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Nursing Knowledge and Attitudes Regarding the Pain Management of Cancer Patients

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NURSING KNOWLEDGE AND ATTITUDES REGARDING THE PAIN MANAGEMENT OF CANCER PATIENTS

BY

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ABSTRACT

The framework that guided this study was Betty Neuman’s Systems Model (1995), The Gate Control Theory (1965), and Malcolm Knowles’ Principles of Andragogy (1998). The pathophysiology of pain and the pharmacological treatment of pain were also used to guide this study. This non-experimental/comparative study utilized a repeated measures design and retrospective, as well as, cross-sectional data to investigate the effectiveness of an educational intervention designed to increase nursing knowledge/attitudes regarding cancer pain management.

The overall findings of this study, following the educational intervention, indicate that there was an increase in the nursing knowledge/attitudes. While the study did not show an increase in the total number of nursing documentations post-educational intervention, they were of statistical and practical importance. These study results are also of clinical importance. When examining the educational intervention there was an increase in pre- and post-intervention scores from 75.56% to 84.54%, with an exact $p=.003$, Wilcoxon Signed Ranks Test. The alpha set for this study was $\alpha = .10$.

This study also provided relevant information regarding the oncology nurses’ characteristics and patient demographics. Of the nurses in this study, 50% were greater than 41 years of age. The nurses in the 21-30 age group increased their scores from 69% to 95%, which was the greatest increase in score from the various ages. The patients’ admitting diagnoses were lung cancer, breast cancer, and colon cancer, which are found in the literature as the most common cancer diagnoses for men and women.
CHAPTER 1
INTRODUCTION

At present, one in four deaths is caused by cancer and it is estimated that there will be about 1.4 million new cases diagnosed this year, excluding superficial skin cancers and in situ cancers (American Cancer Society, 2005). Surveillance data and survey data on the incidence and prevalence and of cancer and cancer-related pain indicate that a majority of patients experience pain at one time or another during the course of treatment and that cancer pain impairs quality of life and functionality (Agency for Healthcare Research and Quality, 2002). Pain is experienced by 30% to 50% of cancer patients receiving treatment and by 70% to 90% of patients with metastatic or advanced disease. Estimates of the incidence of pain in hospitalized cancer patients have been reported as high as 90% (Sternman, Gauker, & Krieger, 2003).

Cancer pain management is complicated and requires assessment, reassessment, and constant vigilance by health care providers. Similarly, many barriers to successful pain management have been identified. Some identified health care barriers include: inadequate pain assessment by nurses, undertreatment of pain with analgesics, inadequate knowledge of nurses regarding pain management and pain medications, nurses’ fear of oversedating patients, which could produce respiratory suppression, nurses inadequate knowledge of non-pharmacological interventions for pain, and the perceptual differences of pain between patients and health care providers (Mcguire & Sheidler, 1997).

Statement of the Problem

According to The Agency for Health Care Policy and Research, (2002); The Joint Commission in Accreditation of Healthcare Organizations (1999) and the Oncology Nursing Society (2004), patients’ pain management is being inadequately managed and documented by nurses across the country. Inadequate pain management has serious consequences for the patient, physician, nurse, and the health care system. Undertreatment of pain in the health care system is at all levels: physician offices,
hospitals, and long term care facilities. The results are often needless suffering for patients, complications that can cause further injury or death, and added cost to the healthcare system (Furrow, 2002). The societal cost of pain is enormous; pain is responsible for up to 80% of all doctor visits and accounts for at least $1 billion annually. The costs arise from emergency room visits, healthcare provider visits, and increased hospital lengths of stay (Li, 2002). Therefore, proper management of patients with pain is essential for controlling cost and alleviating patient suffering. The failure to manage pain by healthcare providers, either physicians or nurses is considered professional negligence (Furrow, 2002). It is the nurses’ moral, ethical, professional, and legal obligation to assess the patients’ pain and to intervene and relieve pain and suffering with appropriate interventions. Pain documentation includes: the patient’s pain intensity ratings and comfort goal, interventions, and the patient’s response to the interventions, and, according to Cohen, Easley, Hughes, Owenby, Rashad, Rude, et al. 2003, nurses are not documenting the pain management care that they provide in a manner consistent with organizational and regulatory standards. Pain documentation is crucial to pain management. The old adage “not documented, not done”, is particularly true in a litigious situation. Communication from one healthcare provider to another regarding patient care is mandated by professional and regulatory organizations and agencies including JCAHO, American Nurses Association, and Oncology Nursing Society (JCAHO, 2000; ANA, 2003; ONS, 2004).

Pain is a prevalent problem for the majority of those hospitalized for cancer and patients’ satisfaction with their pain management can improve when patients feel that their pain needs are being addressed (Sternman, Gauker, & Krieger, 2003). The Oncology Nursing Society’s (ONS) position on cancer pain makes it clear that all people have the right to optimal pain relief, which includes culturally relevant and sensitive pain education, assessment, and management (Oncology Nursing Society, 2004). In addition, The Joint Commission on Accreditation of Healthcare Organizations (JCAHO, 2000) standard asserts that patients have the right to appropriate assessment and management of pain, and that it is the staff’s responsibility to respect and support each patient’s right to pain management.
Pain is one of the most feared sequelae for patients and their families. Whether the pain is a result of cancer or cancer-related treatment, it causes considerable physical and psychosocial burdens. Pain is a personal experience that impacts the quality of life, increases vulnerability in an already vulnerable population, and promotes dependence on health care providers for access to adequate pain management (Oncology Nursing Society, 2004). The literature reviewed thus far indicates an overall problem with nursing pain management and documentation and it also identifies some general barriers to nursing pain management and documentation. However, the available literature regarding nursing knowledge and attitudes toward pain management and documentation is insufficient to be conclusive.

**Significance of the Problem**

Nurses are required by the JCAHO (1999) standards and by individual organizational policy to assess pain on initial contact, or admission, and to reassess at regular intervals. Nurses are to intervene, as indicated by the patient’s self-reported pain rate and their personal pain goal. When pain is not adequately alleviated, the patient suffers needlessly. But there are also other considerations. For example, the patient cannot heal so quickly or return to his/hers normal activities of daily living if he/she is having unrelieved pain. This will lead to longer hospitalization lengths of stay and increased cost of care (McGuire & Scheidler, 1997).

In assisting patients, physicians, nurses, and nursing directors with pain management and documentation issues, the advanced practice nurse (APN) is an asset. An APN, such as a clinical nurse specialist (CNS), is a master’s prepared registered nurse who has expert knowledge and skill in caring for a population of patients within a given specialty (Galassi, 1997). The CNS role has four functional components including clinical practice, education, consultation, and research. In addition to the core roles, the CNS functions as a leader on the unit and serves as a change agent for the health care organization. The Oncology, or Pain, CNS, as a care provider, will be able to assess patients and assist the physicians and nurses with appropriate pain management. As an educator, the CNS will be able to educate nurses, physicians, and patients about pain, pain management, and documentation. In addition the CNS can assist in the development of unit and organizational-based policy, and procedures that will assist with the
improvement of pain management and documentation. As a consultant, the CNS can offer his/her expertise to any staff, ancillary staff, other areas of the organization, and/or community to assess patients or situations, to educate, and to promote health initiatives. Finally in the area of research, the CNS has the ability to bring research to the practice level and assist nurses with incorporating research into daily practice. The CNS can also conduct, evaluate, and utilize research to improve patient care on the unit by identifying best practice guidelines, clinical pathways, and evidence–based protocols. Having a CNS on the nursing units is an invaluable asset to patient care. Advanced practice nurses make important contributions to oncology care, and studies have shown that the APNs improve patient outcomes and deliver cost-effective, quality care with a high degree of patient satisfaction (Galassi, 1997).

**Purpose**

The purposes of this non-experimental/comparative study are multiple:

1. to assess the current knowledge and attitudes of nurses within the target population;
2. to provide empirical evidence of nurses’ assessment and documentation behaviors prior to an intervention designed to address real and potential knowledge and attitude deficits;
3. to assess the effectiveness of the intervention in terms of changes in knowledge and frequency of documentations; and finally,
4. to provide evidence of personal and systematic barriers to effective pain management.

It is anticipated that the outcomes of this study will add to the body of literature concerning the pain management knowledge, attitudes, and assessment/documentation behaviors of nurses. It is also anticipated that the present inquiry will provide evidence of the effectiveness of an educational intervention designed to improve nurses’ management and documentation of patients’ pain.

**Research Questions**

To accomplish the objectives of this study the following research questions will be addressed empirically:
1. What is the current level of pain management knowledge and attitudes among the oncology nurses?
2. To what extent are nurses meeting, or exceeding, the pain comfort goals of cancer patients?
3. What is the effectiveness of a pain management educational intervention designed to improve oncology nurses’ knowledge, pain assessments and documentation?
4. What are the barriers to acceptable pain management and documentation that are identified by the oncology nurses?

**Hypotheses**

Research questions one and two and four are descriptive in nature and therefore no hypotheses will be posed. Research question three is inferential and it is hypothesized that the educational intervention will improve the nurses’ knowledge and attitudes regarding cancer pain management. It is also hypothesized that the intervention will have a positive effect on the documentation behaviors of oncology nurses.

**Operational Definitions**

Operational definitions explain how the variables under investigation are observed and measured within a study (Polit & Hungler, 1999). For the purposes of this study, the following operational definitions will be utilized.

*Pain Intensity Rating* - A numerical rating index ranging from 0 to 10, with 0 being no pain, 1-3 being mild pain, 4-6 being moderate pain, and 7-9 being severe pain, with 10 being the “worst pain imaginable” (Clearly, 2000), as measured by the nurses documentation on the 24-Hour Patient Care Flowsheet.

*Patients’ Comfort Goal* - The level of pain described by the patient, measured on a numerical rating index, deemed acceptable to them for them to function as measured by the nurses’ documentation on the Adult Functional Health History.

*Pain Intensity Difference* - The difference between the patients’ comfort goals and their self-reported pain intensity rating as determined by subtracting the comfort goal from the pain intensity rating on the reassessments, during the last 24 hours of admission. This may be a positive number if the pain intensity rating is greater than their comfort goal. This is unrelieved pain. A negative number would occur if the comfort goals were greater than their pain intensity ratings on reassessment, which would indicate pain relief.
Admission Pain Assessment - The first reported pain intensity rating and comfort goal as measured by the nurses’ documentation on the Adult Functional Health History.

Pain Reassessment - Patients’ self-reported pain intensity rating routinely assessed at least every 4 hours during the last 24 hours of the hospitalization.

Pain Management Knowledge and Attitudes - The knowledge and attitudes of oncology nurses regarding pain management based on the Nurses’ Knowledge and Attitudes Survey Regarding Pain (NKAS) as detailed in Appendix A. This survey will be scored by individual percentages of correctly answered questions.

Nursing Characteristics – Demographic and work-related descriptions of the attending oncology nurses as documented on the Pain Management Nursing Assessment Survey (PMNAS), as detailed in Appendix B.

Patient Characteristics - Demographic and pain-related descriptions of the patients as to their documented comfort goals, pain intensity ratings, and length of stay (LOS), as documented on the Patient Data Collection Tool (PDCT), as detailed in Appendix C.

Educational Intervention - An educational pain management in-service developed by the researcher. The pain management in-service will be based on the information gathered from the PMNAS and NKAS. The intervention will be conducted by the researcher using lecture, audio visual materials, as well as, handouts. It will be presented twice daily over a period of a week, to accommodate all shifts.

Pain Management Educational Intervention Effectiveness - This variable will be operationalized using the scores on the NKAS. There should be an increase in the percentage of correctly answered questions after the educational intervention.

Pain Assessment Documentation - Is the documentation of the oncology nurses on the patient’s medical records regarding pain management, as measured in 100 charts selected from 60 days prior to the pain management intervention and 30 days post-educational intervention. This variable will be operationalized using the PDCT to compare 60 days pre and 30 days post-educational intervention patient pain intensity rating scores.

Barriers - Are the barriers identified by the oncology nurses based on information gathered on the PNMAS.
Theoretical Framework

To provide a framework to guide the research process, a combination was created of Betty Neuman’s Systems Model (1995) and the Gate Control Theory of Pain, pathophysiology of pain and Malcolm Knowles’ Theory of Adult Learning. Neuman’s model is used to identify stressors that impact the person at the lines of resistance and defense and fortify the lines of resistance with adequate pain management. The Gate Control Theory of pain validates the patients’ perception of pain upon which the nurses base the appropriate pain management interventions. The pathophysiology of pain provides the basis for selecting and determining the effectiveness of pain management interventions. Malcolm Knowles Adult Learner theory will guide the nursing educational intervention, as well as, to make the nurses aware of adult learning theory so that they may better educate their patients about pain and pain management.

The Neuman Systems Model

Betty Neuman’s Systems Model (1995) addresses physiological, psychological, sociocultural, developmental, and spiritual aspects of the person as he/she interacts with internal and external environmental stressors. The individual is viewed as an open system composed of a core and surrounding protective rings. The core is the person’s basic survival factors. Examples of these core factors include the ability to regulate body temperature, genetic structure, and organ strength or weakness. According to Neuman, an adaptational level of health for a person is developed over time. She refers to this as the normal line of defense (Sohier, 1997). Factors, for this study, that may influence the patient’s normal line of defense include: physiological response to pain, psychological response to pain, changes in the person’s sociocultural norms as a result of cancer or cancer-related pain, developmental facets of how a person copes with cancer and cancer-pain, and spiritual aspects that are affected by illness and pain.

The mechanism that protects the individual’s stability when faced with a stressor is the flexible line of defense. The flexible line of defense, a cushioning mechanism, protects the normal line of defense from penetration by stressors. The greater the stressor, the less cushion is provided, as the flexible lines of defense are drawn closer to the normal line of defense. Lines of resistance are internal factors that protect the core from stressors that penetrate the normal line of defense. The lines of resistance ideally
decrease stressor reaction, increase patient resistance, and allow the patient to reconstitute or return to some level of wellness and stability (Sohier, 1997). The cancer diagnosis and pain often breach the lines of resistance and affect patients at their core. Therefore, it is the nurses’ responsibility to assess the patient holistically to determine the factors that are threatening the patient’s stability, such as pain, and intervene appropriately.

**Gate Control Theory**

Cancer pain can have various causes ranging from direct tumor invasion, metastasis, and other disease processes to pain that is not related to the cancer diagnosis. Direct tumor involvement is the most common cause of cancer pain, representing about two-thirds of cancer pain (Cleary, 2000). The Gate Control Theory (Melzack & Wall, 1965) is the most comprehensive theory of pain yet proposed and serves an extremely useful purpose in explaining pain mechanisms. In 1965, Melzack and Wall viewed pain as a category of experiences, signifying a multitude of different and unique experiences, having different causes, and characterized by different qualities varying along a number of sensory and affective dimensions (McGuire & Sheidler, 1997).

According to The Gate Control Theory, nociceptive impulses are transmitted from specialized skin receptors to the spinal cord through small A and larger C fibers. These fibers terminate in the substantia gelatinosa, in the dorsal horn of the spinal cord. Cells in the substantia gelatinosa function as a gate, regulating transmission of impulses to the central nervous system. Stimulation of larger fibers causes the cells in the substantia gelatinosa to “close the gate”. A closed gate decreases stimulation of trigger cells, decreases transmission impulses, and diminishes pain perception. Persistent stimulation of the large fibers, however, allows adaptation. When adaptation occurs, the result is a relative increase in small neuron activity. Adaptation to larger fibers may, as a result, “open the gate”. Small fiber input inhibits cells in the substantia gelatinosa and opens the gate. An open gate increases the stimulation of trigger cells, increases transmission of impulses, and enhances pain perception. In addition to gate control through large and small fiber stimulation, the central nervous system, through efferent pathways may close, partially close, or open the gate. As a result, cognitive functioning may modulate pain perception. Interaction of the cognitive /evaluative, motivational / affective, and sensory / discriminative systems determines the individual’s response to pain (Melzak, 1975).
Therefore, the nurse assesses the patient’s pain intensity rating as stated by the patient without personal evaluations, and provides the appropriate intervention. Pain is what the patient says that it is (JCAHO, 2000; ONS, 2004; AHCPR, 1994).

_Pain Pathophysiology_

Historically pain has been a phenomenon that has not been easy to describe, because of its subjective nature. There is no definitive way to distinguish pain occurring in the absence of tissue damage from pain resulting from tissue damaged. Studies show that when pain is measured from the pathophysiological and biochemical processes that cause it, pain experienced by patients with cancer is no different from that of patients without cancer. Etiologic, clinical, and psychosocial characteristics of both tumor and treatment-related cancer pain, distinguish it from other types of pain (McGuire & Sheidler, 1997). Cancer patients can have both acute and chronic pain. Cancer pain can have various causes ranging from direct tumor invasion, metastasis, and other disease processes to pain that is not related to the cancer diagnosis. There are four identified types of cancer pain (Foley & Sunderson, 1985). The first is acute pain, which is divided into two sub-categories: tumor associated pain and pain associated with cancer therapy. The second category of cancer-related pain is chronic pain. This is also sub-divided into two categories. The first is chronic cancer-related pain that is associated with disease progression, or a cancer pain syndrome, of which the pain lasts longer than 6 months. The second category of chronic pain is associated with cancer therapy; for example, the amputation of a limb where nerves were severed during the surgery (Foley & Sunderson, 1985).

The pathophysiology of cancer pain includes a series of neuropathic and neuropharmacologic changes that occur initially in the peripheral nervous system and produce secondary changes in the central nervous system, thereby altering normal pain modulation.

According to Foley & Sunderson (1985), these include the following:

1. Activation and sensitization of nociceptors and mechanoreceptors in the periphery by mechanical (tumor compression or infiltration) and chemical (epinephrine, serotonin, bradykinin, prostaglandins, histamine) stimuli, for example, tumor invasion of the bone.
2. Mechanical and chemical nerve injury leading to the generation of abnormal afferent impulses, such as tumor invasion of peripheral nerve.

3. Development of deafferentation pain states from a lack of balance between excitatory and inhibitory components of the peripheral nerve, leading to central and neuronal hyperactivity, such as traumatic neuromas in postmastectomy pain and brachial plexopathy pain.

5. Alterations in the autonomic nervous system with sensitization of perivascular receptors and local venous stasis and edema.

Pain receptors in the skin, nociceptors, identify the painful stimulus and substance P, neurokinin A are released into the tissue surrounding the injury causing inflammation and an increased pain sensation. The painful sensation is transmitted to the spine, where the gates are either opened or closed, depending upon the chemicals that are released in the Substantial Galantines. When the nurse administers an opined, the transmission of the painful stimuli is interrupted, thereby causing a decreased sensation of pain. The pain is relieved and then the nurses can determine the effectiveness of the medication and repeat the administration of the drug as often as ordered.

Malcolm Knowles: Adult Learner Theory

An educational intervention will be provided to the nurses that will enhance their ability to assess and respond to the patient’s pain intensity rating. Careful attention will be given to ensure that the educational intervention utilizes the learning concepts described by Malcolm Knowles. According to Knowles (1980), an andragogical approach should be utilized when educating the adult learner. When utilizing this approach, there are some assumptions that must be made about the adult learners: (a) they are self-directed; (b) they can utilize life experiences as a resource for learning; (c) they must perceive a need to know; and (d) they are problem-centered and interested in immediate application of knowledge (Knowles, 1998).

Knowles (1998) described the assumptions of the andragogical approach to adult education. Adults need to know why they need to learn something before they take the time to learn it. Adult learners have a self-concept of being independent-learners, and are responsible for their own decisions. They resent situations in which they feel others
are imposing their will upon them. Adults bring to an educational session life experiences that inhibit or enhance their learning experience. Adults become ready to learn those concepts that the feel they must know in order to fulfill their role in society. Adults are life-centered, task-centered, and/or problem-centered in their orientation to learning. Adults are motivated to learn when it will help them perform tasks or deal with problems in real life situations. Adult learners are more typically internally motivated than externally motivated.

For this study the researcher will attempt to enhance the participants’ awareness of the “need to know” about pain management and documentation in an educational program. Every nurse will be given an invitational letter to participate in the program. In the invitation, the program will be outlined as to purpose and content, as well as risk and benefits to the participants. The educator is assuming that the participants are motivated to learn by their voluntary presence at the educational program.

*Combined Model*

The educational program will contain an explanation of how the patients perceive pain, physiologically as well as psychologically. The educational program will also include pain pathophysiology and the factors that modulate pain, which is the basis of the gate control theory. Under-treated pain affects all aspects of the patients’ lives. Patients in pain cannot manage their daily activities, heal properly, or have a good quality of life.

Figure 1 depicts the Neuman’s Systems model and indicates the stressors that affect patients. It also shows a representation of interventions that may alleviate some of the ill effects of the stressors. Primary, secondary, tertiary preventions are performed by the nurse and/or the patient to reduce or eliminate the contact with, or effects, of stressors on the patients’ well being across the continuum of care. These actions may be innate, but are more usually learned. Stressors can affect the patient on three levels; intrapersonal, interpersonal, and extrapersonal. Additionally, stressors can affect the patient at any level in defenses, even to the core. There are many variables that affect the degree to which the patient reacts to the stressors. The effect of the stressors is dependent upon the patients’ basic core defenses, natural and learned resistances to the stressors, and time of encounter to the stressors. Interventions are the nursing and patient actions that reduce or eliminate the effects of the stressors on the patients’ well being.
Interventions strengthen the flexible line of defense and reinforce the lines of resistance and, thereby, decrease the degree of reaction to the stressors. At the primary and tertiary interventional level is where Malcolm Knowles’ Theory will be applied. Pain can damage the core of the patient making healing harder to attain. By providing appropriate pain education to the nurses, they can in turn, educate the patients more effectively. This secondary intervention of administering pain medications as well as, educating the patient about their pain and pain management acts to prevent further core damage. Over time with tertiary interventions, the core may be restored and the degree of reaction moved back to the lines of resistance. This could lead to the reduction of pain in cancer patients across the continuum of care. See Figure 1, The Model for Pain Management.

Figure 2 depicts the pain perception at the cellular level. The core is the basic constitution of the patient. This is the cellular level at which pain is sensed and responded to. The portions of pain that are responsible for the sensation and perception of pain are divided into 3 areas: afferent pathways, efferent pathways, and the central nervous system. The pain response begins at the time of injury and results in the release of prostaglandins (PEG 2 and PGI 1), bradykinins, and histamine, in the tissue, which leads to inflammation and a spread of the pain sensation. Nociceptors, pain receptors, at the distal end of the large and small fibers in the afferent pathways sense the painful stimuli and transmit the pain impulses into the Substantia Gelatinosa, in the dorsal horn of the spine, the gate control system, which regulates the transmission of pain impulses. A closed gate (-), inhibits the impulses and decreases the pain sensation. Endorphins are a family of neuropeptides that inhibit transmission of pain impulses. All endorphins act by attaching to opiate receptors on the plasma membrane of the afferent neuron. The open gate (+) increases the transmission of impulses and enhances the pain perception. From there the impulse is carried through the spinothalamic tract that carries the information to the brain. The 2 divisions of the spinothalamic tract are the neospinothalamic tract (acute pain) and the paleospinothalamic tract (dull and burning pain). The neospinothalamic tract carries the information to the midbrain (where pain is perceived) and the cortex. The paleospinothalamic tract carries the information to the reticular formation, pons, limbic system, and midbrain.
Figure 1. Model for Pain Management. Primary, Secondary, Tertiary are interventions performed by the nurse and/or the patient to reduce or eliminate the contact with or effects of stressors on the patients' well being across the continuum of care. Stressors can affect the patient on three levels; intrapersonal, interpersonal, and extra personal. The blue lines identify prevention interactions. Additionally, stressors, indicated by black lines, can affect the patient at any level in defenses, even to the core. There are many variables that affect the degree to which the patient reacts to the stressors. The effect of the stressors is dependent upon the patients' basic core defenses, natural and learned resistances to the stressors, and time of encounter to the stressors. Interventions are the nursing and patient actions that reduce or eliminate the affects of the stressors on the patients' well being. Interventions strengthen the flexible line of defense and reinforce the lines of resistance and, thereby, decrease the degree of reaction to the stressors. The solid lines with arrows show the directional relationship between the stressors and the lines of defense and resistance, the red lines indicating the directional relationships of interventions to the patient. Knowles is incorporated at the primary and tertiary levels when nurses and patients are being educated.
The efferent pathways are responsible for modulation or inhibition of the afferent pain signal. Efferent neuron located in the periaqueductal gray (PAG)(gray matter surrounding the cerebral aqueduct) in the midbrain. The efferent pathways for synapses with structures in the medulla that inhibit pain. Then a cognitive evaluation of the impulse is made, then acted upon by the motivational-affective, sensory-discriminative action system and motor mechanism is completed (McCance, 1994).

*Figure 2.* Model for Pain Management Core Level. The core is the basic constitution of the patient. It is the cellular level at which pain is sensed and responded to. The pain response begins at the nociceptors as an impulse, that travel through the small and large fibers into the Substantia Gelatinosa the gate control system, which regulate the transmission of pain impulses. A closed gate (-), inhibits the impulses and decreases the pain sensation. The open gate (+) increases the transmission of impulses and enhances the pain perception Afferent pathways (blue lines) carry the pain impulse to the brain, where a cognitive evaluation of the impulse is made, then acted upon by the motivational-affective, sensory-discriminative action system and motor mechanism is completed. The efferent pathway (red lines) transmits the information back to the spinal cord to the dorsal horn, and the afferent pathways are the blue lines.
Assumptions

Assumptions are the basic main beliefs that are believed true by the researcher (Polit & Hungler). The following are the assumptions made by the researcher during this study:

1. Patients are truthfully and accurately reporting their pain intensity ratings and comfort goals.
2. Nurses are completing the NKAS instrument truthfully.
3. Assessments and assessment documentations are “typical and not influenced by the nurses’ participation in the study (Hawthorne Effect).

Limitations

The following limitations may influence this study:

1. This study does not address whether the prescribed pharmacological interventions are appropriate for the patients’ pain intensity ratings, or whether nurses’ request from the physician a change in the prescription was done.
2. Since no concurrent observations will be done, all data collected are dependent upon the documentation in the patients’ medical records. There will be no way to evaluate any of the nursing assessments or interventions which have not been documented.
3. The study findings cannot be generalized beyond the restricted setting described for this study.

Summary

Studies show that greater than 90% of hospitalized cancer patients experience pain (Cleary, 2000; Cohen, Easley, Ellis, Hughes, Ownby, Rashad, et al., 2003; Sternman, Gauker, & Krieger, 2003). As pain is such a common symptom with a significant impact on patients’ quality of life, it would seem that nurses would be able to accomplish adequate pain management and assessments for the majority of their cancer patients; however, this is not the case (Agency for Healthcare Research and Quality, 2002; Joint Commission on Accreditation of Healthcare Organizations, 2000; Oncology Nursing Society, 2004). In addition to the inadequate pain management there are the serious consequences for the patient, physician, nurse, and the organization (Furrow, 2002; Li, 2002; ONS 2004)). The patient suffers needlessly; there are delays in wound
healing; and there are increased hospital lengths of stay (McGuire & Schindler, 1997).
The physicians and nurses have to identify barriers to adequate pain management and
documentation and overcome them. Hospitals, healthcare facilities, and regulating
agencies also need to identify their obstacles and put plans into place to assist staff,
physicians and nurses to meet their patients’ needs and expectations, JCAHO standards,
and professional organizations guidelines and mandates (ONS 2004).

The predominant theory that binds the conceptual framework together is
Neuman’s Systems Model. Pain Pathophysiology, Gate Control Theory, and Malcolm
Knowles Theory are melded into a working model of pain management, with the patient
at the center of care to guide this study. The purposes of this non-
experimental/comparative study are multiple. Initially the assessment of the current
knowledge of the nurses within the target population will be done. Next empirical
evidence will be provided of nurses’ assessment and documentation behaviors prior to an
intervention designed to address real and potential knowledge and attitude deficits. Then
the assessment of the effectiveness of the intervention in terms of changes in knowledge
and frequency of documentations will be done and finally, evidence will be provided of
personal and systematic barriers to effective pain management. A comprehensive review
of the literature will be presented in Chapter 2.
CHAPTER 2
REVIEW OF THE LITERATURE

The documentation of pain before and after an educational intervention with the nurses on an inpatient oncology unit is a focus of this study. Another focus is on the knowledge and attitudes of the nurses and exploring the relationship between these attributes and the nurses’ documentation behaviors. Support from the literature for such a study will be presented in the areas of: (a) documentation of pain assessments, comfort goals, and reassessments; (b) staff education, and (c) barriers to pain management by healthcare providers and patients. Additionally, there will be support for the use of Neuman’s Systems Model, Malcolm Knowles’ Adult Learning Theory, pain physiology and Gate Control Theory, as a conceptual framework. A theoretical and empirical review of each topic will be separately presented in the chapter.

Theoretical Review

Conceptual Framework

Betty Neuman’s Systems Theory. The intent of Neuman’s systems model is to provide a structure that depicts the parts and subparts and their interrelationship for a wholistic view of the patient, as a complete system (Neuman & Fawcett, 2002). Neumans’ Systems theory of nursing includes the following concepts: (a) wholistic client approach; (b) an open system; and (c) stressors. Patients are viewed as wholes whose parts are in dynamic interactions. The patients are open systems that have a continuous interaction with the environment, other people, and within themselves. The main components of the model are organized by the nursing metaparadigm concepts which include the person, the environment, the person’s health and nursing (Neuman & Fawcett, 2002). These interactions between the components can cause stress to the patient on several levels. The degree of the patient’s reaction to the stressors depends upon the basic structure, or core, of the patient, the natural and learned resistances, as
well as, the time of encounter with the stressor (Freese, Beckman, Boxley-Harges, Bruick-Sorge, Harris, Hermiz, Meininger, & Steinkeler).

This model is concerned with the stressors that disrupt stability of the system. The stressor is identified as a possible risk to the body’s flexible and normal lines of defense (Fawcett & Neuman, 2002). The individual’s degree of reaction to the stressor is dependent upon the time of occurrence of the stressor, the present and past condition of the individual, the nature and intensity of the stressor, and the amount of energy required by the individual to adapt to the stressor. Stressors may be intra-, inter-, and extra personal (Neuman, 1995). These stressors, in regards to this study, are discussed in the following paragraphs.

Neuman (1995) defined intrapersonal stressors as internal environmental forces occurring within the boundary of the client. Examples of intrapersonal stressors are conditioned responses and autoimmune responses, and the pain response. Examples of intrapersonal factors, which influence the pain response of the patients, may include: the diagnosis of cancer, unmanaged pain, spiritual distress, altered body image and sexuality, as well as, factors such as age and gender.

Interpersonal stressors are external environmental interaction forces occurring outside the boundaries of the client at proximal range, between one or more individuals (Fawcett & Neuman, 2002). Interpersonal stressors may include a change in role expectations, or role conflict related to treatments, procedures, or surgery. Alterations in daily living by the cancer treatment can cause the patient to have increased stress which can lead to an increase in the patient’s pain intensity rating.

Extrapersonal factors are external environmental interaction forces occurring outside the boundaries of the client at distal range (Neuman, 1995). Frequent hospitalizations, LOS, and physician visits are examples of extrapersonal stressors. The LOS will be addressed in this study.

The goal of nursing care, in this model, is the promotion of optimal wellness of the individual through maintenance, or attainment, of system stability by strengthening the lines of resistance. This goal is accomplished through intervention at the three levels of prevention (Sohier, 1997). For this study, the first level of intervention is the primary level where the nurses can strengthen the flexible line of defense by reducing the
patients’ exposure to pain and painful stimuli. The secondary level of intervention is the early and accurate pain assessments by the oncology nurses. Also at the second level of intervention is the education of the nurses, which if their knowledge and attitudes improve regarding pain management, then the patient should receive better pain management. Secondary interventions reduce exposure time to the stressor and strengthen the lines of resistance. If the core has been penetrated the interventions may reduce the damage or restore the integrity of the core. Finally at the tertiary level of interventions is the need for ongoing reassessments and re-education if necessary. This will lead to appropriate interventions such as: routine re-assessments, pharmacological and non-pharmacological interventions, as well as patient education. These interventions will also reinforce the lines of resistance. This will be discussed in more detail in the following paragraphs.

Neuman (1995) described primary prevention as an intervention before a reaction occurs. This type of intervention may begin when a risk factor or potential stressor is suspected or identified. Primary prevention promotes wellness by protecting the normal lines of defense. This is done by reducing the likelihood of an individual’s encounter with stressors and by strengthening flexible lines of defense (Sohier, 1997). In the hospital setting, when a member of the health care team identifies a risk factor for a stressor that will increase pain, primary prevention interventions may be initiated. Primary prevention, such as the prophylactic administration of a pain medication prior to a treatment or procedure that may cause pain or increase pain intensity ratings, may allow the person to alleviate or decrease his/her pain intensity rate, thereby maintaining system stability. Primary prevention will not be measured in this study, but may have bearing on the patients’ pain intensity ratings and comfort goals.

Secondary prevention is aimed at the treatment of existing symptoms. Its focus is on the strengthening of internal lines of defense to reduce the degree of reaction, promote reconstitution, and prevent death (Sohier, 1997). An example of a secondary prevention intervention is the administration of pain medication to the patient following a self-reported pain rating above his/her comfort goal in order to assist the patient’s return to stability. The patients’ pain intensity ratings and comfort goals will be collected on the Patient Data Collection tool and analyzed for this study.
Tertiary prevention focuses on readjustment toward optimal system stability. The primary goal is to strengthen resistance by reducing the exposure to stressors in order to prevent recurrence of a reaction (Neuman, 1995). An example of a tertiary prevention is the maintenance of pain intensity ratings at or below the patient’s comfort goal. This can be achieved by educating the patients regarding the cause of their pain and the medication and/or other interventions that will keep their pain intensity rate at, or below, their comfort goal. Neuman views health on a continuum of wellness to illness that is dynamic in nature and constantly subject to change. The ultimate goal of Neuman’s System Model is to return the individual to his/her optimal system stability. System stability, for this study, will be achieved if the patients reach their comfort goals, through timely nursing assessment, intervention, and reassessment.

Pain pathophysiology. The portions of the nervous system responsible for the sensation and perception of pain may be divided into three areas: afferent pathways, central nervous system, and efferent pathways. The afferent portion of the system is composed of nociceptors in the tissue. Nociceptors are specialized terminal branches of sensory nerve fibers that are sensitive to noxious stimuli (Regan & Peng, 2000). Afferent pathways end in the dorsal horn of the spinal cord, which contains the substantia gelatinosa at the tip of the dorsal horn and layers of ganglia called laminae. Both incoming and descending stimuli modulate pain patterns in the dorsal horn. The portions of the central nervous system involved in the interpretation of pain signals are the limbic system, reticular formation, thalamus, hypothalamus, medulla and cortex. The various regions of the brain that modulate spinal pain transmission are complex and integrated. The efferent pathways composed of the fibers connecting the reticular formation, midbrain, and substantia gelatinosa, are responsible for modulating pain sensation (Ludwig, Huether, & Schoessler, 1994).

The pathophysiology of cancer pain includes a series of neurophysiologic and neuropharmacologic changes that occur initially in the peripheral nervous system and produces secondary changes in the central nervous system. Neuromodulators of pain are found in the pathways that mediate information about painful stimuli; including the periphery; ascending and descending spinal tracts; the cortex; and the gastrointestinal tract. Tissue injury results in the release of prostaglandins (PEG 2 and PGI 1),
bradykinins, and histamine which depolarizes adjacent nociceptors causing pain. Lymphokines released from lymphocytes in chronic inflammatory lesions may contribute to some kinds of chronic pain. Substance P, neurokinin A, and calcitonin-gene-related peptide are released from peripheral pain receptors and promote the spread of pain locally. Norepinephrine and 5-hydroxytryptamine contribute to pain inhibition in the medulla and pons. Substance P and other neurotransmitters contribute to the modulation of pain in both the afferent and efferent fibers of the spinal cord (Ludwig, Huether, & Schoessler, 1994).

Endorphins, endogenous morphines, are a family of neuropeptides that inhibit transmission of painful stimuli in the brain and spinal cord. There are three classifications of endorphins: β-lipotrophin, enkephalin, and dynorphin. β-lipotrophin (β-, y- α- endorphin) is a powerful endorphin located in the hypothalamus and the pituitary gland. Enkephalin is found in the neurons of the brain and spinal cord. It is a weaker analgesic than other endorphins but more potent and longer lasting than morphine. Dynorphin is 50 times more potent than β-lipotrophin and is thought to originate in the neural lobe of the pituitary. All endorphins act by attaching to opiate receptors on the plasma membrane of the afferent neuron. It is the combination of the opiate receptor and the endorphins that inhibit the release of excitatory neurotransmitters, i.e., substance P, thus blocking the transmission of painful stimulus (Ludwig, Huether, & Schoessler, 1994).

Pain is classified into two categories, acute and chronic. Acute pain usually has a more rapid onset and of a short duration. This pain is described as somatic, visceral and referred. Somatic pain is superficial and is usually described as sharp or dull, aching, and poorly localized. Visceral pain is internal pain of the organs, abdomen or bones and referred pain is pain that is present in an area that is removed from the point of origin (Ludwig, Huether, & Schoessler, 1994).

Acute pain is responded to by multiple responses. There are physiologic, psychological, and behavioral responses to pain. Physiologic responses include: increased heart rate, pallor or flushing, dilated pupils, diaphoresis and sometimes nausea. Psychological and behavioral responses can include the following: fear, anxiety,
withdrawn or over-excitability, and a general sense of unease. The stress of fear may contribute to physiologic signs of pain (McGuire & Sheidler, 1997).

Chronic pain is prolonged pain, longer than 6 months and is responded to differently than acute pain. Physiologic responses to chronic pain are adaptive and the patients may have normal heart rates and blood pressures. Psychological and behavioral responses to chronic pain are more significant than those of acute pain. Individuals with chronic pain may have depression and difficulty sleeping, eating, and may become preoccupied with their pain. They may have a fear of being labeled as a complainer, or an addict (McGuire & Sheidler, 1997).

Cancer pain syndromes can be classified into three categories: somatic, visceral, or neuropathic. A review by Regan and Peng, 2000, stated that research has greatly added to the body of knowledge of pain mechanisms and treatment for pain syndromes. The methods used in this review involved reviewing the three major syndromes and therapeutic options. Advances in knowledge in neurophysiology, neuroanatomy, and pharmacology have allowed a greater understanding of the peripheral and central nervous systems. New drugs and interventional techniques based on this knowledge have improved the control of cancer pain. They conclude that by understanding the neurophysiology of cancer pain promotes the use of the most appropriate palliative measures of pain control.

In a study by Lesage and Portenoy, 1999, the authors used their experience and the experience of others to review the evaluation and diagnosis of cancer pain syndromes and the principles of management. Their results showed that the WHO, and other governmental agencies have recognized the importance of pain management as part of routine cancer care. Conducting a comprehensive assessment, competently providing analgesic drugs, and communicating with the patient and family allow effective management of pain in cancer patients. In conclusion, several approaches can promote adequate management of cancer pain, such as enhancing clinician knowledge of pain syndromes, improving pain assessments, and updating medical information related to pain and symptom control.

Pharmacologic management of pain. The pharmacologic management of cancer pain accounts for the major source of pain treatment. There are two classifications of pain
medications used to treat cancer pain, nonopioids and opioids (Foley & Sunderson, 1985). Successful treatment of cancer pain requires the use of therapies that are consistent with the etiology of pain, the patient’s medical status, and the goals of care (Li, 2002).

Nonopioid analgesics are used for mild to moderate pain. The mechanism of action is thought to reduce or to prevent sensitization of pain receptors to nociceptive stimuli by preventing prostaglandin release. This group of drugs consists of substances differing in chemical structure and pharmacologic action. Many of these drugs have analgesic, anti-inflammatory, and antipyretic effects. These drugs when combined with opioid analgesics will produce an additive effect (Foley & Sunderson, 1985). Nonopioid analgesics include the following: acetaminophen, nonsteroidal anti-inflammatory drugs, such as naproxen and ibuprofen, and COX-2 selective inhibitors such as celecoxib, valdecox, and rofecoxib (Li, 2002).

The principle approach to the management of cancer pain is opioid-based pharmacotherapies (Lesage & Portenoy, 1999). Opioids interfere with pain perception in the central nervous system, but not all opioid receptors are found in the central nervous system. They are also in the musculoskeletal structures, in visceral and vascular smooth muscle, and at the terminals of sympathetic and sensory peripheral neurons (Li, 2002). Opioids are classified into three groups: (a) morphinelike opioid agonists; (b) opioid antagonist; and (c) opioid agonist-antagonists (McGuire & Sheidler, 1997).

The morphinelike opioid agonists bind with mu and kappa receptors (mu receptors affect supraspinal analgesia, respiratory depression, euphoria, and physical dependence; kappa receptors affect spinal analgesia, miosis, and sedation); this group of drugs includes: codeine, fenatanyl, hydromorphone, morphine, methadone, and oxycodone. This classification is the most useful for cancer pain management (McGuire & Sheidler, 1997).

The opioid antagonist has no agonist receptor activity. An example of this classification is naloxone. Naloxone, a pure narcotic antagonist, is indicated for the reversal of opioid effects (Li, 2002). The third classification of opioids is the opioid agonist-antagonist. Mixed opioid agonist-antagonists act competitively at different receptor sites, and the partial agonists act at only the mu receptor site. This classification
of opioids has limited usefulness in cancer pain management because of their propensity to induce opioid withdrawal. The drugs included in this classification are: (a) Mixed opioid agonist-antagonists; (1) pentazocine, (2) butorphanol, and (3) nalbuphine; and (b) partial agonists; buprenorphine (McGuire & Sheidler, 1997).

*The Gate Control Theory (Melzack & Wall, 1965).* This is the most comprehensive theory of pain yet proposed and serves an extremely useful purpose in explaining pain mechanisms. In 1965, Melzack and Wall viewed pain as a category of experiences, signifying a multitude of different and unique experiences, having different causes, and characterized by different qualities varying along a number of sensory and affective dimensions (McGuire & Sheidler, 1997).

According to The Gate Control Theory, nociceptive impulses are transmitted from specialized skin receptors to the spinal cord through small A and larger C fibers. These fibers terminate in the substantia gelatinosa, in the dorsal horn of the spinal cord. Cells in the substantia gelatinosa function as a gate, regulating transmission of impulses to the central nervous system. Stimulation of larger fibers causes the cells in the substantia gelatinosa to “close the gate”. A closed gate decreases stimulation of trigger cells, decreases transmission impulses, and diminishes pain perception. Persistent stimulation of the large fibers, however, allows adaptation. When adaptation to impulses from large fibers occurs, the result is a relative increase in small neuron activity. Adaptation to larger fibers may, as a result, “open the gate”. Scratching and vibration prevent large neuron adaptation and keep the gate closed over prolonged periods (McCance & Huether, 1994).

Small fiber input inhibits cells in the substantia gelatinosa and opens the gate. An open gate increases the stimulation of trigger cells, increases transmission of impulses, and enhances pain perception. In addition to gate control through large and small fiber stimulation, the central nervous system, through efferent pathways may close, partially close, or open the gate. As a result, cognitive functioning may modulate pain perception. Interaction of the cognitive / evaluative, motivational / affective, and sensory / discriminative systems determines the individual’s response to pain (Ludwig-Beymer, Huether, & Schoessler, 1994).
Barriers of effective pain management. There are barriers to effective pain management on both the side of healthcare providers and on the side of the patients. There are a number of obstacles to pain management that can be attributable to healthcare professionals. In a report by Pasero and McCaffery, 2001, the authors responded this question “To comply with the pain treatment standard of the JCAHO, my hospital’s health care providers are required to use the 0 to 10 pain rating scale to assess patient’s pain. We have been told to believe what the patient says, but sometimes I don’t. Do I have to provide pain relief when I don’t believe the patient’s report?” Pasero and McCaffery responded by stating that personal opinions do not determine clinical practice. The JCAHO and AHCPR standards for pain management state that all patients have the right to appropriate pain management. The authors conceded that there may be a few patients who are addicts or malingers, by adhering to the standards it ensures that everyone who has pain receives the best possible management. Healthcare professionals do not have the right to deprive a patient of appropriate treatment simply because they believe that the patient is lying.

Another barrier of effective pain management for healthcare providers is inaccurate and inadequate knowledge about the pharmacological principles to pain management (Ferrell, McCaffery, & Rhiner, 1992; McGuire & Sheidler, 1997; ONS, 2004). Another obstacle to appropriate pain management is fear of the patient becoming addicted to the opioids, or other pain management analgesics (McGuire & Sheidler, 1997; ONS, 2004). In a study by Ferrell, McCaffery, & Rhiner, 1992, of 2459 people attending pain workshops, mostly nurses, less than 25% correctly identified the incidence of addiction following the use of opioids for main relief, which is less than 1%.

Lack of adequate pain management documentation. According to the Joint Commission on Accreditation of Healthcare Organizations (JCAHO), 2000, the majority of nurses are not meeting JCAHO standards of care in the management and documentation of cancer-related pain which can interfere with care and have legal implications. In a review by JCAHO, 1999, that was conducted in five hospitals, of a 117 charts of 80 inpatients and 37 outpatients with cancer, who had pain, it was determined that pain assessment and management were not documented adequately. Only 57% of outpatients and 53% of inpatients had a pain intensity rating documented adequately.
When pain was documented, treatment was noted in 86% of outpatients’ charts and 89% of inpatients’ charts. Of those with documented pain, reassessment after treatment was documented only 37% of the time.

*Malcolm Knowles: Principles of andragogy.* According to Knowles (1998), an approach of andragogy should be utilized when educating the adult learner. Knowles viewed adults as autonomous and growth-oriented. When utilizing this approach, there are several assumptions that must be made about adult learners; they are self-directed, they can utilize life experiences as a resource for learning, they must perceive a need to know, they are problem-centered and interested in immediate application of knowledge, and they are internally motivated (Knowles, 1998). These assumptions will guide the design and implementation of the educational intervention and practical applications for course content.

Adult learners have a self-concept of being independent-learners, can direct their learning, and are responsible for their own decisions. They resent situations in which the feel others are imposing their will upon them (Knowles, 1998). Every nurse will be given an invitation to participate and the nurses will know that they are in control of their decision to participate or not. They will be able to leave without penalty at any point during the session.

The roles of the learners’ experiences must also be considered. Adults bring to an educational session life experiences that inhibit or enhance their learning experience. The benefit of this life experience is that adults can contribute to group discussion and problem-solving simulations. The researcher will incorporate real-life scenarios into the educational session and encourage informal group discussions. The participants will be given the opportunity to ask questions and offer solutions. A problem-solving exercise will be included in the presentation. The negative effect of this life experience is the tendency to develop biases, habits, and presumptions that tend to decrease the receptiveness to new ideas and approaches to a problem. This is an obstacle that the educator must recognize when educating adult learners (Knowles, 1998). As a result of the pre NKAS, PMNAS and PDCT data, some of these biases and barriers will be identified by the researcher prior to the educational intervention. These data will be
analyzed and information designed to reduce the deficits will be incorporated into the educational intervention.

The readiness to learn must also be considered. The facilitator of learning can induce readiness to learn through exposure to best practice and stimulation of interest (Knowles, 1998). Again, every nurse will be given an invitation to participate in the study. Only those nurses with a desire to participate will attend the educational session.

The orientation to learning must also be evaluated and considered by the educator. Adults are life-centered, task-centered, or problem-centered in their orientation to learning. Adults are motivated to learn when it will help them perform tasks or deal with problems in real-life situations. They are interested in immediate applications of knowledge (Knowles, 1998). By presenting real-life scenarios, the educator will be able to assist the learner in applying the concepts to the situations that occur in real life.

Motivation to learn must also be evaluated. Adult learners are generally more internally motivated than externally motivated. Internal motivators include self-esteem, quality of life, and personal satisfaction (Knowles, 1998). The educator will make the assumption that the nurses who will attend the educational program are motivated to learn based on their willingness to attend the educational session, which is strictly on a voluntary basis.

In 1998, Knowles described a method of designing and managing learning activities for the adult learner. Knowles explained that the process of designing and managing learning activities involves the following phases: (a) setting a climate for change; (b) establishing a structure for mutual planning; (c) formulating objectives for learning; (d) designing a pattern of learning experiences; (e) managing the execution of the learning experiences; and (f) evaluating results and rediagnosing learning needs. According to Knowles, for an educational intervention to have the maximum effect the researcher must promote an environment conducive to learning. This includes the physical environment, such as lighting and temperature. This also includes the psychological environment. This is an environment that addresses the learners’ perception of mutual respect and mutual responsibility that promotes collaboration and is supportive and caring. The emphasis should be on learning and the researcher must utilize these key elements to foster an environment of learning, (Knowles, 1998).
Educational Intervention. Pain assessment is often referred to as the fifth vital sign and is an integral component of the nursing assessment. Changes in pain practice begin with education. Education not only includes theory but incorporates examples of actual patients and case studies so that hands-on-learning can occur (Sternman, Gauker, & Krieger, 2003). Knowles theory supports this concept of including case studies and actual patient scenarios, because it increases the adult learner’s awareness of the “need to know”.

Empirical Review

Conceptual Framework

Betty Neuman’s Systems Theory (1995). This model has been utilized in a number of nursing research studies. Its adaptability is in its ability to be applied to individuals, families, groups, communities, and societal issues. Neuman’s Systems Model is one of the most frequently used conceptual models for nursing research, and recent nursing model-based research literature indicates that the model continues to be used as a guide for nursing research (Neuman, 1995).

The first research rule of the Neuman model states that the phenomena to be studied includes the (a) physiological, psychological, sociocultural, developmental, and spiritual variables; (b) properties of the central core of the patient; (c) properties of the flexible and normal lines of defense, as well as the lines of resistance; (d) characteristics of the internal, external, and created environment; (e) characteristics of intrapersonal, interpersonal, and extrapersonal stressors; and (f) elements of primary, secondary and tertiary preventions. The second rule states that the clinical problems to be studied are those dealing with the impact of stressors on the client system stability with regard to the lines of defense and resistance and the five interaction variable areas. The third rule stated that the subjects can be the client system of individuals, families, groups, communities, and organizations or collaborative relationships between two or more individuals. The fourth rule indicates that the Neuman Systems Model is an appropriate base for inductive and deductive research using qualitative and quantitative research designs and associated instrumentation. The fifth rule states that the data analysis techniques associated with both qualitative and quantitative research designs are appropriate. The sixth and final rule states that research will advance understanding of
the influence of prevention interventions on the relationship between stressors and the patient’s system stability (Neuman, 1995).

Nursing practice application of the model has ranged from nursing assessment of pain to depression management (Breckenridge, 1989; Cunningham, 1982; Davies, 1989; Hassell, 1996; Mill, 1997). The focus of this study is on nursing knowledge and attitudes regarding cancer pain management and its effect on the patients’ comfort goals being met and is well served by the Neuman Systems Model. It is helpful to assess Neuman’s Systems Model within the realm of nursing and management of cancer pain.

Giglotti (1999) directed a study of women’s multiple stress roles utilizing Neuman’s Systems Model as the theoretical framework. In this study, a sample of convenience containing 191 women was utilized. The mean age was 36.8 years, and the arithmetic mean number of children was 2.5. Initially, an Analysis of Variance (ANOVA) was used to support this study. The results indicated a positive correlation between participant ages and perceived social support ($r = .15, p = .04$). The women in the older group (>35 years) had the same mean perceived multiple role stress as the younger women ($t = .31$). Another ANOVA was performed and there was a statistically significant four-way interaction ($F = 6.22, p = .01$) between age, maternal role involvement, student role involvement, and perceived social support. Additionally, a hierarchical multiple regression analysis was performed because an ANOVA design loses information by reducing continuous variables to dichotomous ones (Gigliotti, 1999). Four research questions were presented with this analysis and the full model explained that there was 24% of the variance in perceived multiple role stress for women in the older group and nothing for the younger women. Specifically, for older women, their age potentates the effects of the maternal and student role involvement which exerted pressure on the flexible lines of defense. These age variables also potentates the effect of the social support variable which resulted in a negative impact on the flexible line of defense. The results of this study emphasized the importance of having social support as a buffer for stress, and noted that Neuman’s five variables interacted in various ways to explain the normal line of defense invasion. This study was thorough; however, it was difficult to understand due to the multiple designs and the many variables.
Pain Physiology. In a study by Honore, Et.Al. it was demonstrated that osteoprotegerin (OPG), a secreted “decoy” receptor that inhibits the activation and proliferation osteoclast activity by binding to and sequestering the OPG ligand and also blocks behaviors indicative of pain in mice with bone cancer. The substantial part of the actions of osteoprotergerin seems to result from inhibition of tumor-induced bone destruction that in turn inhibits the neurochemical changes in the spinal cord that are thought to be involved in the production of cancer pain. OPG is a secreted soluble receptor that is a member of the tumor necrosis family.

These experiments used 36 adult male mice divided into 2 groups, 18 mice were sham-injected; 18 mice were sarcoma injected). Then beginning 5 days after the sham or sarcoma injections, each group of mice were give daily subcutaneous injections of osteoprotegerin (OPG). The amounts of OPG varied in each group. Group one received OPG at a concentration of 2.25mg/ml, the other group did not receive the OPG. This was a blinded study. Treatment with OPG or placebo ended 17 days after injection, when final behavioral testing was done and the mice were killed (Honore, et.al., 2000).

In the behavioral analysis, all the mice were assessed for bone destruction and behavioral responses before the sarcoma, or sham injections and then retested at days 5, 10, 14 and 17. The mice were assessed for guarding and flinching during a forced ambulation, and rated on a scale of 0-5. Zero as normal and 5 as complete lack of use of the limb. A One-way ANOVA was used to compare the behavioral results, bone histology results and immunohistochemical measures. For multiple comparisons, the Fisher’s PLSD post-hoc test was used. The results were considered statistically significant at P<0.05. OPG has been shown to increase bone mineral density and bone volume that is associated with a decrease in the number of active osteoclasts in women with osteoporosis (Sabino & Mantyh, 2005). In conclusion, these results demonstrated that excessive tumor-induced bone destruction is involved in the generation of bone cancer pain and that OPG may provide an effective treatment for this common human condition (Honore, Et Al., 2000)

Pharmacologic management of pain. In a study by Wells (2000), the purpose was to examine the relationships among pain intensity, interference in daily life because of pain, reported pain relief, and analgesics prescribed in hospitalized patients with cancer.
The study design was cross-sectional and descriptive. The setting was the internal medicine service of two acute-care facilities, an academic medical center, and a community hospital in the northeastern United States. The sample was 176 patients with cancer, 139 of whom reported pain during their hospitalization. Cohen’s (1988) formula was used to calculate the sample size and conventional values were used for power (0.80) and alpha (0.05). A sample of 133 subjects was needed to detect a small to moderate correlation ($r = 0.24$). The mean age of the sample was 59 years (range 19 – 88), 50% were male and 50% were female, 79% were Caucasian, 14% African American, 5% Hispanic, 1% Asian and 1% not noted. The methodology for this study was patient interviews in their hospital rooms. The Brief Pain Inventory-Short Form, with an internal consistency of 0.86 – 0.92, and the Pain Management Index (PMI) were used. Demographic, clinical, and analgesic prescription data were obtained from patients’ medical records. Two individuals entered the data using SPSS-PC. The relationships among pain intensity, pain interference, pain relief, and analgesics prescribed were examined using Pearson’s Product-Moment correlations. Student -t-test was used to examine the impact of presence of metastatic disease, surgical experience during hospitalization, or invasive procedure during hospitalization on pain intensity, pain interference, and pain relief. Chi-squared analyses were used to determine the relationship between metastatic disease, surgery, or invasive procedures on the PMI. Because previous research indicated variation in analgesic prescription by location of care, ethnic background, gender and age, Chi-squared analyses were conducted to examine the relationship between these variables and the PMI. Level of significance was set at $p < 0.05$. The results revealed that the mean average pain intensity was 4.42, worst pain $m = 5.65$, and mild $m = 2.17$, on a 0 to 10 scale. Pain interfered to some degree in all aspects of daily life. The most affected areas were enjoyment of life ($m = 5.19$), sleep ($m = 4.64$), walk ($m = 4.64$), and mood ($m = 4.57$). The overall interference score ranged on a 0 to 10 scale, with a mean of 4.49. Analgesic prescription and pain relief, PMI, scores ranged from -3 to +3. Thirty eight patients (29%) had negative PMI scores, indicating inadequate analgesic were prescribed for their level of worst pain. Patients reported a mean of 69% relief from all pain control interventions. A significant positive correlation was found between worst pain and interference ($r = 0.63, p < 0.001$). Significant
negative correlations were found between worst pain and the PMI ($r = -0.40, p < 0.001$) and pain relief ($r = -0.26, p < 0.10$), indicating that greater worse pain is related to inadequate analgesic prescribed and less pain relief. The PMI however, was not significantly correlated with interference ($r = -0.13, p > 0.05$) or pain relief ($r = 0.04, p > 0.05$). Almost half the sample had metastatic disease ($n = 57$), however, no differences were found between patients with and without metastasis for pain relief. Differences in analgesics prescribed approach significance ($c^2 = 3.49, p = 0.07$), with a greater proportion of patients with metastases having adequate analgesic prescriptions (80%) than patients with localized disease (65%). In this sample, patients with metastatic disease reported greater pain intensity and interference because of pain, in spite of what appeared to be adequate analgesics prescribed for their pain. Limitations for this study included the fact that the PMI reflected prescribed rather than administered analgesics which may explain why patients with metastatic disease reported greater pain intensity and interference because of pain, in spite of what appeared to be adequate analgesics prescribed for their pain. The major limitation cited was the lack of data regarding administered analgesics. In conclusion, patients continue to have pain and a substantial amount of interference because of pain despite improvements in types of analgesia, routes of administration, and dissemination if national standards for pain management (Wells, 2000).

In a clinical study by Anderson & Burchiel (1999), it was determined that continuous intratheical morphine can safely and effectively manage severe, nonmalignant pain among a carefully selected population. Forty patients with severe, chronic nonmalignant pain poorly managed by systemic medications were identified as candidates for this study, 30 patients actually participated. The average age of the participants was 58 years ($SD = 13$), 53% were women, and the average pain duration was 8 years, with a range of 6 months to 40 years. All participants were exposed to systemic medication. Fifteen patients suffered form mixed nociceptive-neuropathic pain, 14 of whom were diagnosed with failed back surgery syndrome caused by multiple lumbospinal operations. Ten patients had peripheral neuropathic pain syndromes as a result of arachnoiditis, thoracotomy, radiation, or other peripheral nerve irritation. Patients with deafferation pain caused by stroke, limb amputation, paraplegia,
rhizotomy represented another 13% of the sample population. The remaining patient suffered from nociceptive pain due to coccydynia (3%). The most commonly reported pain was low back pain radiating unilaterally (13%) or bilaterally (7%). Patients who presented with chronic nonmalignant pain (defined as pain with duration of at least 6 months) refractory to medical and/or surgical interventions, sensory loss in an anatomic distribution, and no contraindications to surgery were considered for an intraspinal trial of morphine. All patients had a neurological examination and evaluation, a psychological evaluation consisting of a semistructured interview and administration of the Minnesota Multiphasic Personality Inventory (MMPI or MMPI-2). Candidates with psychopathologic or substance abuse problems or those with significant unresolved issues of secondary gain were rejected for surgery if it was determined that these conditions were central to the pain complaint. All the patients complete a health history including: current medications, disability status, and pain history. They also completed the following: McGill Pain Questionnaire (MPQ), Chronic Illness Problem Inventory (CIPI), and Beck Depression Inventory (BDI). Patients were then admitted to the hospital and screened for response to intraspinal morphine sulfate. Two different screening protocols were used. Fourteen patients (45%) received a 1-mg intrathecal morphine injection, with pain response monitored on a 0-10 number analog scale for the next 12 to 23 hours. Patients who reported pain relief at least 50% of the time were offered implantation (10 of 14 patients). The other 26 patients were screened during a 2 to 3 day inpatient trial of epidural morphine delivered via an external pump. Pain relief was assessed similarly. Twenty of the 26 patients reported at least 50% pain relief and were implanted with the pumps. Implantation was per usual surgical standards. At 3, 6, 12, 18, and 24 months after implantation, study participants were asked to complete the same battery of test as at baseline. Statistical analyses were performed using JMP Statistical Visualization software (SAS Institute, Cary, NC). All p values are two-sided. To correct for multiple comparisons, 0.01 significance level was used throughout. Three patients died during the study, not as a result of the study. The VAS showed significant decreases over baseline at all intervals, most dramatically in the first 3 months. P6 = 0.69, P 12 vs. 6 = 0.07, P 18 vs. 12 = 0.22, and P 24 = 0.07 paired t test. Changes in daily function were assessed using CIPC. Total CIPI scores tended to improve throughout the first 12 to 18
months, but returned to baseline by the 24-month evaluation. Treatment outcomes were defined in terms of improvement in the VAS pain rating. Success was defined as a 25% or greater decrease in the VAS average rating. There were 2 treatment failures; the remaining patients were treatment successes after 24 months. Systemic medications were assessed at baseline and throughout the study, but were not quantified. By the admission criteria 47% of participants were disabled at the time of the study, after 24 months 35% of the patients were disabled ($p = 0.05$, McNemar [chi]2). Complications included device-related and drug-related. Device-related complications included: subdural puncture headaches, 5 (20%) repeat operations and, intrathecal catheter migration from the intrathecal space. Drug-related complications included: constipation (31%), nausea (21%), lethargy (14%), pruritis (14%), diaphoresis (10%), mental status change (10%), urinary hesitancy (3%), and peripheral edema (3%). All cases were managed. In conclusion, this study indicated that continuous intrathecal morphine can reduce and improve function among patients with chronic, severe nonmalignant pain. (Anderson & Buchiel, 1999).

The Gate Control Theory. In a study by Olbrys, 2001, the Gate Control Theory of pain was utilized to guide the research. This study was on the effect of topical lidocaine anesthetic on pain in women who underwent needle wire localization prior to breast biopsy. The research was limited to a small sample of 40 women. Twenty women were assigned to the experimental group and 20 were assigned to the control group. The experimental group received a lidocaine cream at the insertion site, while the control group received a similar cream without the active lidocaine. The results produced a test statistic of -2.27, greater than the critical $t$-value of -1.68. Thus the null hypothesis was rejected and there was significant evidence to support the research hypothesis that women who received the lidocaine cream would have less pain than the women who received the placebo cream. The mechanism described in the Gate Control Theory was the lidocaine cream decreased sensory impulses generated by the injury-sensitive receptors (Olbrys, 2001).

The next study looked at the relationship between electrical stimulation and the Gate Control Theory. Electrical stimulation of the nervous system arose as a direct consequence of Melzack’s Gate Control Theory. In 1997, researchers conducted a
prospective study of 45 patients with recurrent symptoms following lumbar discectomy. These patients were then randomized to either spinal cord stimulation or re-operation. They were followed for over a mean of 3 years. In those patients who underwent spinal cord stimulation, 47% reported significant relief. Of those who had a re-operation, the patients reported significant relief only 12% of the time. This study emphasized the potential usefulness of electrical stimulation in the treatment of low back pain (UMHS Neurosurgery, 2004).

**Barriers of effective pain management.** Pain management education provides some patients with more effective pain management than others. Some patients remain reluctant to use the prescribed analgesics to their optimal doses or effects. This study was part of a larger study that tested the effectiveness of a self-care intervention called the PRO-SELF Pain Control Program. The pain management intervention was delivered over the course of 6 weeks and included home-visits at weeks 1, 3, and 6, with follow-up telephone calls during the intervening weeks. Patients in the intervention group received detailed education about the principles of cancer pain management and individualized coaching about how to manage their pain. The control group received standard care, including the consumer version of the Cancer Pain Guideline published by the AHCPR.

In this randomized clinical trial, adult oncology patients were recruited from 7 outpatient settings. In this study a total sample of 115 patients, with 11 (9.6%) patients met the eligibility criteria. Participants were primarily women ($n = 9$) with a mean age of 63.2 years ($SD = 13.0$) and they had 14.5 years of education ($SD = 4.6$). Nine were white, 1 was African American, and 1 was Asian Pacific Islander. All of the patients were experiencing pain from bone metastasis. Data for the qualitative analysis consisting of verbatim transcripts of audiotaped nurse patient interactions during the 3 home visits and the nurses field notes and telephone logs. This study identified the following patient-related barriers to effective pain management: fear of addiction, tolerance, and side-effects. Fear addiction was two-pronged, first was the patients fear of addiction and then the there was the fear of stigmatizing as being an addict. These stigmatizing communications may have been inadvertent on the part of the caregiver, it was not able to be overcome by the patient. The patients also reported fear that if they took “too much” pain medication, that it was toxic. It was also noted that pain so severe that it makes one
“tootie-fruitie”, was preferable to taking medications. And finally, the intolerable side-effects, of which constipation was reported as the one that will stop patients of this study form taking their medications as prescribed. The results of this study suggest that pain education and coaching alone may not be sufficient for some patients. When powerful previous experiences or deeply ingrained convictions about medication use make pharmacologic management of pain unacceptable to patients, even after a psychoeducational intervention, then another intervention, approach must be found (Schumacher, West, Dodd, Paul, Tripathy, Koo & Miaskowski, 2002).

A barrier to effective pain management for the healthcare providers is fear of opioid side-effects including respiratory suppression and over-sedation (McMillian, Tittle, Hagan, Laughlin, & Tabler, 2000; ONS, 2004). Then there are the general attitudes and beliefs regarding pain management that can bias the nurse; some are based in fact and other in myth. Examples include: (a) an expectation of the nurses that pain should be present in a cancer patient; (b) women report pain more than men; (c) elderly patients have less pain than a younger patient with similar diagnosis, and (d) perceptual differences between patients and professionals about severity of existing pain (Cleary, 2000; McGuire & Sheidler, 1997; McMillian, Tittle, Hagan, Laughlin, & Tabler, 2000).

In a study by Rushton, Eggett, and Sutherland (2003), a random sample of 1500 nurses in the state of Utah was selected to complete a demographic tool of 23 items and a 37 item Survey, Nurses’ Knowledge and Attitude Survey Regarding Pain, developed by Ferrell, et.al. (1993) to assess knowledge and attitudes about cancer pain management. The content of the tool was established from standards of pain management from the American Pain Society (APS), World Health Organization, (WHO), and AHCPR. The construct validity was established by comparing scores of nurses at various levels of expertise, such as students, new graduates, oncology nurses, graduate nurses, and experienced senior pain experts. The tool was found to discriminate between these levels. Reliability of test-retest situations was established ($r = 0.80$) in a continuing education class of staff nurses ($n = 60$) through repeated testing. Internal consistency reliability was established ($\alpha = 0.70$) with items reflecting knowledge and attitudes domains. Potential study participants received a letter of explanation, the demographic survey, the Knowledge and Attitudes Survey Regarding Pain, and a stamped envelope. A
comparison of the demographic information between oncology and non-oncology nurses was completed using chi-squared analysis and analysis of variance (ANOVA) for continuous data. Differences between the oncology and non-oncology nurses in relation to demographics were tested at the \( p = 0.01 \), which was also used for individual analysis. Surveys from 44 oncology nurses and 103 non-oncology nurses were returned and used in the data analysis. The demographic information showed no significant differences between the two groups in age or years of experience. The oncology nurses had more formal education, worked in larger hospitals and cared for more patients with chronic pain than the non-oncology nurses. The oncology nurses missed 5 items related to pharmacologic aspects of analgesia more than 40% of the time. The non-oncology nurses missed 15 items more than 40% of the time. In conclusion, the oncology nurses had a better understanding of cancer pain management principles than the non-oncology nurses. However, the oncology nurses had difficulty with some questions regarding the pharmacology of analgesics. Non-oncology nurses had less understanding of cancer pain control principles. Findings were consistent with previous research. A limitation of this study was a small sample size for oncology nurses (Rushton, Eggett, and Sutherland, 2003).

**Lack of adequate pain management documentation.** Malek and Oliveri (1996), conducted a descriptive study to examine the nurses’ decision-making regarding pain management as documented in the clinical records of patients after orthopedic surgery. The research questions for this study included the following: (1) What cues do nurses’ document to support their nursing diagnosis of pain? (2) What clinical decisions do nurses document regarding nonpharmacologic interventions for pain management? (3) What clinical decisions do nurses document regarding pharmacologic interventions for pain management? And (4) How do nurses document the outcomes of nursing interventions for patients in pain? Inclusion data for this study were as follows; patients had orders for PRN narcotics, patients had to understand English, and the patients had to be oriented to person, time and place. The time frame for this investigation was the first 24 hours post discharge from the Post Anesthesia Care Unit (PACU). The instrument was a 25-item Nurses’ Pain Management Audit Tool (NPMAT), developed by the authors and was piloted on 5 patients’ medical records with a 93% of agreement. Twenty-three medical
records were in the data analyses. The sample included 9 (39%) men and 14 (61%) women. The mean age was 52 years (range 26-83 years). An every 2 hour assessment was used as the “ideal occurrence” of the standard of practice. Research question 1 results identified that 80.3 percent of patients’ medical records had no pain assessment documentation, 12% were non-quantifiable, 2% documented the pain rating scale, and 3.2% documented the location of the pain. Research question 2 results identified that in all of the patient medical records there was no documentation of cognitive-behavioral nursing interventions. Of the independent exercise interventions to manage pain 24% of the documentations were “ideal occurrences”. In research question 3, the researchers found that nurses administered PRN medications 90 of the possible 180 times, which was 49%, if the orders were every 3 hours PRN. The final research question revealed that 66% of the time there was no documentation of pain relief, 20% quantifiable pain relief was documented and 13.3% non-quantifiable pain relief was documented. There were 5 major findings as a result of this study. First, the nurses did not adequately document their patient pain assessments. Second, Nurses did not adequately document their patients’ pain relief. Third, There was an under treatment of pain that was evident in terms of the number of PRN medications administered. Fourth, there was no documentation of cognitive and behavioral interventions. Finally, the documentation of physical interventions was also lacking (Malek & Olivieri, 1996).

Malcolm Knowles: Principles of Andragogy. Grant et al; (1996) conducted a study to evaluate the effectiveness of a community-based educational program for cancer nursing. The researchers utilized Malcolm Knowles’ principles of andragogy as a framework to guide the study. The researchers concurred that utilizing this framework provided a theoretical base for educational sessions and allowed the opportunity to apply nurses’ clinical experiences. The teaching techniques utilized by the researchers included lecture, discussion, problem-solving simulation, and clinical laboratory demonstration. Educational needs of the nurses were determined using the Educational Needs Assessment tool. This tool was completed by 44 Directors of Nursing Education. For this information, three courses were designed and implemented, based on knowledge deficits indicated by the assessment tool. Over a 9-month period, an average of two classes was taught each week totaling 417 hours. A total of 1,175 nurses participated in
the educational sessions immediately following the educational intervention and the second, 3 months following the educational intervention. Only 12% \((n=34)\) of the participants returned the second post-test. Data were analyzed using the mean, standard deviation, and the student \(t\)-test. For the basic oncology course there was an increase in the mean score from the pre-test 25.92 to 30.18 for the post-test \((n=153)\). For this comparison group \(p = 0.05\). Although a small percentage of the 3-month post-test were returned \((n=26)\), the mean \((m = 29.35)\) indicates a retention of knowledge.

Similar findings were identified in the introduction to a chemotherapy course \((n =152)\). There was an increase in the mean score for the pre-test to post-test \((18.45\) to 25.55). For this group the statistical significance was \(p =0.05\). Only eight of the 3-month post-test were returned; the mean of the scores for this group was 24.75, again reflecting knowledge retention. In order to evaluate the application of this learning, the researchers collected data on changes observed in chemotherapy administration practices. There was no increase in the amount or frequency of chemotherapy given after the educational intervention. However, two hospitals did report an increased number of orders actually administered by registered nurses, and an increase in the use of already existing supplies \((Grant, et al; 1996)\). By utilizing the theoretical framework established by Knowles, the researchers were able to contribute to their desired outcome to educate nurses regarding the identified knowledge deficits. This study also indicates that Knowles’ theory of adult education can be an effective tool to educate nurses about clinical care. In addition, these outcomes reflected both a change in knowledge and a change in behavior \((Grant, et al; 1996)\).

In a literature review by Herrick, Jenkins, and Carlson, 1998, Malcolm Knowles’ theory was utilized to determine if self-directed learning modules were effective and cost-effective. This study also identified the differences in pedagogic and andragogic philosophies. The topics covered in this literature review included: a) Evaluation and effectiveness of self-directed learning models; b) module development; c) orientation programs; d) mandatory inservice education and staff development; d) nursing education and; e) cost/benefit ratios. A conclusion for this review was that the advantages of self-directed learning modules outweigh the disadvantages. Another conclusion was that with careful assessment of the learners’ abilities and need and their initiative and motivation
for learning, many of the disadvantages can be overcome. The major disadvantage is that this is a time consuming process, but if done well, the development of self-directed learning modules may be seen as part of a long-term plan, which may become time and cost efficient over time.

Educational Intervention. Cancer-related pain is undertreated across the continuum of care. In a study of patients in the Eastern Cooperative Oncology Group (ECOG), 36% of the patients in the sample had pain severe enough to limit their daily function. Of the oncology outpatients who had metastatic disease, 42% did not receive the type of analgesics recommended by standard cancer pain management guidelines. In addition, 9% to 20% of cancer patients in intensive care units of some teaching hospitals reported being dissatisfied with their pain management (Cleary, 2002). Finally, pain in nursing home cancer patients is under-treated. According to Cleary (2002), 13,000 cancer patients discharged from hospitals to nursing homes 4,003 (31%) reported daily pain, and of these 26% did not receive any form of analgesia.

In a study by Howell, Butler, Vincent, Watt-Watson, and Stearns (2000), 101 nurses participated in an educational inservice that was designed to assess the knowledge, attitudes, and behavior of nurses regarding cancer pain management. The sample of nurses for this descriptive, correlational study was drawn from 6 in-patient units. The instrument was composed of 46 items that were used to measure the variables of knowledge and attitudes of nurses participating in the study. The construct validity for the instrument was established by experts in pain management using a process of differentiating scores of nurses with a range of expertise levels including students, new graduates, nurses in oncology, and pain experts. Reliability based on Cronbach’s Alpha for internal consistency was reported to be greater than 0.70 for both knowledge and attitude items. Test-retest reliability was reported to be greater than 0.80. Case-study situations and chart audits were methods used to measure nurses’ documentation and practice behaviors in the rating of patient’s pain and the titrating of morphine doses. Of the 101 nurses who attended the educational inservice, 53 completed the knowledge, attitudes and behaviors questionnaire 3 months after the intervention. The results are based on these 53 nurses.
Before the educational intervention, more than 70% of the nurses scored correctly on the items relating to the need for continuous assessments of pain, the use of narcotics for chronic pain, and the action of narcotics on the central nervous system. Most of the nurses (92.4%) recognized that the lack of pain expression does not mean lack of pain. Some of the nurses (43.4%) reported their belief that patients should experience pain before the next dose of pain medication. Most of the nurses (77%) did not believe that their patients would become addicted to their pain medication, and the majority of nurses (83%) chose the correct definition for tolerance. All of the nurses (100%) believed that patients are the most accurate judge of their pain. The nurses rated their own practice in relieving cancer pain as good (44%) and very good (32.1%). Most of the nurses surveyed (91%) believed that cancer pain could be controlled (Howell, Butler, Vincent, Watt-Watson, & Sterns, 2000).

After the intervention, improvement in scores was noted for most of the items immediately post-intervention. McNemara’s test was used to test for statistical significance in scores among pre-intervention, post-intervention, and at 3 months. The improvements in scores after the intervention were statistically significant for 15 of the 35 items. Nurses’ knowledge improved immediately post-intervention in relation to management of acute and chronic pain and risk related to opioids such as sedation and respiratory depression. Before the intervention, few nurses believed that patients could be pain free (20%), and only one third (34%) reported that they would contact the physician if the patient was experiencing unrelieved pain. Immediately after the intervention, 50% of the nurses reported that they would call a physician for a patient with unrelieved pain, and only 24% reported that they would call at the 3 month follow-up. At the 3 month interval, there was a statistically noted decline in the knowledge and attitude scores, with a trend toward the pre-intervention scores. In conclusion, the nurses in this study showed a significant improvement after a 1 day workshop, but reverted to pre-intervention levels when assessed 3 months later. These results indicated that nurses need support in maintaining effective practice and further research should explore the effect of organizational support on the practice behaviors of all health care professionals (Howell, Butler, Vincent, Watt-Watson, & Sterns, 2000).
In a study by Alley, 2001, 91 nurses providing direct patient care on 5 study units during a 72 hour study period were examined to see the influence of a formal organizational pain management policy on pain management practices. The setting for this descriptive correlational study was the five general medical inpatient units of a tertiary-care medical center in a large metropolitan area in the Southeastern United States. There were 91 respondents, 48 (53%) were RNs and 43 (47%) were LPNs. Analysis with t-test revealed no statistical difference between the RNs and LPNs in regards to years of nursing experience, years worked in the medical center, or years worked in their present assignments. A chi-squared analysis revealed no statistical significance in the difference in the highest formal nursing education levels among the nurses on the five patient-care units. The instruments used for this study were a Chronic Pain Management Questionnaire, Knowledge about Pain and Pain Management Questionnaire, Accountability for Pain Management Questionnaire, Nurse information sheet, and Medical records data-collection sheet. To test the relationship between nurses’ knowledge of pain management policy and nurses’ knowledge regarding pain and pain management, a Pearson’s product-moment correlation coefficient was determined and revealed a significant positive correlation ($r = 0.278$, $df = 84$, $p < 0.05$). Chronbach’s alpha was used to assess the internal consistency reliability of the 3 questionnaires, demonstrating the following alpha values: $\alpha = 0.822$ for the Chronic Pain Management Questionnaire, $\alpha = 0.557$ for the Knowledge About Pain and Pain Management Questionnaire, and an $\alpha = 0.496$ for the Accountability for Pain Management Questionnaire. The major findings of this study supported the idea that knowledge of policy influences nurses’ pain knowledge and perceived accountability. The results were weaker than expected, accounting for a relatively small amount of the variance. One reason, suggested by the authors, for the lower than expected correlations is that the quality of the policy used by the organization was sub-optimal. Another reason may be that additional intervening variables, operational in the institution but not a focus of this study may have distorted the true relationships.

**Summary**

The purposes of this are multiple: to assess the current knowledge and attitudes of nurses within the target population: to provide empirical evidence of nurses’ assessment
and documentation behaviors prior to an intervention designed to address real and potential knowledge and attitude deficits; to assess the effectiveness of the intervention in terms of changes in knowledge and frequency of documentations and finally; to provide evidence of personal and systematic barriers to effective pain management.

Through the review of the literature it was illustrated that utilizing Betty Neuman’s Systems Model, The Gate Control Theory, and Malcolm Knowles’ Principles of Andragogy provides an appropriate framework for this study. In addition, through the literature review it was beneficial in gaining an understanding of: pain pathophysiology, the pharmacologic management of pain, barriers to effective pain management and inadequate pain management documentation.

Betty Neuman’s Systems Model provides a structure that depicts the parts and subparts and their interrelationship for a wholistic view of the patient and the degree to which stressors affect the wellness of the patient (Neuman & Fawcett, 2002; Freese, Beckman, Boxley-Harges, Bruick-Sorge, Harris, Hermiz, Meininger, & Steinkeler, and Neuman, 1995, Giglotti, 1999). Neuman’s model also depicts the roles that intrapersonal, interpersonal and extrapersonal play in the effects of stressors on the patient (Neuman, 1995, & Sohier, 1997). In addition, Neuman’s model describes the uses of primary, secondary, and tertiary prevention to eliminate or reduce the effects of the stressors on the patients (Neuman, 1995; Sohier, 1997; Giglotti, 1999).

To fully understand the Gate Control Theory it was necessary to review the literature regarding pain pathophysiology and the pharmacologic management of pain. For this study, it was necessary to understand the pain pathophysiology, how pain is perceived, transmitted, and reacted upon. Pain is felt in the tissue by nociceptors, then transmitted via afferent pathways to the brain, where it is process and the information is then transmitted via efferent pathways back down the spine where the rest of the body reacts. Chemicals are produced by the body that either inhibit or excite the pain impulses (Regan & Peng, 2002; Ludwig-Beymer, Huether, & Schoessler, 1994).

Pharmacological management of pain reviewed extensively in the literature. The administration of analgesics is the major intervention for the treatment of cancer pain and there are 2 classifications of analgesics used in the treatment of cancer-related pain (Foley & Sunderson, 1985; Li, 2002). Opioids are the analgesic of choice for both acute
and chronic cancer pain (Lesage & Portenoy, 1999; McGuire & Sheider, 1997; Wells, 2002).

With this basic understanding, The Gate Control Theory exquisitely describes the patients’ perception of pain at the core, or cellular level. Pain is viewed as a category of experiences, signified by a multitude of different and unique experiences, each having a different cause, and are characterized by different qualities varying along a number of sensory and affective dimensions. Chemicals produced by the body, either as a direct or indirect result of a painful stimulus, serve as a “gate” to either inhibit or pass on the pain stimulus. A closed gate inhibits the transmission of the impulse while an open gate allows the impulse to pass (Melzack & Wall, 1965; McGuire & Sheidler, 1997; Olbrys, 2001).

Barriers to effective pain management can interfere with appropriate pain management. The barriers may be healthcare provider or patient related (Pasero & McCaffery, 2001; Ferrell, McCaffery, & Rhiner, 1992; McGuire & Sheidler, 1997; ONS, 2004). Patient related barriers include fear of addiction or tolerance, aversion to side-effects, or an ingrained belief that taking pain medication is “bad or poisonous” (Ferrell, McCaffery, & Rhiner, 1992; McGuire & Sheidler, 1997; Schmacher, West, Dodd, Paul, Tripathy, Koo, & Miaslowski, 2002). Some healthcare identified barriers included: nursing fears of over sedating patients or suppressing respirations; general lack of knowledge regarding pain management or pain medications; and a bias that patients may not be accurate with their pain intensity ratings (Pasero & McCaffery, 2001; Ferrell, McCaffery, & Rhiner, 1992; McGuire & Sheidler, 1997; ONS, 2004; Schmacher, West, Dodd, Paul, Tripathy, Koo, & Miaslowski, 2002; McMillian, Tittle, Hagan, Laughlin & Tabler, 2000; Rushton, Eggert, & Sutherland, 2003). In addition to barriers to appropriate pain management there is also a concern identified in the literature review regarding inadequate pain management documentation by nurses. The JCAHO has identified deficits in nursing documentation as well as other professional and regulatory organizations (JCAHO, 2000; Malek & Oliveri, 1996).

Malcolm Knowles’ Principles of Andragogy can be utilized to guide the educational interventions for adult learners. This theory can be used not only for nursing education, but also be used to guide the learning for adult patients (Knowles, 1998; Herrick, Jenkins, & Carlson 1998; Grant, et al, 1996). There have been several attempts
identified in the literature review to determine the most effective way to educate nurses regarding pain management. The studies reviewed have met with mixed results, with good short term improvement, but no long lasting effects (Sternman, Gauker, & Krieger, 2003; Cleary, 2002; Howell, Bulter, Vincent, Watt-Watson, & Sterns, 2000; Alley, 2001). The methodology and study design are discussed in Chapter 3.
CHAPTER 3
METHODOLOGY

This chapter presents the methodology that was used to address the research questions for this study. The research design, setting, population and sampling plan, protection of human subjects, instruments, procedures, and data analysis plan are also discussed.

**Design**

The study design is non-experimental/comparative and utilized both pre- and post-intervention, cross-sectional data. The time interval between the pre- and post-samples was four weeks. Pre- and post-intervention data originated from multiple sources: a) Patient Data Collection Tool (PDCT), an instrument designed by the investigator for the purpose of extracting information about patient comfort goals, nurses’ assessments and nurses’ documentation in the patients’ medical records; b) the Nursing Knowledge and Attitude Survey Regarding Pain Management (NKAS), a 37 item instrument designed by Betty Farrell, RN, PhD, FAAN, and Margo McCaffery, RN, MS, FAAN, in 1987, was used to assess nurses’ knowledge and attitudes regarding pain management and documentation, and finally, c) the Pain Management Needs Assessment Survey (PMNAS), a survey to collect data regarding nurses real and perceived barriers to effective pain management and documentation, this survey also provided information as to the nurses’ self-assessment of cancer pain and the best times to conduct and educational intervention.

**Setting**

The data for this study were collected within a private, not-for-profit, full-service, urban, regional medical center in north Florida. This integrated health care system includes 770 licensed beds (a 597 - bed tertiary hospital, a 60 - bed psychiatric hospital, a 53 - bed sub-acute facility, and a 60 - bed rehabilitation facility), two home health care agencies, nine family medicine practices in seven surrounding counties,
and a medical staff of 435 physicians, of these, four of the physicians are medical oncologists and two of the physicians are radiation oncologist (Strategic Plan, 2003). The selected hospital has more than 24,000 inpatient admissions per year and offers a comprehensive system of healthcare services, including those needed by inpatient medical and surgical oncology patients. There are approximately 13,500 oncology admissions per year (Cancer Registry, 2004). There is an average nurse-patient ratio of 1:6 on day and evening shifts and 1:7 or 8 on night shift. The selected hospital, includes the longest continually-accredited Cancer Program in the state of Florida, Occupational and Colleague Development for nursing education, and radiation and medical researchers (Strategic Plan, 2003). At the time of this study the inpatient oncology unit had an average daily census of 21 and employs 1 director, 1 CNS, 9 full time RNs, 9 Full time LPNs, 4 RNs on a weekend option, and one traveling RN. There were 2 fulltime RN vacancies. The turnover rate for 2004 was 18% for the hospital-wide nursing department.

**Population**

The target population for this inquiry was the oncology nurses and their patients within the previously described regional medical center. The oncology nurses were comprised of full and part-time registered nurses (RN) and licensed practical nurses (LPNs), as well as agency RNs and LPNs. The oncology nurses were comprised of full and part-time registered nurses (RNs) and licensed practical nurses (LPNs), as well as agency RNs and LPNs. The nurses were English speaking and were able to read these instruments. All of the nurses, employees and agency, had been through the standard hospital orientation, which included a computer-based pain management class. Additionally, some may have had pain management courses in the interim. Inclusion criteria for the selection of patient charts from which data was gathered were those who have had a primary diagnosis of cancer and a symptom of pain. The cancer-related pain, caused either by the disease or by the treatment for the cancer, and was admitted on the oncology unit during the selected study intervals. Charts were those of those patients who were 18 years of age or older, English-speaking, oriented to self, and were able to report the occurrence of pain on a pain rating scale.
Sampling Plan

The data for this study were obtained at two separate time intervals. For each of the two time periods (August 2005, and September 2005), 50 charts were randomly selected from approximately 150 discharges from the oncology unit. The first data collection was performed with the Patient Data Collection Tool on closed patient medical records for a 4-week period prior to the educational intervention (August 2005). This process took approximately 1 week to collect and analyze the results. During the same time period of the first patient medical record review, the nurses who agreed to participate completed the Pain Management Needs Assessment Survey (PMNAS) and the Nursing Knowledge and Attitudes Survey (NKAS). These tools identified real and perceived barriers to pain management and documentation, and obtained current demographical data and knowledge and attitude deficits regarding pain pathophysiology and pain management. The identified deficits from the data collection and the identified barriers were addressed in the educational intervention. Four weeks after the educational intervention, the second data collection occurred, and the nurses were asked to complete the NKAS. This timeframe allowed for enough new patients to be discharged and records filed in Medical Records to accrue an adequate sample, as well as time for the educational intervention to be utilized by the nurses.

The plan for this current study had an alpha (α = .10), Power [(1-β = .80], and an Effect Size (ES = .25σ) equal to a Cohen (1990) moderate. The ES was a quartile range of scores on the KNAS.

Protection of Human Subjects

The researcher obtained approval from the Institutional Review Boards (IRB) at Florida State University (Appendix D) and the selected hospital (Appendix E) and an a priori waiver from HIPAA regulations (Appendix F). Each participant was provided information about this study and a written, signed consent form was obtained (Appendix G). Subjects were assigned a code number by the researcher, in lieu of their name, on the NKAS (Appendix A). There were no names collected from the nurses or from the patient’s medical records.
After approval by the IRBs, the researcher consulted the medical records of patients meeting the inclusionary criteria for this study. All data collected from the medical records were kept confidential, to the extent allowed by law. All confidential information was treated and respected according to the guidelines of Florida State University and the selected hospital. There was no personal contact with any patients included in this study. The original records did not leave the medical records department of the selected hospital. The completed data forms are secured in a locked file cabinet in the investigator’s home following data collection until June, 2010, at which time the data forms will be destroyed through a shredding process. The consent forms are stored separate from the data collection instruments, and maintained with equal security. Also the numerical link code was destroyed through a shredding process upon analysis of the data. Data were not viewed by anyone except the investigator and the data analyst. Also, any information that may have revealed the identity of the subjects was excluded from reports, presentations, or publications that may result from the data collected for this study.

**Instruments**

This study evaluated the effectiveness of an intervention designed to improve nurses’ pain assessment behaviors and documentation. Data was obtained pre- and post- intervention to determine the extent to which: a) there is improvement in achievement of patients’ pain/comfort goals; b) there is change in nurses’ knowledge and attitudes regarding pain management and documentation and; c) the nature and extent of nurses’ barriers to effective pain management and documentation.

The Nursing Knowledge and Attitude Survey (NKAS) (Appendix A) was utilized to determine the nurses’ knowledge and attitudes regarding pain management and documentation. The content validity of this instrument had been established by a review of pain experts. The content of the tool was derived from current standards of pain management such as the American Pain Society, the World Health Organization, and the Agency for Health Care Policy and Research. Construct validity had been established by comparing scores of nurses at various levels of expertise such as students, new graduates, oncology nurses, graduate students, and senior pain experts. Test-retest reliability was established ($r > .80$) by repeat testing in a continuing
education class of staff nurses \( (n = 60) \). Internal consistency reliability was established (alpha \( r > .70 \)). With items reflecting both knowledge and attitudes. This is a 37-item instrument, with questions posed in a variety of formats; true-false (22 questions), multiple choice (13 questions), and the use of patient case studies (2 case studies). With regards to data analysis, the authors of this survey recommend that distinguishing between knowledge and attitudes is to be avoided. Many items, such as the one measuring the incidence of addiction, really measures both knowledge and attitude issues (Farrell & McCaffery, 1987).

In addition to this survey, the Pain Management Needs Assessment Survey (PMNAS) (Appendix B), designed by the University of Wisconsin, 1996 was used to obtain information about the oncology nurses. These questions included the following information: age, licensure, number of years as a nurse, and number of years in oncology, educational background, exposure to education regarding cancer pain management, shift worked, ethnicity, and religion. This instrument allowed the nurses to identify times for the educational intervention to be held. Additionally questions were asked regarding barriers and basic pain management knowledge (University of Wisconsin, 1996).

Data were also collected using The Patient Data Collection Tool (PDCT). The PDCT (Appendix C), created by the investigator, was used to extract demographic information, pain ratings, and comfort goals from the patients’ medical records. The PDCT, collected the following demographic and personal health data regarding oncology patients: age, gender, ethnicity, religion, diagnosis, body mass index (BMI), and length of stay (LOS). Since this instrument served only to organize extracted data, no validity or reliability estimates were necessary.

**Procedure**

Following approval form the IRBs from Florida State and the selected hospital, the study proceeded according to the following time frame:

*Time Zero*

Patient charts \( (n = 50) \) meeting the required inclusionary criteria were randomly sampled and the data collected was a base line assessment of pain assessment documentation prior to the educational intervention. The patient charts
were discharged patient medical records from the first 6 months of 2005. Nurses were given an invitation to participate (Appendix H), as well as, a brief description of the study. Then they were given a consent form (Appendix G) to read and sign. The nurse participants were then asked to complete the NKAS and the PMNAS. This allowed the researcher time to evaluate the nurses’ knowledge and attitudes regarding pain, pain management, and pain documentation characteristics, prior to the educational intervention. One week prior to the educational intervention, the participants were given the same invitation (Appendix H) to attend the educational intervention with an addendum of the presentation dates and times.

**Time One**

The researcher provided an educational intervention based on pain pathophysiology and best-practice pain management and documentation as identified in the literature review. Also information extracted from the PDCT, PMNAS, and NKAS were included in the educational materials. The results of these surveys and tools are presented in graphical and table format, in Chapter 4. After reviewing the results with the participants at the educational intervention, the researcher provided the participants with pain pathophysiology and best-practice pain management and documentation. Participants that did not wish to participate in this study could attend the presentation or leave at any time, without penalty. The material was provided in an hour-long presentation that was conducted two or three times per day for 1 week.

**Time Two**

Four weeks after the educational intervention, the participants were asked to complete the post-test (NKAS) and another random selection of charts \( n = 50 \) was reviewed. This process was concurrent, as in Time Zero, and took 1 week to complete. Comparisons of the pre- and post-NKAS, as well as, the data extracted from the first and second PDCT were completed. This information was also shared with the participants in a written summary of the results.

**Data Analysis**

The following discussion is intended to provide the analytical processes that will be used to answer the research questions stated in Chapter One. Those questions
are repeated here and the data analysis discussion will address each in the order of presentation.

Research Question One

This question inquires about the current level of pain management knowledge and attitudes among the oncology nurses sampled for this study. This is a descriptive question and is answered utilizing descriptive statistics. The data for the question is derived from the NKAS, and was obtained both before and after the educational intervention that was designed to address knowledge/attitude deficits and the scores are considered to be interval in scale. Frequencies and percentages are used to describe the distribution properties of the data. A graphical display is offered where necessary and informative and the entire sample of scores is analyzed for the degree to which assumptions necessary for other analyses are reasonable. Means ($M$) and medians ($md$) are used to describe central location. Standard Deviations ($SD$) and Interquartile ranges ($IR$) are used to describe score dispersions. Finally, correlations between the knowledge/attitude scores and the patient/nurse demographics are offered, when necessary, to describe associations between the variables.

Research Question Two

The second research question is concerned with the degree to which nurses are meeting, or exceeding, the pain/comfort goals of their patients. Data for this question was obtained utilizing the PDCT and collected both prior to, and after, the educational intervention. The patient pain/comfort goal data are also on an ordinal scale and are described utilizing medians for central location and interquartile ranges for dispersion. Graphical displays of the frequency data are also be provided where necessary and informative. Whether or not patients’ pain/comfort goals had been achieved, is a discrete dichotomous variable with scores that are nominal in scale and, thus, answering this question requires the use of frequencies and percentages.

Research Question Three

The only inferential question of the study addressed the effectiveness of an educational intervention designed to address the knowledge and attitudes of the nurses regarding the pain management and documentation of assessments on the oncology nurses in a large, North Florida hospital. Knowledge and Attitudes are
considered a single continuous variable with scores, derived from the NKAS instrument that is interval in scale. Since the same group of nurses provided the pre- and post-intervention data, a Related-samples \( t \)-test is used to test the hypotheses:

\[
H_0: \mu_{\text{pre}} = \mu_{\text{post}}
\]

This is the null hypothesis and states that the true means on the knowledge/attitude variable both prior to (pre-), and after (post-), the educational intervention, are equal, or more simply \( (H_0: \mu_d = 0) \) which states that the difference between these two parameters is zero. In the context of the present inquiry, this null states that the effectiveness of the educational intervention \( (\mu_d) \) is zero or that the intervention is ineffective. The alternative hypothesis:

\[
H_a: \mu_{\text{post}} > \mu_{\text{pre}}
\]

states that the true mean knowledge/attitude post-intervention is greater than the true mean knowledge/attitude prior to the intervention, or more simply, \( H_a: \mu_d > 0 \). In the context of this inquiry, this hypothesis states that the educational intervention is effective for increasing the knowledge/attitudes of oncology nurses in a large North Florida hospital.

Presuming the data on this variable provide sufficient evidence for comfort with the assumptions required for the parametric, Related-Samples \( t \)-test, this analytical tool will be used to test the hypotheses above. In the event normality can not be reasonably presumed, a nonparametric analogue (the Wilcoxon Signed Rank Test) will be used instead. The entire list of assumptions required for the related-samples \( t \)-test follows:

1. The presumed, infinitely large distribution of knowledge/attitude difference scores is normally distributed (Brewer & Workman, 2003). The distribution of sample difference scores will be scrutinized for the degree to which this assumption is tenable.

2. The sample of knowledge/attitude scores is selected at random (Brewer & Workman, 2003). This required assumption is not tenable as the number of oncology nurses and patients within the study facility, are not of sufficient number to obtain a random sample. The entire assessable population will therefore, be utilized and a verbal argument made for the generalizability of
the findings. That this assumption can not be guaranteed constitutes a limitation of the study.

3. The knowledge/attitude scores are independent (Brewer & Workman, 2003). The fact that these nurses all work within same unit is reason to question whether or not this assumption is tenable. However, there is no reason to believe that any of the nurses has had any experience with the instrument that will be used to measure this variable. Nor has their knowledge/attitudes been formally assessed prior to this investigation. Thus, the investigator feels reasonably comfortable with this assumption.

4. The underlying knowledge/attitude variable is continuous in nature and the scores thereon are at least interval in scale (Brewer & Workman, 2003). The discussion provided by the authors of this instrument, The Nurses’ Knowledge and Attitudes Survey Regarding Pain, was sufficient to give the investigator comfort with this assumption.

In the event that the assumption of normality can not be reasonably assumed, the Wilcoxon Signed Rank test will be used to answer this research question. This statistical test is a nonparametric analogue for its parametric cousin, the Related-Sample \( t \)-test but does not specify the nature of the underlying population of knowledge/attitude difference scores (Brewer & Workman, 2003). The balance of assumptions listed above, however, are likewise required for the Wilcoxon. This test has a power efficiency of approximately 80% when compared with the \( t \)-test and under the assumptions of the latter. Under the condition of a failure of the normality assumption, however, the Wilcoxon has been demonstrated to be many times more powerful than its parametric analogue (Brewer & Workman, 2003).

A second test of the effectiveness of the intervention has to do with whether or not the educational intervention will increase the frequency of pain assessments and documentation that are completed by the oncology nurses. Since this is frequency data and nominal in scale, a related samples \( t \)-test or Wilcoxon was conducted on the data collected on the PDCT.
Research Question Four

This question is also descriptive, qualitative in nature and inquires of the real and perceived barriers oncology nurses may be experiencing as impediments to effective pain management and/or documentation. This information was extracted from the PMNAS and the results are presented as themes or predominant responses and where numerical presentations (frequencies and percentages) were warranted, such will be provided.

Summary

The purpose of this study is to describe the nursing knowledge and attitudes regarding pain management and to determine if an educational intervention based on existing literature and the study survey results will improve nursing pain management documentations, as evidenced by compliance with JCAHO and institutional guidelines and policies. Also, this chapter describes the research methodology utilized for this study. The setting and sample are also described, which includes the protection of the human rights of the participants. Analyses and study findings are presented in Chapter 4.
CHAPTER 4
RESULTS

This non-experimental/comparative study utilized both pre-and post-intervention, cross-sectional data to investigate the effectiveness of an educational intervention for increasing nursing knowledge regarding cancer pain management, and for increasing the amount of nursing documentations regarding patients’ pain intensity ratings and comfort goals. The purpose of the chapter is to present and discuss the results of the study. The results will be presented in graphs, tables, and as a discussion. The discussion of the findings and presentations are given with respect to each of the research questions and presented to facilitate the reader’s understanding.

Description of the Samples

A sample of 16 (73%) nurses from an accessible population of 22 nurses, employed by the Oncology Unit at a large North Florida hospital was collected. All of the nurses were female. Of these 16 nurses, 10 were Caucasian and the 6 remaining were African-American. Of the nurses sampled, 2 were ages 21-30; 6 were ages 31-40; 8 were 51-60. The educational preparations of the nurses are as follows: 5 nurses are Licensed Practical Nurses (LPNs), 2 are Associate degree Nurses (ADNs), 7 nurses are Baccalaureate Degree nurses and 2 have their Masters’ Degrees. To evaluate the pain management practices of these oncology nurses, closed patient medical records were reviewed for pain intensity ratings and patient comfort goals and compared pre- and post-educational intervention. Fifty closed patient medical records were chosen at random prior to and fifty were chosen as a sample of convenience post an educational intervention.

Of the pre-intervention patients, 16 (38%) of the patients were male and 26 (62%) of the patients were female. The mean age of the patients on the oncology unit pre-intervention was 58.64 years, median age 55 years. Caucasian patients
represented 85.7% of the total and the remaining 14.3% of the patient population were African-American. The average lengths of stay for the pre-intervention population was mean =7.02 days; median = 6 days. The pre-intervention body mass index (BMI) of the patients was a mean of 25.85 and a median of 25.75. All of patients had a cancer diagnosis and a symptom of pain, and were on the oncology unit. Table 1 is a table of the patient diagnoses and the number of patients in the pre- and post-intervention samples with these particular diagnoses.

Table 1

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Pre- f</th>
<th>Pre- %</th>
<th>Post- f</th>
<th>Post- %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colorectal Cancer</td>
<td>2</td>
<td>4.8</td>
<td>9</td>
<td>21.4</td>
</tr>
<tr>
<td>Lymphoma</td>
<td>3</td>
<td>7.1</td>
<td>3</td>
<td>7.1</td>
</tr>
<tr>
<td>Cervical Cancer</td>
<td>1</td>
<td>2.4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Breast Cancer</td>
<td>8</td>
<td>19</td>
<td>14</td>
<td>33.3</td>
</tr>
<tr>
<td>Liver Cancer</td>
<td>1</td>
<td>2.4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Gastric/Esophageal Cancer</td>
<td>4</td>
<td>9.5</td>
<td>2</td>
<td>4.8</td>
</tr>
<tr>
<td>Bladder Cancer</td>
<td>2</td>
<td>4.8</td>
<td>1</td>
<td>2.4</td>
</tr>
<tr>
<td>Lung Cancer</td>
<td>10</td>
<td>23.8</td>
<td>3</td>
<td>7.1</td>
</tr>
<tr>
<td>Leukemia</td>
<td>1</td>
<td>2.4</td>
<td>3</td>
<td>7.1</td>
</tr>
<tr>
<td>Uterine Cancer</td>
<td>3</td>
<td>7.1</td>
<td>1</td>
<td>2.4</td>
</tr>
<tr>
<td>Primary Unknown</td>
<td>1</td>
<td>2.4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Multiple Myeloma</td>
<td>2</td>
<td>4.8</td>
<td>1</td>
<td>2.4</td>
</tr>
<tr>
<td>Bone Cancer</td>
<td>1</td>
<td>2.4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Pancreatic cancer</td>
<td>1</td>
<td>2.4</td>
<td>1</td>
<td>2.4</td>
</tr>
<tr>
<td>Ovarian Cancer</td>
<td>1</td>
<td>2.4</td>
<td>2</td>
<td>4.8</td>
</tr>
<tr>
<td>Brain Cancer</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>4.8</td>
</tr>
<tr>
<td>Totals</td>
<td>42</td>
<td>100</td>
<td>42</td>
<td>100</td>
</tr>
</tbody>
</table>

Of the post-intervention patients, 14 (33.3%) were male and 28 (66.7%) were female. The mean age of the post-intervention patients was 58.52 years; the median age was 58.5 years. Thirty-one (73.8%) of the patients were Caucasian and 11 (26.2%) of the patients were African-American. The post-intervention length of stay was 4.71 days. The BMI of the post-intervention patient sample was a mean of 26.90
and a median of 25.9. All of patients had a cancer diagnosis and a symptom of pain, and were on the oncology unit.

According to the literature the top three cancer diagnoses for men are lung cancer, prostate cancer and colon cancer. The top three diagnoses for women are lung cancer, breast cancer and colon cancer (American Cancer Society, 2005). Both the pre-and post-intervention samples were representative of the literature.

**Oncology Nurse Characteristics**

*Research Questions One, Three, and Four*

Research question one was descriptive in nature and research question three was an inferential question. Both questions inquired of the nurse characteristics, which are found to be associated with nursing knowledge/attitudes and documentation habits of the nurses sampled. These questions were answered after detailed demographic and work-related descriptions, and barriers were assessed.

A sample of 16 (73%) nurses from an accessible population of 22 nurses was obtained for this study. All of the nurses were female. Of the nurses sampled, 2 were ages 21-30 (12.5%); 6 were ages 31-40 (37.5%); 8 were 51-60 (50%). In the 21-30 age range, 2 (12.5%) were Caucasian and none of the nurses were African-American. In the 31-40 age range, 5 (31.3%) of the nurses were Caucasian and 1 (6.3%) of the nurses was African-American. In the 51-60 age range, 3 (18.8%) of the nurses were Caucasian and 5 (31.3%) of the nurses were African-American.

The following is a summation of the educational preparations of the nurses as they relate to the age groups. Five nurses (31.3%) are Licensed Practical Nurses (LPNs), 1 (20%) is in the 31-40 age group and 4 (80%) are in the 51-60 age group. Two (12.5%) nurses are Associate Degree Nurses (ADNs), 1 nurse (50%) is in the 31-40 age group and the other 1 nurse (50%) is in the 51-50 age group. Of the 7 (43.8%) Baccalaureate Degree (BSNs) nurses, 2 nurses (28.6%) are in the 21-30 age range. Three nurses (42.9%) are in the 31-40 age group, and 2 nurses (28.6%) are in the 51-60 age range. Two of the oncology nurses have their Masters’ Degrees (MSNs), 1 nurse (50%) is in the 31-40 age group and the other 1 (50%) is in the 51-60 age group.
Of the oncology nurses, 4 (25%) have been practicing in the field of Oncology 1-5 years and 4 (25%) of the nurses have been in oncology 6-10 years. Three (18.8%) of the nurses have been in oncology 11-15 years, and 1 (6.3%) has been in oncology 16-20 years. Two (12.5%) nurses were in oncology 21-25 years and 2 (12.5%) were in oncology 26-30 years. Of the LPNs, 2 (40%) nurses have been in oncology for 6-10 years, 1 (20%) LPN has been in oncology for 16-20 years and the other 2 (40%) LPNs have been in oncology for 26-30 years. Of the ADNs, 2 (100%) are in the 16-20 year group. Of the BSNs, 4 (57.1%) nurses are in the 1-5 year group; 1 (14.3%) nurse is in the 6-10 year group; and 1 (14.3%) is in the 21-25 year group. Of the MSNs, 1 (50%) nurse is in the 6-10 year group and the other 1 (50%) nurse is in the 21-25 year group. Greater than half of the nurses have been in oncology over 11 years reflecting an experienced group of nurses.

**Nursing Knowledge and Attitudes Regarding Cancer Pain Management**

*Research Question One*

This question inquired about the current level of knowledge and attitudes among the oncology nurses sampled. The tool used to obtain these data was The Nursing Knowledge and Attitude Survey (NKAS) developed by Farrell and McCaffery, 1987. Table 2 is a description of the nursing scores on the pre-NKAS.

<table>
<thead>
<tr>
<th>Table 2 Nursing Knowledge and Attitude Survey Pre-Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>N</em>=16</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td><em>M</em></td>
</tr>
<tr>
<td><em>md</em></td>
</tr>
<tr>
<td><em>SD</em></td>
</tr>
<tr>
<td>Skewness</td>
</tr>
</tbody>
</table>

The NKAS is a 37-item questionnaire that utilizes true and false, multiple choice, and case studies to determine nursing knowledge/attitudes regarding cancer pain management. On average the nurses scored a mean and median of 75.56% on the survey. The LPNs (*N*= 5) scored a mean of 71.8%, median of 70%. The ADNs
(\(N = 2\)) scored a mean of 79.5\% with a median of 79.5\%. The BSNs (\(N = 7\)) scored a mean of 73.28\% with a median of 73\%. The MSNs (\(N = 2\)) scored a mean and median of 89\%. As one may believe that the higher the educational preparation, the higher the scores would be. The MSNs did score higher; however the ADNs scored higher than the BSNs. The 21-30 age group (\(N = 2\)) scored a mean and median of 69\%. The 31-40 age group (\(N = 6\)) scored a mean of 76\%, and a median of 75.5\%. The 51-60 year olds (\(N = 8\)) scored a mean of 76.9\% and with a median of 74\%. The Caucasian nurses (\(N = 10\)) scored a mean of 76.1\%, with a median of 79.5\%. The African-American nurses (\(N = 6\)) had a mean score of 76.7\%, with a median of 71.5\%. The nurses (\(N = 4\)) in the 1-5 years in oncology nursing scored a mean of 70.3\%, with a median of 71.5\%. The nurses (\(N = 4\)) in the 6-10 years in oncology scored a mean of 77.5\%, with a median of 79.5\%. The nurses (\(N = 1\)) in the 16-20 years in oncology nursing, scored the lowest of the sampled groups, with a mean and median of 62\%. The nurses (\(N = 2\)) in the 21-25 years of oncology nursing scored a mean and median of 93\%. The nurses (\(N = 2\)) in the 26-30 years in oncology scored a mean and median of 69\%.

A Spearman’s Rho correlation was calculated for the pre- and post-NKAS results and the nurses’ ages and educational preparation. The Spearman’s Rho for pre-NKAS and education was \(r = .159\). A positive correlation for education and score, the higher the education the better the score. The Spearman’s Rho for the pre-NKAS and nurses ages was \(r = -.336\). A negative correlation, the older the nurses, the worse the score. It was also noted that half of the nurses in the older age group were LPNs, which may account for the negative value. These results were not significant and will be discussed further in Chapter 5.

**Pain Management**

**Research Question Two**

This research question was concerned with the degree to which nurses are meeting, or exceeding, the pain/comfort goals of their patients. Data for this question were obtained utilizing the Patient Data Collection Tool, designed by the researcher. The data were collected pre-educational interventions, as well as, post-educational intervention. The number of nursing pain management documentations was also
collected because nursing pain management standards require that nursing
documentations be made at least every four hours. As depicted in Table 3, the nurses
are meeting the patients’ comfort goals, on average, 37% of the time pre-intervention
and 18% of the time post-intervention. There was a decrease in the percentage of
times nurses met their patients’ comfort goals from the pre- to post- intervention
samples. There were two notable explanations for these findings. First there was a
decrease in LOS, which may account for a decrease in the number of documentations
and, second, there was a change in nursing documentation methods. Documentation
changed from a paper system to a computerized 2 weeks prior to the start of the
second data collection. This will be discussed further in Chapter 5.

Table 3
Descriptives Nurse-Met Patients’ Comfort Goals Pre- and Post-Intervention

<table>
<thead>
<tr>
<th></th>
<th>Pre Pt. Comfort Goals Met</th>
<th>Post Pt. Comfort Goals Met</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>42</td>
<td>42</td>
</tr>
<tr>
<td>M</td>
<td>37.11</td>
<td>18.39</td>
</tr>
<tr>
<td>md</td>
<td>41.66</td>
<td>16.67</td>
</tr>
<tr>
<td>SD</td>
<td>19.46</td>
<td>12.68</td>
</tr>
<tr>
<td>Skewness</td>
<td>-.124</td>
<td>1.44</td>
</tr>
</tbody>
</table>

There was not an increase in the mean percentage of nursing pain
management documentations from the pre-intervention to the post-intervention
medical record reviews. Again, as stated before, the decrease in LOS and change in
documentations may account for some of these findings, and will be discussed further
in Chapter 5. Table 4 illustrates the differences in the number of documentations
from pre- to post- intervention samples.

Table 4
Number of Pre- and Post-Intervention Nursing Pain Management Documentations

<table>
<thead>
<tr>
<th></th>
<th>Pre-Intervention Documentations</th>
<th>Post-Intervention Documentations</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>42</td>
<td>42</td>
</tr>
<tr>
<td>M</td>
<td>47.93</td>
<td>19.00</td>
</tr>
<tr>
<td>md</td>
<td>36.00</td>
<td>15.00</td>
</tr>
<tr>
<td>SD</td>
<td>33.75</td>
<td>15.54</td>
</tr>
<tr>
<td>Skewness</td>
<td>1.00</td>
<td>2.05</td>
</tr>
</tbody>
</table>
There was not an increase in the raw number of nursing documentations from the pre- to the post intervention sample of patients, but a large decrease was noted. In Table 5, the nursing documentations were adjusted for the LOS. The decrease in nursing documentations was adjusted by multiplying the LOS times 6, which is the minimum number of documentations expected in a 24 hour period, the data are more representative of the actual nursing practice. The percent was calculated by dividing the number of documentations by the number of possible documentations. Six documentations was chosen as the minimum, because nursing practice at the study hospital stated that when patients are on a pain management care guideline, then their pain should be assessed at least every four hours. Table 5 depicts the percentages of documentations based on the LOS both pre- and post-intervention.

Table 5
Percentages of Documentations Based on LOS both Pre- and Post-Intervention

<table>
<thead>
<tr>
<th></th>
<th>% Pre-Intervention</th>
<th>% Post-Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>42</td>
<td>42</td>
</tr>
<tr>
<td>M</td>
<td>112.45</td>
<td>66.29</td>
</tr>
<tr>
<td>md</td>
<td>109.13</td>
<td>60.42</td>
</tr>
<tr>
<td>SD</td>
<td>38.1</td>
<td>32.34</td>
</tr>
<tr>
<td>Skewness</td>
<td>1.45</td>
<td>1.46</td>
</tr>
</tbody>
</table>

A Pearson Correlation ($r = .9$), 2-tailed ($r = 0$) of the pre-intervention data and a Pearson Correlation ($r = .76$), 2-tailed ($r = 0$) of the post-intervention data also illustrates these differences. It is noted that these correlations are not significant.

As illustrated in Table 5, the nurses were documenting well above the minimum expectations as stated by the patient care guidelines in the pre-intervention timeframe. The minimum number of documentations in a twenty-four period is six, at least on pain documentation every four hours. However, while there is a decrease in the number of documentations post-intervention, the nurses are still meeting this guideline in the post-intervention documentations.

**Educational Intervention Effectiveness**

**Research Question Three**

This research question addressed the effectiveness of an educational intervention designed to address the knowledge and attitudes of the oncology nurses in a large North Florida Hospital. The same group of nurses was provided a pre- and
post-intervention survey; the NKAS and Related-samples t-test was used to test the alternate hypothesis:

\[ H_a: \mu_{\text{post}} > \mu_{\text{pre}} \]

This hypothesis states that the educational intervention is effective for increasing the knowledge/attitudes of the oncology nurses. The alternative hypothesis was supported, as depicted in Table 6. The nursing knowledge did increase after an educational intervention was performed going from a mean of 75.56% correct to a mean of 84.55% correct. The following table illustrates these differences in the nursing scores from the pre-NKAS to the post-NKAS.

Table 6

<table>
<thead>
<tr>
<th></th>
<th>Pre NKAS Sum Correct</th>
<th>Pre NKAS Percentage Correct</th>
<th>Post NKAS Sum Correct</th>
<th>Post NKAS Percentage Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>(N)</td>
<td>16</td>
<td>16</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>(M)</td>
<td>28.00</td>
<td>75.56</td>
<td>31.27</td>
<td>84.54</td>
</tr>
<tr>
<td>(md)</td>
<td>28.00</td>
<td>75.50</td>
<td>33.00</td>
<td>89.00</td>
</tr>
<tr>
<td>(SD)</td>
<td>3.86</td>
<td>10.40</td>
<td>4.41</td>
<td>12.13</td>
</tr>
<tr>
<td>Skewness</td>
<td>.00</td>
<td>-.01</td>
<td>-.93</td>
<td>-.91</td>
</tr>
</tbody>
</table>

The distribution of the pre-NKAS scores was 0; therefore, the assumption of normality is tenable. Chronbach’s Alpha was used to test the reliability of the instrument. Chronbach’s alpha was equal to .69 in the pre-NKAS. A Paired-Samples t-test was used to determine the statistical significance of the nursing KNAS results. Table 7 illustrates these findings.

Table 7

<table>
<thead>
<tr>
<th>Differences of Pre- &amp; Post- Intervention KNAS</th>
<th>M</th>
<th>SD</th>
<th>Std. Error</th>
<th>Mean Difference</th>
<th>Lower 95% CI</th>
<th>Upper 95% CI</th>
<th>t</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-NKAS % Correct &amp; Post-NKAS % Correct</td>
<td>-10.45</td>
<td>9.10</td>
<td>2.74</td>
<td>-16.57</td>
<td>-4.33</td>
<td>-3.8</td>
<td>10</td>
<td>.003</td>
<td></td>
</tr>
</tbody>
</table>
The Paired Samples t-test had an approximate $p$ value of .003, which is less than the alpha of .10, which was set for this study. However, the assumption of normality could not be established, therefore a Wilcoxon Signed Ranks Test was done. The Wilcoxon Signed Ranks Test does not require the assumption of normality; therefore, the $p$ value is an exact $p$ value, as illustrated in Table 8. The standard deviation of the difference scores was 9.1 units, which is larger than the Effect Size for this study which was set at ES=.25. The mean was 2.74. The post-hoc effect is 10 times greater than the ES. The reader is reminded that the educational intervention was, in part, constructed on the errors that were committed by the nurses on their pre-NKAS. The intervention may have inflated the post-NKAS results.

<table>
<thead>
<tr>
<th>Z</th>
<th>-2.58</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asymp. Sig. (2-tailed)</td>
<td>.01</td>
</tr>
<tr>
<td>Exact Sig. (2-tailed)</td>
<td>.01</td>
</tr>
<tr>
<td>Exact Sig. (1-tailed)</td>
<td>.003</td>
</tr>
</tbody>
</table>

The Wilcoxon Signed Ranks Test had an exact $p$ value of .003. Both the Wilcoxon and the Paired Samples T-Test hand the same $p$ value, $p = .003$, which is statistically significant. The $p = .003$ is less than the $\alpha = .10$, that was set for this study. Again, this educational intervention was designed to address the errors committed by the nurses on the pre-intervention NKAS, which may have inflated the post-intervention NKAS scores.

The nurses scored better on the post-intervention NKAS. Table 9 describes the frequencies and percentages of the correct responses by the nurses on the Pre- and Post-NKAS by individual questions. The NKAS is a 37-item survey designed to assess the nurse knowledge and attitudes. There was a sample of 11 nurses who answered both the pre-intervention and the post-intervention NKAS. This sample was of convenience and all of the oncology nurses were invited to participate. Sixteen nurses answered the pre-intervention NKAS and eleven nurses answered the post-intervention NKAS.
Table 9 illustrates how often the individual questions were answered correctly by the nurses. Question number 12 was the least correctly answered question, both pre- and post-intervention. Question 12 was a true or false question that asked: True
or False - Demerol 50mg by mouth (PO) has the same analgesic effects as does 650 mg of Aspirin, PO. This is a true statement.

**Barriers to Effective Pain Management**

*Research Question Four*

This question was descriptive and qualitative in nature, and inquires as to the real and perceived barriers oncology nurses may be experiencing as hindrances to effective pain management. This information was extracted from the Pain Management and Needs Assessment Survey that the oncology nurses completed pre-intervention. Each nurse was asked to identify which barriers prevent or hinder her from performing adequate pain management and documentation.

The most prevalent barrier identified was “too many patients, not enough time” to document pain management activities. Of the 16 nurses who responded to this question, 11 (78.6%) of the nurses listed this as the number one barrier. Another 3 nurses listed it as the second (7.1%), third (7.1%) and fourth (7.1%) barrier to adequate pain management. The second option was medications not available in the Pyxis machine. Five (71.4%) of the responding nurses listed this as the second more common barrier to adequate pain management. Another two nurses listed this as the third (14.3%) and fourth (14.3%) most common barrier. The third barrier was the nurses’ “not knowing which medication to administer if more than one pain medication was ordered”. Three nurses responded to this barrier. One nurse (33.3%) chose this as her first choice, another nurse (33.3%) responded that it was her fifth choice; the final nurse (33.3%) chose this as her 6th ranked barrier. The next barrier option was the nurses’ belief that the patient was accurately indicating his/her pain intensity rating (1-10 scale). One nurse (33.3%) listed this as their number one barrier; tow other nurses listed this as their third barrier (66.7%). Two nurses listed the barrier that they “do not believe their patients’ pain rating” as their fourth barrier to adequate pain management. The next barrier option was regarding the use of non-pharmacological interventions. One nurse (33.3%), listed this as her 3rd ranked barrier and two other nurses listed this as their 4th (33.3%) and 5th (33.3%) ranked barrier. Fear of over-sedation was the next option. Three nurses (42.9%) listed this barrier as their 3rd ranked barrier. While four other nurses listed this barrier as their 3rd, 4th, 6th,
and 7th ranked barrier. Fear of respiratory suppression was the next barrier option. One (14.3%) nurses listed this as their 2nd ranked barrier, 3 (42.9%) nurses listed this as their 3rd ranked barrier. Another 3 nurses listed this as their 5th, 6th, and 8th ranked barrier. Finally, the last option was apprehension about approaching the physician for a change in pain medication. One nurse (33.3%) listed this as her 1st barrier. Two other nurses listed this as their 2nd and 9th barrier. There was a blank option so that the responding nurses could list a barrier, but none chose to do so.

Other Results

Additionally there was a significant finding relating to the patients’ lengths of stay (LOS). The mean pre-intervention LOS was 7.02 days. The mean post-intervention LOS was 4.71 days. Table 10 describes the patients’ pre-intervention and post-intervention LOS data.

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>M</th>
<th>md</th>
<th>SD</th>
<th>Skewness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-intervention</td>
<td>42</td>
<td>7.02</td>
<td>6.00</td>
<td>4.34</td>
<td>1.18</td>
</tr>
<tr>
<td>Post-intervention</td>
<td>42</td>
<td>4.71</td>
<td>4.50</td>
<td>2.64</td>
<td>1.15</td>
</tr>
</tbody>
</table>

As Table 10 describes, there was a decrease in the patients’ LOS. The decrease in LOS may have contributed to the decrease in number of documentations. After the adjustment for the decrease in LOS, it was demonstrated that the nurses were meeting their patients’ comfort goals and a minimum number of pain management documentations. This will be discussed further in Chapter 5.

Conclusions

The following conclusions were drawn from the analysis of the data. The educational intervention did have a positive effect on nursing knowledge/attitudes. However, while there was not an increase in the number of documentations noted in comfort goals met or in the number of nursing pain management documentations from the pre-intervention to the post-intervention. The pain management documentations and comfort goals met did meet or exceed the minimum number of required documentations for the patients’ LOS. Changes in behaviors occur over time and this single intervention is not enough to change nursing documentation.
behaviors. This change is going to require more interventions to improve documentation practices of the oncology nurses.

Summary

This study provided descriptive and statistical findings to compare the difference between the mean number of documentations of patients’ pain intensity ratings and comfort goals before and after an educational intervention. This study also provided descriptive and statistical findings to compare nursing knowledge/attitudes before and after an educational intervention. In addition, a description of the sample of nurses that participated in this study is included. A discussion of the outcomes of this study will be presented in Chapter 5.
CHAPTER 5
DISCUSSION

The purpose of this inquiry was to determine if nursing knowledge/attitudes regarding pain and pain management affects their pain documentation behaviors, before and after an educational intervention. This study utilized both retrospective and cross sectional data. Patient charts meeting the required inclusionary criteria were sampled through random selection and baseline was extracted from a 6 month period of time just prior to the educational intervention. Another sample was collected after the educational intervention using a sample of convenience. In addition, a sample of convenience, of the oncology nurses, was given a Nursing Knowledge and Attitude Survey (NKAS) and a Pain management Needs Assessment Survey (PMNAS), prior to an educational intervention. Then these same nurses were asked to complete another NKAS one week after the educational intervention. This chapter presents a discussion of the findings; comparison of findings to the literature; limitations; assumptions; strengths; conceptual framework; implications for the nursing profession, practice, education, and administration; and recommendations for future nursing research.

Discussion of the Findings

The overall findings of this study, following an educational intervention, indicate that the nursing knowledge did significantly increase; however, the frequency of patient pain intensity ratings and comfort goals did not increase significantly. When the numbers of documentations were adjusted for the LOS, the results indicated that the minimum required amount of nursing documentations and comfort goals were being met. The results of the study were both statistically significant and/or of clinical or practical importance.

Changes occur slowly over time. Of the nurses in this study, half of the nurses were over the age of 40. A Spearman’s Rho correlation ($r = -.336$) showed
that as the number of years of nursing experience increased, the total number of post-NKAS answered correctly decreased. Another interesting Spearman’s Rho correlation \((r = -0.259)\) also identified that nurses’ years in nursing negatively affected their correct responses on the post-NKAS. The nurses that were nursing longer did not do so well on the post-NKAS. That also held true for the nurses who were in oncology nursing longer. They had a Spearman’s Rho of -0.259 post-NKAS. These correlations suggest that a relationship exist between the nurses’ ages, years of oncology nursing experience, and their performance on the NKAS, but it is important to note these are not statistically significant findings. This phenomenon can be partially explained using Knowles’ Principles of Andragogy. The previous experiences of adult learners can inhibit their learning process and can lead to resistance to change. Other studies have found similar results that indicate an increase in knowledge does not always lead to a change in behavior. Halimaa et al. (2001) concluded that many of the nurses in their sample possessed knowledge about pain and pain assessments, but their actions were not consistent with their knowledge. Another way, using Knowles (1998), to view this negative correlation between age and correct post-NKAS answers may be that younger, or less experienced, nurses perceive a greater need to know, and are more likely to apply this new knowledge to practice.

**Demographics of the Nurses**

The nurses that participated in this study were compared with other nurses in the United States. The percentage of nurses in this study over the age of 50 was 50%, and the other 50% under the age of 40, in keeping with a national mean age of 45.2 years. The different racial/ethnic groups of the participants were 62.5% Caucasian and 37.5% African-American. The national racial/ethnic groups of nurses included: 88% Caucasian and 12% minority groups. The sample of participants had a higher percentage of minority nurses, which according to Spratley, Johnson, Sochalski, Fritz, and Spenser (2000) is more common in the southern United States. Educational degrees of the sampled nurses consisted of 31.3% Licensed Practical Nurses (Vocational), 12.5% Associate, 43.8% Baccalaureate, and 12.5% Masters. The national average for educational degrees of registered nurses included 34.3%
Associate, 32.7% Bachelors, 22.3% Diploma, and 9.6% Masters or Doctoral (Spratley et al., 2000). The sample of nurses had a higher percentage of Bachelor’s Degrees, than other educational degrees, which may be due to the facility’s being a teaching hospital for two local universities. The sample had a much lower percentage of Diploma nurses, than the other educationally prepared nurses, which may be due the fact that there are no diploma programs in the area.

Demographics of the Patients

In the pre-intervention patient sample, there were 42 patient medical records that were reviewed. Some interesting findings included a correlation between the patients’ Body Mass Index (BMI) and their LOS. It is generally considered that patients with a higher than normal BMI, have a longer hospital stay because of various co-morbid conditions that can accompany morbidly obese patients. This sample demonstrated that assumption. A Pearson correlation (2-Tailed), was $r = .51$ which was a positive correlation. Another patient correlation was patient age and comfort goals met. A Pearson correlation ($r = .284$), which showed a positive correlation between increase patient age and increased number of comfort goals met. It is often thought that a people age they develop strong coping mechanisms. They may have patterns or skills developed to help them cope with their pain. This may explain why older patients had their comfort goals met more frequently. Another noteworthy pre- intervention correlation was between the numbers of assessment documentations. The Pearson’s correlation of $r = .901$ showed a positive correlation, as LOS increased so did the number of assessment documentations. It is important to note that this correlation showed a relationship between LOS and total number of pain documentations, but it is not statistically significant. Each shift a nurse is required to assess their patients’ pain on a routine basis, every four hours. It is reasonable that the longer the patient is in the hospital, the more pain documentations there will be if the patient is having pain. In the post-NKAS patient sample, also 42 patients, there were also some expected and unexpected findings. One expected finding was the positive correlation between LOS and number of documentations. There was a positive Pearson correlation of .761, as LOS increased so did the number of documentations. An unexpected finding was that there was a negative Pearson’s
correlation of -.05 for patient comfort goals met and LOS. With an increase in patients’ LOS, there was a decrease in the number of times nurses were meeting their patients’ comfort goals. The actual number of pain management documentations was adequate, but the nurses were not consistently meeting patients’ comfort goals. This is an area of concern, and an opportunity for the oncology CNS to investigate and to determine if the patients are suffering from pain, or going home with unrelieved pain, or to determine if there is another explanation for these findings.

**Relationship to Literature**

The literature reviewed and presented for this study included numerous findings and recommendations related to pain management and improving pain documentation by nurses. Based on the literature review, cancer pain management documentation remains inadequate despite increased awareness and the implementation of mandates by regulatory agencies (Ferrell, McCaffery, & Rhiner, 1992; McGuire & Sheidler, 1997; ONS, 2004; Halimaa et al., 2001; JCAHO, 2000). This study’s findings were in keeping with the literature that an increase in knowledge does not necessarily translate into improved practice, or to increased pain management documentation. In this study, there was a decrease in the number of pain documentations and a decrease in the number of times nurses met the patients stated comfort goals, after an intervention designed to educate the nurses and to improve their documentation practices. In the pre-intervention findings, the nurses documented meeting the patients’ comfort goals had $m = 13.8$, and post-intervention findings had $m = 5.6$. The pain assessment documentations pre-intervention are $m = 47.9$ and post-intervention at $m = 20.38$. In a review by JCAHO, 1999, of 80 inpatients and 37 outpatients with cancer, who had pain, it was determined that pain assessment and management were not documented adequately. Only 57% of outpatients and 53% of inpatients had a pain intensity rating documented adequately. When pain was documented, treatment was noted in 86% of outpatients’ charts and 89% of inpatients’ charts. Of those with documented pain, reassessment after treatment was documented only 37% of the time.

In this study there were circumstances that may have hindered the nurses more so than the usual. The most profound circumstance was that in the pre-intervention
data collection, the nurses had documented on a paper “symptom management flow sheet”. These flow sheets had been in-serviced heavily and there had been a lot of auditing and nursing interventions done to make sure that these sheets were utilized appropriately. However, two weeks prior to the post-intervention data collection, the nurses changed from the paper charts to electronic charting. This was a major change for the nurses. As discussed previously, the majority of the oncology nurses are older than 40 and many of them had little to no computer experience. The nurses were provided with a two hour training session and there were extra support staff on duty during the “go live” phase of the electronic documentation. Change occurs slowly, and as this study showed, and as the literature explains, the nurses are unable to adequately document in the new electronic medical records (EMR). This is not only on the oncology unit, but a facility-wide problem. It will take much reinforcement by the CNSs and savvy computer users to help their colleagues adjust to this change.

**Limitations**

Several limitations were identified and may have influenced this study:

1. This study does not address whether the prescribed pharmacological interventions are appropriate for the patients’ pain intensity ratings, or whether nurses’ request from the physician a change in the prescription was done. This study looked at the number of nursing documentations in closed patient medical records, pre- and post- intervention only. If the pain regimen ordered by the physician was inadequate that may have influenced the number of unmet comfort goals recorded by the nurses. Also, this study did not review the number of pain medication requests made by the nurses on behalf of the patients, or by the patients themselves, which also would affect the number of unmet comfort goals.

2. Since no concurrent observations were done, all data collected were dependent upon the documentation in the patients’ medical records. There was no way to evaluate any of the nursing assessments or interventions which were not been documented. This limitation held particularly true for the post-intervention documentations. The pre- intervention documentations were recorded in the patients’ medical records on a paper symptom management
flow sheet. The post-intervention pain documentations were documented on a newly instituted electronic medical record (EMR). The EMR was in serviced by facility trainers and initiated by the nurses 2 weeks prior to the post-intervention data collection. While the start-up for the EMR appeared to be a smooth transition, there was a significant drop in pain management documentations from the pre-intervention documentation. Anecdotally, the oncology CNS noted that the nurses in the 51-60 age group had little to no computer experience of any kind, and there continues to be documentation deficits noted in all areas of the EMR, including, but not limited to pain management.

3. The study findings cannot be generalized beyond the restricted setting described for this study. Due to the small sample size of nurses and patients’ medical records, these findings cannot be generalized to all nursing realms.

4. Another limitation of this study is that due to the limitations of the Health Insurance Portability and Accountability Act (HIPAA) the researcher was unable to link documentation patterns of nurses who attended the educational intervention. Without linking the participants, by name, to their documentation, the researcher was unable to compare the documentation practices of the participants to the patients’ medical records.

5. The final limitation of this study is the risk of the Hawthorne Effect. Awareness of being in a pain assessment study may have altered the documentation behaviors of the nurses. The researcher minimized this by being discrete with the patient medical record reviews and not discussing additional particulars of the study with the nurse participants. Additionally, with the decrease in the number of documentations, this doesn’t appear to be a valid limitation.

**Strengths of the Study**

One strength of this study was that 73% (16/22) of the available nurses participated. In addition, 14 of the 16 (87.5%) nurses participated in the educational intervention. Therefore, the demographics of the nurses are representative of the nursing population caring for the oncology patients in the selected facility and
compare favorably to nurses nationwide in terms of mean age, racial/ethnic groups, and educational preparation. This indicates that these nurses may be considered representative of the larger population of nurses in the United States. This study contributes to the body of knowledge regarding the documentation of cancer pain and oncology nurses’ knowledge/attitudes regarding cancer pain management. Furthermore, this study provides nurse researchers with a theoretical framework and research design that can be used for replication and/or further studies.

Assumptions

In using documentation to assess nursing practice, an assumption is made that documentation accurately reflects nursing practice. This may be an underestimation of actual pain assessment conducted. There is no reliable way for the researcher to support or deny this assumption. However, the standard by which all nurses are guided throughout their careers in accepting the responsibility of legal documentation is “not documented, not done”. Therefore, there is some assurance that the documentation represents a strong portion of nurses’ practice.

The researcher made the assumption that there was a knowledge deficit among the target population regarding cancer pain management. This study supports that there was a knowledge deficit among the sampled nurses, and that the increased scores on the post-intervention NKAS supports this assumption. Support for the analytical assumptions was discussed in Chapter 4, and the results of the nonparametric test were reported; therefore, the reader may be more comfortable with these results that do not require these assumptions.

Conceptual Framework

Neuman’s Systems Model

Neuman’s Systems Model was used as a component in the framework for this study. Factors that affect the nurses’ abilities to manage cancer pain, and the patients’ abilities to cope with pain are numerous and complex. It is usually not one single stressor, but many that are bombarding the patient at any given moment. Stressors can be intrapersonal, such as, unmanaged pain and their cancer diagnosis, and their bodies’ gate control system that is unable to cope. Interpersonal stressors include treatments and procedures that are related to a cancer diagnosis. Chemotherapy,
surgery, and radiation therapy can cause stress to the patients. Extrapersonal stressors, such as, frequent hospitalizations and financial difficulties that often accompany a cancer diagnosis can cause undue stress in already compromised patients. Nurses can interact with the patients on three levels of prevention. Primary prevention reduces the possibility of encountering the stressors and protects the patient from complications. Secondary prevention includes early and accurate pain assessments and interventions. Education is also incorporated at the secondary and tertiary prevention levels. Ongoing patient and nursing education helps to minimize pain by keeping everyone up to date with current information, and re-evaluations of changing statuses.

The flexible line of defense serves as a buffer to protect the patient from the stressors. This line can flex with the pressures of the stressors. The flexible line of defense is drawn in closer to the core in patients with unmanaged mild to moderate pain. The normal line of defense is rigid and is the “normal” line of defense that protects the core from the “usual” stressors, and mild pain. The lines of resistance are the last lines of defense before there is a breach to the core. These lines help to protect the patient from more severe pain. Nursing interventions strengthen and reinforce the lines of resistance. Pharmacological interventions protect the core and manage pain at the cellular level.

Gate Control Theory

This theory along with the pathophysiology of pain and the pharmacological management of pain are used to explain the mechanisms of pain, and the physiological response to opioids for pain management. The Gate Control Theory (GCT) focuses on the physiological aspects of pain and how pain is transmitted. The GCT states that nociceptive impulses are transmitted from specialized skin receptors to the spinal cord through small A and larger C fibers. These fibers terminate in the substantia gelatinosa, in the dorsal horn of the spinal cord. Cells in the substantia gelatinosa function as a gate, regulating transmission of impulses to the central nervous system. Stimulation of larger fibers causes the cells in the substantia gelatinosa to “close the gate”. Small fiber input inhibits cells in the substantia gelatinosa and opens the gate. An open gate increases the stimulation of trigger cells.
increases transmission of impulses, and enhances pain perception. In addition to gate control through large and small fiber stimulation, the central nervous system, through efferent pathways may close, partially close, or open the gate. As a result, cognitive functioning may modulate pain perception. Interaction of the cognitive /evaluative, motivational / affective, and sensory / discriminative systems determines the individual’s response to pain (Ludwig-Beymer, Huether, & Schoessler, 1994). The pathophysiology of cancer pain includes a series of neurophysiologic and neuropharmacologic changes that occur initially in the peripheral nervous system and produces secondary changes in the central nervous system.

The pharmacologic management of cancer pain accounts for the major source of pain treatment. There are two classifications of pain medications used to treat cancer pain, nonopioids and opioids (Foley & Sunderson, 1985). Nonopioid analgesics are used for mild to moderate pain. The mechanism of action is thought to reduce or to prevent sensitization of pain receptors to nociceptive stimuli by preventing prostaglandin release. Many of these drugs have analgesic, anti-inflammatory, and antipyretic effects. The standard approach to manage cancer pain is opioid-based pharmacotherapies (Lesage & Portenoy, 1999). Opioids interfere with pain perception in the central nervous system, but not all opioid receptors are found in the central nervous system. They are also in the musculoskeletal structures, in visceral and vascular smooth muscle, and at the terminals of sympathetic and sensory peripheral neurons (Li, 2002).

These mechanisms of action for pain medications is the one of the main reasons why the nurses are required to make a minimum of four hour pain assessments for patients who are having pain. The nurses are also required to follow-up with their patients with in one hour after administering a narcotic pain medication. It is imperative that the nurses assess and document their patients’ pain intensity ratings and comfort goals so that their patients are receiving adequate and safe pain management.

Malcolm Knowles’ Principles of Andragogy

This non-nursing theory was used with Neuman and the Gate Control Theory to guide this study. It is at the secondary and tertiary prevention levels where
Knowles’ principles are utilized. Nurses must understand the principles of adult learning to better educate their patients. And Nurse Educators must also understand and utilize Knowles’ principles to better educate nurses. This study demonstrated the need for continued education regarding pain assessment and documentation. Utilizing the principles of andragogy to educate patients and nurses about pain can enhance the teaching-learning process, can increase receptiveness to learning, and can promote a positive learning environment. According to Knowles, there are several assumptions to be made about adult learners; (a) they are self-directed; (b) they can utilize life experiences as a resource for learning; (c) they must perceive a need to know; and (d) they are problem-centered and interested in immediate application of knowledge. These assumptions guided the educational intervention provided to the nurses. The researcher attempted to enhance the participants’ awareness of the “need to know” in the invitational letter presented to each nurse. The letter included the purpose of the study and described the benefits and risk of the research. The format and time obligation were also discussed. Every nurse was given an invitation to participate, and only those who had a desire to participate did. By presenting case studies, the educator was able to aid the learner in applying the concepts to situations that occur. The nurses were able to select the time and date of an educational session and the educator set these times from the information obtained from the PMNAS, that the nurses specified. The educator could make the assumption that the nurses that came to the educational session were motivated to learn, based on their willingness to participate.

*Barriers of Effective Pain Management and Lack of Adequate Pain Management Documentation*

According to the Joint Commission on Accreditation of Healthcare Organizations (JCAHO), 2000, the majority of nurses are not meeting JCAHO standards of care in the management and documentation of cancer-related pain, and this study concurs. The majority of the nurses in this study did not meet their patients’ pain goals. In this study, the nurses are meeting the patients’ comfort goals on average 13.8% of the time pre-intervention and 5.6% of the time post-intervention. Not only was there a decrease in the times comfort goals were met, there was also a
decrease in the number of nursing pain management documentations from the pre-intervention to the post-intervention medical record reviews. The top four barriers identified by this study were: (a) too many patients, not enough time cited by the nurses 14 times; (b) medications not available in Pxysis, cited by the nurses 7 times; (c) the third barrier was fear of over-sedation, cited 7 times, and; (d) fear of patient respiratory suppression, also cited 7 times.

Combined Model

The predominant theory that binds the conceptual framework together is Neuman’s Systems Model. Pain pathophysiology, Gate Control Theory and Malcolm Knowles Theory are melded into a working model of pain management, with the patient at the center of care to guide this study. In the following, Figure 3 is the Model for Pain Management that depicts these theories combined.

Figure 3.- Model for Pain Management. The core is the basic constitution of the patient. It is the cellular level at which pain is sensed by nociceptors and responded to by the gate control system, neurotransmitters and the central nervous system. Stressors, indicated by the orange lines, can affect the patient at any level in their defense system. The effect of the stressors is dependent upon the patients’ basic core defenses, natural and learned resistances, and time of encounter to the stressors. Primary (green line), secondary (blue line), and tertiary preventions can be patient or nursing interventions that reduce, or eliminate, the effects of the stressors on the core. Interventions strengthen the flexible line of defense and reinforce the lines of resistance and, thereby, decrease the degree of reaction of the stressors. Knowles is incorporated at the primary and tertiary levels when the nurses and patients are being educated.
Implications for Nursing

Nursing Practice

All nurses have the responsibility to prevent patients from having unrelieved pain. These responsibilities are outlined in standards of practice, best practice guidelines, and institutional policies and procedures. The implications for nursing from this study include an emphasis of the need for nurses to manage patients’ pain, and document appropriately. This can be accomplished through regular assessments, using pain intensity ratings and comfort goals along with appropriate interventions and documentation of these findings, in accordance with the standards of practice and institutional policies. Nurses must continue to expand their knowledge of pain management and provide their patients with state of the art cancer pain management. Accurate assessments of the patient’s pain ratings, along with all of the other factors that play a role in pain perception are vital to the outcome. Cancer pain has been perceived as hard to manage and is often underrated, and under-treated by healthcare professionals.

Advanced Practice Nursing

The advanced practice nurse (APN) is the caregiver, consultant, educator, leader, and researcher in providing quality health care. These roles are inherent to advanced practice nursing, and, as such, the APN needs to stay abreast in approaches to, and the treatment of, cancer pain. The APN has the responsibility for making contributions to quality health care, particularly for vulnerable populations, such as individuals with cancer-related pain. The intervention of the APN in the acute care setting should be directed towards identifying gaps between the provision of health care and patient outcomes. In addition, APNs could provide important linkages with other members of the healthcare team, in order to create multidisciplinary care rounds or a team with a focus on pain management.

The science of pain management is complex, and there are educational and practice voids about the art of caring for cancer patients in pain. APNs need to have a broad knowledge of cancer pain management, as they will do the assessing, treating, managing, consulting, and educating these patients.
Nursing Administration

Nurse administrators in the inpatient setting are ultimately responsible for ensuring positive patient outcomes. Administrators of clinical organizations must ensure proper pain management to their patients and to the community. The primary focus of today’s healthcare administrators is to deliver cost-effective care and ensure patient satisfaction. They also have the duty and responsibility to empower and align with the APNs to implement a strategic plan designed to improve pain management practices within their organizations. By supporting APNs in continuing educational activities, administrators will enhance organizational pain management activities, improve patient outcomes, and increase nursing and patient satisfaction.

Increased LOS is directly related to increased hospital cost. When patients are having unrelieved pain their hospitalization will be longer, which adds to hospital cost. Also, there is a human cost to pain, increased suffering and decreased patient satisfaction with their pain management.

Nursing Education

Education on pain management should be an essential part of nursing curricula at both graduate and undergraduate levels. Nursing curricula should incorporate the importance of primary, secondary, and tertiary prevention strategies in caring for patients with pain. This will provide all nurses with a basic foundation on which they can grow in their knowledge of pain, as it relates to cancer patients and other populations of patients with differing pain and pain syndromes. Nurse educators have a critical role in regard to pain education. Their role is pivotal in raising awareness and increasing the knowledge base of nurses, regarding the impact on patient outcomes that is caused by unrelieved pain.

Recommendations for Future Research

The replication of research strengthens the findings of studies. Therefore, similar studies should be conducted to evaluate educational interventions to increase nursing documentations. In addition, further research is needed on the long term effects of inadequate pain management in the cancer patient population. As this study illustrates, Neuman’s Systems Model can be utilized when caring for oncology patients. By treating the patient as a whole, decreasing the stressors, and intervening
on all three levels of prevention, then the patients’ pain will be better managed and there will be an increase in patients’ comfort goals being met. The principles of andragogy for adult learners must also continue to be researched in the healthcare setting. This especially includes evaluating the variables that prevent older and more experienced nurses from changing their behaviors as readily as younger, less experienced nurses. Constant surveillance may be required by administration. Routine chart reviews and nursing in-services to provide the nurses with feed-back on their documentation progress. The oncology CNS can coach individual staff members as to their particular documentation deficits, and offer solutions to help the nurses manage pain more effectively. A peer review group, where the nurses are allowed to evaluate each others’ pain documentation behaviors, may be a better approach and increase nursing autonomy. With the new EMR, staff nurses will have to vigilant with their pain assessments and documentations to be in compliance with JCAHCO and institutional policy. This may be another area for future research, comparing paper documentation and EMR documentation as to pain management documentations.

Summary

This study demonstrated the effectiveness of an educational intervention on the nursing knowledge/attitudes and documentation regarding cancer pain management. As previously stated, in order to meet the requirements of regulatory agencies and policies implemented by the facility, additional educational interventions and follow-up chart reviews will need to be conducted. However, as shown by this study and others, an individual educational intervention may not be enough to change nursing documentation behaviors. This study supports the used of Neumans Systems Model, Knowles’ Principles of Andragogy, and The Gate Control Theory as theoretical framework to guide the study. Even though there was an increase in the nursing knowledge/attitudes regarding cancer pain management, there remains a lack of documentation of accurate pain assessments and patient comfort goals in the patients’ medical records. There is a moral and ethical obligation to cancer patients to manage their pain and to prevent needless suffering that is associated with the under treatment of pain. Advanced Practice Nurses must educate,
support, and mentor nurses on an ongoing basis about pain and conduct chart reviews to ensure adherence to these policies. Fear of pain is the patients number one cause for fear and nurses must meet patients’ comfort goals, not only to alleviate this fear, but to promote healing and a return to an optimal level of wellness.
APPENDIX A

NURSING KNOWLEDGE AND ATTITUDE SURVEY REGARDING PAIN
Dear Colleague:

We have had many inquiries regarding the need for an instrument to measure nurses' knowledge and attitudes regarding pain. Therefore, we have prepared our instrument for distribution to others. The tool can be used to assess nurses in your setting and as an evaluation measure following educational programs. The tool was developed in 1987 and has been used extensively from 1987 - present. The tool was recently revised and tested in a pain education course with greater than 800 subjects. Psychometric analysis will be conducted on this data using the updated version.

The following data was based on evaluation of the previous version.

- Regarding issues of reliability and validity: This tool has been developed over several years. Content validity has been established by review of pain experts. The content of the tool is derived from current standards of pain management such as the American Pain Society, the World Health Organization, and the Agency for Health Care Policy and Research. Construct validity has been established by comparing scores of nurses at various levels of expertise such as students, new graduates, oncology nurses, graduate students, and senior pain experts. The tool was identified as discriminating between levels of expertise. Test-retest reliability was established ($r>.80$) by repeat testing in a continuing education class of staff nurses (N=60). Internal consistency reliability was established (alpha $r>.70$) with items reflecting both knowledge and attitude domains.

- Regarding analysis of data: We have found that it is most helpful to avoid distinguishing items as measuring either knowledge or attitudes. Many items such as one measuring the incidence of addiction really measures both knowledge and attitude issues. Therefore, we have found the most benefit to be gained from analyzing the data in terms of the percentage of complete scores as well as in analyzing individual items. For example, we have found it very helpful to isolate those items with the least number of correct responses and those items with the best scores.
Enclosed for your use is a copy of our instrument and an answer key. You may use and duplicate the tool for any purpose you desire in whole or in part. References to some of our studies which have included this tool or similar versions are included below.

We hope that our tool will be a useful aid in your efforts to improve pain management in your setting.

Sincerely,

Betty R. Ferrell, RN, PhD, FAAN
Associate Research Scientist
8/97

Margo McCaffery, RN, MS, FAAN
Lecturer and Consultant
References:


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<td>1. Observable changes in vital signs must be relied upon to verify a patient’s statement that he has severe pain.</td>
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<td>2. Because of an underdeveloped neurological system, children under 2 years of age have decreased pain sensitivity and limited memory of painful experiences.</td>
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<td>3. If the patient can be distracted from his pain this usually means that he does NOT have high pain intensity.</td>
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<td>4. Patients may sleep in spite of severe pain.</td>
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<td>5. Comparable stimuli in different people produce the same intensity of pain.</td>
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<td>6. Aspirin and other nonsteroidal anti-inflammatory agents are NOT effective analgesics for bone pain caused by metastases.</td>
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<td>7. Non-drug interventions (e.g. heat, music, imagery, etc.) are very effective for mild-moderate pain control but are rarely helpful for more severe pain.</td>
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<td>8. Respiratory depression rarely occurs in patients who have been receiving opioids over a period of months.</td>
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<td>9. Aspirin 650 mg PO is approximately equal in analgesic effect to meperidine (Demerol) 50 mg PO.</td>
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<td>10. The World Health Organization (WHO) pain ladder suggests using single analgesic agents rather than combining classes of drugs (e.g. combining an opioid with a non-steroidal agent).</td>
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<td>11. The usual duration of action of meperidine (Demerol) IM is 4-5 hours.</td>
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<td>12. Research shows that promethazine (Phenergan) is a reliable potentiator of opioid analgesics.</td>
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<td>13. Patients with a history of substance abuse should not be given opioids for pain because they are at high risk for repeated addiction.</td>
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<td>14. Beyond a certain dosage of morphine increases in dosage will NOT increase pain relief.</td>
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<td>15. Elderly patients cannot tolerate opioids for pain relief.</td>
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<td>16. The patient with pain should be encouraged to endure as much pain as possible before resorting to a pain relief measure.</td>
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<td>17. Children less than 11 years cannot report pain with reliability and therefore, the nurse should rely on the parents’ assessment of the child’s pain intensity.</td>
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18. Based on one’s religious beliefs a patient may think that pain and suffering is necessary.

19. After the initial recommended dose of opioid analgesic, subsequent doses are adjusted in accordance with the individual patient’s response.

20. The patient should be advised to use non-drug techniques alone rather than concurrently with pain medications.

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

22. In order to be effective, heat and cold should only be applied to the painful area.

Multiple Choice – Place a check by the correct answer.

23. The recommended route of administration of opioid analgesics to patients with prolonged cancer-related pain is
   a. intravenous
   b. intramuscular
   c. subcutaneous
   d. oral
   e. rectal
   f. I don’t know

24. The recommended route of administration of opioid analgesics to patients with brief, severe pain of sudden onset, e.g. trauma or postoperative pain, is
   a. intravenous
   b. intramuscular
   c. subcutaneous
   d. oral
   e. rectal
   f. I don’t know

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. Brompton's cocktail
   b. codeine
   c. morphine
   d. meperidine (Demerol)
   e. methadone
   f. I don’t know

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 q4 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 chronic cancer pain has been receiving daily opioid analgesics for 2 months. The dose increased during this time period. Yesterday the patient was receiving morphine 200 mg/hour intravenously. Today he has been receiving 250 mg/hour intravenously for 3 hours. The likelihood of the patient developing clinically significant respiratory depression is
   ______ a. less than 1%
   ______ b. 1-10%
   ______ c. 11-20%
   ______ d. 21-40%
   ______ e. > 41%

29. Analgesia for chronic cancer pain should 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

30. The most likely explanation for why 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.

31. Which of the following drugs are useful for treatment of cancer pain?
   ______ a. Ibuprofen (Motrin)
   ______ b. Hydromorphone (Dilaudid)
   ______ c. Amitriptyline (Elavil)
   ______ d. All of the above

32. 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

33. Which of the following describes the best approach for cultural considerations in caring for patients in pain:
   ______ a. Because of the diverse and mixed cultures in the United States, there are no longer cultural influences on the pain experience.
   ______ b. Nurses should use knowledge that has defined clearly the influence of pain on culture (e.g. Asian patients are generally stoic, Italians are expressive and exaggerate their pain, etc.)
   ______ c. Patients should be individually assessed to determine cultural influences on pain.

34. What do you think is the percentage of patient who overreport the amount of pain they have? Circle the correct answer.
   0 10 20 30 40 50 60 70 80 90 100%

35. Narcotic/opioid addiction is defined as psychological dependence accompanied by overwhelming concern with obtaining and using narcotics for psychic effect, not for medical reasons. It may occur with or without the physiological changes of tolerance to analgesia and physical dependence (withdrawal).

Using this definition, how likely is it that opioid addiction will occur as a result if treating pain with opioid analgesics? Circle the number closest to what you consider the correct answer.
< 1.5% 25% 50% 75% 100%
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.

36. **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.

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   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 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.

37. **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 assessment of Robert’s pain:

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   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 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 B

PAIN MANAGEMENT NURSING ASSESSMENT SURVEY
**Pain Management Needs Assessment Survey**

1. **Educational Preparation**
   - (a) LPN
   - (b) Diploma
   - (c) ADN
   - (d) BSN
   - (e) Masters Degree

2. **Age**
   - (a) 20-30 years
   - (b) 30-40 years
   - (c) 40-50 years
   - (d) > 50 years

3. **Sex**
   - (a) Female
   - (b) Male

4. **Ethnicity**
   - (a) African American
   - (b) Asian
   - (c) Caucasian
   - (d) Hispanic
   - (e) Other

5. **Religion**
   - (a) Baptist
   - (c) Catholic
   - (d) Christian
   - (e) Jewish
   - (f) Methodist
   - (g) Pentecostal
   - (h) Seventh Day Adventist
   - (i) Other

6. **Years in Nursing**
   - (a) 0-5 Years
   - (b) 6-10 Years
   - (c) 11-15 Years
   - (d) 16-20 Years
   - (e) 21-30 Years
   - (f) > 30 Years

7. **Years in Oncology Nursing**
   - (a) 0-5 Years
   - (b) 6-10 Years
   - (c) 11-15 Years
   - (d) 16-20 Years
   - (e) 21-30 Years
   - (f) > 30 Years

8. Please rank the most important issues you need information about related to pain management, with 1 being most important.
   - (a) Pain Assessment
   - (b) Pharmacologic Management of Pain
   - (c) Technical Skills with Analgesia Pumps
   - (d) Non-pharmacologic interventions
   - (e) Psychological Issues in Pain
   - (f) Pain Management in Specialty Populations (elderly, children, ICU)
   - (g) Other: ________
9. Rank the top pain management barriers that prevent you from performing pain management to the level that you would like, with 1 being the biggest barrier. Leave blank if not a barrier for you.
   ___ (a) too many patients to care for, or not enough time
   ___ (b) medications not available in Pxisys
   ___ (c) do not know which PRN to give if more that one is ordered
   ___ (d) not sure if patient is reporting pain intensity rating accurately (pain 1-10 scale)
   ___ (e) do not believe patients pain intensity rating
   ___ (f) not sure what non-pharmacologic interventions would be beneficial
   ___ (g) afraid of over-sedation
   ___ (h) afraid of respiratory suppression
   ___ (i) apprehensive about approaching physician, charge nurse, or other if pain medication is inadequate
   ___ (j) other(s): __________________

10. How have you utilized your Pain Liaison Nurse?
    ___ (a) consultation for individual patient pain management
    ___ (b) provision of pain management staff in-services
    ___ (c) orienting new nurses to pain management
    ___ (d) development of patient education materials
    ___ (e) equianalgesic conversion problems
    ___ (f) patient advocacy issues with medical staff
    ___ (g) do not utilized pain liaison nurse, or don’t know who the pain liaison nurse is

11. Please rank the top three methods of education that you prefer, with 1 being the most preferred.
    ___ (a) case studies
    ___ (b) lectures
    ___ (c) journal articles
    ___ (d) video
    ___ (e) games
    ___ (f) self-directed learning packet
    ___ (g) unit resource manual

12. Please Rank the top three best times of day to schedule an educational offering, with 1 being the most preferred.
    ___ (a) 0600-0700
    ___ (b) 0800-0900
    ___ (c) 1100-1200
    ___ (d) 1400-1500
    ___ (e) 1600-1700
    ___ (f) 1800-1900
    ___ (g) 1900-2000
APPENDIX C

PATIENT DATA COLLECTION TOOL
### Patient Data Collection Form

**Demographics**
- Age_________________
- Gender_________________
- Ethnicity_________________
- Religion_________________

- MR #_________________
- Admit Date_________________
- DC Date_________________
- LOS_________________
- Diagnosis_________________
- BMI_________________

<table>
<thead>
<tr>
<th>Time</th>
<th>Score</th>
<th>Patient's Comfort Goal</th>
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<tr>
<th>Time</th>
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</tr>
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</table>

**Difference: (met/not met)**

- 
- 
- 

**Non-Pharmacologic Interventions offered for pain ratings above comfort goal**

- 
- 
- 
- 
-
APPENDIX D

FLORIDA STATE UNIVERSITY APPROVAL LETTER
APPROVAL MEMORANDUM

Date: 8/31/2005

To:
Dawn Bishop
6435 Cavalcade Trail
Tallahassee, FL 32309

Dept.: NURSING

From: Thomas L. Jacobson, Chair

Re: Use of Human Subjects in Research
Nursing Knowledge and Attitudes Regarding Cancer Pain Management

The forms that you submitted to this office in regard to the use of human subjects in the proposal referenced above have been reviewed by the Secretary, the Chair, and two members of the Human Subjects Committee. Your project is determined to be Exempt per 45 CFR § 46.101(b) 2 and has been approved by an accelerated review process.

The Human Subjects Committee has not evaluated your proposal for scientific merit, except to weigh the risk to the human participants and the aspects of the proposal related to potential risk and benefit. This approval does not replace any departmental or other approvals, which may be required.

If the project has not been completed by 8/30/2006 you must request renewed approval for continuation of the project.

You are advised that any change in protocol in this project must be approved by resubmission of the project to the Committee for approval. Also, the principal investigator must promptly report, in writing, any unexpected problems causing risks to research subjects or others.

By copy of this memorandum, the chairman of your department and/or your major professor is reminded that he/she is responsible for being informed concerning research projects involving human subjects in the department, and should review protocols of such investigations as often as needed to insure that the project is being conducted in compliance with our institution and with DHHS regulations.

This institution has an Assurance on file with the Office for Protection from Research Risks. The Assurance Number is IRB00000446.

Cc: Jeanne Flannery
HSC No. 2005.631
APPENDIX E

TALLAHASSEE MEMORIAL APPROVAL LETTER
September 1, 2005

Dawn Bishop, RN
6435 Cavalcade Trail
Tallahassee, FL 32309

Dear Ms. Bishop:

Your study “Nursing Knowledge and Attitudes Regarding Cancer Pain Management” has been reviewed by Larry C. Deeb, M.D., Chair / IRB. Your study meets the criteria for an Expedited Review and upon receipt of this letter you may proceed with your study.

The expiration date of this approval is September 1, 2006, one year from the approval date. If your study will not be completed by that date, you will need to submit to the TMH IRB an application for continuing review/approval two (2) months in advance of the expiration date. You will also need to request approval throughout this study to make any amendments to either the study protocol or the informed consent.

For your records, a copy of the Informed Consent with stamped IRB approval, and the approved IRB Waiver of HIPAA Privacy Authorization is enclosed. Please provide a copy of your completed results to the Medical Staff Office at Tallahassee Memorial HealthCare so that the results can be archived and presented to the Institutional Review Board.

Sincerely,

Richard I. MacArthur, M.D., MS
Administrative Liaison/IRB

IRB# 48
HARUB/Expedit review Irs/Bishop D 48.doc

VHA
Member of the Voluntary Hospitals of America (VHA) System
APPENDIX F

HEALTHCARE INFORMATION PORTABILITY PRIVACY ACT WAIVER
TALLAHASSEE MEMORIAL HEALTHCARE, INC.
IRB RECORD OF APPROVAL OF REQUESTED WAIVER

APPROVAL RECORD
FOR IRB USE ONLY

IRB Protocol No: ________________

Reviewed by: □ Convened IRB
               IRB Chair or Vice Chair pursuant to expedited procedures

1. The use or disclosure of protected health information involves:
   □ MINIMAL RISK to individual privacy.
   □ MORE THAN MINIMAL RISK to individual privacy.

2. There □ IS
       □ IS NOT
       an adequate plan to protect identifiers from improper use/disclosure.

3. There □ IS
       □ IS NOT
       an adequate plan to destroy identifiers at the earliest opportunity.

4. There □ ARE
       □ ARE NOT
       adequate written assurances that information will not be reused/redisclosed.

5. The research □ COULD NOT
       □ COULD
       practically be conducted without the waiver or alteration.

6. The research □ COULD NOT
       □ COULD
       practically be conducted without the protected health information.

The request for waiver or alteration of authorization is:

□ Not Approved
□ Approved as a Waiver (the first box must be checked for all the elements above)
□ Approved as an Alteration (description of nature of alteration required):

__________________________
Signature of IRB Chair or Vice Chair

__________________________
Joel Kramer M.D.
Print Name

9/11/05
Date

Created 4/8/05
C:/Documents and Settings/e0575551/My Documents/theia/FHPPA/WSA1.doc

Page 5 of 5
INFORMED CONSENT FORM

Title of Research: Nursing Knowledge and Attitudes Regarding Cancer Pain Management

I freely and voluntarily, and without any element of force or coercion, consent to participate in this study. I have been informed that this project is to be conducted, as part of the degree requirements, by Dawn L. Bishop, a registered nurse, who is currently enrolled in the graduate nursing program at Florida State University. The study will take place during August 19, through October 21, 2005, under the guidance of Jeanne Flannery, DSN, ARNP, a professor in the School of Nursing.

I understand that the purpose of this research project is to evaluate the effectiveness of an educational intervention, and filling out a paper and pencil pain management needs assessment and nursing knowledge and attitude survey.

I understand that once I give my consent, my participation will involve attending an educational session and filling out paper and pencil surveys with general information about my self. The total commitment time will be about two hours, divided into two 30-minute survey sessions and a one-hour educational presentation.

I understand that the chart reviews will be conducted prior to and after the pain education session. The chart reviews are institutionally driven for quality improvements and my nurse's notes will not be identified or tied to me personally. Nor is the chart review being conducted to evaluate any treatments by physicians. The chart review is designed to evaluate the frequency of nurses' pain assessments and documentations.

I understand that my privacy will be protected at all times. All information gathered during the course of this study will remain confidential to the extent allowed by law, and only group findings will be reported. All information will be identified by a code number, and no names will appear in any report. The data will be locked in a file cabinet in the researcher's office until June 2010, after which they will be destroyed. Only the researcher and the data analyst committee will have access to the data. The research results of this study may be published but my name or identity will not be revealed.

Page 1 of 2
Participant's Initials____
I understand that I will not be paid by the researcher to participate in this study. However, I understand that I will be permitted to attend the educational session during work hours if I choose, and I will be paid by the hospital for this time.

I understand that there may be potential benefits for participating in this research project. First, my own awareness about pain management may be increased. Also, I will be providing researchers with valuable insight into pain management practices for cancer patients. This knowledge can assist in improving pain assessment documentation by nurses.

I understand that there is a minimal level of foreseeable risk involved in this study if I agree to participate in this study. I might experience anxiety or guilt when reflecting on my cancer pain management practices. The nurse researcher will be available to discuss any emotional discomfort I may experience while participating.

I understand that my participation is voluntary and that I may withdraw from the study at any point without penalty. I have been given the opportunity to ask questions about this study, and my questions have been answered to my satisfaction. Any additional questions I have concerning the research study or my participation in it, before and after my consent, will be answered by Dr. Jeannie Flannery at Florida State University, School of Nursing at (850) 644-5626 or Dawn Bishop at (850) 668-0804.

In case of injury or in the event that I have questions about my rights as a participant in the research study, I can contact the Chair of Florida State University Human Subjects Committee through the office of the Vice President for Research at (850) 644-8633. The nature, demand, benefits, and any risk of the project have been explained to me. I knowingly assume any risk involved. I understand that in signing this consent form, I am not waiving any legal claims, rights, or remedies.

I have read the entire informed consent form and have been offered a copy with my signature.

Participant Signature_________________________ Date____________________

Printed Name of Participant__________________________

Participant’s Initials____
APPENDIX G
INFORMED CONSENT
INFORMED CONSENT FORM

Title of Research:  Nursing Knowledge and Attitudes Regarding Cancer Pain Management

I freely and voluntarily, and without any element of force or coercion, consent to participate in this study. I have been informed that this project is to be conducted, as part of the degree requirements, by Dawn L. Bishop, a registered nurse, who is currently enrolled in the graduate nursing program at Florida State University. The study will take place during August 19, through October 21, 2005, under the guidance of Jeanne Flannery, DSN, ARNP, a professor in the School of Nursing.

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Page 1 of 2

Participant’s Initials___
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I understand that there may be potential benefits for participating in this research project. First, my own awareness about pain management may be increased. Also, I will be providing researchers with valuable insight into pain management practices for cancer patients. This knowledge can assist in improving pain assessment documentation by nurses.

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In case of injury or in the event that I have questions about my rights as a participant in the research study, I can contact the Chair of Florida State University Human Subjects Committee through the office of the Vice President for Research at (850) 644-8633. The nature, demand, benefits, and any risk of the project have been explained to me. I knowingly assume any risk involved. I understand that in signing this consent form, I am not waiving any legal claims, rights, or remedies.

I have read the entire informed consent form and have been offered a copy with my signature.

Participant Signature __________________________ Date __________________________

Printed Name of Participant ____________________________________________

Participant’s Initials ______
APPENDIX H
INVITATION TO PARTICIPATE
Dear ADCU Colleagues,

As many of you are aware, for the past several years I have been working on
obtaining my master’s degree. As part of the course work, I am required to complete a
thesis. My thesis title is Nursing Knowledge and Attitudes Regarding Cancer Pain
Management.

It is my hope that all of you will participate by reviewing and signing the
informed consent and returning it to me in the envelope on my door. Then by completing
the 2 surveys enclosed and returning them to me in this envelope.

All information will remain confidential and I will compile the data and present it
to you in an inservice format. About 30 days after the inservices, I will ask you again to
complete one of the surveys.

When my research project is complete, I will present all the information I learned
to you. I want to thank you for your consideration of my study.

Dawn Bishop

PLEASE RETURN ALL FORMS TO ME BY SEPTEMBER 12, 2005
REFERENCES


BIOGRAPHICAL SKETCH

Dawn Lynn Bishop graduated from Florida State University with a Bachelor of Science in Nursing in December of 1995. Previously, she held an Associate Degree in Nursing from Gulf Coast Community College. She currently lives in Tallahassee, Florida, with her husband, David, and their two sons, Joshua and Jacob.

Dawn has been employed by Tallahassee Memorial in the Oncology Department since 1987. During which time, she has been a Staff Nurse, Outpatient Coordinator, and a Nurse Manager. She is currently a Clinical Nurse Specialist in Oncology at Tallahassee Memorial Hospital.

Dawn’s personal interests include reading, watching her son’s sporting activities, family outings, and weekends at the beach. She plans to publish her thesis manuscript to heighten the awareness of oncology nurses regarding the importance and effects of superior cancer pain management.