multiple copies may obscure the markings and compromise the validity of the scale.

There are a number of clinical factors that may affect the nurse's ability to assess pain in surgical patients. Sedation, anesthesia, altered states of consciousness, cognitive impairment, and mechanical ventilation may all impair the accuracy of a patient's self report of pain. A variety of valid and reliable pain measurement tools such as the Critical Care Pain Observation Tool for mechanically ventilated patients, the PAINAD scale for cognitively impaired older adults, and the FLACC scale for small children have been developed to address pain in special populations.

Post-Operative Pain Management

Numerous studies starting in the 1970s (McCaffery, 1979: Kim, Schartz-Barcott, Tracy, & Fortin, 2005; Harper, Ersser, & Gobbi, 2008; Rejah, Ahmandi, Mohammandi, Kazemnejad, & Anooshen, 2009) have documented that doctors and nurses either under-medicate or fail to believe a patient's self-report of pain resulting in inadequate pain control following surgery. The magnitude of the problems prompted the Joint Commission (1999) as well as the American Pain Society (1993) to develop guidelines for clinicians that stressed the use of evidence-based therapies specific to pain management.

The following guidelines have now become the standard of care for in-patient and ambulatory care settings:

- Patients have a right to be pain free.
- Pain treatment should include intermittent as well as regularly scheduled medications.
- Pain assessments must be documented and include a description of the intensity, quality, character, frequency, location, duration, and response to treatment.
- Pain assessment should be standardized and documented with vital signs.

- Pain education should be provided for all patients and families.
- Organizations should have visible institutional policies, standards, and/or mission statements regarding pain.
- Physicians and staff should receive ongoing pain management education.
- Clinicians should address patient complaints of pain in a timely manner.
- Institutions should have processes for outcome measurement and performance improvement.

Effective post-operative pain management is an essential component of quality nursing care. Nurses who work with post-operative patients must combine understanding of pain as a physiologic process and the implications of pain on surgical patients. The nurses must be able to assess a patient's pain as accurately as possible using all sensory, physiological, and behavioral parameters as well as the patient's self-report of pain. In the post-operative setting, nurses must assume that patients have pain irrespective of the conscious state or behavioral responses.

Opioid and drug therapy is the mainstay management of acute pain in the postsurgical patient. Multiple studies have identified a host of factors contributing to inadequate pain management. In practice, many nurses identify a lack of knowledge and understanding of effective pain management. As far back as 1990, research studies support that nurses do not receive sufficient education to manage pain appropriately (McCaffery, Ferrell, O'Neil, & Lester, 1990; Summer, 2001). This deficiency contributes to under treatment when paired with cultural misconceptions and unrealistic fears of the risk of addition or overdosing.

Recent studies (Allegaert, Simons, Vanhole, & Tibboel, 2007; Fries et al., 2006) suggest that there is considerable variability in the way each individual responds to analgesics. Clinicians are trained to expect certain results based on the origin of pain, drug profile, dosing,

and frequency of administration. As objective as these factors may appear, the fact that there is individual physiological, psychological, and behavioral variability may put some patients at risk for under treatment.

The most frequent method used by healthcare providers to treat surgical pain is the "as needed" approach. Typically, these orders contain the drug, dose, and frequency at which the nurse may administer the drug when the patient requests pain medication. Some orders may link the dose with the patient's numerical pain level. In both instances, the nurse's judgment and the patient's subjective expression of pain must be in agreement in order to achieve optimal pain relief. This is often not the case. The inefficiency of this method has been clearly documented in the literature (Schafheutle, Cantrill, & Noyce, 2001; Gordon, Pellino, Higgins, Pastero, & Murphy-Ende, 2008; White & Kehlet, 2010).

Nurse Experience and Knowledge

In her seminal work, Benner (1984) has elucidated the role of past experiences on nursing judgment. Her five-step model of nursing competency development has long been used in nursing education and staff development. Her model proposes stages in which new nurses progress from using rule-based decision-making to exercising nursing judgment based on intuition. Benner assumes that there is a link between the level of competence and the length of experience. Based on this theory, less experienced nurses will be more inclined to use rules or protocols or rely on the opinions of more experienced nurses in their decision-making process. On the other hand, experienced nurses would be more apt to use a synthesis of knowledge, prior experience, and intuition. Subsequent studies have found inconsistent results in applying this theory to practice. Rischel, Larson, and Jackson (2007) observed that the nurses in their study showed individual patterns of practice that did not show a strong relationship between length of

experience and Benner's stages. In their study, they conclude that the differences in performance may have been more related to individual capacity versus experience.

Manias (2002) proposed that the relationship between a nurse's level of experience and efficiency of nursing interventions is stronger than the association between experience and advanced skills and knowledge. Ferrell and Grant (1993) provide an example that supports Manias' conclusions. They note that a nurse on a surgical floor observes a patient during a family visit; the patient appears animated, engaged in conversation, smiling, and overall appears very comfortable. When his family leaves, the patient requests pain medication. The nurse asks the patient to rate his pain using a 0 to 10 scale. The patient tells the nurse he has a pain level of 8 out of 10. Based on prior experiences with other patients who have had similar procedures, the nurse may have concerns when the patient's behavior does not support his self-report of pain intensity.

Highly effective healthcare organizations value and cultivate continuous learning as a strategy for improvement and risk mitigation. The role of the nurse preceptor has been well elucidated in the nursing literature as an effective method of transferring knowledge that values the diversity of a given unit and acknowledges the importance of staff expertise. (Piemme, Kramer, Tack, & Evens, 1986; Giles & Movan, 1989; Suchy, Maklebust, DiBiose, Allen, & Beaver, 2008) Although there is no standardized curriculum for preceptor training, there are shared key elements included in most preceptor training courses that include adult learning theory, teaching strategies, communication, evaluation methods, and providing constructive feedback. A recent integrative review of the literature by Billay & Myrick (2008) identifies an ever-recent trend in education of the role of the preceptor. Many hospitals utilize a designated unit preceptor to evaluate the competencies of new graduates transitioning to practice as well as

acculturating the new employees to the unit environment. The challenge for nurse preceptors is to employ strategies that promote meaningful learning for both new and experienced nurses. In clinical practice, the PRN role can be viewed as analogous to the unit preceptor. Both roles impart new knowledge, foster critical thinking, and role model expected behaviors.

The unique nature of pain may cause patients to express their pain differently than what is expected, but this does not mean that the patient is *not* experiencing pain. From this example, one can glean that any nurse could have arrived at the conclusion if the decision was based solely on behavior, regardless of length of experience. For nurses working with post-operative patients, the length of experience may not guarantee appropriate pain management. If newer nurses rely on the more experienced nurse as a basis for their clinical decisions, the patient's outcomes may be adversely affected. In this paradigm, the sharing of inadequate knowledge between these nurses can perpetuate inconsistent practices and compromise the patient's comfort.

Barriers to Effective Post-Operative Pain Management

Using their experiences in auditing hospital performance, the Joint Commission (1999) identified several barriers to effective pain management including:

- Low priority for pain management within organizations
- Failure of clinicians to routinely assess for pain
- Lack of documentation regarding interventions and response to treatment
- Lack of protocols to address pain
- Fragmented care with very little continuity when the patients' levels of care changes

Barriers can be further categorized as patient, health care provider, and healthcare systems related issues.

Patient

In an influential study by Gunnarsdottir, Donovan, Serlin, Vogue, & Ward (2002), the researchers identified a host of patient-related barriers affecting pain control. Many patients are reluctant to report pain, either because of a stoic personality or because they fear a negative reaction from staff. Most patients view surgical pain as inevitable believing that it is not possible to achieve pain control. Persons from different cultures or religious backgrounds may believe that pain has a higher meaning that transcends the physical world. Others believe that pain is redemptive and is a result of previous transgressions. Patients may also fear becoming addicted to strong pain medications, making them reluctant to ask for or take pain relievers. Some patients may refrain from requesting pain medications because they fear retaliation from the staff or want the staff to think of them as a "good" patient. Intolerable side effects or adverse reactions also make it difficult for some patients to continue taking pain medications.

Healthcare Provider

Perhaps one of the most significant barriers to effective pain management is the attitudes and beliefs of healthcare practitioners. Some providers may believe that pain should not be treated until a cause is known; others may see a patient as weak or exaggerating their pain to get achieve an altered state of mind (Comley & Banks, 2000). Hartlog, Goettermann, Zimmer, & Meissner (2009) conducted a qualitative study to explore doctors' and nurses' views of post-operative pain management. The results indicated that nurses consistently scored a patient's pain higher than would physicians and that both nurses and physicians over or under estimated the painfulness of procedures. Most significantly, both groups perceived that there is usually a six-hour delay from the time a patient requests pain medication to the time the patient actually receives the medication. Dalton, Carlson, Blau, Beernard, & Youngblood (1998) were interested

in the relationship among nurses' pain management knowledge and pain management practices. Their study found that nurses' attitudes, beliefs, intentions, and expectations influenced their practice. Nurses who accepted the patient's self-report of pain intensity were more apt to engage in educational activities. Nurses who believed in the patient's right to be pain free were more apt to perform pain management activities. The same nurses also voiced difficulties implementing new practices because of time constraints, low staffing levels, and a lack of team collaboration.

Healthcare provider knowledge is the single most identified issue known to affect pain control (McCaffery ,1979a, 1990b, 2005c, 2007d ; Michaels, Hubbart, Carroll, & Barr, 2007; Cousins, Powers, & Smith, 2000; Gordon, Pellino, Higgins, Pasero, & Murphy-Ende, 2008). Providers often lack sufficient, current, evidence-based information to effectively manage post-operative pain. Although the literature on addiction provides evidence that the risk of addiction to opioids and narcotics is low when used appropriately, many doctors and nurses continue to fear over-sedating patients or fostering addiction. This Capstone Project is designed to impact this specific issue related to pain in the post-operative patient. The knowledge of nurses related to pain, pain management, and their attitudes and beliefs about pain management will serve as the impetus for this Capstone Project. Ultimately, the Capstone Project seeks to offer education that will improve the nurse's practice and ultimately enhance patient care.

In the post-operative setting, a patient's pain may be treated by a number of practitioners. The attending or admitting physician holds primary responsibility for managing the care received by the patient throughout his or her hospital stay. Depending on the institution, however, the surgeon or the anesthesiologist may also prescribe pain medication. Each of these practitioners may approach pain management in different ways, which may lead to inconsistent practices. Regardless of the approach, it is ultimately the nurse's responsibility to enact the pain

management order. The nurse assesses, implements, and evaluates the dose and timing of the pain medicine based on the order. Therefore, it is imperative that nurses working with post-operative patients understand that they have a duty to be knowledgeable and advocate for the patients by understanding the physiology of pain, applying and communicating the most current evidence to other providers, and remaining non-judgmental. To not adequately treat a patient's pain is contrary to the aims of nursing, which includes easing suffering, preventing unintended effects, and aiding in the restoration of health. The program constructed by the DNP student for this Capstone Project is intended to provide nurses with the knowledge needed to enhance this critical aspect of their practice.

Healthcare System

Many pain management therapies are not reimbursable on their own. As a result of Diagnosis Related Groups (DRG) reimbursement, the costs for pain management therapies are bundled into the cost of the procedure. This makes hospitals less willing to provide additional services such as interdisciplinary pain management services or alternative therapies. Many hospitals lack policies and procedures that support clinicians in providing quality pain management. Some organizations fail to hold clinicians accountable for failing to provide pain control in a timely manner. There are also societal factors that limit the use of controlled substances such as the Controlled Substances Act enacted by Congress in 1970. The original intent of the act was to consolidate legislation into one single federal law that would regulate the manufacturing, prescribing, and use of narcotics and other substances. Compliance with the law requires that complex governmental, law enforcement, and healthcare organizational processes be developed and policed to prevent or minimize the illicit or inappropriate use of narcotics. The complexities of these systems may at times interfere with the patient's pain control requirements.

It is in the best interest of both the patient and the institution to address the pain management practices and provide programs that can lessen pain and ultimately affect the economic and social aspects of pain.

The Pain Resource Nurse

A Pain Resource Nurse or PRN is the name used by Ferrell and Grant (1993, 2008) to describe a nurse who has successfully completed a Pain Resource Nurse Program. The program was conceived to address a gap in effective pain management for oncology patients at the City of Hope Medical Center in Duarte, California in 1992. What started as a quality improvement project has evolved into a nationally recognized educational curriculum based on sound scientific principles and evidence-based practices. The current edition was revised in 2008 using subject matter experts in the field of pain, professional guidelines from the American Pain Society, the International Society for Pain and Joint Commission pain standards. The PRN Program Curriculum and Planning Guide (2008) are available for purchase from the Resource Center Alliance of State Pain Initiatives in Madison, Wisconsin. The Board of Regents of the University of Wisconsin System holds the copyright.

The planning guide contains educational coordination materials, lectures, and electronic presentations that allow the educator to modify the program and adapt the material to a specific area or population. It also contains case studies, learner self-evaluation, and the Nurses' Knowledge and Attitude Survey (2008). The latter is a valid and reliable instrument that can be used to measure the participant's knowledge before and after the intervention. The program has been used by several reputable organizations including the City of Hope Hospital, Northwestern Memorial Hospital in Chicago, Illinois, James A. Haley Veterans Hospital in Tampa, Florida, and also Children's Medical Center of Dallas.

The PRN program is grounded in the philosophy that bedside nurses spend more time with patients than any other discipline and are therefore uniquely qualified to identify, treat, and manage pain. Using a curriculum that incorporates both classroom and guided clinical experiences, the program is intended to prepare bedside nurses to become leaders, educators, mentors, and change agents in pain control and management at the unit level.

The role of the PRN encompasses advocacy, education, and quality improvement activities (Ferrell and Grant, 2008). The PRN is primarily concerned with assisting other nurses to systematically assess pain, facilitate the development and implementation of collaborative treatment plans, educate peers on how to identify and treat adverse effects, and evaluate the efficacy of interventions (Paice, Kreamer, & Ormand, 1993). The PRN is expected to set the standard for excellence in pain management on their unit. By educating the staff, role modeling the expected behaviors and working with the nurses to evaluate clinical outcomes, the PRN is pivotal in creating a culture where all nurses believe that every patient expects and has the right to be pain free.

The available data support the use of PRNs as change agents positively influencing pain management practices (Ferrell, Grant, Richey, Ropchan, & Rivera, 1993; Paice, Kreamer, & Ormand. 1993; Schoenwald & Clark, 2006; McMillan, Tittle, Hagan, & Small, 2004). Evaluations of units with PRNs cite improvement in nursing knowledge regarding pain management, improved attitudes toward pain control as well as attitudes toward patients with pain.

The concept of a PRN was conceived to improve the quality of care for adult and pediatric oncology patients experiencing pain and has additionally now been used in an obstetrical unit. There is a gap in the literature regarding the use of this model in a post-

operative setting. This paper will describe the implementation of a PRN program on an acute post-operative unit using the Pain Resource Nurse Program model developed by Ferrell, Grant, Richey, Rophan, and Rivera (1993).

Problem Statement

The problem is that nurses' knowledge and attitudes reflect a deficit in the management of acute post-operative pain.

Significance to Nursing

Uncontrolled pain is one of the main reasons for seeking healthcare. The failure of healthcare providers to adequately diagnose and treat pain has serious implications for patients' physical, psychosocial, and spiritual health. The ability of the nurse to deliver high-quality, effective pain management starts with education. Other factors such as access to new knowledge and resources that support learning are equally important.

Manias, Bucknell, and Botti (2005) suggest that the problem with pain management does not lay with finding new strategies to manage pain; instead, the focus should be on using current knowledge and communicating that knowledge at the bedside. This Capstone Project will build on that philosophy and acknowledge the value of nurses as communicators of knowledge, leaders, and advocates at the bedside.

The implementation of this Capstone Project requires the knowledge and skills of an advanced practice nurse (APN) to direct, oversee, and evaluate the program. The DNP student is evolving as a clinical expert through education, practice, consultation, and translational research, developing and refining the ability to competently implement this Capstone Project. Although the content and a framework for implementation has been provided in the Pain Resource Nurse Curriculum and Planning Guide, the implementation and evaluative process requires an Advance

Practice Nurse with expertise in pain management and the educational preparation to apply and translate knowledge from anatomy and physiology, psychology, and human behavior as it relates to pain management into nursing practice.

The successful implementation of this Capstone Project requires an understanding of micro and macro systems and how to work within these systems to improve the care of surgical patients in pain. The program requires staff nurses to perform additional duties; therefore, the DNP student considered the impact on productivity and financial and human resources. To effectively implement the program and ensure its success, the institutional polices and procedures, the nursing staff, and the units were carefully considered. The PRN program was initially designed for an adult oncology population. The framework lends itself to be used in other setting where nurses provide care to patients in pain. In order to evaluate the success of the program in the post-operative setting, data must be generated, collected, and analyzed. New findings must be disseminated in order to generate new evidence of transferability of the program.

The PRN program is an example of nurses advocating for patients rights by increasing knowledge, utilizing all available resources to meet the patients' needs, and disseminating that knowledge at the bedside directly (Ferrell & Grant, 1993). The program necessitates working with both patients and staff to ensure that patients with surgical pain receive competent and ethical care. The information gained during this implementation may also be used to support the transferability of this model to other practice settings.

Education

Plaisance & Logan (2006) conducted a study to explore the pain management knowledge of nursing students. The authors found that the students had misconceptions and exaggerated fears about creating addiction and overdosing patients. The authors feel

that these outcomes are associated with the amount of time dedicated to teaching new nursing students about pain. If this is true, new graduates are already at a deficit from the time they begin their practice. This problem is not unique to the student; experienced nurses face the same deficits, oftentimes exhibiting less knowledge than the recent graduate. The role of nursing knowledge and clinical practice is well presented in the literature as a precursor for changing practice patterns. The nursing knowledge required to effectively manage post-operative pain encompasses an understanding of the prevalence of pain including optimal assessment and management by both pharmacologic and non-pharmacologic therapeutic strategies. The Pain Resource Nurse Program Curriculum and Planning Guide by Ferrell and Grant (2008) is a nationally recognized program that provides a not only a comprehensive pain curriculum but also the tools to plan and implement a PRN program. The curriculum offers a high degree of flexibility to meet the educational needs of nurses working with a variety of patient populations.

Practice

The PRN program seeks to improve the knowledge and skills of nurses working on post-operative units. The introduction of a group of clinicians with advanced knowledge in pain management that can transmit new knowledge and skills to their peers may result in positive changes in the unit's attitudes and beliefs toward pain management. The program is designed to enhance the quality of communication between patients and nurses regarding pain and encourage nurses to partner with patients to optimize pain control. While the issue of under-treating pain is not unique to nursing, the amount of time spent by nurses caring for patients makes the nurse accountable for enhancing patient comfort. Pain control is a concern for all nurses and especially those who work with post-operative patients. The PRN program is designed to allow nurses to immediately access new knowledge, enhance communication skills, and develop insight and advocacy, all of which are essential to the delivery of quality nursing care. The DNP student seeks to effect change on the post-operative unit with a program ideally suited to the unit. The program aims to directly affect the nurse and ultimately the practice of pain management.

After completing the course, the PRN will be expected to:

- Recognize of the rights of patients to have their pain appropriately assessed and managed.
- Record pain assessments in a systematic way that enhances team communication.
- Educate patients, families, and other providers.
- Assist with the development of institutional policies that support appropriate pain management.

Nursing research in the area of unit culture has shown that there is a relationship between a nurse's practice and the unit on which they work. The most compelling evidence comes from the work of Wild & Mitchell (2000), which demonstrated that variables such as attitudes supportive of aggressive pain management and frequent discussion by the nurses regarding pain were associated with pain management outcomes. This further suggests that members of a nursing unit often share attitudes toward pain management. These shared attitudes in turn affect individual practice. These findings were considered carefully in attempting to translate the evidenced-based practices of pain management and the PRN tenets to the bedside.

Clabo (2007) noted that nursing units demonstrate a unique, shared thinking regarding pain assessment. Nursing care does not occur in a vacuum. It is not performed privately with the patient like many other professions. Nurses working in acute care setting demonstrate their individual practice daily to their peers, patients, and other members of the healthcare team. Over time, certain practices become part of the unit norm. Nurses may not always be aware of the underlying dynamics of unit culture and practice

Research

Research is vital to the growth and development of a profession. This Capstone Project incorporates prior nursing research findings and program evaluation results subsequently to test how well the PRN model translates from oncology and pediatric practice settings into an adult post-operative unit. This Capstone Project may add to our understanding of the process and outcomes associated with adapting practice models created for specific populations to different settings with similar patients needs. This Capstone Project will explore the perceptions of the PRNs after completing the course at the point where they begin to realize their new roles. The Capstone Project is a natural evolution of the work started by Ferrell and colleagues. It will demonstrate how nurses can positively impact the recovery of surgical patients in pain. Further research is needed to determine the impact of the PRN role on pain management practices, patient satisfaction with pain control, and surgical complication rates. After attending this course, the expected outcomes are that the nurse will:

- Develop outcome-oriented indicators for pain management.
- Assist with specific data collection for quality improvement projects.
- Evaluate the effectiveness of pain management on their assigned work units.
- Disseminate quality improvement findings to their peers.

Public Health Policy

Cousins, Power, and Smith (2000) suggest that there is a significant financial burden associated with the life-long treatment of the persistent pain that can occur as a result of mismanaged acute surgical pain. They estimate that the lifetime cost of treatment for a 30-year-old man with chronic persistent pain is approximately $1 million. The issue of pain and pain management is of interest to healthcare providers globally. Several research studies

acknowledge that pain increases hospital lengths of stay, strains existing resources, and has a negative impact on patient and staff satisfaction. Based on research findings, pain management guidelines alone have not had a significant impact on the problem of untreated pain. The strong implication is that additional strategies are required.

More and more patients are becoming consumers of healthcare. In clinical practice, patients expect to be pain-free after surgery. Patients look to nurses to provide comfort and help in their recovery. The PRN program seeks to educate nurses in knowledge and attitudes about pain. It is hoped that this may increase patient's awareness of the role of the nurses following surgery.

The changes brought about by the sweeping reforms in healthcare will require healthcare organizations to deliver quality healthcare to more patients than are currently receiving healthcare. The lack of primary care will show itself in the number of patients requiring secondary and tertiary care. With the prospect of an aging population, treatments, and technologies increasing life span, and the inevitable increase in the number of surgical and invasive procedures, certainly pain will become a more prevalent and manifest issue requiring more specialized knowledge to manage it appropriately.

The ever-increasing financial burdens faced by patients can be mitigated by innovative nursing initiatives such as PRN programs. The DNP student has considered the fiscal importance in designing the proposed Capstone Project. It is anticipated that a PRN program can be implemented incurring very little cost to the organization. The DNP student anticipates the PRN model may have applicability to other practice settings and can positively impact patients' quality of life. This Capstone Project offers support to the appropriateness of nurses to continue pursuing the implementation of the PRN model in other practice settings.

Purpose of the Capstone Project

The purpose of this Capstone Project is to evaluate the effectiveness of a PRN program for nurses working on a post-operative unit. The PRN role enables the nurse to function as peer resources for acute pain management issues. The PRN program has been successfully implemented in oncology and pediatric settings but has not been tested in a postsurgical practice setting. This Capstone Project will implement the PRN model in a post-operative unit to evaluate the effectiveness of the model in improving the knowledge level of nurses working with patients who have acute post-operative pain.

Theoretical Framework

The PRN program is first and foremost an educational intervention aimed at increasing practical knowledge and understanding of post-operative pain management. The premise of this Capstone Project is that registered nurses working with post-operative patients have a need to understand and apply concepts related to effective pain management. As a professional, the registered nurse is accountable for his or her practice and has a moral and ethical duty to alleviate pain.

This Capstone Project will reference Knowles Theory of androgogy and adult learning (2005). Knowles approaches his theory from a humanistic orientation. He believes that self-actualization is the goal of adult learning and that the adult educator role should serve as a facilitator helping the learner to reach his or her full potential. Androgogy is a set of assumptions that change the focus of learning from the teacher to the learner. Although Knowles is not the first person to use the term androgogy, he is credited with developing and refining its application in adult learning. Knowles' assumptions have been successfully applied to

curriculum designs for several of the sciences, including nursing, medicine, information technology, and human resource development.

In his model, Knowles (2005) presents six assumptions that he believes drive adult learning. The first assumption is that adults have a need to know why they should learn. The second is self-concept, meaning that adults are self-directed. The third assumption is the role of learner experiences as adults mature they acquire different experiences, which they bring to the learning environment and use as resources for learning. The fourth is readiness to learn; adults learn when they perceive a need for the information. The fifth is orientation to learning. As adults mature, learning moves from subject oriented to problem solving and application. Adults are motivated to learn if the material is applicable to real-life situations. The sixth assumption claims that an adult's motivation to learn is intrinsic and in most cases is not driven by external rewards.

This framework has been used successfully to develop educational interventions aimed at teaching adults to master and apply new skills that build on previous knowledge and skill sets. It has been selected because it complements the existing PRN program design and curriculum. Using tested learning concepts that are well suited to the adult learner; the curriculum encourages and supports the motivated learner, capitalizing on his or her past experiences working with patients in pain. Combining classroom teaching with clinical mentoring, the nurse will be able to add new knowledge that is current, evidence-based, and directly applicable to their daily practice.

Adaptation of Knowles's Theory of androgogy to the Pain Resource Nurse Program

Readiness to Learn

The first assumption is that adults have a need to know why they should learn. A nurse working on a post-operative unit is expected to know how to appropriately manage surgical pain. Fundamentally, the nurse understands this expectation through feedback from patients, managers, physicians, and other staff members. It is vital for nurses to understand that research in the science of pain is continuously providing new approaches for optimal pain control. Central to effective pain control is knowledge of pharmacological interventions including management of adverse effects, variances in patient responses to opioids, adjuvant therapies, and the ability to perform focused assessments to measure patient responses to therapy. The literature also reflects a need for nurses to be able to discriminate between patients with dependency, tolerance, or addition to pain medications when managing post-operative pain. The PRN program curriculum provides the nurse with a deeper understanding of the subject matter using an evidence-based approach to optimize interventions.

Self-Concept

Participation in this program will facilitate the nurse's transition from a dependent learner to a self-directed resource person, leader, and subject mater expert. As the nurse matures, there is a shift from dependent learner to self-directed practice and a desire to be recognized as such by their peers.

Experience

The model acknowledges the use of experience as a method of learning. Nurses value past clinical experiences and will often use what they have learned from these experiences as a reference point for decision-making and future learning. A nurse's practice is very much

influenced by prior experiences, whether those experiences are gained through personal life experience or professional practice. The PRN program builds on this concept utilizing various adult-learning techniques, such as problem-oriented case studies and group discussions, and activates using both successes and failures to introduce new knowledge of familiar concepts.

Readiness to Learn

The fourth assumption is readiness to learn. As the nurse matures professionally, his or her focus shifts to the developmental task of their social roles. As the nurse develops self-concept, he or she will be open to learning certain tasks that coincide with their social role, which in this case is providing care to post-operative patients.

Orientation to Learn

The fifth assumption is orientation to learning; as adults mature, learning moves from subject-oriented to problem-solving application. Nurses are concerned with knowledge that is immediately applicable to their situation. The immediacy of pain control on surgical units shifts the nurse's focus from subject-centered learning to a problem-focused orientation. Managing pain appropriately requires critical thinking to optimize patient outcomes. The PRN program provides a framework for this to occur.

Motivation to Learn

The sixth assumption claims that an adult's motivation to learn is intrinsic, rather than focused on external rewards. In this Capstone Project, the nurses elected to participate, demonstrating an intrinsic motivation to learn. Knowles proposes that these individuals have self-diagnosed their learning needs, are taking advantage of available resources, and are choosing to implement strategies that will address their learning needs.

The PRN program and Knowles Theory of androgogy are complementary. Nurses in post-operative settings have a need to know how to manage acute post-operative pain appropriately. The PRN program helps the nurse link familiar concepts and experience with more current knowledge in pain management. The knowledge gained is immediately applicable to the nurse's role and practice. Emphasis is on problem solving and critical-thinking skills. It is expected that nurses who complete the PRN program will transition from a dependent learner to a self-directed resource, leader, and expert.

Figure 1. Paula's application of Knowles theory of androgogy to the PRN program.

Project Research Questions

This Capstone Project is concerned with the effects the of a PRN program on the knowledge level of nurses working in a post-operative unit. Specifically, this project seeks to gain information on whether the nurse who has completed the PRN program will recognize the pain experience as it relates to patients with acute post-operative pain and evaluate the knowledge level of nurses working in a post-operative unit. Is the PRN curriculum effective in

increasing the knowledge level of nurses working on a post-operative unit? Upon completion of the educational aspect of the project, follow-up visits with the participants will be conducted. The DNP student seeks to discover how the nurse perceived the program and how the staff nurses feel the program influenced their practice.

Capstone Project Objectives

The proposed capstone has four objectives. They are:

- Develop a PRN course for nurses working on a post-operative unit using the Pain Resource Nurse Curriculum by Ferrell and Grant.
- Educate a group of staff nurses working on a post-operative unit using a nationally recognized PRN curriculum.
- Evaluate the effects of the program on the participant's knowledge of pain management.
- Evaluate the implementation of the PRN program in the post-operative setting.

Chapter Summary

The impact of inappropriately managed pain has a profound impact on a patient's health and quality of life. In the surgical patient, undertreated pain can lead to a number of preventable post-surgical complications. The available nursing research suggests a significant knowledge deficit exists in the way nurses manage pain. The implementation of Pain Resource Nurses in oncology units has demonstrated improvements in the way nurses manage patients with pain. There is a gap in the literature specifically addressing the use of PRNs in surgical units. The success of this role in the oncology setting may also be realized in the post-operative setting. The DNP student seeks the opportunity to transfer the success of this role in the oncology setting to the post-operative setting. This Capstone Project will build on the experiences of previous

studies by implementing the successful elements identified and attempt to transfer those finding to nurses caring for post-operative patients in the acute care setting.

CHAPTER TWO

REVIEW OF THE LITERATURE

Since the early 1970s, the issue related to the ineffective management of pain in post-operative patients has been a topic of discussion among healthcare providers and patients. An extensive review of the literature was performed using the search engines EBSCOhost, OVID, MEDLINE in PubMed, and the Cumulative Index to Nursing and Allied Health Literature (CINAHL) to generate available scholarly research studies in peer-reviewed journals that addressed post-operative pain. The search yielded articles that referenced the use of Pain Resource Nurses (PRN) for improving post-operative pain. The initial search parameters were changed to include all articles with the phrase PRN in either the title or in text and keywords: pain assessment, post-operative pain, and surgical pain. The search was narrowed to identify studies that were published in English between 2003 and 2010. Multiple articles addressing pain management, acute pain, post-operative pain, and pain as a concept were identified. Only one study addressing PRNs was identified. The dates were amended to search for articles published from 1980 to present. Four seminal studies addressing PRNs published before 2003 were identified. These studies formed the basis of the Capstone Project. No recent literature addressing PRN was identified, and no studies addressing the use of PRNs in post-operative units were found. The physiologic responses and psychosocial and behavioral manifestations of acute post-operative and chronic persistent pain are significantly different; studies that referenced chronic persistent pain, end of life, or intractable pain were excluded, as these are not within the scope of the Capstone Project.

The chapter begins with a general discussion of published articles addressing the concept of pain. Studies that provide background information pertaining the gateway theory, pain

assessment, post-operative pain management, and barriers to effective post-operative pain management have been included to provide a reference point and to give the reader a deeper understanding of the experience of post-operative pain. The chapter concludes with a discussion of Knowles' Theory of androgogy, which has been the theoretical framework for this Capstone Project. Every attempt was made to gather all available information addressing the creation, development, implementation, and evaluation of Pain Resource Nurse Programs in the United States.

The Pathophysiology of Pain

The gate control theory of pain by Ron Melzack and Patrick Wall (1965) is presented as one of the most accepted theories addressing the phenomena of pain. Previous theories in the scientific literature emphasized the sensory response to tissue injury, inflammation, or the pathology producing the pain. The gate control theory builds on the relationships between the physiologic, behavioral, and psychological aspects of pain. In 2001, Melzack furthered his theory and renamed it the neuromatrix of pain. He describes the neuromatrix as a widespread network of neurons that acts as a feedback loop between the thalamus and cortex as well as between the cortex and limbic system. The cyclical processing of the nerve impulses through the neuromatrix results in a characteristic pattern that he calls the neurosignature. This neurosignature of the neuromatrix is communicated to all of these centers by the generated nerve impulses. The resulting neurosignature is produced by the synaptic connections throughout the neuromatrix. The neuromatrix has specialized portions that process sensory impulses resulting from major events such as injury or temperature changes. The neurosignature is projected onto a portion of the brain called the sentient neural hub in which the streams of incoming impulses are converted into changing states of awareness. The theory further proposes that pain disrupts the

brains normal homeostatic and regulatory mechanisms producing stress. This disruption signals the brain activates portions of the brain that trigger the activation of neural, hormonal, and behavioral responses. Melzack (2001) suggests that the result of this process sets in motion a "genetically determined repertoire of programs and are influenced by the extent and severity of the injury" (p. 1380).

Turk and Wilson (2010) summarized the current understanding of the role of pain-related fear in the onset of acute pain, the transition of acute pain to chronic pain, and treatments aimed at reducing pain-related fears. Although the research is focused on the application of fear-avoidance models on chronic pain, it does present evidence that patient characteristics and individual differences in sensitivity, illness, and injury sensitivity as well as genetic variability play significant roles in how a patient interprets and anticipates the future and the impact of their pain behaviors. The authors found literature evidence supporting the negative or positive impact of previous pain encounters, environment, and social context on fear avoidance behaviors. These same factors are also present in healthcare workers. They affect the treatment behaviors as well as the recommendations made to the patient. It cites education and as one of the treatments effective in reducing anxiety. For the nurse practicing in a post-operative setting, it is important to recognize that patients' responses and their evaluation of the effectiveness of pain control are unique to the individual patient and must be taken into account as part of the treatment plan. Another important concept is that the interaction between the nurse and a patient is affected by the beliefs each hold. These particular beliefs may encourage fear-avoidance behaviors.

The psychological and behavioral manifestations of pain have implications for both the patient and the nurse. Acute pain is a problem in the post-operative setting, causing patients to express a lack of information regarding pain management options and more significantly report

ineffective pain control. Two qualitative studies, one from a nursing perspective and the other a patient's perspective, have been selected because they were able to convey the strengths and limitations that affect each of the participants.

Blondal and Halldorsdottir (2009) sought to increase the understanding of the nurses' experiences caring for patients in pain through the design of a phenomenological study with 20 dialogues and 10 experienced nurses. The results indicated that nurses view care for patients as challenging for the nurse. The nurse's treatment of pain was motivated by moral and professional obligation, personal experience, and knowledge. The authors identified three recurring themes. The first is the nurse's motivational factors such as moral obligation, knowledge, personal experiences, self-confidence, and conviction. The second theme was the challenges nurses face when caring for patients in pain. Also included is the ability to accurately assess the patient, a clinician's inner moral conflicts that may arise from interactions with physicians, and organizational barriers. The third is outcome as either positive or negative. When the patient has a positive outcome, it affects the nurse in a positive way. The same hold true for patients. The converse is also true; a negative outcome has a negative affect on the nurse and the patient. The importance of this study is the recognition that nurses need multiple levels of knowledge as well as a favorable practice environment in order to meet their moral and professional obligations regarding pain relief.

Carr and Thomas (1997) used a qualitative approach to explore the experiences and expectations of post-operative patients. The study sought to identify the patient's views of factors, which influenced effective or ineffective pain control and what strategies were most effective. In their review, the authors felt that previous quantitative studies failed to capture the patient's experience. Using a convenience sample of 10 patients admitted for surgery at a

hospital in London, England, the authors gathered data using a combination of pre-and post-surgery Visual Analog Rating scale results, semi-structured interviews, and daily analgesic. The authors found that patients viewed the roles of nurses to relieve pain by giving pain medication. Some patients viewed the nurses as very busy and would consider themselves to be in better condition than the other patients to whom the nurses were tending. Patients considered the emotional support provided by the nurses as very important in perceiving the nurses as present and willing to help. Another finding was that patients considered a nurse's touch as important and soothing. On a less positive side, patients did not remember nurses discussing pain management. The research method used in the study was not clear-cut. The discussion and conclusion present qualitative data. Significantly, the study validates previous research confirming the patient's view of nurses as a comforting presence and their willingness to help ease their pain. However, the authors failed to clarify the purpose to the project of gathering analgesic requirements or the significance of the VAS data, other than a brief mention of the differences in the perception and degree of pain comparing pre- and post-operative ratings.

Idval, Bergquist, Silverhjelm, and Unosson, (2008) used a qualitative, descriptive approach to describe the perceptions of surgical patients about their post-operative pain management. An advanced practice nurse interviewed 30 patients at discharge. The patients were asked about their experiences with post-operative pain and were asked to describe a specific pain situation. The authors analyzed the data by constructing a manifest analysis and formulated categories regarding post-operative pain that dealt with interpretations from verbatim text. The authors found that patients described pain as a symptom that was always in focus, either because it was constantly present or it threatened to appear abruptly. The patients' knowledge about pain was influenced by previous personal or vicarious experiences.

Information was sometimes provided during periods in which the patient was not fully aware, such as in the recovery. The patients' approach to pain management was based on personal experiences; the nursing staff did not use these experiences or the influence of relatives when creating care plans. The study highlights the importance of nursing interventions that reflect the patients' past experiences.

Pain Assessment

Pain assessments guide the nurse in determining the level of intervention required to achieve pain control in post-operative patients. Inaccurate assessments can cause the nurse to underestimate a patient's pain and withhold available treatments resulting in unnecessary suffering. Numerous studies have shown a correlation between knowledge, beliefs, and inaccurate assessment with negative patient outcomes. This section will focus on studies that speak to how nurses assess pain, what criteria are used to assess pain, and how these affect the nurse's decision-making process.

Hirsh, Jensen, and Robinson, (2010) conducted a two-part study using virtual human technology to understand the influences of contextual information on pain-related decision-making. The researchers had a sample of 54 nurses view video vignettes of a virtual human patient with text describing the patient's post-surgical context. The authors concluded that biases might have played a significant role in nurses' decision-making about pain. They concluded that providers are minimally aware of their bias or, alternately, that they lack the willingness to acknowledge their bias. The study validated previous research surrounding the complexity of decision making about pain management.

While working at the University of Wisconsin Hospital and Clinics, the group of Gordon, Rees, Pellino, Sanford-Ring, Smith-Helmenstine, and Danis (2008) noted inconsistent

documentation by the nurses when addressing patients' pain management. The authors noted that nurses were documenting pain intensity but were not addressing or communicating re-assessment after interventions. To address the issue, the authors used the Plan-Do-Check-Act model of performance improvement and designed a series of interventions. This encompassed the creation of an evidence-based policy addressing pain, repetitive education, bedside coaching, re-designed bedside flowsheets, and aggressive auditing procedures. By focusing attention on the problem and implementing a multi-pronged plan, the compliance rate for re-assessment documentation increased to 94% of audited charts.

Harper, Ersser, and Gobbi (2007) conducted a study to describe how military nurses rationalize their post-operative pain assessment decisions when their observations differ from the patient's self-report. The authors conducted an ethnomethodological study using semi-structured, open-ended interviews with individual nurses over a four-month period in 2003. A purposive sample of 29 British military registered nurses working in surgical or orthopedic units was selected. Results were captured through the use of cultural and collective stories representing the person's subjective experiences. All 29 nurses started their assessment by asking the patient about their pain level. All of them believed that the patients' self-report of pain should be used for decision-making. This held true when there was agreement between the patients' expression and the nurses' perceptions. Participants described knowing when a patient was in pain, as well as the intensity of the pain by the patient's non-verbal expressions, and/or changes in their physiological parameters, additionally relying on their past experiences with similar patients. The authors conclude that knowledge and awareness of cultural attitudes and how these are used in the context of pain management are essential elements of accurate pain assessments. The study was conducted using British military nurses, and the authors

acknowledge that the results may have been affected by the culture of military nursing. In future studies, the researchers plan to replicate the study using civilian nurses, assuming that the results will be similar.

White (1999) studied pain in a post-anesthesia care unit where patients were scheduled for back surgery (n=35). During a three-hour observation period, only 40% of patients had a documented pain assessment either before or after receiving pain medication. Of those who did receive medication, the nurses administered 50% of the ordered doses, and three patients had not received any medication up to eight hours after surgery. The author found that nurses needed more education on how to assess pain, pharmacology, and effective pain management modalities. Although this study was completed in 2001, subsequent research studies support the author's conclusion.

Puntillo, Neighbor, O'Neal, and Nixon (2003) conducted a prospective descriptive study to describe and document discrepancies between nurse and patient pain intensity ratings. The authors used a convenience sample of 37 emergency room triage and clinical nurses and 156 patients who presented to the emergency room with a chief complaint of pain. Using a 0-10 numerical rating scale, a trained research assistant in the triage area asked patients to rate their pain intensity. A triage nurse reassessed the same patient before transferring to the clinical treatment area where a different nurse repeated the assessment. The authors found significant differences in the mean scores of patients' pain intensity in triage (7.5 ± 2.2) versus the nurse's rating (5.1 ± 2.4, $p < .001$). The same findings held true in the clinical area where the nurses' intensity ratings (4.2 ± 2.3) were significantly lower than the patients (7.7 ± 2.2 $p < .001$). Although not statistically significant, the nurses' ratings decreased from triage to the clinical areas while the patients' rose slightly. The results of this study corroborate discrepancies

between patient and clinician pain intensity ratings found in similar studies. The authors conclude that incomplete or inaccurate pain assessments adversely affect patients by withholding appropriate treatment

Kim, Schwartz-Barcott, Tracy, and Fortin (2005) investigated the criteria used by nurses to assess post-operative pain. The authors designed a phenomenological study with videotaped, face-to-face interviews used to gather data on nurses' previous experiences and attitudes toward managing post-operative pain. The investigators used a strategic sample of 10 nurses, five with six or more years of experience and five with less than six years. Five open-ended question interviews were conducted with each nurse at various points in time from 1998 to 1999. The nurses performed pain assessments on 30 post-operative patients who had undergone a procedure within the last 24 hours and were experiencing pain. Excluded from the study were all patients with PCA pumps, altered mental status, and metastatic cancer pain. The authors found that nurses rely on their observations of the patients' appearance and their past experiences with similar patients in their clinical decision-making. Nurses who learned through experience to listen to their patients were more inclined to use what the patient said about their pain as their primary assessment and management strategy. Some nurses looked for objective physical manifestation, such as vital signs, believing that the patient's self-report was not always reliable.

Nurses commonly use alterations in vital signs as a way to assess pain intensity. In a recent study by Arbour and Gelina (2010), the researchers observed ICU patients during three testing periods: unconscious and ventilated, ventilated and conscious, and conscious after extubation. Data was collected using mean arterial pressures, heart rates, end-title CO2 monitors, and oxygen saturation. The authors concluded that using vital signs as a measure of the presence or intensity of pain is inconsistent and these findings could be affected by other

variables unrelated to pain. The use of vital signs as an indicator of pain should be used as part of a more comprehensive assessment when other behavioral indicators are not present, such as in mechanically ventilated or unconscious states.

Post-Operative Pain Management

Manias, Bucknall, and Botti (2005) sought to understand how nurses managed patients' pain in the post-operative acute care setting. The researchers used a sample of 52 RN volunteers from two general surgical units. Six field observations were conducted by a single research assistant at predetermined times during the workday. Each observation reflected a nursing shift report, staff breaks, pre-sleep patient assessment times, and medication and unit rounds. The nurses were individually observed, and clarifying questions were used after each observation. The results were categorized into six themes: managing pain, prioritizing pain, missing pain cues, regulators and enforcers of pain, prevention, and proactive management. The most common strategies used included administration of pain medicine (37.9%), discussing options with other professionals (17.4%), patient discussions (15.8%), and other non-pharmacological measures (28.9%). Findings suggest that patient involvement, identification of strategies, and probing questions by the nurse elicited optimal results. Nurses minimized the patient's pain, giving priority to other activities even when they knew that the patient was experiencing moderate to severe pain. The authors found evidence that the nurses failed to pick up pain cues in 27 cases, mostly as a result of patient ambiguity. Patients benefited when nurses followed timely routine administration. Patients suffered from delays when time frames were strictly enforced. Only 11% of the cases involved pain prevention activities. The researchers found that in 65 cases out of 120, nurses offered pain medication after, rather than before, a painful procedure. The authors concluded that effective communication between clinicians and patients,

as well as from clinician to clinician, are critical elements in managing pain effectively. In reference to the PRN program, this study demonstrated that nurses utilize each other when they lack knowledge or are seeking affirmation.

McCaffery, Zerwekh, and Keller (2005) looked at key nursing research pertaining to pain education from 1997 to 2004. The authors identified several key concepts regarding pain management: 1) the process of managing pain is rooted in feelings, beliefs, and opinions as well as knowledge; 2) knowledge alone is not sufficient to change practice; and 3) information that leads to learning can at times appear as conflictive and illusive unless it is attached to some aspect of the individual's reality or experience. The authors proposed that educators should consider the influence of beliefs and attitudes when teaching students about pain. It is the opinion of the authors that instruction without exploration of associated feelings may lead to immediate changes, but the changes are only temporary.

Michaels, Hubbartt, Carroll, and Hudson-Barr (2007) designed a quasi-experimental, two-group pre-test, post-test study to examine the outcomes of pain management education on hospitalized patients after providing an educational intervention to nurses. Eight specialty adult and pediatric units were selected as the intervention group with eight similar units for the control group. The researchers used a modified version of the Nurses' Knowledge and Attitude Survey Regarding Pain (Ferrell & McCaffrey, 1993), selecting 15 questions from the original 40 to assess nursing knowledge. The intervention group attended a 20-30 minute educational session. Retrospective chart reviews to assess nursing documentation and patient surveys were used by the researchers to assess patient perceptions of the pain intervention used by the nurse. The patients were surveyed during hospitalization, one month, and six months after discharge. The authors concluded that there was no significant difference in nurse knowledge and patient

perceptions between the groups. Overall, nursing documentation was slightly higher in the intervention group. In retrospect, the authors found the attendance at the educational session varied from unit to unit, compromising comparisons. Also, the lack of randomization, data collection, and sampling bias limited the ability to generalize the results to other implementations.

In an experimental post-test study, McDonald, LaPorta, and Meadows-Oliver, (2007) wanted to test how nurses responded when patients used their own words, a pain intensity scale or both to communicate pain. The researchers used a convenience sample of 122 registered nurses. The researchers randomly assigned each of the nurses to one of three groups. Each group was given a vignette about a trauma patient developed from three nationally recognized pain organizations. Each vignette incorporated six standards from which the nurse could select. The details of the patient's condition were the same for each group. The study variables included age, the use of words alone, or words in combination with a numerical rating scale to describe pain. The authors found that nurses planned similar numbers of pain management strategies (2.1%) out of six recommended strategies. Only 49% of the nurses elected to assess the pain level. Only 4.1% elected to continue administering medication until the desired effect. The authors concluded that there was no difference in the number of strategies implemented by the nurse based on the age or method of communication used by the patient. In their discussion, the authors cited a variety of potential reasons for the responses including believing that non-pharmacological interventions would not be helpful, diffusion of pain management responsibilities between the nurse, and the physician. Although the use of a vignette may have imposed limits on the nurse's ability to perform a full physical assessment, the study made some important points. The authors concluded that nurses use fewer strategies to manage moderate to

severe pain regardless of the method used by the patient. Based on the results of this study, nurses would benefit from additional pain education and skill advancement, as well as additional clinical practice support.

Barriers to Effective Pain Management

Many barriers to assessing and managing pain have been identified. These barriers have been described as multifactorial involving the patient's clinical status, staff attitudes, beliefs and practices, and organizational process.

Duignan and Dunn (2009) described how nurses perceived pain management barriers in the emergency room setting. The study is representative of other research in different settings (Bell, 2002; Stegman, 2001) and clearly illustrates the most significant barriers to effective pain management in the acute care setting.

The researchers distributed a 13-question survey to emergency room nurses working in five counties in the Republic of Ireland. The nurses cited the following factors as the most significant barriers:

Organization

- The inability to offer pain medicine until a diagnosis is made
- A lack of time to assess and manage pain
- The acuity of other assigned patients
- The inability to monitor for side effects

Clinician-related barriers included:

- Inadequate knowledge regarding pain management
- Difficulty accepting the patients' self-report of pain and substituting their own judgment

- Reluctance of nurses to administer opioids

The study provides important insight into the perceptions of clinicians who work in a setting where pain is a prevalent complaint. Clinician knowledge and organizational processes are controllable factors that could successfully impact how pain is managed.

Pulido, Hardwick, Munro, May, and Dupies-Rosa (2010) initiated a nurse-led quality improvement project to address pain issues on an orthopedic post-operative unit. Data from the hospital's patient satisfaction surveys (Press Ganey) indicated that the scores for pain satisfaction were well below the national benchmark. The authors used four-question surveys to query nurses (n= 43) and patients (n=80) asking then to identify areas for areas for improving pain management. The following issues were identified: 1) no formalized process to facilitate communication between nurses, physicians, and patients; 2) ineffective analgesia orders within the first 24 hours; 3) a lack of standardized analgesic orders (11 different order sets were being used); 4) high frequency of call by the RNs to physicians regarding pain issues; 5) significant variation in RN interpretation of analgesic orders leading to either under or over sedation; and 6) the type of anesthesia used play a role in the patients recovery. The authors collected data related to the survey responses and re-surveyed at one- month, six-month, and one-year intervals.

As a result of the findings, the orthopedic surgeons agreed to one evidenced-based analgesic order set. An antiemetic order set was also developed. Pain education was provided. The authors conclude that as a result of the interventions patients reported a 10% increase in satisfaction of pain management. The staff reported a 38.7% decrease in the number of phone calls to physicians and the use of oral pain medications increased by 25%.

The intent of this article was to mainly communicate the results of a quality improvement projects. There are a number of limitations that preclude its usefulness and transferability of

findings. The article is not presented in a clear and logical manner. It lacks a clear methodology. The authors do not clearly articulate the sampling techniques used, the development, validity, or reliability of the instrument used. Similarly absent in their presentation was the method of data collection and analysis.

The origins of the project came from the Press Ganey patient satisfaction survey. These types of surveys generally have one or two simple questions regarding pain control requiring a yes or no answer. The authors made an attempt to explore the meaning behind the yes and no answers. Using a qualitative research design may have strengthened the validity of the results. Yet, in spite of these deficiencies and although the results of the survey are not legitimized in this article, the issues identified by the respondents are in fact instructive and pertinent to any project that attempts to improve pain management.

The Pain Resource Nurse

Several articles addressing the implementation of PRN programs in oncology will be presented, including seminal studies by Ferrell and associates. The literature search conducted for this project revealed a gap in the literature addressing the use of PRNs in a post-operative setting. However, the existing literature does provide the background necessary to understand the intent, process, and evaluation methods used in prior implementation.

In a landmark study, Ferrell, Grant, Richey, Ropchan, and Rivera (1993) used a pre-and post-test design to measure the effects of a newly developed Pain Resource Nurse Program on the knowledge level of nurses providing pain management to oncology patients. Using the Nurses' Knowledge and Attitudes Survey Regarding Pain (a validated tool developed by Ferrell and McCaffery (1993), the authors' sampled 105 nurses working in pediatric and adult hematology and oncology units, as well as oncology ambulatory clinics. This data along with

accepted concepts regarding pain and existing research findings was used to develop a 40-hour pain management course that would prepare participants to assume the role of a PRN. Twenty-six nurses attended the course. Post-test mean scores at the completion of the course demonstrated an overall 35% increase when compared to pre-test mean scores. The authors also observed that there was an increase in the percent of nurses (from 58% to 92%) recognizing the patient as the authority in rating pain intensity. When asked if facial expressions were indicative of the presence and intensity of pain, the scores improved from 62% to 92%. Identification of correct route of administration improved from 38% to 96%. Questions pertaining to reluctance in administration of opioids, pain goal expectations, and pre-emptive pain control all demonstrated a 30% increase. Informal queries by the authors at three-month post implementation found that 84% of the pain resource nurses reported more teaching to co-workers, 84% felt they had a more positive attitude toward patients in pain, and 92% reported engaging in more patient teaching. Although the authors identified no specific limitations, it is understood that this paper represents the results of a performance improvement project, not scholarly research. Still, the project served as a foundation for future implementations.

McMillan, Tittle, Hagan, and Small (2004) conducted a pre-test, post-test study to determine the changes in knowledge and attitudes of nurses working with oncology patients after attending a week-long PRN course. The study was designed using the Ferrell, Grant, Richey, Ropchan, and Rivera (1993) program. The authors modified the original pain management curriculum from 40 to 32 hours for financial reasons, also modifying the survey tool used in the original program. Using the Nurses' Knowledge and Attitudes Survey Regarding Pain developed by Ferrell and Grant (1993) with the most current literature available, the researcher created the Pain Survey. Pre- and post-testing of 28 nurses after attending a 3-hour pain course

found the new tool to be reliable ($r = 0.89$, $p = 0.00$) and valid ($t = 6.88$, $p = 0.00$). The researchers used a non-randomized sample of 18 registered nurses working with oncology patients in a 681-bed Veterans Administration (VA) Hospital. Participant selection was based on interest, education, and manager referral. The results showed the mean score for pain knowledge and the nurses' attitudes toward patients in pain increased from 20.8 to 24.9 and 11.8 to 15.6, respectively. The mean scores measuring attitudes toward pain management also increased from 66.3 to 69.3. The authors conclude that attending a PRN course had a positive effect on nurses' knowledge and attitudes. Additionally, the authors asserted that results support the validity of the new assessment tool used. The authors claimed that their tool was created using 12 attitude questions from the Farrell and Leak instrument. However, in a 2008 commentary, Ferrell cautioned against separating attitude and knowledge questions since the tool was not designed or tested to measure these concepts individually.

Paice, Barnad, Creamer, and Omerod (2006) developed and implemented a two-day PRN program in an academic acute care medical center. They implemented a multifaceted program that included a two-day pain management course, ongoing education, newsletters, listserv, clinical experiences, and quality improvement activities. Using a convenience sample of 96 nurses employed at the hospital, the researchers measured pre- and post-knowledge levels. Survey scores suggested that there was a correlation between attending the course and achieving a higher post-test score. The mean score of pre-test was 59% ±12.6, compared to 93.6 ± 5.3 post courses. Scores at eight months post implementation of the program remained high at 83% ± 8.5%. The authors completed an item analysis and found that there was an increase in the percentage of nurses responding positively to questions as compared to pre-test scores. Although the researchers did not provide a clear description of the survey tool used, they claimed that the

results of this study validated the changes in knowledge observed in prior studies. The authors also looked at patient satisfaction scores and RN turnover rates pre- and post-implementation; however, the correlation between these two variables was not clear. The authors recognize that the setting, sample, and overall design of the study all limit its generalizability. Nevertheless, the results supported the model's applicability in other practice settings when combined with prior research.

Chapter Summary

The available nursing research suggests there is evidence supporting the implementation of PRNs to improve the care of patients in pain. Although there is no literature specifically addressing the use of PRNs in surgical units, the experiences and findings from prior implementations suggest that this model may be successfully implemented in other practice settings. This Capstone Project will build on those experiences, identifying and selecting elements that are appropriate for a post-operative environment. Knowles Theory of Androgogy will be used as a framework in the development of the new curriculum and program design as it is relevant to the adult learner.

CHAPTER THREE

METHODOLOGY

The purpose of this Capstone Project was to educate a group of staff nurses to function as peer resources for acute pain management issues in the post-operative acute care setting. The Capstone Project was prepared, administered, and evaluated by the DNP student. After conducting an extensive literature review to identify staff nurse's knowledge and attitudes toward pain and pain management, a multifaceted intervention to address the needs of nurses working on a post-operative unit was designed. The nationally recognized PRN curriculum served as the foundation for the Capstone Project.

The Capstone Project required 14 weeks to complete and was accomplished in three phases. Phase 1 was finalized in approximately 8 weeks and consisted of curriculum development, site selection and support, and institutional review board approval from the university and the Capstone Project site. Phase 2 began with the selection of eligible staff, the administration of the pre-test, two-day classroom instruction, and follow-up visits, all of which were accomplished in three weeks. Phase 3 was the evaluative process and required approximately three weeks to collect and analyze data obtained from the pre- and post-test survey and follow up visits. Phase 3 concluded with a written summation of findings to the acute care hospital's nursing team.

Setting

All phases of the Capstone Project were conducted on a 40-bed post-operative unit at a faith-based acute care community hospital in southeast Florida. The acute care hospital holds ANCC Magnet designation and is currently in the process of re-designation.

Phase 1 – Planning and Course Development

Phase 1 began with the planning and preparation for conducting the proposed Capstone Project. Through a rigorous review of the concept of pain and evidenced-based strategies for managing pain, the PRN program was identified as an effective tool for oncology patients in the acute care setting. Following clinical review, discussions with experts in the field of pain management and knowledge of the post-operative patient, the proposed Capstone Project adapted the nationally recognized program to meet the needs of a specific unit in an acute care facility in southeast Florida. The foundation for the course is the Pain Resource Nurse Program Curriculum and Planning Guide by Ferrell and Grant (2008). The University of Wisconsin Board of Regents (2008) holds the copyright to the program and provides expressed consent to use and modify the curriculum provided written credit is given to the original source. Modules were selected on the basis of their relevance to the management of patients with post-operative acute pain.

Meetings with the Chief Nursing Officer and the Director of Nursing education were scheduled to present the Capstone Project proposal, which included a discussion of the nature of the problem, scope of the Capstone Project, resources, implementation methods, timelines, and benefits to the organization. During this meeting, a post-operative unit was identified. Written evidence of site support (Appendix E) was provided by the acute care hospital.

A separate meeting was scheduled with the Nurse Manger of the selected unit to present the Capstone Project and coordinate implementation timelines and resources. Once all the approvals were obtained, a copy of the training plan was submitted to the Department of Nursing Education for coordination of continuing education credits. Based on the curriculum, 12 hours of continuing education credits were granted.

The PRN Program Curriculum and Planning Guide consisted of multiple modules organized by pain-related topics. The planning guide included a hardcopy binder, a flashdrive, compact disk, Fast Fact in-service formats, samples of program proposal, agendas, teaching plans, budget worksheet, and program checklist. The PRN curriculum was reviewed with an acute pain expert to select modules from the curriculum that were appropriate to the care of post-operative patients. Exercises that focused on problem-solving and knowledge application of post-operative pain management were developed for the classroom and follow-up visits. The exercises were customized to reflect adult-learning concepts addressed in Knowles theory of androgogy. Two additional modules addressing communication with physicians and coaching and teaching of staff were added to supplement the participant's ability to implement the role.

Although post-operative and persistent pain are not mutually exclusive, the treatment plans required for each vary. The complexities of chronic pain require a level of expertise that was beyond the scope of this Capstone Project.

The final program was developed as a 12-hour classroom course over two days, followed by a 2-hour individual follow-up visits with each participants. As part of the program, the participants were asked to select a unit pain-related problem, and as a group formulate and complete a quality improvement project. Additionally, the participants were required to present a brief in-service at a future staff meeting using the *Fast Fact* handouts included in the curriculum.

Phase 2 – Education

Phase 2 commenced with the identification and selection of program participants. Flyers were posted in the staff lounge of the identified unit inviting staff to learn about the PRN program. An overview of the program was presented and informational letters (Appendix A) were distributed at two unit staff meetings. Moving forward with the Capstone Project, eight participants were identified and scheduled to attend the advanced pain management course.

The Nurse Manager agreed to make the required scheduling changes to allow volunteers to participate in the classroom course and follow-up visits. The selected volunteers were advised in writing of the date, time, and location of the educational program. The advanced pain management course was presented in a two-day classroom format at the Capstone Project site (Appendix C). The course commenced with obtaining consent from the participants (Appendix B) followed by the administration of the Nurses' Knowledge and Attitude Survey Regarding Pain pre-test.

Nurses' Knowledge and Attitude Survey Regarding Pain

The Nurses Knowledge and Attitude Survey Regarding Pain (Appendix D) was developed by Ferrell and McCaffery (1993) and has been in use since its inception. Ferrell and McCaffery later revised the survey in 2002 and again in 2008. Pain experts have established the instruments content validity over a series of years. Construct validity was established by using the scores of nurses at various levels of experience and practice settings. Test-retest reliability was established ($r>.8$), internal consistency was established (alpha $r>.7$) with items reflecting both knowledge and attitude domains. The tool has been used or adapted by numerous nursing researchers looking to expand the understanding of the relationship between nurses' knowledge

and pain (Michaels, Hubbartt, Carroll, & Hudsun-Barr, 2007; Manias, Bucknell, & Botti, 2005; McMillian, Tittle, Hagan, & Small, 2005; Ferrell, Grant, Ritchey, Ropchan, & Rivera, 1993; Paice, Kreamer, & Ormand, 1993). The survey consisted of 38 questions, 22 true and false, 14 multiple choice, and two case studies. All items were graded using the authors' test key. Each item had a correct or incorrect answer. A total score expressed as the number of correct answers was computed for each participant survey. Scores from the pre- and post-tests were used to compute composite means.

At the completion of the classroom course, two-hour follow-up visits were conducted with each individual participant. The follow-up visits were designed to enrich the participants' clinical experience through the use of selected exercises from the PRN and discussions with the DNP student. All visits were prearranged with the participant to occur during times when the participants were scheduled to be present on the unit. The participants were provided with the DNP student's contact information to encourage communication between the participant and the DNP student. No identifiable points were presented orally or in writing; this included interaction with patients and families. As part of the follow-up visits, general observations reflective of the implementation process, were recorded for later analysis.

Phase 3 – Program Evaluation

Phase 3 of the Capstone Project consisted of the evaluation of the program. The data was collected from three sources, the pre- and post-test scores obtained from the Nurses' Knowledge and Attitude Survey Regarding Pain (Ferrell & Grant, 2008), participant discussions, and perceptions during the follow-up visits, and general observations of the participants during the implementation process, specifically, interactions with unit staff nurses and other members of the healthcare team. All data for this Capstone Project was collected at the acute care hospital.

Phase 3 concluded with the presentation of findings to the nursing team at the Capstone Project site.

Ethical Considerations

The Capstone Project methodology was designed to protect the participants by providing informed consent, using procedures and methods that prevent exploitation and minimize risks wherever possible.

The proposed Capstone Project was presented to the university's Institutional Review Board and to the acute care hospital's Interdisciplinary Research Committee, a hospital intermediary committee charged with reviewing all research proposals prior to submission to the hospital's Institutional Review Board. Both bodies granted exempt status after determining that the scope of the project was an education intervention and program evaluation. The Capstone Project would not require direct patient care in any manner and did not include protected information or pose any identifiable risk to either patients or staff.

All potential participants received an informational letter presenting the purpose and significance of the Capstone Project, confidentiality, the role of the participant, risks and benefits of participation, data collection, and management. The potential participants had an opportunity to pose questions during the presentation as well as individually if so desired. Nurses who volunteered to become PRNs received additional information specific to the role of a PRN including the purpose and significance of the role, participant expectations, benefits and risks of participation, confidentiality, and management of information during the informed consent process. The consent forms were kept by the DNP student in a secure location off campus in the DNP student's home office.

The PRN curriculum used learner evaluations and tests as part of the curriculum. All tests administered as part of the course were used solely for the benefit of the participant. No grades were assigned, collected, or used to determine the participant's level of competency. Only the participant had access to the test results. The aim of the Capstone Project was to evaluate the effectiveness of the PRN program not on any individual nurse's performance; therefore, all results obtained from the pre- and post-test surveys and follow-up visits were presented as aggregate data, and no individual scores were reported.

The participants did not receive any compensation for taking the pre- and post-test surveys, attending the course, or assuming new responsibilities as part of the PRN role. Eligible participants who elected to become PRNs were compensated by way of education and continuing education credits for completing the course. The program offered the participants the opportunity to gain new knowledge in pain management. Those nurses who participated in the PRN program advanced their knowledge and are better prepared to assume leadership and mentoring roles on their unit.

Staff nurses were assured that during the educational program, their comments and discussion would remain private within the context permitted by law. In the event of extreme circumstances that required disclosure, the participant would be directed to engage in mutual discussion with the appropriate party and/or the unit manager. Ultimate responsibility for required reporting was maintained as per the Nurse Practice Act, state and federal guidelines, and institutional policies.

No direct patient contact or primary sources of data (i.e., patient records) were incorporated into this Capstone Project. In discussion of patient scenarios, the DNP student and staff were required to utilize pseudonyms and avoid specific identifiers. Participants were

permitted to withdraw at anytime. In the event of withdrawal, the DNP student did not contact the participant for further activities.

To ensure ethical standards in evaluating the focus group and observational data, the DNP student employed the concepts of trustworthiness, authenticity, and rigor in the analysis of the data.

Resources

The designated acute care facility agreed to provide classroom space, media support, and time for volunteer participant training. The nationally recognized, Pain Resource Nurse Program Curriculum and Planning Guide was purchased by the DNP student from the Resource Center Alliance of State Pain Initiatives at a cost of $100. The purchase agreement allowed the educator to utilize all material contained in the written and computerized curriculum. A letter indicating the specific copyright guidelines and responsibilities is included (Appendix F). Each participant was provided with a copy of the course handbook with selected modules from the Pain Resource Nurse Curriculum and Planning Guide.

Outcome Measures

At the conclusion of Phase 1:

- A PRN course for post-operative pain management was developed using the Pain Resource Program Curriculum and Planning Guide.
- Access and support for the Capstone Project was obtained from an acute care hospital to conduct the two-day training course and implement the PRN program on a designated post-operative unit.
- All required resources were identified and allocated.

At the conclusion of Phase 2:

- A two-day course in advanced pain management was conducted on premise.
- Two-hour individual follow-up visits were completed with each participant.
- Pre- and post-testing using the Nurses' Knowledge and Attitude Survey Regarding Pain was completed.

At the conclusion of Phase 3:

- Data obtained from the Nurses' Knowledge and Attitude Survey Regarding Pain and observations from participant follow-up visits was analyzed.
- A group meeting with the participants was conducted to presents the program evaluation to the participants.
- A formalized program evaluation with recommendations was presented to the nursing team at the acute care hospital.

Chapter Summary

This chapter has outlined the process for implementing a PRN program on a post-operative unit. The implementation was accomplished in the three phases. Phase 1 encompassed the planning, development, and site support required, Phase 2 presented the educational aspects of the program, and Phase 3 outlined the evaluative process including a discussion of the instrument and research methodologies that were used. This chapter concludes with a discussion of the ethical consideration and expected outcomes associated with the PRN implementation.

CHAPTER FOUR

RESULTS AND DISCUSSION

This chapter will examine the findings of the Capstone Project implementation of a Pain Resource Nurse Program (PRN) on a post-operative unit. As previously discussed, the Capstone Project consisted of three phases.

Phase 1 – Planning and Development

The design of a pain management curriculum required advanced knowledge in the pathophysiology, assessment, and interventions associated with effective pain control. The DNP student's clinical experiences in the area of pain management and ongoing preceptorship with pain management experts facilitated the selection, adaptation, and presentation of the new PRN curriculum. The PRN curriculum was originally developed for the oncology practice setting but was easily adapted and provided a reliable foundation for the post-operative curriculum. It was anticipated that the planning phase could occur over an eight-week period. This timetable was easily achieved utilizing an organized and proactive approach.

The PRN curriculum was reviewed carefully and the sections reflecting oncology specific points were removed. Issues specific to the surgical patient were included and the PRN template was found to be flexible enough to accomplish the educational goals and meet the needs of the student, staff nurse, and the hospital's financial and staffing needs.

In order to gain support and access to the acute care facility there was a great deal of information needed in advance. The ability to create the program required knowledge of adult teaching and learning principles, the infrastructure of the facility, the manner in which education is provided and accepted in the hospital, and the commitment of key nursing leaders. Having a written proposal that clearly articulated the purpose, benefits, methods, and resources and

timelines facilitated the process of obtaining support from the nursing leaders. They conveyed attentiveness to the unique needs of their system and personnel and were essential in gaining access and support. The nursing education team was invaluable helping in the coordination of the program. The nurse manager embraced the idea of a PRN program and allowed recruitment from her team. Initially, it was anticipated that more than one unit would be involved, but due to staffing and fiscal issues, only one unit participated in the offering

The objectives for Phase I were achieved within the anticipated time frame of eight weeks. There were no unusual circumstances that required additional time or consideration. Assessment of the institution allowed greater understanding of their needs and for the establishment of mutual goals. The PRN curriculum leant itself to be adapted from the oncology setting to the acute post-operative setting. This flexibility enabled the accomplishment of the goals and was designed to meet the hospital's financial and staffing concerns. This completion of this phase served to be important in gaining support and was critical as the foundation for the subsequent phases.

On critical reflection there were some elements that could have been enhanced. The PRN program is population specific (oncology) and appears to have been targeted to adults and pediatrics. In making it more useful for the acute care post-operative team, it had to address a broader group. Specifically, the elder clients who make up a large percentage of the hospitalized surgical population had to be considered.

The approach used by the PRN authors was not specific enough to meet the needs of age-specific populations. Recommendations for future adaptations would address this oversight. The normal aging process and medical co-morbidities must be understood in the context of pain management

Phase 2 – Education

Phase 2 commenced with the identification and selection of eight participants. It was intended that the participant group would be 12 nurses. In the end, there were fewer available participants. This occurred as external factors including the impending sale of the facility during the project resulted in subsequent restructuring and reengineering of personnel. The number of available units was eventually limited to only one with the sample of available participants significantly reduced. In addition, unexpected patient care priorities precluded two of the volunteers from further participation after the first day of class. The preliminary design included the collection of demographic data to further describe the characteristics of the participants. This data was not used in the analysis of the project because of the small sample size.

A combination of interactive lectures, videos, case studies, role-plays, and group exercises were used to present the curriculum content. The lesson plans were organized to present the scientific foundation of pain on the first day followed by role development on the second day. Additional time was allotted during the course to satisfy the participant's request for additional material on the appropriate use of multimodal therapy and medication safety. An informal working lunch format was mutually selected. The format was well suited to the participants' needs, providing for a free exchange of ideas, questions, experiences, and concerns. The participants shared both personal and professional experiences with each other. This became a powerful venue for learning, validation, and bonding. This experience was perceived by the participants as separate from role-plays and group exercises. During this session, the role of the DNP student shifted from instructor to group facilitator. The outcomes of this sessions were discussed

with the participants during the follow-up visits; it is speculated that the experience may have reinforced the bond between the participants and also the DNP student.

The follow-up visits started immediately after the course. At the first meeting, individualized plans were established in collaboration with each participant, delineating the timeframes and objectives and appointment times. The use of this method proved to be beneficial, helping the DNP student and the participant to focus on progress and outcomes. Initial timeframes and appointment times were modified as needed to accommodate unanticipated time constraints.

The participants' perception of the PRN role and the implementation process were discussed during the individual sessions and group activities. Individually, the participants reflected on their interactions with staff on pain related issues. During their one-on-one sessions, some participants used storytelling as a format in which to demonstrate and validate their abilities to manage pain rather than a forum for active learning. The primary mechanism used for evaluating the participants and providing feedback was coaching or a preceptorship type model. Each student was required to keep individual appointments, and all were given the DNP student's contact information in the event of questions, comments, or concerns.

Overall, the group was reluctant to utilize this resource and only sought assistance during the one-on-one sessions. The DNP student had anticipated and planned for more informal contact from the participants, but this did not occur. This aspect is an area that would evoke future research possibilities.

The follow-up meetings with the participants served to allow them to process information, clarify concepts, and share their real-world experiences with the DNP student. There were many elements that clarified the educational richness of the course, and as with any

educational intervention, there were opportunities to improve on the original. The summation of the individual follow-up visits as well as general observations made by the DNP student has been organized into four categories.

Perceptions of Implementation

The ability to teach patients, families, and members of the healthcare team is part of the core competencies of a nurse and is expected in all aspects of patient care. The capacity to transmit new knowledge to nurses in the clinical environment is crucial to the success of the PRN role as well as the program. The skilled PRN uses knowledge to influence practice at the unit level. Teaching is both an art and a skill, and the development of both occurs over time. In developing the PRN course, considerable thought was given to developing exercises that provided the participants with opportunities to select evidence-based articles, organize their presentation, and practice with the DNP student.

The participants expressed that their ability to teach was influenced by several factors including knowledge, experiences, and personal and professional confidence. The participants anticipated the success or failure of the role was closely associated with the support or resistance by their colleagues. In this group of nurses, the less experienced nurses were more susceptible to intimidation, real or perceived. Nurses who functioned in a charge nurse role where more apt to give direction rather than coach other nurses in the use of pain medication. Nurses functioning as unit preceptors for staff or nursing students reported feeling comfortable with bedside teaching.

A frequent complaint by participants was the perception of time as a barrier to bedside teaching. This was a significant issue for most of the participants and reiterated throughout the implementation process. Teaching was perceived by many of the participants as time

consuming. Some participants voiced restricting their teaching to a particular time such as morning report or a particular place such as the nursing report room. Consistent with the theoretical framework of this Capstone Project, the participants were exposed to the concept of the "teachable moments" used by educators to introduce new knowledge at a moment that captures the interest of the leaner. This method is fairly easy to learn and apply and can be accomplished in brief periods. For the PRN, opportunities for teachable moments may present themselves as a result of the staffs readiness and orientation to learn as defined by Knowles.

Pain Management Practices

Some of the participants expressed an increased awareness of the variability between provider interventions for pain control. Participants attributed the practice inconstancies to multiple factors including lack of knowledge, fear, negative experiences, or a lack of experience with pain medications. When asked how they might approach these issues as a PRN, the participants cited education, pain protocols, and management support as solutions.

Throughout the program, the participants sought to understand and apply the use of multimodal therapy. At varying points in the program, the participants expressed new realizations regarding the use of multimodal and adjuvant therapies. There was consensus among the participants that the nurses on their unit had a poor understanding of the multimodal approach. Their new grasp of this concept was seen as a topic they could easily teach since the nurses already had some familiarity with this approach as ordered by the surgeons. The participants voiced a deeper understanding and comfort with the concepts of basal and breakthrough drugs, a crucial concept in achieving and maintaining post-operative pain control.

Role Development

The participants expressed an understanding of the PRN role using words such as expert, educator, and advocate. There was consensus within the group that the unit staff was expecting a higher level of knowledge from them after attending the course. Some felt the course and individual discussions with the DNP had provided them with greater insight into their own practice but not the confidence to assume a leadership role given Good communication between providers is essential in pain management. To this end, a separate module was designed for this implementation that addressed meaningful dialogue between the PRN and the physician. The module outlined specific steps the nurse should use to communicate a patients pain control needs. The participants were asked to examine trends in the patient's pain control responses such as duration of relief after intervention, frequency of pain medication requests, or the patient's experiences with other forms of pain management.

During the on-unit observations, the PRNs were not observed in active discussions with the patients' physicians. Participant accounts for their experiences during the individual follow-up visits revealed personal variability between clinicians in how they approached physician communication. Further exploration revealed that the participants perceived their relationship with the physician(s) as most influencing their communication. Exposure to the physicians ordering style, frequency of interactions, and a perceived personal relationship with the physician were valued by the participants as conducive to open dialogue. In the absence of the above, the participants favored using brief communication that addressed current level of pain intensity and response to last dose. Some of the participants felt that engaging a physician in a pain-related conversation was often challenging and frustrating for them as well as the patient. Multiple issues were cited by the participants as affecting the success of the exchange including, the

physician's familiarity with the patients, such as on-call physicians, the physicians' personality, or personal philosophy regarding pain. In general, the systematic approach presented in class was perceived as cumbersome and not beneficial. In retrospect, future projects should consider using an experiential design and engage discussion and exploration of the topic with both physicians and nurses prior to developing the class.

Organizational Culture

Participants spoke of past experiences with the organizations' leaders who often failed to support or follow through with new initiatives. There was concern among the participants that this program would follow suit, and they would return to a "business as usual" mode. Participants perceived the organization as responsible for the overall success of the program.

In contemporary healthcare, change is a constant. This hospital is not unique in changing leadership, and the effect on day-to-day operations as well as programming and personnel is real. The stress and anxiety that change brings affected the Capstone Project directly and indirectly.

The concept of change was addressed in the classroom and during the performance improvement activity. In the classroom and during the follow-up visits, the participants expressed frustration with the hospital's internal policies and processes for medication safety. The new process was developed as a result of an increase in the frequency of narcotic related respiratory compromise. A collaborative team including members of the pharmacy department, risk management, and nursing administration established a new pain control protocol designed for the post-operative setting. The participants voiced an understanding of the rationale for the changes but considered the protocol to be restrictive and perpetuating delays in patient care.

The concept of advocacy at the organizational level through policymaking and participation in hospital and nursing committees was addressed in the classroom but not

addressed by the participants during the implementation process. This concept was not fully explored during this implementation but merits further study to gain a richer understanding of perceptions and actions taken by bedside nurses with clinical expertise in pain management and patient advocacy at the organizational level.

A curious and unexpected finding in this project was the manner in which the participants elected to avail themselves of the experience and presence of the DNP student. The role of the DNP student in this Capstone Project was conceptualized, as a resource person available to the participants for immediate and ongoing consultation, clarification, and guidance while implementing their new role. The PRN would benefit from the knowledge and experience of the DNP student who in turn would gain insight relative to the knowledge, practices, and challenges, faced by the nurses working on a post-operative unit. The availability of the DNP student was considered essential to providing the new PRN direction and support for role development. The presence and availability the DNP student was reinforced to the participants from the beginning stages of the PRN program and throughout the individual sessions.

The concept of preceptor did not unfold as was expected. As the project progressed, the nature of the relationship between the PRN and the DNP student evolved to a traditional student and teacher relationship. The participants did not avail themselves of the opportunity to consult with the DNP student as situations were evolving where the participants would later acknowledge a desire for guidance. Future implementations of PRN programs that would utilize APNs should consider the participants' perceptions of the relationship and its implications during situations that require immediate attention. Ideally, a mentoring model might serve as an opportunity to build a hospital-wide type program.

The participants met as a group to design a quality improvement project that addressed problem areas in their unit. All of the participants had prior experience with hospital data collection for core-measures and performance activities. The focus of this exercise was to assist the group to work collectively to identify issues in an objective manner and to validate their perceptions through basic data collection and analysis. At the conclusion of the activity, the participants were able to objectively validate their perception of pain-related issues though objective data and basic analysis.

The elements of Phase 2 were implemented within the anticipated timeframe. The program will require additional time and support to fully recognize the potential benefits. The unpredictable nature of the clinical environment and the overriding responsibilities of managers to meet patient care needs affected the number of participants who were able to complete the program. It is critical to the success of the program that support be evident and ongoing. The presence of the Nurse Manager and open support of the program by the CNO would reflect administrative support for the PRN program.

Phase 3 – Program Evaluation

The Implementation of the PRN program on a post-operative unit was evaluated by comparing the average scores obtained from the pre-test-post-test using the Nurses' Knowledge and Attitudes Survey Regarding Pain and qualitative data from the follow-up sessions with the participants.

The Nurses' Knowledge and Attitude Survey Regarding Pain was administered on the first day of class as a pre-test and again at the conclusion of the implementation. Participants were instructed to label their surveys with a unique identifier and to write the identifier in their student manual for easy recall on the post-test. The pre- and post-tests were matched using the

unique identifier. Test without a matching identifier was excluded from the analysis. The analysis was based on the results of five matched tests.

Eight nurses completed the pre-test and five nurses completed the post-test. The average pre-test score was 61.28%. The average post-test scores obtained at the conclusion of the Capstone Projects increased to 91.20%, representing a 49% percent increase. Due to the extremely small size of the group, the statistical value of the data s limited

Item analysis was performed to identify select questions with the largest percent change from the pre-test to post-test. Questions with the most significant changes on the post-test scores include: Vital signs are always reliable indicators of intensity of pain (40% false and 80% false), analgesics for post-operative pain should initially be given round the clock (40% true and 90% true). The survey presented two case studies asking the nurse to accept, reject, or reassign a pain intensity score based on nurse-observed behaviors; 100% of the respondents accepted the patients self-report when the patient exhibited pain-like behaviors (grimacing, vocalizations), and 90% accepted the patients self-report when the behaviors were not clear-cut. Two respondents elected to administer a lower dose when a more appropriate dose was available. This finding was consistent with data from prior implementations where the nurse would select a lower dose when the patient's behaviors were not congruent with the nurse's expectations (Harper, Ersser, & Gobbi , 2007; Hirsh, Jensen, & Robinson, 2010).

The participants reported a lack of knowledge in using extended-release and immediate release drugs to achieve and sustain adequate post-operative pain relief. The participants perceived greater comfort in advising their peers how to optimize pain control through the use of multimodal therapies. The participants attributed this change in attitudes toward multimodal therapy to new knowledge gained in the course and

perceived overcoming their reluctance to use multimodal therapy as a meaningful change in practice.

Phase 3 evaluated the program implementation by comparing the pre- and post-test means and summarizing the qualitative data from the follow-up visits. The results of this Capstone Project should be considered in relation to the small sample size and implementation timelines.

Significance to Nursing

The Essentials of Doctoral Education for Advanced Practice Nurses (AACN, 2006) outlines key skills and practices that prepare graduates to impact clinical practice by combining expert knowledge, skill, and utilization of the best evidence. A valuable characteristic of doctoral nursing education, specifically the Doctor of Nursing Practice (DNP), is the ability to synthesize evidence from the physical, behavioral, and psychosocial sciences and through scholarship and research. The literature presented in this paper demonstrates the need for advanced practice nurses who are experts in their specialties to develop strategies to meet the current needs of patients in pain. This Capstone Project is significant to nursing because it addresses one of the major causes of patient distress and suffering associated with surgical interventions.

Translating evidenced-based research into practice at the bedside requires great attention to detail, analytical acumen, and operational knowledge of the clinical setting. This Capstone Project allowed the DNP student to put many of these critical pieces into action. Using analytical methods to critically evaluate the existing literature regarding pain enabled a greater understanding of the problem. The post-operative patient's needs were evident, and the significance of optimal pain management in this period was well

documented. After evaluating the evidence, the PRN program was identified as an effective educational opportunity to implement in the clinical practice setting as a "best practice" in pain management. Adapting the existing program appeared to be key in changing how nurses cared for this patient population. In order to effectively evaluate the design and implementation, outcome measures were required to monitor both the classroom and the practice elements. The pre-test post-test method was beneficial for knowledge, and the follow-up sessions with participants yielded an ability to evaluate each nurse's growth. The Capstone Project culminated in an evaluation that reinforces the need for programs that allow comparison to national benchmarks so that clinical outcomes and population trends are documented. The ability to serve as a clinical expert in the area of pan management is central to the DNP role, and this project serves only to scratch the surface of the scholarship and collaborative research efforts for this student.

Nursing Practice

This Capstone Project sought to evaluate the application of a quality improvement model developed to improve pain management in patients with cancer pain to a postsurgical practice setting. Although the number of participants in this Capstone Project was small, observations and survey results share similarities with findings in the nursing pain literature. The brief evaluation period used in the Capstone Project precludes any judgments of significance regarding implementation on other post-operative units or the sustainability of the results. The nurses working on this surgical unit are faced with similar issues found in nurses working in other practice settings that provide pain management. What is known is that for the nurses participating in this Capstone Project, the PRN curriculum helped influence pain management decisions and

increase their comfort using multimodal therapies. It was also noted that at least initially, the PRNs were willing to share their new knowledge with other nurses on the unit. The preliminary results obtained from this small Capstone Project suggest that additional research is needed to validate the sustainability of PRN programs in post-operative setting

Ongoing efforts to collect and generate evidence for clinical practice in the area of pain management are necessary. The PRN program may be expanded to a larger institution with enhanced effort on fostering post-classroom experiences to be self-directed by participants and utilize the clinical expert more as a resource person. In disseminating findings, this area will be highlighted, and further programs will address this idea.

Healthcare Policy

Healthcare analysts predict that hospitals will continue to see increases in surgical and invasive procedures; this trend coupled with longer life spans will challenge nurses to manage patients with complex pain requirements. The medical and scientific communities have made great strides in developing less invasive procedure methods, improved instruments, and technology. The problem is the same successes have not been realized in post-operative pain management. Healthcare organizations are continuously searching for ways to increase efficiency and maximize reimbursement. Hospital pain management services are non- revenue generating; the return on investment is realized in “soft” dollars. The reimbursement for post-operative pain management is included in the surgeon’s professional fee and the surgical DRG.

Some larger healthcare organizations or academic medical centers provide Acute Pain Management services as part of a comprehensive approach to enhance patient satisfaction.

Hospital administrators expect pain management services to yield higher patient satisfaction, minimize complications, and optimize the patient's recovery, which in turn, promotes patient satisfaction and referrals. Not all organizations have the resources to have dedicated pain management specialist. Could the use of PRNs in these organizations help surgical patients achieve faster recovery times or improve the quality of life in the immediate post-operative period? The evaluation of this implementation may inspire other clinical experts to move beyond the preliminary steps taken in this Capstone Project.

Education

Education is the vehicle used by the PRN program to change practice behaviors. Implementing a PRN program requires the Advanced Practice Nurse to have an appreciation for adult learning methods. Knowles' Theory of Androgogy was an appropriate framework for this Capstone Project. The new curriculum was oriented to the learners' needs, providing new knowledge, using knowledge application problem-solving and critical thinking exercises. The program honored the nurse's experiences while simultaneously attempting to stimulate change. Those nurses who elected to participate in the PRN program were intrinsically motivated by the desire to improve their pain management skills as a result of their practice environment requirements. The nurses were offered the opportunity to transition from dependent learners to self-directed resource persons that could help bring new knowledge to the nurses at the bedside.

The instructional material was presented in a manner that is relevant to the practice environment. As proposed by Knowles, this group of participants valued the synthesis of practice experiences with new knowledge in pain management. Educational efforts to address pain management in the classroom have been marginally effective in changing the mindset of nurses. It is often difficult for nurses to apply theoretical learning to their practice. Further

studies are needed to validate the long-term effects of the program curriculum used in this Capstone Project.

Research

Program evaluation studies are valuable elements of implementation and dissemination studies. The original PRN program developed at City of Hope was the catalyst for future programs. Over the years, the program as well as the curriculum has evolved beyond the original concept. This Capstone Project was designed and tailored to the needs of a specific unit in one institution and has limited generalizability. This organization was open to adapting cost-effective, high-quality care models that could be customized to meet the specific needs of the institution. The evidence for selecting this model was obtained from the experiences of previous implementations.

Implications for Nursing

Pain management is a significant concern for nurses working in post-operative settings. The results of this project should be viewed as preliminary and a component of a more comprehensive pain management strategy. As with previous educational interventions, this project suggest that individual knowledge regarding pain and pain management can be improved at least temporarily, after attending a course in advanced pain management.

This Capstone Project served to expose the DNP student to the process of enacting the essential elements of the role. The ability to translate research into practice, adapt a program to enhance patient centered care, evaluate the program, utilize research methods and technology, and participate in a collaborative project targeted to a population of interest was eye opening. It culminated in the adaptation of an educational intervention developed for oncology patients to post-operative patients with similar care requirements.

Limitations

Multiple and simultaneous and unexpected factors surfaced during the implementation of this project. The initial discussions with nursing administrators at the acute care hospital resulted in enthusiastic support of the PRN program. It was anticipated that approximately 20 participants from multiple perioperative units would take part in the program.

As the external challenges affecting the organization occurred, the implementation was limited to one nursing unit. Financial and staffing priorities reduced the number of potential volunteers available for participation and resulted in a lower than anticipated number of participants completing the project requirements. The educational needs of the staff had to be balanced with the institutional goals of providing ongoing care to post-operative patients. This was noted to be a major limitation of the Capstone Project. The CNO and Nurse Manager mandated additional scheduling requirements, which were accommodated to meet mutual goals. These included limiting class time to no more than 16 hours and to provide the classes one week apart so that the program would occur over different payroll cycles.

Two additional critical organizational and departmental issues surfaced during the implementation, the participation of the identified nursing unit in a new nursing care delivery model pilot study and a formal announcement by the hospital's administrators of the impending sale of the hospital to a nationally based healthcare system. Individually or in combination, these factors were acknowledged by the participants as distracters and must be considered in terms of their impact on the implementation process.

Another limitation of the study was the use of the DNP student as a resource for the course participants. Discussion with participants occurred only during scheduled meetings, and the group never transcended to a point where they felt comfortable in contacting their educator. Future interventions would include an exploration of alternative methods that may enhance this including a structured preceptorship or more formal mentoring component.

Discussion

In today's highly complex healthcare environment, significant gaps exist between research and practice. The DNP prepared nurse can link the two areas to form a stronger bond. The science of pain is growing rapidly. New understandings are helping providers to select treatment options that are best suited to meet the individual patients needs. We can no longer afford to think that all pain medications work the same on all patients. The DNP as a clinical leader can assist organizations to critically evaluate new evidence, link the evidence to the practice environment, and evaluate the outcomes of the implementation. Programs such as the PRN program were designed by advanced practice nurses to address the needs of bedside nurses and facilitate their ability to deliver high-quality nursing care. Nurses are educated to value and respect the uniqueness of the individual. What they are often missing are the new insights, discoveries, and the support

to adequately address the singular needs of an individual patient. This project is limited to observations made during the initial implementation of an existing curriculum and program in the post-operative setting. The observations made during this project suggest that nursing knowledge of pain management can be increased in the immediate timeframe using this curriculum. The more important question is whether this knowledge changes a unit's practice over time. Future implementations and evaluations of resource nurse programs in general should explore broader outcomes to find the true measure of these efforts. Do PRNs contribute to practice changes at the unit level? What is the relationship of PRNs to patient outcomes such as lengths of stay or post-operative complications rates?

In summary, the PRN program conceived by Ferrell and Grant can be used successfully to develop a PRN curriculum for nurses who provide care to post-operative patients. Implementing the project proved to be challenging such that the results and observations made during this Capstone Project illustrate how healthcare economics and competing organizational initiatives may affect the outcomes of well-intended quality improvement initiative.

The Essentials of Doctoral Education of Advanced Nursing Practice by the American Association of Colleges of Nursing elucidates the need for advanced practice nurses to be competent in understanding organizational systems and leadership for quality improvement. This project illustrates the challenges facing DNPs charged with improving the quality of patient care in complex systems. The implementation of this PRN program was affected by unpredictable changes and financial constraints faced by the organization. Knowledge of the organizations internal processes and systems was not

enough to overcome the limitations imposed by the substantial changes occurring within the organization. The observations made during this implementation may be useful in anticipating the impact of organizational changes on projects at the bedside. The DNP must consider the desire of an organization to change and balance that desire against its readiness to change. Programs such as the PRN may one day help nurses working in post-operative settings improve patient outcomes. Additional research is needed to determine the efficacy of the program on improving pain management practices on post-operative units.

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APPENDIX A

INFORMATIONAL LETTER

Implementing a Pain Resource Nurse Program on a Post-operative Unit

Your participation in a Capstone Project is requested. Francisco Paula, a student in the Doctor of Nursing Practice (DNP) at Barry University, is conducting a Capstone Project. The aims of the Capstone Project are to educate a select group of volunteer nurses working in a post-operative unit in advanced pain management. The volunteer nurses will be educated using a nationally recognized pain management program called the Pain Resource Nurse Program by Ferrell and Grant (2008). The goal of the Capstone Project is to evaluate and understand the implementation of a PRN program on a post-operative unit.

In accordance with these aims, the following procedures will be used: The participants will be asked to sign a consent indicating there understanding of the Capstone Project and their willingness to participate. Participants will be asked to attend a 16-hour course in advanced pain management that will be provided by the DNP student at the facility during normal business hours. At the conclusion of the classroom course the participants will receive 2 hours of follow up with the DNP student in the areas of assessment, pharmacological and non-pharmacological nursing interventions, therapeutic communication, pain specific performance improvement activities. As part of the learning process, each participant will be asked to take a 37-question survey called the Nurses' Knowledge and Attitude Survey Regarding Pain at the start of the Capstone Project and again at the conclusion. Each survey will take approximately 20 minutes to complete. The participant will be asked to share their perceptions of the effectiveness of the implementation process.

Your consent to participate in the program is strictly voluntary. Should you decline to participate or should you choose to drop out at any time during the Capstone Project, there will be no adverse effects on your employment status, duties, or responsibilities.

There are no foreseeable risks to you for participating in this Capstone Project. There will be no additional compensation for your participation. The benefits of participating will be acquiring new clinically relevant knowledge in the area of pain management.

As a Capstone Project participant, the information you provide will be held in confidence to the extent permitted by law. Published results of the program will remain confidential and will not be presented by name, location, shift, or any other information that could disclose the identity of the participant. Data obtained from the surveys and focus group will only be presented as aggregate data, with no personal identifiers. Completed surveys will be kept by the DNP student in a secure location off campus and destroyed after 5 years.

If you have any questions or concerns regarding the study or your participation in the study, you may contact me, Francisco Paula, at (305) 756-7514, my supervisor, Dr. Carolyn LePage, at (305) 899-4889, or the Institutional Review Board point of contact, Barbara Cook, at (305) 899-3020.

If you decide to participate in this research, you will be asked to do the following:

- Please sign your name on a sign-up sheet posted in the staff lounge. Participation will be limited to the first 10 volunteers. Manager approval will is required to participate in the program.

Thank you for your time and consideration
Sincerely,
Francisco Paula, MSN, ARNP

APPENDIX B

BARRY UNIVERSITY INFORMED CONSENT FORM

Implementing a Pain Resource Nurse Program on a Post-operative Unit

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As part of the learning process, each participant will be asked to take a 37-question survey called the Nurses' Knowledge and Attitude Survey Regarding Pain at the start of the Capstone Project and again at the conclusion. Each survey will take approximately 20 minutes to complete. The participant will be asked to attend a 60-90 minute focus group to explore the participant's perceptions of the effectiveness of the implementation process.

Your consent to participate in the program is strictly voluntary. Should you decline to participate or should you choose to drop out at any time during the Capstone Project, there will be no adverse effects on your employment status, duties, or responsibilities.

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- Please sign your name on a sign-up sheet posted in the staff lounge. Participation will be limited to the first 10 volunteers. Manager approval will is required to participate in the program.

Voluntary Consent

I acknowledge that I have been informed of the nature and purposes of this Capstone Project by Francisco Paula and that I have read and understand the information presented above, and that I have received a copy of this form for my records. I give my voluntary consent to participate in this Capstone Project.

_____	_____	_____	
Signature of Participant	*Date*	*Signature of DNP Student*	*Date*

APPENDIX C

CURRICULUM DESIGNED FOR THE POST-OPERATIVE UNIT

IMPLEMENTATION

Classroom Instruction	**12 hours**
Overview of Pain Types and Prevalence	60 minute
Assessment of Pain	60 minutes
Pain Management: Pharmacological	90 minutes
Pain Management: Delivery Systems	60 hour
Pain Management: Non-pharmacological	60 minute
Principles of Acute and Chronic Pain	60 minutes
Principles of Pain Management in Patients with Substance Abuse	60 minutes
Role of The PRN	60 minutes
How to speak with physician regarding pain	60 minutes
Implementing the program	40 minutes
Coaching Staff	60 minutes
Case Studies	60 minutes
Follow up visit	**2 hours**

Pain Assessment, medication management, case studies, and simulations. Case study - Equalgesia

Pre and Post Nurses' Knowledge and Attitudes Survey Regarding Pain

APPENDIX D

NURSES' KNOWLEDGE AND ATTITUDES SURVEY REGARDING PAIN

True/False – Circle the correct answer.

T F 1. Vital signs are always reliable indicators of the intensity of a patient's pain.

T F 2. Because their nervous system is underdeveloped, children under two years of age have decreased pain sensitivity and limited memory of painful experiences.

T F 3. Patients who can be distracted from pain usually do not have severe pain.

T F 4. Patients may sleep in spite of severe pain.

T F 5. Aspirin and other nonsteroidal anti-inflammatory agents are NOT effective analgesics for painful bone metastases.

T F 6. Respiratory depression rarely occurs in patients who have been receiving stable doses of opioids over a period of months.

T F 7. Combining analgesics that work by different mechanisms (e.g., combining an opioid with an (NSAID) may result in better pain control with fewer side effects than using a single analgesic
agent.

T F 8. The usual duration of analgesia of 1-2 mg morphine IV is 4-5 hours.

T F 9. Research shows that promethazine (Phenergan) and hydroxyzine (Vistaril) are reliable potentiators of opioid analgesics.

T F 10. Opioids should not be used in patients with a history of substance abuse.

T F 11. Morphine has a dose ceiling (i.e., a dose above which no greater pain relief can be obtained).

T F 12. Elderly patients cannot tolerate opioids for pain relief.

T F 13. Patients should be encouraged to endure as much pain as possible before using an opioid.

T F 14. Children less than 11 years old cannot reliably report pain so nurses should rely solely on the parent's assessment of the child's pain intensity.

T F 15. Patients' spiritual beliefs may lead them to think pain and suffering are necessary.

T F 16. After an initial dose of opioid analgesic is given, subsequent doses should be adjusted in accordance with the individual patient's response.

T F 17. Giving patients sterile water by injection (placebo) is a useful test to determine if the pain is real.

T F 18. Vicodin (hydrocodone 5 mg + acetaminophen 500 mg) PO is approximately equal to 5-10 mg of morphine PO.

T F 19. If the source of the patient's pain is unknown, opioids should not be used during the pain evaluation period, as this could mask the ability to correctly diagnose the cause of pain.

T F 20. Anticonvulsant drugs such as gabapentin (Neurontin) produce optimal pain relief after a single dose.

T F 21. Benzodiazepines are not effective pain relievers unless the pain is due to muscle spasm.

T F 22. Narcotic/opioid addiction is defined as a chronic neurobiologic disease, characterized by behaviors that include one or more of the following: impaired control over drug use, compulsive use, continued use despite harm, and craving.

Multiple Choice – Place a check by the correct answer.

23. The recommended route of administration of opioid analgesics for patients with persistent cancer-related pain is

a. intravenous
b. intramuscular
c. subcutaneous
d. oral
e. rectal

24. The recommended route administration of opioid analgesics for patients with brief, severe pain of sudden onset
such as trauma or post-operative pain is

a. intravenous
b. intramuscular
c. subcutaneous
d. oral
e. rectal

25. Which of the following analgesic medications is considered the drug of choice for the treatment of prolonged, moderate to severe pain for cancer patients?

a. Codeine
b. Morphine
c. Meperidine
d. Tramadol

26. Which of the following IV doses of morphine administered over a 4-hour period would be equivalent to 30 mg of oral morphine given q 4 hours?

a. Morphine 5 mg IV
b. Morphine 10 mg IV
c. Morphine 30 mg IV

d. Morphine 60 mg IV

27. Analgesics for post-operative pain should initially be given

a. around the clock on a fixed schedule

b. only when the patient asks for the medication

c. only when the nurse determines that the patient has moderate or greater discomfort

28. A patient with persistent cancer pain has been receiving daily opioid analgesics for 2 months. Yesterday the patient was receiving morphine 200 mg/hour intravenously. Today he has been receiving 250 mg/hour
intravenously. The likelihood of the patient developing clinically significant respiratory depression in the
absence of new comorbidity is

a. less than 1%
b. 1-10%
c. 11-20%
d. 21-40%
e. > 41%

29. The most likely reason a patient with pain would request increased doses of pain medication is:

a. The patient is experiencing increased pain.
b. The patient is experiencing increased anxiety or depression.
c. The patient is requesting more staff attention.
d. The patient's requests are related to addiction.

30. Which of the following is useful for treatment of cancer pain?

a. Ibuprofen (Motrin)
b. Hydromorphone (Dilaudid)
c. Gabapentin (Neurontin)
d. All of the above

31. The most accurate judge of the intensity of the patient's pain is

a. the treating physician
b. the patient's primary nurse
c. the patient
d. the pharmacist
e. the patient's spouse or family

32. Which of the following describes the best approach for cultural considerations in caring for patients in pain:

a. There are no longer cultural influences in the U.S. due to the diversity of the population.

b. Cultural influences can be determined by an individual's ethnicity (e.g., Asians are stoic, Italians are expressive, etc).

c. Patients should be individually assessed to determine cultural influences.

d. Cultural influences can be determined by an individual's socioeconomic status (e.g., blue collar
workers report more pain than white collar workers).

33. How likely is it that patients who develop pain already have an alcohol and/or drug abuse problem?

< 1% 5 – 15% 25 - 50% 75 - 100%

34. The time to peak effect for morphine given IV is

_____a. 15 min.

_____b. 45 min.

_____c. 1 hour

_____d. 2 hours

35. The time to peak effect for morphine given orally is

_____a. 5 min.

_____b. 30 min.

_____c. 1 – 2 hours

_____d. 3 hours

36. Following abrupt discontinuation of an opioid, physical dependence is manifested by the following:

_____ a. sweating, yawning, diarrhea and agitation with patients when the opioid is abruptly discontinued

_____ b. Impaired control over drug use, compulsive use, and craving

_____ c. The need for higher doses to achieve the same effect.

_____ d. a and b

Case Studies

Two patient case studies are presented. For each patient you are asked to make decisions about pain and medication.

Directions: Please select one answer for each question.

37. Patient A: Andrew is 25 years old and this is his first day following abdominal surgery. As you enter his room, he smiles at
you and continues talking and joking with his visitor. Your assessment reveals the following information: BP = 120/80;
HR = 80; R = 18; on a scale of 0 to 10 (0 = no pain/discomfort, 10 = worst pain/discomfort) he rates his pain as 8.

A. On the patient's record you must mark his pain on the scale below. Circle the number that represents your assessment
of Andrew's pain.

0 1 2 3 4 5 6 7 8 9 1 0

B. Your assessment, above, is made two hours after he received morphine 2 mg IV. Half hourly pain ratings following the injection ranged from 6 to 8 and he had no clinically significant respiratory depression, sedation, or other untoward side effects. He has identified 2/10 as an acceptable level of pain relief. His physician's order for analgesia is "morphine IV 1-3mg q1h PRN pain relief." Check the action you will take at this time.

1. Administer no morphine at this time.
2. Administer morphine 1 mg IV now.
3. Administer morphine 2 mg IV now.
4. Administer morphine 3 mg IV now.

38. Patient B: Robert is 25 years old and this is his first day following abdominal surgery. As you enter his room, he is lying quietly in bed and grimaces as he turns in bed. Your assessment reveals the following information: BP = 120/80; HR = 80; R = 18; on a scale of 0 to 10 (0 = no pain/discomfort, 10 = worst pain/discomfort) he rates his pain as 8.

A. On the patient's record you must mark his pain on the scale below. Circle the number that represents your assessme of Robert's pain:

0 1 2 3 4 5 6 7 8 9 1 0

B. Your assessment, above, is made two hours after he received morphine 2 mg IV. Half hourly pain ratings following
the injection ranged from 6 to 8 and he had no clinically significant respiratory depression, sedation, or other untoward
side effects. He has identified 2/10 as an acceptable level of pain relief. His physician's order for analgesia is"morphine IV 1-3 mg q1h PRN pain relief." Check the action you will take at this time:

1. Administer no morphine at this time.
2. Administer morphine 1 mg IV now.

3. Administer morphine 2 mg IV now.
4. Administer morphine 3 mg IV now.

APPENDIX E

LETTER OF SUPPORT

MERCY Hospital

March 11th, 2010

Carolyn LePage, PhD, ARNP
Barry University
11300 NE 2nd Avenue
Miami Shores, Florida 33161

Dear Dr. LePage,

The purpose of this letter is to confirm that Mercy Hospital will support Mr. Paula's request for implementing a pain resource nurse program on our post-operative unit as part of his capstone project.

Final approval for the project will be granted after a full review of Mr. Paula's proposal including the nature of the project, selection of participants, data collection, confidentiality, timeframes, and any costs associated with the implementation.

Mr. Paula understands that he is expected to comply with all Mercy Hospital policies including, research in the clinical setting, corporate compliance, and HIPAA.

Mr. Paula understands that Mercy Hospital reserves the right to withdrawal their support of the project at any time before or during implementation with notice.

Sincerely,

Deborah A. Piehl, RN, MSN
Director Nursing Education
3663 South Miami Ave
Miami, Florida 33133
(305)285-2744

APPENDIX F

AUTHOR PERMISSION FOR MODIFICATION OF CURRICULUM

Description of the PRN Program Curriculum and Planning Guide

This *Curriculum and Planning Guide* is a program implementation tool-kit, designed to assist clinicians/ educators in hospital settings to coordinate and implement a Pain Resource Nurse (PRN) Program as a means of improving the quality of pain management. Although PRN Programs can be developed in a variety of settings, the focus of this *Guide* is the inpatient hospital setting.

This *Guide* contains the first comprehensive set of PRN Program educational and coordination materials designed to be used to develop PRN Programs in hospitals. They have been developed by pain management experts with PRN Program experience and are designed to facilitate the conduct of PRN Programs across the United States to promote effective organizational change to improve the quality of pain management.

This *Guide* provides an overview of the PRN Program concept as well as practical tips on how to coordinate, budget for and evaluate a PRN training course, and how to support and engage the PRNs who are trained. The *Planning and Coordination Tools* section contains templates for a PRN Program proposal, conference planning checklists, budget and planning forms, training course agendas, presenter's letter, flyers, course evaluations, documentation forms that can be used to apply for continuing education credits, and policies to define and re-privilege the PRN role.

PRN Programs need to begin by providing education in pain assessment and management for staff nurses who wish to become PRNs. The curriculum in this *Guide* includes content on the prevalence and impact of pain, basic pain physiology, assessment of pain, pharmacological and non-pharmacological treatments, methods of drug delivery, management of acute and chronic pain, as well as management of pain in patients with cancer or substance abuse. There is also information on the PRN role with a discussion of the skills necessary for PRNs to function as champions and change agents as well as a realistic description of the challenges they will face.

The course curriculum is organized into nine modules. Table 1 on page vii provides a list of the modules and their objectives. A printout of the content of each module is included in the tabbed sections in this *Guide*. We have designed the modules to be used by presenters who are on the staff of your hospital or are local or national experts. Each module includes:

- an **outline** that can serve as a participant handout and/or a reference for an application for continuing education credits
- **PowerPoint® slides** with extensive speakers' notes and references
- a **case study**, elements of which have been integrated into the PowerPoint® presentation.
- a **case narrative** which summarizes and expands on the material in the slides and notes
- **sample test questions** to help the presenter stimulate discussion or to use with an audience response system if one is available.

There is a knowledge pre/post test, which can be used as an integral part of course evaluation. It can also serve as a tool to encourage self-discovery of areas for improvement. There are additional materials to foster interactive and independent learning: an attitude

VITA

EDUCATION

Doctor of Nursing Practice, anticipated date May 2011
Barry University, Miami Shores, Florida

Master of Science in Nursing August 2003 - May 2005.
Barry University, Miami Shores, Florida
Major: Family Nurse Practitioner

Certificate in Human Resource Management, February 1996 - April 1996
Florida International University, Miami, Florida

Bachelor of Science in Nursing, August 1993 - December 1996
Florida International University

Diploma in Nursing, August 1978 - April 1981
Jackson Memorial School of Nursing
Major: Nursing

EMPLOYMENT

December 2007 to December 2009 Advanced Registered Nurse Practitioner
Acute Pain Service, Jackson Memorial Hospital, Miami, Florida

April 2006-present Clinical Practice Specialist– Emergency Room
Mercy Hospital, Miami, Florida

April 2005 to 2006 Advanced Registered Nurse Practitioner
Arrhythmia Syncope Center, Mercy Hospital

February 2002- April 2005 Emergency Department Nurse Clinician
Mercy Hospital, Miami, Florida

January 2000 – February 2002 Director, Human Resources
Mercy Hospital, Miami, Florida

April 1998 – January 2000 Manager, Organization Development
Mercy Hospital, Miami, Florida.

April 1993 – April 1998 Organization Development Specialist
Mercy Hospital, Miami, Florida

April 1991 – April 1993 Cardiac Nurse Specialist, Cardiac Rehabilitation Program
Mercy Hospital

October 1990 - March 1991 Lt. US Navy Nurse Corps
Operation Desert Shield/Storm

APR 1990 - OCT 1990 Director, Infection Control Employee Health Nurse

Harbor View Hospital, Miami, Florida

October 1989 - APR 1990 RN II Neurosurgical ICU
Jackson Memorial Hospital, Miami, Fl

July 1986 - September 1989 Lt U.S. Navy Nurse Corps
Naval Hospital Portsmouth, Virginia

May 1985 - May 1986 Head Nurse Adult Psychiatric Units
Harbor View Hospital, Miami, Fl

October 1981 - May 1985 Staff Nurse, Behavioral Health
Tallahassee Memorial Hospital, Tallahassee, Florida

April 1981 - SEP 1981 Staff Nurse Burn Center
Jackson Memorial Hospital, Miami, Fl.

TEACHING EXPERIENCE

Critical care Course for Navy Corpsmen, Portsmouth, Virginia. 1987.
HIV/AIDS and Exercise. South Florida HIV AIDS Conference. Miami, Florida. 1993.
HIV/AIDS Counseling Course For Health Care Providers. Mercy Hospital, Miami, Florida 1995-1999.
Basic Arrhythmia and 12 Lead EKG. Mercy Hospital, Miami, Florida, 1996 – 1999.
Critical Care for Nurses. Mercy Hospital, Miami, Florida1998 – 2005
Emergency Room Nursing Course, Mercy Hospital, Miami, Florida, 1999.
HIV Update for Healthcare Providers. Miami, Florida. 1994-2001.
Pharmacologic Management in Palliative Care. Jackson Memorial Hospital, 2009.

PROFESSIONAL AFFILIATIONS

- Advanced Practice Nursing Council, Southeast Florida Chapter,
- Florida Nurses Association/District 5
- Sigma Theta Tau International National Honor Society for Nursing

RESEARCH / PUBLICATIONS

- Davis, S., Paula, F. Management of accidental occupational exposures. HIV Primary Care Guide,
- 2003, 2004, 2005, 2006
- Evidenced based-review of Literature for best practice dirty wound management. Poster presentation, Florida Nurses Association 2005.

COMMUNITY SERVICE

- St John Bosco Clinic –Volunteer, ARNP Cardiology 2005 - present
- Public Speakers Bureau Dade County Public Schools for HIV/AIDS
- Speakers Bureau Archdiocese of Miami