

ASSESSING NORTH DAKOTA NURSE PRACTITIONERS' KNOWLEDGE OF THE
NATIONAL COMPREHENSIVE CANCER NETWORK'S TREATMENT
GUIDELINES FOR ADULT CANCER PAIN

A Dissertation
Submitted to the Graduate Faculty
of the
North Dakota State University
of Agriculture and Applied Science

By

Lisa Marie Schoenberg

In Partial Fulfillment of the Requirements
for the Degree of
DOCTOR OF NURSING PRACTICE

Major Department:
Nursing

February 2013

Fargo, North Dakota

North Dakota State University
Graduate School

Title

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Lisa Schoenberg

The Supervisory Committee certifies that this *disquisition* complies
with North Dakota State University's regulations and meets the
accepted standards for the degree of

DOCTOR OF NURSING PRACTICE

SUPERVISORY COMMITTEE:

Donna Grandbois, PhD

Chair

Loretta Heuer

Brenda Hall

Jack Rydell

Kara Falk

Approved:

3-6-2013

Date

Carla Gross

Department Chair

ABSTRACT

The purpose of this project was to determine if access to the National Comprehensive Cancer Network's guidelines on the treatment of adult cancer related pain increased nurse practitioner knowledge and utilization in practice. The guidelines were provided to nurse practitioners who practiced within an oncology setting in North Dakota to assess whether their knowledge of pain management increased and if they found the guidelines to be a useful tool to have in practice. A pre-intervention questionnaire was sent to the participants to gain demographic information, including, age and gender, type of certification, primary area of practice, number of years practicing as an nurse practitioner, hours spent in clinical practice per week, and the average number of oncology patients seen per week. In addition, the pre-intervention questionnaire evaluated current treatment modalities the participants utilized in treating cancer related pain.

After receiving the pre-intervention questionnaires, the National Comprehensive Cancer Network's guidelines were distributed to the participants who agreed to utilize them for the duration of this project. The participants were given the full guidelines, a pocketbook of the guideline's algorithms, and instructions for utilizing the phone application of the guidelines. A post-intervention questionnaire was sent out three months after the guidelines were distributed assessing their impact on nurse practitioner practice. Overall, the participants felt that the guidelines increased their knowledge on treatment modalities for cancer related pain and found them to be a useful resource in practice. From this project we can assume that the evidence based guidelines provided from the National Comprehensive Cancer Network are beneficial for novice and experienced nurse practitioners practicing in oncology.

ACKNOWLEDGMENTS

First and foremost I would like to thank my family for their encouragement and support during the past three years as I pursued my graduate degree. My husband, Josh, and two beautiful young boys, Landon and Lane, have provided me with the motivation needed to continue my education and conduct this project. They have dealt with my busy schedule and pushed me to work harder at times. My husband has worked extra hours over the past years in order to provide for our family for which I cannot thank him enough. My mother has also been an encouragement throughout the past years. Watching her be a single mom and develop her career gave me the internal motivation to go into the nursing field and ultimately to obtain a graduate degree. My family's love and support has been overwhelming and I am grateful for all they do.

I would also like to thank my project committee for all the help and encouragement provided to me as I wrote this project. Primarily I would like to thank my advisor and committee chair, Dr. Donna Grandbois, who has challenged me throughout the years and provided me with the education and support I needed in writing this project.

Lastly I would like to thank all of my extended family, friends, and co-workers whom I did not get to see as often over the past few years. The encouragement and support I received was unexpected and uplifting.

DEDICATION

This project is dedicated to my grandmother, Augusta 'Susan' Jaicks, who died from complications related to metastatic breast cancer in 2006, and to the numerous oncology patients I have worked with over the years who suffered from uncontrollable pain.

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CHAPTER 1. INTRODUCTION

Background & Significance

Despite advances in pharmacotherapy, nursing care, and symptom control, cancer remains the second leading cause of death in the United States, just behind cardiovascular disease (Kochanek, Xu, Murphy, Minin, & Kung, 2011). In fact, cancer mortality rates have changed little over the last 50 years (Remington & Brown, 2011). Since the 1960's, the mortality rates for breast, uterine, colon, stomach, and prostate cancers have declined; however, the death rate for lung cancer has increased, leading to the minimal decline in overall cancer mortality (Remington, & Brownson, 2011). In addition to the high mortality rates, annual incidence rates continue to increase. According to the American Cancer Society (2012), new cancer diagnoses in the United States will be more than 1.6 million by the end of 2012. The estimates for new cancer diagnoses in 2012 are highest among prostate, breast, lung, and colon cancers (American Cancer Society [ACS], 2012).

Although mortality rates remain high, relative survival rates of cancer have increased from 50 percent in 1975 to 67 percent in 2007 (ACS, 2012). Relative survival rates are often examined in cancer research and indicate the number of patients surviving with a cancer diagnosis divided by the total population for a given period of time. The increase in relative survival is largely due to the advances taken in earlier diagnosis and treatment modalities (ACS, 2012). With an increase in survival time, symptom management, such as pain, will be a key component in the treatment of patients diagnosed with cancer.

Pain, dyspnea, and depression are the leading concerns for patients diagnosed with cancer (Lorenz et al., 2008). Cancer related pain is both worrisome to patients and

their providers. According to Jost and Roila (2010), pain is prevalent at some point during the disease process in more than 80 percent of cancer patients. Many patients diagnosed with cancer will benefit from the World Health Organization's (WHO) analgesic ladder for pain management (Hagen, Biondo, & Stiles, 2008). Although effectiveness has been shown, the WHO's pain ladder is not adequate for the treatment of all cancer related pain, as shown by the continued high pain prevalence rates.

The National Comprehensive Cancer Network (NCCN) developed new guidelines in 2011 for the treatment of adult cancer related pain. The NCCN is a non-profit organization comprised of the world's twenty-one leading cancer centers whose primary goal is to "improve the quality, effectiveness, and efficiency of oncology practice" (National Comprehensive Cancer Network [NCCN], 2011). Guidelines developed by the NCCN are based on the most current scientific evidence and reviewed by expert clinicians within the organization (NCCN, 2011). The pain management guidelines developed by the NCCN are specific to the type and intensity of the pain experienced by each individual patient. The use of the NCCN pain management guidelines is greatly needed in practice. Patients' pain has not been adequately controlled in the past; however, the NCCN provides clinicians with alternative treatment options and dosing guidelines that will allow better control for individual patients (NCCN, 2011). Due to the recent publication of the guidelines, research is needed to estimate their utilization in practice.

Although most nurse practitioners (NPs) work autonomously, NPs working in an oncology practice do not have their own patients. Cancer patients are managed by an oncologist, or a medical doctor who has specialized in cancer care, because of the extensive nature of the disease. NPs working in oncology will become key providers in

the care of cancer patients in the near future due to the shortage of medical oncologists and the increasing rate of new cancer diagnoses (ACS, 2012). New graduate NPs will be asked to fill the oncology role in many facilities. Rosenzweig et al. (2010) examined the knowledge needed by first year NPs practicing in oncology and found over 70 percent of those surveyed believed they were not proficient in managing oncologic emergencies, including pain management. The results of the study by Rosenzweig et al. (2010) show an increased need for oncology-related education and resources for the novice NP.

Problem & Purpose of the Project

Effectively treating cancer related pain has been shown to be difficult. The NCCN has provided a set of specific cancer pain treatment guidelines that would help novice and expert NPs in the treatment of cancer related pain. Due to the relatively recent development of the NCCN guidelines, there is a lack of research on the number of NPs who utilize them in practice and on the perceived barriers related to underutilization. The purpose of this practice improvement project was to 1) identify the demographics of North Dakota NPs who practiced in oncology, 2) identify current treatment strategies utilized by North Dakota NPs practicing in oncology in the treatment of cancer related pain, 3) provide NPs with specific evidence-based guidelines from the NCCN, and 4) investigate if utilization of the NCCN guidelines improves their practice.

Project Goals

1. NPs practicing in oncology within North Dakota will become familiar with the NCCN guidelines and algorithms on the treatment of adult cancer pain by having the guidelines readily available in practice.

2. NPs practicing in oncology within North Dakota will utilize the NCCN guidelines on the treatment of adult cancer pain in practice.

Project Objectives

1. Identify the number of NPs who practice in oncology in North Dakota.
2. Identify demographics of the participants, including age and gender, type of certification, primary area of practice, number of years practicing as an NP, hours spent in clinical practice per week, and the average number of oncology patients seen per week.
3. Identify current treatment modalities of pain utilized by North Dakota NPs practicing in oncology.
4. Identify if NPs practicing in oncology in North Dakota are utilizing the NCCN guidelines in practice pre and post intervention.
5. Identify barriers to the utilization of the NCCN guidelines in practice.
6. Identify if having the NCCNs evidence-based guidelines and algorithms on adult cancer pain treatment increases NP utilization and understanding, thus improving practice.

CHAPTER 2. LITERATURE REVIEW

Cancer is a general term used to describe many diseases. Normally, cells within the tissues of the body grow and divide in a controlled manner. When these normal cells become damaged or old, the body replaces them with new cells (National Comprehensive Cancer Network [NCCN], 2011). Cells that divide in an uncontrolled manner are given the term cancer. The development of these abnormal cells stems from damage or an unexpected change in the genetic material located within each of the body's cells (National Cancer Institute [NCI], 2011). The damaged cells produce mutations that alter the sequence of cell growth, division, and death, leading to an excess of mutated cells. The extra mutated cells will sometimes form together to create a tumor, or mass of tissue; however, not all cancers form tumors (NCI, 2011). Mutated cells that do not form tumors cause an overcrowding of cells leading to impaired bodily functions (NCCN, 2011). For consistency purposes throughout the project cancer was stated as any malignant disorder in which cells abnormally grow. This chapter explores a number of areas. The beginning of the chapter explains the definition of cancer and cancer related pain, the theoretical framework used to guide the project, and past and present cancer pain management. The latter half of the chapter provides clarification of a NP, NPs role in cancer pain management, NPs current knowledge and utilization of the NCCN guidelines, and gaps in the literature.

Classification of Cancers

Once a tumor has been formed, nutrition in the form of blood supply develops and provides continued growth. The body becomes deprived of nutrients in order to feed the tumor, leading to the characteristic symptom of unexplained weight loss in an otherwise

healthy individual. Spreading of cancer cells to other parts of the body can occur via the lymphatic system and blood supply. The spreading of malignant cells, or metastasis, leads to reinvasion of adjacent cells, allowing the cancer to grow at a new location (NCI, 2011). The cancer cells may be found within the body at various locations but are named according to the primary tumor's origin. For example, cancers that originate in the colon are termed colon cancer, while cancers that originate in the breast are termed breast cancer.

Grading and staging of the cancer occurs after the primary location of origin is determined. A numerical grade is assigned to most cancers based upon microscopic examination. Cancer cells with fewer abnormalities are given a low grade number, either grade I or II, while those with many abnormalities receive a higher grade number, either III or IV (NCI, 2011). Staging refers to the severity of the cancer based upon the size of the tumor, whether lymph nodes have been invaded, and whether the original cancer has spread to other parts of the body (NCCN, 2011).

Cancer Related Pain

Pain is one of the most common symptoms patients diagnosed with cancer experience. Cancer pain can be caused by a number of factors. Malignant cells that invade nearby tissue and organs often cause pain because of the increased pressure applied to these locations. Destruction and inflammation of tissue, and cancer treatment can also cause pain (Copstead & Banasik, 2010). Pain associated with cancer treatment is typically related to invasive procedures such as biopsies and tumor removal; however, intravenous administration of chemotherapy has also been shown to cause pain.

Many different types of cancer related pain exist. The type of pain is related to the pathophysiology mechanisms: nociceptive and neuropathic (NCCN, 2011). Nociceptors are present in the circulatory system, skin, muscle, and viscera (Copstead & Banasik, 2010). Injury or damage to somatic and visceral structures cause the release of nociceptors. Somatic nociceptive pain is often described as sharp, throbbing, and localized (NCCN, 2011). Somatic pain typically occurs as a result of bone metastases or from invasive surgical procedures (NCCN, 2011). Pain described as aching, cramping, or diffuse is often visceral nociceptive pain, and is caused by compression and infiltration of the cancer cells (NCCN, 2011). Neuropathic pain occurs as a result of injury to the central nervous system (CNS) or peripheral nervous system. Sharp, burning, or shooting pain is often neuropathic (NCCN, 2011).

Pain intensity is also measured by assigning a numerical value from the patient. Pain intensity provides the starting point for treatment. A pain scale of 0 to 10 is primarily used; however, pictorial scales can be used for patients who have limited English proficiency or for developmentally delayed patients. The pain should also be described by character (i.e., stabbing, shooting, ect.) in order to provide the appropriate analgesic (NCCN, 2011).

Although many treatment modalities exist, pain continues to be a concern for cancer patients and their providers. Van den Beuken-van Everdingen et al. (2007), reviewed the prevalence of pain over the past 40 years. Prevalence of pain in earlier studies ranged from 52 percent to 77 percent (van den Beuken-van Everdingen et al., 2007). Newer studies show similar results in the prevalence of pain. Van den Beuken-van Everdingen et al. (2007) found pain prevalence between 24 percent and 60 percent in

patients receiving treatment for cancer and in 62 percent to 86 percent of patients who had wide-spread, or metastatic, disease. Oldenmenger et al. (2011) also found that more than two-thirds of cancer patients experience pain.

Theoretical Framework

The Symptom Management Model (SMM) is the theoretical framework used to guide this project. Nurse researchers at the University of California, San Francisco developed the model which has been widely used by clinicians in assessing and providing treatment of multiple symptoms (Yarbro, Frogge, & Goodman, 2004). The model has been specifically utilized in numerous studies on the management of pain (Yarbro et al., 2004). The model assumes the following:

1. The only way to truly know a symptom is through individuals' self-report;
2. The symptom does not have to be currently experienced by an individual. They can be considered at high-risk for developing the symptom through environmental related variables. During this time the individual may be treated for the predicted symptom;
3. Individuals who cannot verbally communicate symptoms still experience symptoms;
4. Management of symptoms may be targeted at individuals, families, groups, or the environment;
5. Symptom management is a dynamic process; that is, individual outcomes can modify the symptom experience.

The SMM is also based on the assumption that effective management of a symptom can only occur by considering the symptom experience, symptom management strategies, and the outcomes (Yarbro et al., 2004).

Symptom experience encompasses the individual's beliefs or perceptions about the symptom. The symptom experience also looks at how the individual responds to the symptom. Such responses can include physiological, behavioral, and cultural components, all which have an effect on the individual experience.

Symptom management strategies include the individual's self-care strategies, along with health care providers' recommendations for symptom management. Strategies include who delivers what, where, when, how, to whom, how much, and why (Yarbro et al., 2004). The goal of symptom management is to prevent negative outcomes during patient care. In order to prevent poor outcomes, the SMM focuses on the assessment of symptoms and proper treatment for those symptoms. The current project examines pain assessment completed by NPs on a numerical scale of 0 to 10, and then examines evidence-based treatment modalities depending on the pain rating. The SMM recognizes that one treatment modality may not be beneficial when repeated, leading health care providers to modify treatment strategies over a time period (Yarbro et al., 2004). The NCCNs guidelines for treating adult cancer related pain also recognize pain and treatment modalities as individual and recommend changes for providers to follow in practice.

Outcomes of symptom management are direct evidence of the individual's symptom experience and management strategies. The outcomes look at the status of the symptom, whether it has improved or declined. The individual's functional status,

emotional status, morbidity, quality of life, and costs are all a part of the symptom management outcome (Yarbro et al., 2004).

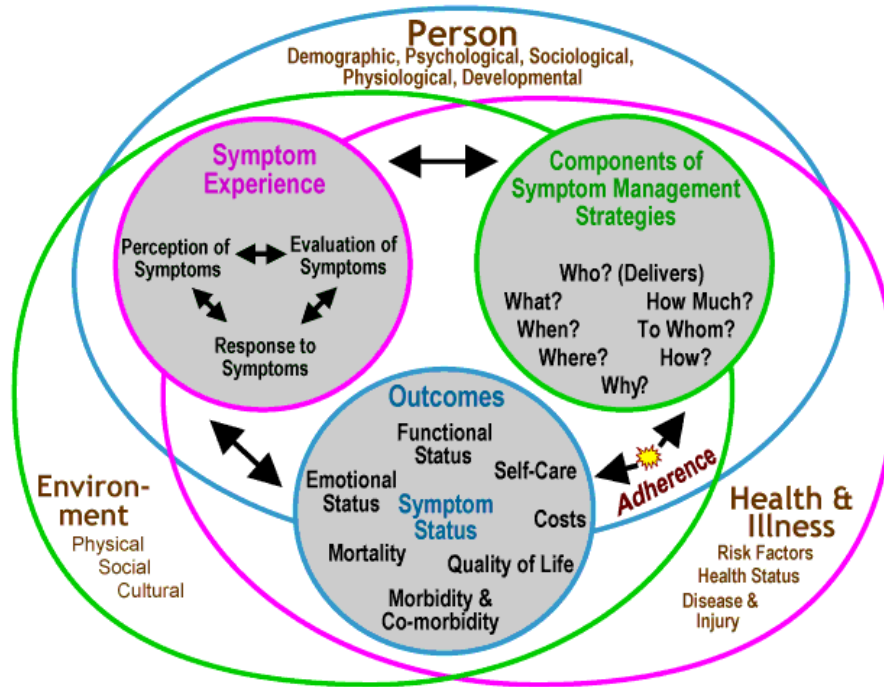


Figure 1. The symptom management model. From: Dodd M, Janson S, Facione N, Faucett J, Froelicher ES, Humphreys J, Lee K, Miaskowski C, Puntillo K, Rankin S, Taylor D. (2001). Advancing the science of symptom management. *Journal of Advanced Nursing*, 33(5), 668-676. Reprinted with permission from Verity Butler, Permissions Assistant, John Wiley & Sons, October 27, 2011.

The SMM provides clinicians with a guide when assessing and managing individual's symptoms. The model helps describe the relationship between the symptom experience, management strategies, and the varied outcomes of one's life. Health care providers are able to choose appropriate interventions based upon individual experiences and perceptions, and then monitor the results of those interventions. The model also allows for clinicians to continuously provide symptom assessment and management for an infinite amount of time. NPs entering into oncology practice will benefit from the use

of the SMM because of the clarity and ease of use. The SMM has been used in numerous pain management studies and proven an effective model to guide research.

Guidelines for Treatment

World Health Organization's Pain Ladder

The most common and widely used guideline for the treatment of cancer pain originates from the World Health Organization (WHO). This guideline is most commonly known as the pain ladder. Established in 1986, the "ladder" consists of a three step approach in the treatment of cancer pain (World Health Organization [WHO], 2011). The first "step" recommended by the WHO is prompt delivery of an oral non-opioid, followed by "step" two which consists of a mild opioid if the pain is not relieved from use of a non-opioid (WHO, 2011). The third and final "step" on the ladder consists of using a strong opioid until the patient is free from all cancer pain. The WHO gives a list of medications to be used during each step of the ladder. Examples of non-opioids include aspirin and paracetamol; mild opioids include codeine; and strong opioids include morphine (WHO, 2011).

The pain ladder recommends using an adjuvant in addition to each step previously listed. Antidepressants and anxiolytics are considered the primary adjuvant in order to help relieve any fear or anxiety the patient may have (WHO, 2011). All of the medication given should be given around the clock, instead of on an as needed basis in order to ensure freedom from pain. The pain ladder suggests administering the medications every three to six hours for maximum effectiveness (WHO, 2011).

WHO's Pain Relief Ladder

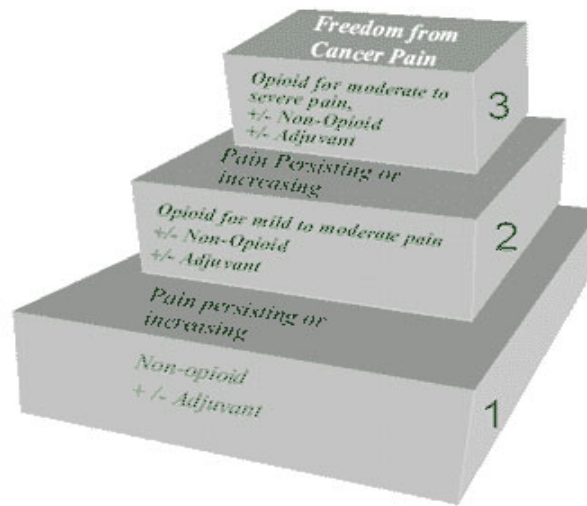


Figure 2. The World Health Organization's Pain Relief Ladder (WHO, 2011), reprinted October 5, 2011.

Oldenmenger et al. (2011) found that even with around-the-clock analgesic administration following the WHO pain ladder, 10 to 30 percent of patients did not receive adequate pain control. This was due to a number of factors, including uncontrolled side effects preventing further administration of the analgesic and improper dosing of opioids (Oldenmenger et al., 2011). In order to overcome some of these barriers, Oldenmenger et al. (2011) recommended a slight alteration to the WHO pain ladder. They found that rotating opioids was found to be effective in 85 to 90 percent of patients with advanced cancer requiring strong opioids (Oldenmenger et al., 2011). Similar findings were given in the research completed by Moryl, Coyle, and Foley (2008). Moryl et al. (2008) found that individual differences in the response and tolerance to opioids required many cancer patients to trial two or three opioid drugs in order to find

any relief from pain. By rotating opioids, side effects were minimal and adequate pain control was achieved.

The “pain ladder” appears simple, and easy for all practitioners to use; however, there are critics of the WHO’s pain ladder. Research by Hagen, Biondo, and Stiles (2008) comments on the lack of treatment options for breakthrough cancer pain in the WHO’s pain ladder. They found that managing cancer pain was more complex than a simple three-step approach and required more thorough recommendations (Hagen et al., 2008). Hagen et al. (2008) also recommend skipping steps in the pain ladder in order to treat sudden, breakthrough pain. Instead of starting out on step one, strong opioids such as morphine, hydromorphone, fentanyl, and methadone should be used initially when a patient presents with intense pain (Hagen et al., 2008). Green et al. (2009) found similar results in their study on breakthrough and chronic cancer pain. Seventy-nine percent of patients studied were found to experience breakthrough pain varying in intensity and location (Green et al., 2009). In order to provide effective pain management in patients experiencing breakthrough pain, bypassing the first two levels of the pain ladder will eliminate unnecessary medications and time, rendering the ladder ineffective.

The National Comprehensive Cancer Network (2011) has also commented on the simplicity of the three-tiered pain ladder. Lack of dosing and opioid selection is one of the primary concerns the NCCN has with the WHO pain ladder (NCCN, 2011). Mercadante et al. (2008) also found that other opioids were more effective than the limited recommendation for the use of morphine in severe cancer pain. In their study, Mercadante et al. (2008) compared the effects of oral sustained-release morphine, transdermal fentanyl, and oral methadone on cancer pain. The results showed that oral

methadone and transdermal fentanyl were more effective in treating severe cancer pain; however, methadone was the superior drug (Mercadante et al., 2008). Although dosing of methadone needed to be changed more frequently, the oral preparation was less expensive, had fewer side effects than morphine, and provided the patients with relief from pain.

Specific recommendations regarding the type of non-opioid and opioid used in the WHO pain ladder was given by Jost and Roila (2010). Non-opioids consisting of acetaminophen, ibuprofen, acetylsalicylic acid, keoprofen, diclofenac, naproxen, and mefenamic acid were recommended for the first step in the ladder (Jost & Roila, 2010). Step two recommendations for the use of mild opioids included dihydrocodeine and tramadol in addition to one of the recommended step one analgesics (Jost & Roila, 2010). The last step of the pain ladder would include strong opioids such as morphine, oxycodone, hydromorphone, fentanyl, buprenorphine, methadone, and nicomorphine (Jost & Roila, 2010). The recommendations for neuropathic pain were amitriptyline, clomipramine, nortriptyline, fluoxetine, haloperidol, chlorpromazine, carbamazepine, gabapentin, and pregabalin (Jost & Roila, 2010). Along with providing individual step recommendations, Jost and Roila (2010) list appropriate dosing information, adverse effects, time of onset, and maximum daily doses. These specific guidelines are not included within the WHO pain ladder but will be of benefit to the novice practitioner in treating cancer related pain.

Research has also shown that the WHO pain ladder may not be effective for all types of cancer pain. Bell, Eccleston, and Kalso (2003) looked specifically at neuropathic pain and the use of the surgical anesthetic ketamine hydrochloride. They found that low-

dose ketamine reduced the need for morphine and “significantly reduced pain intensity in cancer pain with a neuropathic component” (Bell et al., 2003). Xiong et al. (2009) also found that site-specific pain was not easily controlled using the pain ladder suggested by the WHO. In their study, Xiong et al. (2009) examined effective pain management of pancreatic cancer. Between 60 and 90 percent of the subjects in the study experienced pain using standard opioids treatment. The use of high intensity focused ultrasound ablation relieved pain in 80.6 percent of the patients (Xiong et al., 2009). Identification of pain location, type, and intensity is relevant in utilizing the pain ladder’s recommendations for treatment.

NCCN Clinical Guidelines in the Treatment of Adult Cancer Pain

The WHO pain ladder has been widely used and is an effective teaching tool; however, the NCCN developed clinical guidelines and algorithms in 2011 for the treatment of adult cancer pain that is highly specific and detailed. The guidelines are based on scientific evidence and reviewed by expert clinicians within the NCCN (NCCN, 2012). These new recommendations are the result of previous cancer pain management research which has shown that new guidelines were needed due to the consistent prevalence of pain among cancer patients. Lorenz et al. (2008) conducted a systematic review utilizing over 1,200 articles showing that effective treatment of cancer pain was established using opioids, NSAIDs, and radionuclides. The results of the systemic review conducted by Lorenz et al. (2008) are consistent with the 2011 recommendations given by the NCCN for cancer pain treatment. Thus, the guidelines are shown to follow years of evidence-based research of what was effective and not effective in the management of adult cancer related pain. Algorithms and pain intensity are key components within the

guidelines. Intensity is given a numerical value and treatment modalities are then based off that rating (NCCN, 2011). Other essential elements of the NCCN guidelines include:

- a comprehensive pain assessment performed at each visit;
- availability of psychosocial support;
- disease and pain specific education material provided to the patient;
- dosing guidelines for opioids, non-opioids, and adjuvant analgesics;
- suggestions for titration and rotation of opioids;
- suggestions for the escalation of opioids dosage;
- management of opioids adverse effects;
- when to proceed to other interventions for cancer pain treatment.

A number of factors are taken into account when addressing pain management for cancer patients and are all addressed by the NCCN guidelines. For the purpose and scope of this paper, only pharmacological pain management treatment will be addressed. Non-pharmacological pain management, such as massage, psychosocial support, and adjuvant treatment options will not be discussed.

The comprehensive pain assessment addresses intensity, character, and also looks at the duration, onset, location, associated factors, current treatment, effects on lifestyle, and the patient's goals and expectations of pain management. The pain assessment also includes a detailed physical examination, appropriate imaging studies, and laboratory reports in order to provide specific therapy. The goal is for the practitioner to be able to differentiate somatic, visceral, or neuropathic cancer pain in order to provide the appropriate treatment (NCCN, 2011).

Three levels of pain intensity are used in the management of cancer pain and are based upon the numerical rating between 0 and 10 (NCCN, 2011). Mild pain is considered to be rated between 1 and 3; moderate pain is rated between 4 and 6; and severe pain is between 7 and 10 (NCCN, 2011). In addition to pain rating, algorithms were created based on oncologic emergencies, opioid tolerant patients, and opioid naïve patients (NCCN, 2011).

Oncologic emergencies are pain related to brain, epidural, or leptomeningeal metastases; pain related to infection or obstruction; and bone pain secondary to a fracture (NCCN, 2011). Opioid tolerant patients are differentiated from opioid naïve patients in that they chronically take opioids for the treatment of cancer related pain, while opioid naïve patients do not. NCCN (2011) has defined opioid tolerant utilizing the definition provided by the U.S. Food and Drug Administration (FDA) as the following:

Patients taking at least 60 mg oral morphine per day, 25 mcg transdermal fentanyl per hour, 30 mg oral oxycodone per day, 8 mg oral hydromorphone per day, or 25 mg oral oxymorphone per day. Patients who do not fall within the above category are considered to be opioid naïve.

Distinguishing opioid tolerant versus naïve patients is essential to providing the appropriate treatment. By determining which category the patient falls within, NPs will be able to provide specific dosing, titration, and maintenance medications.

In determining the appropriate opioid and dose, the NCCN recommends utilizing an individual approach based on the patient's pain intensity, location, and exposure to opioids in the past (2011). Treatment of opioid naïve patients' mild pain, rated as 1 to 3, should be treated with a non-opioid analgesic, such as acetaminophen or a non-steroidal

anti-inflammatory drug, or NSAID (NCCN, 2011). This recommendation is consistent with the WHO pain ladder. Moderate pain, rated 4 to 6, in opioid naïve patients are treated similar to those with severe pain, rated 7 to 10 (NCCN, 2011). The difference in treatment of moderate and severe pain in these patients is the starting dose and titration of short-acting opioids (NCCN, 2011). Opioid tolerant patients are typically given an opioid dosed at 10 to 20 percent the total daily dose for breakthrough pain. The opioid of choice for breakthrough pain is one with a rapid onset and short half-life (NCCN, 2011).

Mild pain, rated 1 to 3 on the pain scale, should be treated with NSAIDs, specifically ibuprofen 400 mg four times per day, or ketorolac 15 to 30 mg intravenously every six hours (NCCN, 2011). NSAIDs should be avoided in patients with thrombocytopenia; renal, cardiac, or gastrointestinal toxicities; or hepatic failure (NCCN, 2011). Acetaminophen 650 mg every four hours is recommended when the patient is thrombocytopenic or at risk of developing another bleeding disorder. Low-dose opioids should be administered after two NSAIDs are tried without relief of pain (NCCN, 2011).

Opioid naïve patients presenting with moderate pain are recommended to start with short-acting oral morphine at a dose of 5 to 15 mg (NCCN, 2011). If pain persists after 60 minutes, an increase in dosage by 50 to 100 percent is recommended until the pain has subsided. After 2 or 3 unsuccessful attempts at pain relief, intravenous morphine at a dose of 2 to 5 mg is recommended (NCCN, 2011). Hydromorphone, fentanyl, and oxycodone can also be used because of their short half-lives and ease of titration (NCCN, 2011).

For opioid tolerant patients presenting with moderate pain, a calculation of the previous 24 hours total dosage should be calculated and a breakthrough dose of 10 to 20

percent should be given orally (NCCN, 2011). If pain persists after 60 minutes, an increase in dosage by 50 to 100 percent is recommended until the pain subsides. Subsequent pain after 2 or 3 failed attempts requires intravenous administration (NCCN, 2011). Both opioid tolerant and opioid naïve patients should be switched to another opioid if the current prescribed opioid is not effective or is causing severe adverse effects. These recommendations are summarized in table 1.

Table 1. Recommendation for treatment based on pain intensity.

Pain Type & Rating	Intervention	Recommended Drug & Dosage
Mild 1-3	Non-opioid analgesic	NSAIDs -Ibuprofen 400 mg 4 times/day -Ketorolac 15-30 mg IV every 6 hours Acetaminophen 650 mg every 4 hours Low-dose opioids as needed
Moderate 4-6	Short-acting opioid	Morphine 5-15mg oral or 2-5 mg IV; increase by 50-100% or switch to another opioid if pain not relieved after 2-3 attempts
Severe 7-10	Opioids/long & short acting	Morphine 5-15mg oral or 2-5 mg IV; increase by 50-100% or switch to another opioid if pain not relieved after 2-3 attempts
Opioid tolerant patients	Opioids/long & short acting with breakthrough opioids as needed	For breakthrough pain, calculate the past 24 hours dose and administer 10-20 % of the total dose

Different types of cancer pain, such as nerve and bone pain, should be treated with opioids, as well as with additional therapies. Specific treatment recommendations provided by NCCN (2011) are the following:

- Inflammatory pain should be treated with NSAIDs or glucocorticoids;
- Nerve compression or inflammation treated with glucocorticoids;
- Bone pain without oncologic emergency should be treated with NSAIDs, radiation therapy, nerve blocks, bisphosphonates, chemotherapy, glucocorticoids, or radioisotopes;
- Bowel obstructions treated with bowel rest, nasogastric suction, glucocorticoids, and octreotide;
- Neuropathic pain treated with an antidepressant, anticonvulsants, or topical agents, and
- Painful lesions treated with radiation, hormones, or chemotherapy.

The NCCN has provided practitioners with a detailed and specific set of guidelines to be followed in the treatment of cancer pain.

Definition of a Nurse Practitioner

An advanced practice nurse (APN) is an umbrella term used to describe a registered nurse (RN) with additional graduate education in areas of advanced nursing theory, physical and psychosocial assessment, and treatment of illness (American College of Nurse Practitioners [ACNP], 2008). A NP is a “licensed independent practitioner who has been educated at the graduate level, with a minimum of a master’s degree” (Nevidjon et al., 2010).

NPs take detailed health histories and provide complete physical examinations; diagnose and treat many common acute and chronic problems; interpret laboratory results and imaging studies; prescribe and manage medications and other therapies; provide health teaching and supportive counseling with an emphasis on prevention of illness and health maintenance; and refer patients to other health professionals as needed (American Academy of Nurse Practitioners [AANP], 2011).

NPs can provide leadership, deliver quality care, as well as ensure comprehensive care through development, implementation, and evaluation of systems to manage costs and attain quality outcomes (AANP, 2011). NPs work in collaboration with physicians, which means that the physician agrees to be readily available to the NP for consultation regarding patient cases (AANP, 2011). NPs are also given prescriptive privileges which vary from state to state. North Dakota NPs currently do not require a collaborative agreement with a physician when prescribing medication (AANP, 2011).

The Need for NPs in Cancer Care

The American Society of Clinical Oncology (ASCO) conducted workforce studies in an attempt to understand the current supply and needs of oncologists through the year 2020 (Hortobagyi, 2007). From the study, the ASCO learned that by 2020 the demand for cancer services will greatly outweigh the number of available oncologists. Oncologists care primarily for the aging population which is expected to double between the year 2000 and 2030 (Erikson, Salsberg, Forte, Bruinooge, & Goldstein, 2007). With the increasing age of the United States population, there will be an increase in cancer diagnoses and cancer survivors, all needing the care of an oncology specialist. Along with the increasing age of the general population, oncologists will also continue to age

and go into retirement. The ASCO study projected that there will only be an increase of 1,322 oncologists nationwide from the years 2010 to 2020 (Erikson et al., 2007). This calculates to only a 12 percent increase in a highly needed medical specialty, while oncology services are projected to increase by 48 percent, leading to a shortage of over 3,800 oncologists in 2020 (Hortobagyi, 2007). Recommendations have been put into place by ASCO in order to meet the demands of the growing oncology population. The first recommendation is to increase the number of fellowship spots in order to attract more physicians. A 50 percent increase in fellowship spots still leaves a dramatic shortage in cancer care (Erikson et al., 2007). Another downfall is the route oncologists need to follow. An internal medicine residency is needed prior to selecting a specialty, with the majority choosing more lucrative specialties (Erikson et al., 2007). The second recommendation is to increase the number of NPs working in oncology. Studies have previously shown that physicians who currently work with an NP have higher weekly visit rates than those that do not (Erikson et al., 2007). NPs trained in advanced roles such as ordering chemotherapy and performing invasive procedures would allow for an increase in productivity (Erikson et al., 2007). The third recommendation is to allow primary care providers (PCP) to monitor patients in remission which could alleviate shortages in oncology. Unfortunately, many physicians are leaving primary care either through retirement or to specialties other than oncology (Erikson et al., 2007). Thus, NPs will be needed to fill in the role of oncology specialists in increasing numbers by the year 2020.

Nationally, there are over 167,000 licensed NPs, but only 652 have the specialty certification of an Advanced Oncology Certified NP, or AOCNP (Nevidjon et al., 2010).

In order to obtain the title of an AOCNP, the NP must have completed an accredited NP educational program, hold an active, valid license, and have completed a minimum of 500 hours as an NP practicing in oncology (Nevidjon et al., 2010). Working in an oncology practice does not require a NP to hold the certification of AOCNP, evidenced by the rare numbers nationally. In fact, the majority of NPs practicing in oncology hold broader certifications, such as family medicine (Nevidjon et al., 2010).

Gap in the Literature

NPs will play an instrumental role in the treatment of cancer related pain through accurate and thorough pain assessments and treatment. The WHO's pain ladder has been the mainstay of cancer related pain treatment; however, the NCCN guidelines provide NPs with more comprehensive and specific treatment modalities. Due to the relatively recent development of the NCCN guidelines, North Dakota NPs utilization and understanding of the guidelines are unknown. The NCCN also provides algorithms that could prove to be of benefit to not only new graduate NPs entering the oncology workforce, but also to experienced NPs currently practicing in oncology. Currently there is no literature available demonstrating the use of the NCCN algorithms or their efficacy. NPs need to be able to understand the most evidence-based guidelines in the management of cancer related pain in order to provide safe and effective care for their patients.

CHAPTER 3. PROJECT DESIGN

The NCCN has provided a new, comprehensive set of guidelines to aid NPs in the treatment of adult cancer pain; however, the knowledge and use of these guidelines was unknown. The goals of the current practice improvement project (PIP) were:

1. NPs practicing in oncology within North Dakota will become familiar with the NCCN guidelines and algorithms on the treatment of adult cancer pain by having the guidelines readily available in practice.
2. NPs practicing in oncology within North Dakota will utilize the NCCN guidelines on the treatment of adult cancer pain in practice.

The project design was to elaborate on the objectives by:

Step 1: Identifying the number of NPs who practice in oncology in North Dakota.

Step 2: Identifying demographics of the participants, including age and gender, type of certification, primary area of practice, number of years practicing as a NP, hours spent in clinical practice per week, and the average number of oncology patients seen per week.

Step 3: Identifying current treatment modalities of pain utilized by North Dakota NPs practicing in oncology.

Step 4: Identifying if having access to the NCCN guidelines would be beneficial to North Dakota NPs practicing in oncology.

Step 5: Distributing the NCCN guidelines to North Dakota NPs practicing in oncology.

Step 6: Identify if NPs practicing in oncology in North Dakota are utilizing the NCCN guidelines in practice pre and post intervention.

Step 7: Identify barriers to the utilization of the NCCN guidelines in practice.

Step 8: Identify if having the NCCNs evidence-based guidelines and algorithms on adult cancer pain treatment increases NP utilization and understanding, thus improving practice.

A timeline for the project can be found in Appendix A. North Dakota State University Institutional Review Board approval, as an expedited project, was sought and granted prior to initiation of the project.

A list of the NPs practicing in an oncology setting in North Dakota was gathered during the literature review. There were nine NPs found to be practicing in oncology clinics within North Dakota. The nine NPs practicing in oncology in North Dakota were sent a professional letter with a link to a survey, a paper form of the survey, and an agreement for use of the guidelines form (Appendix E). The letter was prepared by the author and printed on NDSU letterhead. The letters were distributed by the United States Postal Service and through personal communication to the nine NPs practicing in oncology between May and June 2012. The letter contained basic information, such as the purpose of the project, the survey link, expiration date, and contact information of the primary and co-investigator. Recipients interested in completing the survey were asked to follow the link provided and complete the survey or to complete a printed version of the survey along with the agreement for use form (Appendix E). The first page of the survey consisted of an explanation of the nature and scope of the practice improvement project, description of the questionnaire, approximate time commitment, and informed consent instructions. NPs that consented to participate were told to follow the link provided on the letter or start the paper survey. They then completed the survey. If the NP chose to

complete the paper version of the survey, only twelve questions were asked, along with the separate agreement of use form (Appendix E). If the NP chose to complete the online version of the survey, thirteen questions were asked, with the additional question being the agreement for use of the guidelines. The electronic link to the survey was made possible through Survey Monkey, a secure online website allowing individuals to create surveys, collect responses, and analyze data. Participating NPs were asked to provide personal information including name, address, and phone number for distribution of the evidence-based guidelines from the NCCN, a pre-test, post-test, and ten dollar Starbucks gift certificate pending completion of both the initial and final survey. Demographic questions were asked followed by one open-ended question, three multiple choice questions, one additional open-ended question, and lastly a yes or no question on the online version of the survey only. The letters were distributed once in May 2012, with one reminder mailed out in June 2012. Access to the survey was closed in August 2012. To assume confidentiality, all identifying information entered by the NPs was permanently deleted and not published.

Sample Description

The project population used during this practice improvement project included NPs who practice in an oncology clinic within the state of North Dakota. Of the nine NPs in North Dakota, five practiced in Fargo, three practiced in Grand Forks, and the remaining NP practiced in Bismarck. The author had a working relationship with the NPs practicing in oncology in Fargo, North Dakota, and was therefore projecting a minimum response rate of 55 percent, although a 100 percent response was anticipated.

Questionnaires

Pre-Intervention

Questionnaires were developed specifically for this PIP. The pre-intervention questionnaire (Appendix B) was developed to gather demographic information, determine the current treatment modalities utilized in the treatment of adult cancer related pain, obtain current knowledge NPs in North Dakota have on the NCCN pain management guidelines, and identify any perceived barriers to the usage of the guidelines. To provide a common reference from which to answer the questions related to treatment, cancer was stated to be any malignant disorder in which cells abnormally grow. Adults were also given a common reference as any person age 18 and older.

In the pre-intervention survey, the initial section of the questionnaire was intended to collect demographic information about the participants. The purpose of question one was to get information on the age range of the participants. Options for age range included 25 to 35, 36 to 45, 46 to 55, 56 to 65, and > 65 years old. Question two asked the participants to identify their gender; being either male or female, and a third option was to not answer the question. Question three was meant to obtain information on area of NP certification. The choices were family NP (FNP), oncology NP (ONP), women's health NP (WHNP), pediatric NP (PNP), geriatric NP (GNP), or other. For persons who chose other, a free text response was recommended. NPs practice in numerous settings, therefore question four was tailored to obtain information on the practice settings of the respondents. Options included oncology ambulatory care, primary ambulatory care, inpatient hospital care, and other. For participants who chose other, instructions to specify their practice settings by free text in the space provided were given. Given that

years of practice can have an effect on knowledge base of a practitioner, question five was included to help gather information on years of practice of the respondents. The options were 0 – 5 years, 6 – 10 years, 11 – 15 years, 16 -20 years, and > 20 years. Question six was meant to obtain information on number of hours in clinical practice per week and the options were 10 hours or less, 11 – 20 hours, 21 – 30 hours, 31 – 40 hours, and 41 hours or more per week. The last question on demographics was coined to find out the average number of patients diagnosed with cancer seen per week by the NPs who responded to the questionnaire. The options were 1 to 10, 11 to 20, 21 to 30, 31 to 40, 41-50, and > 50 patients.

The next part of the questionnaire was keyed to identifying current treatment modalities utilized by NPs practicing in oncology in North Dakota. Question eight asked the participants to identify any current pain management guidelines used to guide practice. Response options for question eight were left open for the participant to fill in. Question nine consisted of asking NPs practicing in oncology in North Dakota about their current familiarity of the 2011 NCCN adult cancer pain treatment guidelines. The options for this question were a) Very familiar, I utilize them frequently in practice, b) Somewhat familiar, I have utilized them a couple times in practice, c) Somewhat unfamiliar, I have heard of them but have never utilized them in practice, and d) Very unfamiliar, I have never heard of them and do not utilize them in practice. The following question then assessed any barriers to the use of the NCCN guidelines for treating cancer pain. The options included a) lack of education on the guidelines, b) use different guidelines for treating cancer related pain, c) have not heard of the 2011 NCCN adult cancer pain treatment guidelines, d) have not had time to look over the specific recommendations of

the NCCN 2011 guidelines, and e) other. If a participant chose “other” for the previous question, a free text option was given as to the specific barriers they encountered.

Due to the length and complexity of the NCCN guidelines in treating adult cancer related pain, a simplified algorithm or algorithms may be of benefit to novice and experienced practitioners. In order to evaluate if the project intervention would be beneficial to the NPs in practice, the eleventh question asked if they felt that having the evidence-based NCCN guidelines and algorithms would increase the utilization and understanding of pain treatment. The options for question eleven were a) yes, b) somewhat, c) maybe, d) probably not, or e) definitely not. Question twelve was an open ended question focused on finding out the challenges NPs practicing in oncology encountered when treating cancer related pain. Response options for question twelve were left open for the participant to fill in. The last question on the online version of the survey looked at whether the participants would agree to utilization of the guidelines after distributed. The options for the last question were “yes” or “no”.

After creation of the survey, the author obtained feedback from a five member committee consisting of three Doctor of Philosophy professors at North Dakota State University (NDSU), one DNP who is also a nursing professor at Concordia College in Moorhead, Minnesota, and one NP who also teaches nursing at NDSU. Recommendations were made and changes were added accordingly. There was no pilot project prior to implementation.

Post-Intervention

The post-intervention questionnaire (Appendix C) was developed to assess whether the implemented intervention helped to improve practice in treating cancer

related pain among the NPs practicing in North Dakota. The post-intervention survey consisted of eight questions. Questions one through four attempted to ascertain the participants' utilization of the guidelines. The first four questions utilized a Likert scale consisting of strongly disagree, disagree, undecided, agree, and strongly agree. The first question asked if the guidelines were used after distribution. The second question aimed to determine if the guidelines continued to be utilized by the participants. The third question aimed to identify if having the guidelines and algorithms in practice helped increase the participants' knowledge of cancer related pain treatment modalities. The fourth question asked if the participants believed the guidelines and algorithms were a useful tool to have in practice.

The next two questions aimed to identify any enabling factors or barriers to utilizing the guidelines in practice. Question five aimed to find out what helped increase utilization of the guidelines in practice. The options were a) having the full set of guidelines available, b) having a pocketbook of the algorithms and treatment options available, c) having the option to utilize a phone application of the guidelines, d) having a desire to learn more about treatment options, and e) other. If the participant chose "other" as a response in question five, a free text option was given. Question six then assessed any barriers to the usage of the guidelines. The options included a) lack of education on the guidelines, b) use different guidelines for treating cancer related pain, c) have not heard of the 2011 NCCN adult cancer pain treatment guidelines, d) have not had time to look over the specific recommendations of the NCCN 2011 guidelines, and e) other. If a participant chose "other" for the previous question, a free text option was given as to the specific barriers they encountered.

The seventh question asked the participants to provide specific information on how they believed the NCCN guidelines have helped to improve their practice in the management of adult cancer related pain. The last question on the post-intervention survey asked for any additional comments in regards to the NCCN guidelines or suggestions which would help to improve pain management outcomes in cancer care. The last two questions were given free text space for the participants to provide their responses. The post-intervention survey was sent out three months after implementation of the intervention to allow for ample utilization time of the guidelines in practice. Responses were gathered through Survey Monkey and paper surveys, depending on which method the participant preferred.

Intervention Implementation

After the results were gathered from the pre-intervention survey, the evidence-based guidelines and algorithms originally created by the NCCN were distributed to the original participants who agreed to use them in practice for a minimum duration of one month with a maximum of three months. The guidelines and algorithms were taken from the NCCN 2011 guidelines on the treatment of adult cancer pain with permission for redistribution (Appendix D). A full set of the evidence-based guidelines were professionally printed and placed in a spiral bound book by the author of this project.¹ The algorithms for acute and chronic opioid users were professionally laminated, made

¹ Reproduced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines©) for Adult Cancer Pain (V.2.2011) ©2012 National Comprehensive Cancer Network, Inc. Available at: NCCN.org. Accessed February 21, 2012. To view the most recent and complete version of the NCCN Guidelines©, go on-line to NCCN.org.

into a spiral bound flip chart, and distributed by the author. For participants who utilize electronic resources, instructions on how to download the phone application from the NCCN for use of the guidelines was also provided (Appendix F). The guidelines, algorithms, and phone application instructions were then sent to the participants who had agreed to utilize the guidelines in practice as indicated from the pre-intervention questionnaire. The post-intervention survey was sent to the original participants three months after the guidelines were provided to them. After results from the post-intervention survey were obtained, Starbucks gift certificates in the amount of ten dollars, along with thank you letters were sent out to the participants in August and September 2012.

Evaluation

Upon completion of the individual surveys, the results were interpreted by the statistics department at NDSU and were based on the total number of participants that completed surveys. All of the results were based on a percentage of the total number of participants. On the pre-intervention survey, questions one through seven obtained demographic information of the participants, which identifies objective two of the project. Questions eight and nine helped to identify the current treatment strategies utilized by NPs practicing in oncology, which helped identify objective three of this project. Questions ten and eleven were keyed to determine the participants' familiarity, utilization, and barriers of the NCCN 2011 guidelines, which helped in identifying objectives four and five. Question twelve helped to identify objective six by analyzing if the NPs would find the NCCN's algorithms to be beneficial in practice and whether having them readily available would increase their utilization. Question thirteen was the

online agreement stating that the participant would utilize the guidelines for a specified period of time which helped to identify the validity of the results. The post-intervention survey then helped to determine whether the guidelines improved NPs practice.

CHAPTER 4. RESULTS

The purpose of this project was to identify current treatment strategies utilized by North Dakota NPs practicing in oncology in the treatment of cancer related pain, provide those NPs with specific evidence-based guidelines from the NCCN, and investigate if utilization of the NCCN guidelines improved their practice. Participants included the NPs who worked in an oncology setting in North Dakota at the time the project was initiated.

Project Goals & Objectives

The goals of the current PIP were the following:

1. NPs practicing in oncology within North Dakota will become familiar with the NCCN guidelines and algorithms on the treatment of adult cancer pain by having the guidelines readily available in practice.
2. NPs practicing in oncology within North Dakota will utilize the NCCN guidelines on the treatment of adult cancer pain in practice.

The following objectives were used in this project:

1. Identify the number of NPs who practice in oncology in North Dakota.
2. Identify demographics of the participants, including, age and gender, type of certification, primary area of practice, number of years practicing as an NP, hours spent in clinical practice per week, and the average number of oncology patients seen per week.
3. Identify current treatment modalities of pain utilized by North Dakota NPs practicing in oncology.
4. Identify if NPs practicing in oncology in North Dakota are utilizing the NCCN guidelines in practice pre and post intervention.

5. Identify barriers to the utilization of the NCCN guidelines in practice.
6. Identify if having the NCCNs evidence-based guidelines and algorithms on adult cancer pain treatment increases NP utilization and understanding, thus improving practice.

Description of the respondents, project results, and analyses of the responses to both the pre-intervention and post-intervention questionnaires are presented in this chapter. Participant demographics, including age and gender, practice location, and practice characteristics were identified. Responses were gathered on the participants' familiarity with NCCN cancer pain management guidelines and barriers encountered during utilization. Follow-up responses were evaluated as to the degree of benefit the participants felt the NCCN guidelines provided. The following chapter takes an in-depth look at the results of the project.

Description of Respondents

NPs practicing in an oncology setting in North Dakota and licensed by the North Dakota Board of Nursing were invited to participate in this project. The initial questionnaire was sent to nine NPs identified as practicing within an oncology setting in North Dakota; however, due to attrition of two NPs, the final sample consisted of seven NPs. The attrition was due to job changes to different specialty fields, which disqualified those participants from participating in the project.

The pre-intervention survey was sent out on May 17, 2012, with a reminder sent out two weeks later to participants who had not yet responded. The majority of participants (67%) completed the online version of the survey, while the others completed and mailed in the paper questionnaire. Of the seven NPs surveyed, six replied.

An initial response rate of 55% was anticipated due to the professional connection of this writer with several NPs in an oncology setting; however, the actual response rate of 86% (n=6) was significantly higher than expected.

Demographics

The pre-intervention questionnaire assessed the demographics of the surveyed participants. All of the respondents were female, and the majority (67%) were between the ages of 25 and 35. Of the remaining respondents, 16% were between the ages 36 and 45, and 16% were 46 to 55 years old. There were no respondents over the age of 56 (Figure 3). A mean age could not be calculated due to the interval age ranges the respondents were given to choose from versus identifying an actual age.

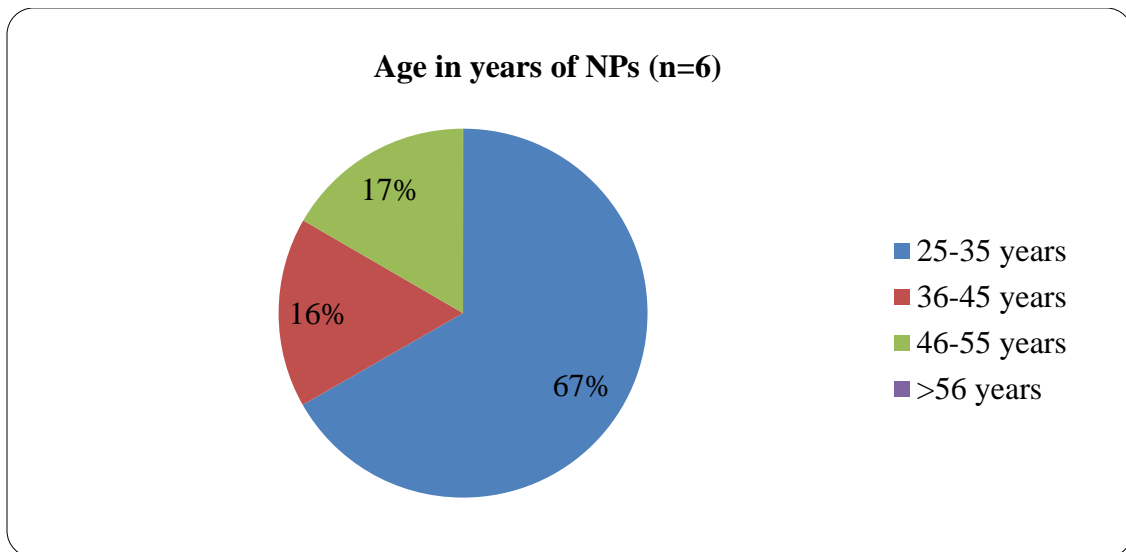


Figure 3. Age ranges, in years, obtained from North Dakota NPs who practice in an oncology setting.

NP certification was evaluated, and included the following six possible responses:

1. FNP, family NP
2. ONP, oncology NP
3. WHNP, women's health NP

4. PNP, pediatric NP
5. GNP, geriatric NP
6. Other (respondents were asked to specify via a free text option)

All of the respondents (100%) were certified family NPs, with one (16%) having an additional certification as an Advanced Oncology Certified Nurse Practitioner (AOCNP). In order to be certified as an AOCNP, the NP needed to meet eligibility requirements of the Oncology Nursing Certification Corporation (ONCC). In addition to being a master's or doctorate prepared NP, the ONCC requires applicants have "a minimum of 500 hours of supervised clinical practice as an adult oncology NP" (Oncology Nursing Certification Corporation [ONCC], 2011).

The majority (83%) of respondents worked in an oncology ambulatory care setting. If a respondent chose "other" for their primary area of practice, a free text response was encouraged. One respondent (17%) chose "other", and the free text given for primary practice setting was "both inpatient and outpatient" oncology care. The options that were not chosen included primary ambulatory care and inpatient hospital care.

NP experience, hours worked per week, and number of patients seen per week were also evaluated as demographics of the participants. When identifying the length of time practicing as a NP, the options included: 0 to 5 years, 6 to 10 years, 11 to 15 years, 16 to 20 years, and more than 20 years. The majority (67%) of respondents indicated that they have been a practicing NP for less than or equal to 5 years. The remaining 33% chose 11 to 15 years as the duration of time practicing as a NP (Figure 4).

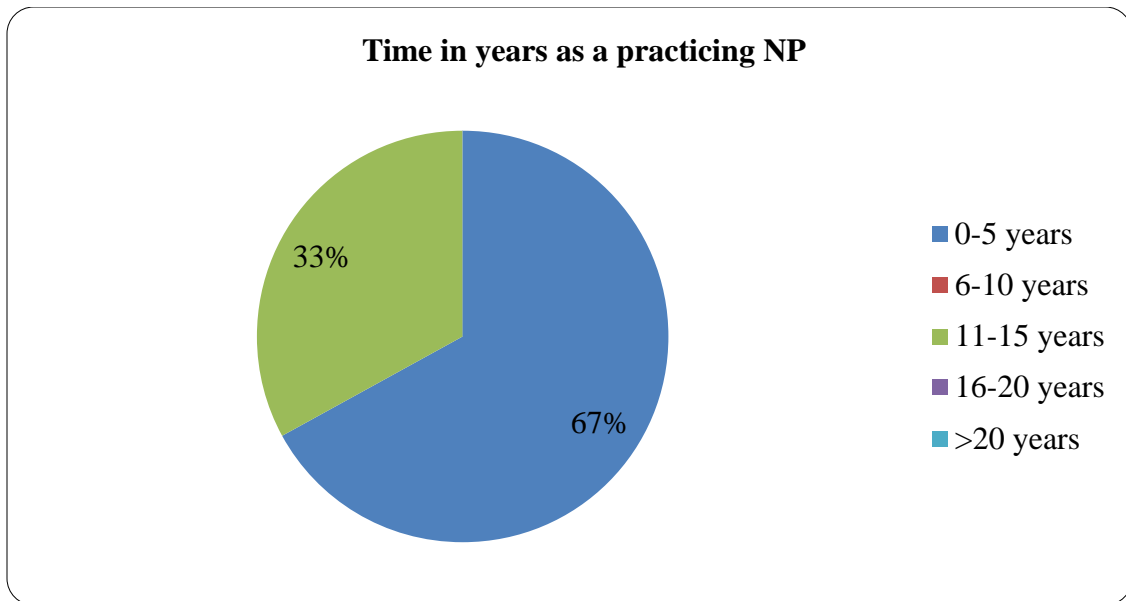


Figure 4. Duration of time in practice, in year ranges, obtained from North Dakota NPs who practice in an oncology setting.

The last questions in the demographic section looked at the amount of time spent in clinical practice each week and the average number of oncology patients seen per week. The answers were varied when assessing the amount of time spent in practice per week. The respondents were given five options as answers and the hours ranged from zero to more than 41 hours per week (Figure 5). Sixteen percent spent between 11 and 20 hours in practice, 16% between 21 and 30 hours, 33% between 31 and 40 hours, and 33% spent more than 41 hours per week in clinical practice.

The average number of oncology patients seen per week also varied among respondents and ranged from 11 to 50 (Figure 6). Thirty-four percent indicated that they saw an average of 11 to 20 patients per week, 34% saw between 21 and 30 patients per week, 16% saw between 31 and 40 patients per week, and 16% saw between 41 and 50 patients per week.

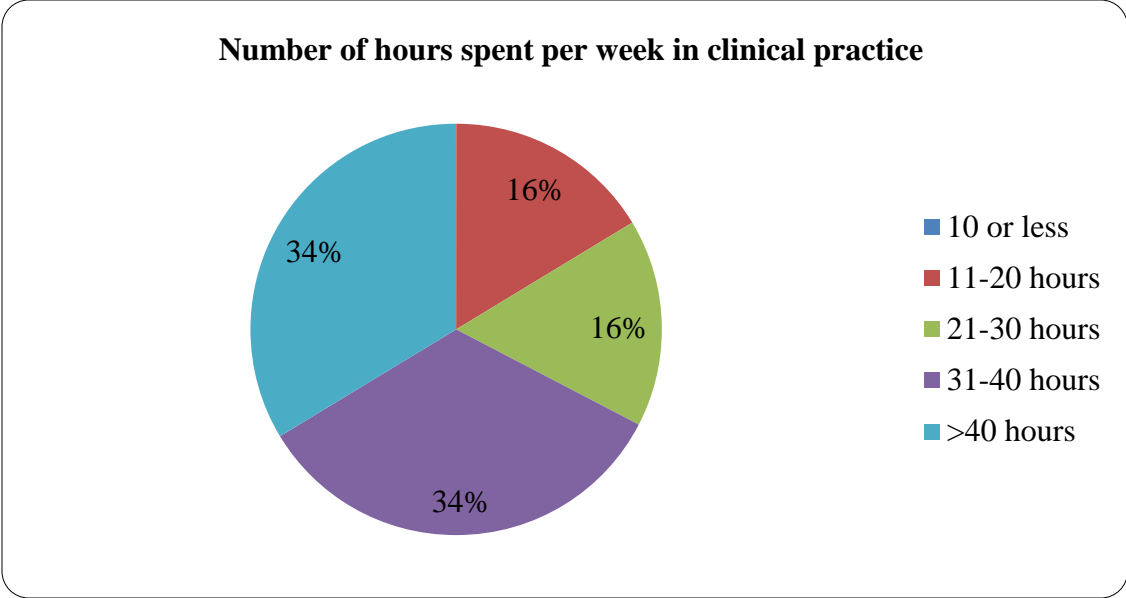


Figure 5. Number of hours spent per week in clinical practice obtained from North Dakota NPs who practice in an oncology setting.

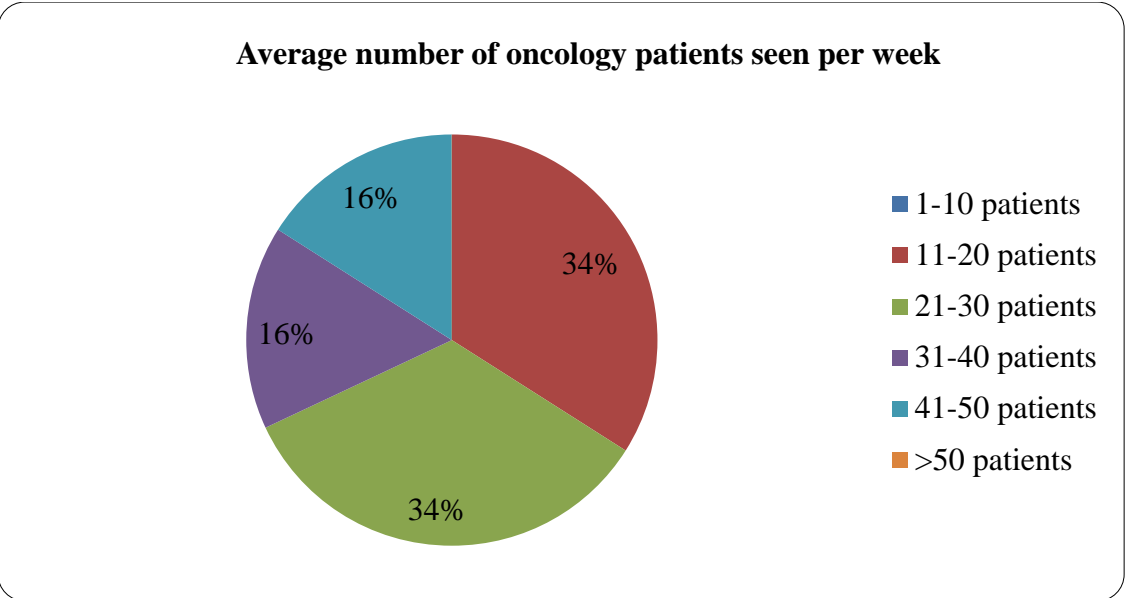


Figure 6. Average number of oncology patients seen per week obtained from North Dakota NPs who practice in an oncology setting.

In summary, all of the respondents were female and were certified as FNPs. The majority (67%) were between the ages of 25 and 35. Eighty-three percent worked in an oncology ambulatory care setting and 67% indicated that they have been a practicing NP

for less than or equal to 5 years. Thirty-three percent of respondents worked between 31 and 40 hours, and 33% spent more than 41 hours per week in clinical practice. Thirty-four percent indicated that they saw, on average, between 11 and 20 patients per week, and another 34% of respondents saw between 21 and 30 patients per week.

Treatment Modalities

The second half of the pre-intervention questionnaire was keyed to identifying current treatment modalities utilized by NPs practicing in oncology in North Dakota and to identify current knowledge of the NCCN guidelines on the treatment of adult cancer related pain. Sixty-seven percent of the respondents indicated they did not follow any guidelines when treating cancer related pain, 16% of respondents indicated they followed the NCCN guidelines, and 16% stated they did not follow any specific guideline consistently, but instead made treatment choices based on the following:

- Previous history and use of pain medications,
- What has worked in past,
- What they are able to understand,
- What other medications may complicate or add further risk to a selection of pain medications, and
- What is the patient willing to take?
- Are they able to follow instructions and take the medication correctly?

After identifying treatment guidelines used in practice, knowledge of the NCCN guidelines on the treatment of adult cancer pain and barriers to utilizing the guidelines were evaluated. The majority of respondents (50%) indicated that they were somewhat unfamiliar with the guidelines in that they had heard of the guidelines but had never

utilized them in practice. Thirty-three percent of the respondents indicated that they were somewhat familiar with the guidelines and had utilized them a couple of times in practice, and 17% of the respondents indicated that they were very familiar with the guidelines and utilized them frequently in practice (Figure 7).

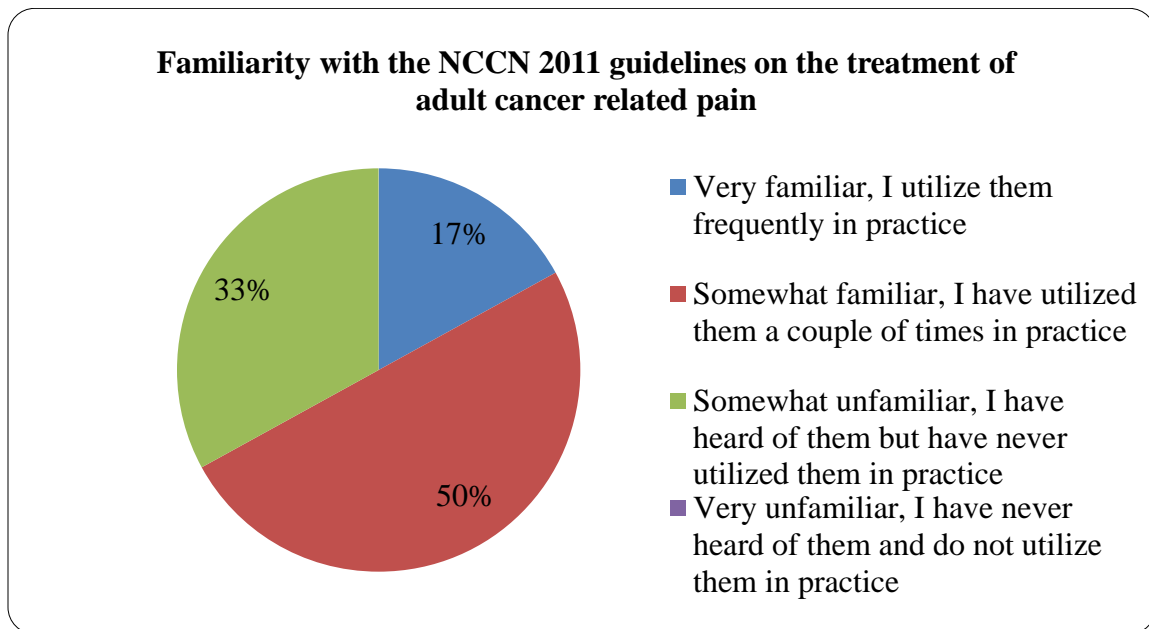


Figure 7. Familiarity with the NCCN 2011 guidelines on the treatment of adult cancer pain obtained from North Dakota NPs who practice in an oncology setting.

Thirty-three percent of the respondents indicated that having a lack of time to look over the specific recommendations of the NCCN guidelines was the biggest barrier encountered, while another 33% of respondents indicated that the biggest barrier to utilization of the guidelines was a lack of education. Of the remaining respondents, 16% indicated they utilized different guidelines in treating cancer related pain and 16% did not answer the question.

In order to evaluate if the intervention would benefit the NPs who practice in oncology, the questionnaire assessed the respondents' opinion on whether having the guidelines and algorithms provided by the NCCN would increase utilization and

understanding. The majority of the respondents (83%) indicated that utilization and knowledge would increase if the NCCN guidelines on the treatment of adult cancer related pain were provided. The remaining 17% of respondents indicated that ‘maybe’ utilization and knowledge of the guidelines would increase if provided.

Cancer pain has shown to be challenging for providers and patients. The last question on the pre-intervention questionnaire aimed to gather specific challenges encountered by the respondents. The results varied, and included the following:

- Lack of education,
- Patient compliance issues,
- Staff nurses not knowledgeable about pain treatment options,
- Multiple other medications and possible interactions,
- Intractable neoplastic pain with increasing tolerance to medications,
- Patient preferences regarding treatment,
- History of drug abuse,
- Lack of willingness from the patient to try other methods of pain control, and
- Providing adequate pain control without experiencing medication side effects.

Fifty percent of the respondents had indicated that medication tolerance was one of the biggest challenges encountered when managing cancer related pain. The other responses varied among the respondents.

To ensure the validity of the post-intervention questionnaire, the respondents were asked to utilize the guidelines in practice for up to three months. Eighty-three percent of the respondents agreed to utilize the guidelines, while the remaining 17% of respondents said they would not agree to utilize the NCCN guidelines in practice. As a result, this

17% of respondents was excluded from the intervention and post-intervention questionnaire. The final portion of the project then consisted of the five participants who completed the initial survey and agreed to utilize the guidelines in practice.

Utilization of the NCCN Guidelines

The post-intervention questionnaire was mailed to the five participants who agreed to utilize the guidelines in practice three months after the intervention was distributed. Four of the five participants, or 80%, responded to the post-intervention questionnaire. Respondents' beliefs on utilization of the NCCN guidelines are summarized in Table 2. For each question respondents were asked to rate their agreeability with the statement provided. The responses included 1) strongly disagree, 2) disagree, 3) undecided, 4) agree, and 5) strongly agree. Twenty-five percent of the respondents strongly disagreed to all four of the statements made. Fifty percent of the respondents utilized the guidelines in practice after distribution; however, only 25% continue to utilize the guidelines. The majority (75%) of respondents agreed or strongly agreed that the intervention increased their knowledge of cancer related pain treatment modalities. Seventy-five percent of respondents also agreed or strongly agreed that the intervention provided was a useful tool to have in practice.

The majority (80%) of respondents did not answer the last two questions on the post-intervention survey, which we could assume was due to a lack of time, as indicated in previous questions. Twenty percent responded that the guidelines helped improve practice by having opioid conversion charts when switching medications and 20% stated that the booklet was very helpful to refer to in practice.

Table 2. Utilization beliefs as reported by North Dakota NPs practicing in oncology

	SD%	D%	U%	A%	SA%
I utilized the guidelines in practice after they were distributed.	25	0	25	50	0
I continue to utilize the guidelines in practice.	25	0	50	25	0
The guidelines and algorithms provided to me increased my knowledge of cancer related pain treatment modalities.	25	0	0	50	25
The guidelines and algorithms are a useful tool to have in practice.	25	0	0	50	25

SD, strongly disagree; **D**, disagree; **U**, undecided; **A**, agree, **SA**, strongly agree.

One comment made in regards to the NCCN guidelines was: “Nice to have easy access to tables to answer questions. NCCN is often used in many other areas of cancer from treatment to education. Often times I forget that this is available for pain management as well.”

In summary, 50% of the respondents utilized the guidelines in practice after distribution, 75% of respondents felt that the intervention increased their knowledge of cancer related pain treatment, and 75% of respondents felt the intervention was useful to have in practice.

This chapter presented the project findings and explained the findings in relation to the posed project objectives and goals. This writer utilized the statistics department at NDSU for analysis of the data. The frequency statistics were provided and interpreted. An attrition of two occurred prior to beginning the project, and an attrition of one

occurred after the pre-intervention survey was distributed. An interpretation of the data, a summary of the project results, implications for practice, limitations of the project, and recommendations for future projects are included in Chapter 5.

CHAPTER 5. DISCUSSION & CONCLUSIONS

In 2012, over 1.6 million people were diagnosed with cancer (ACS, 2012). North Dakota had a total of more than 33,000 cancer patients in 2012, with 3,510 being new diagnoses (ACS, 2012). Although the number of new cancer cases continues to rise, advances in medical technology and disease management have increased patients' relative survival time an average of 20 years (ACS, 2012). With this increase come additional complications, including increased pain, nausea, and other medical comorbidities.

The purpose of this project was to 1) identify the demographics of North Dakota NPs who practice in oncology, 2) identify current treatment strategies utilized by North Dakota NPs practicing in oncology in the treatment of cancer related pain, 3) provide NPs with specific evidence-based guidelines from the NCCN, and 4) investigate if utilization of the NCCN guidelines improved their practice. Participants included NPs who practiced in an oncology setting within North Dakota at the time the project was initiated. The overall goals of the project were to have the participants become familiar with, and utilize the NCCN guidelines on the treatment of adult cancer related pain in practice.

This chapter offers a summation of the project findings, including an examination of the respondents' demographic characteristics, barriers to treating cancer related pain, and benefit of the intervention. The implications for NP practice, limitations of the project and suggestions for further project development will be offered.

Summary of Results

The data collected shows that the majority of NPs practicing in an oncology setting in North Dakota are between the ages of 25 and 35 and have been practicing for no more than five years. The data also showed that the majority of these NPs do not follow any specific guideline when treating cancer related pain. While this could be for a number of reasons, looking at the demographic data we could assume that a lack of education, familiarity with treatment options, and specialty training or certification in an oncology setting are the primary causes. Only participant one stated they followed the NCCN guidelines in practice prior to the intervention. This data is somewhat surprising given that the NCCNs guidelines were developed from the world's leading cancer centers and based on the most current evidence-based treatment options (NCCN, 2011). Participant one also had a specialty certification, AOCNP, and had been practicing as an NP for more than five years. The majority of the other participants knew of the guidelines but had only utilized them infrequently. The data showed that not having enough time and a lack of education to be the most common reasons that the guidelines are not used in practice. We can conclude from these results that having a specialty certification and more years of practice as an NP creates more knowledge about the use of evidenced based pain management guidelines in cancer care.

The overall goal of the project was to increase NPs knowledge and utilization of the NCCN guidelines, which would in turn decrease the pain intensity experienced by oncology patients. According to the data collected, the guidelines provided to the NPs helped to increase their knowledge of cancer related pain management, and showed that the NPs found the guidelines to be a useful tool in practice. We can then assume that use

of the NCCN guidelines in practice decreases oncology patients' pain intensity. The majority of the participants felt that having the guidelines in practice would help to increase their utilization. Given these results, we are left questioning why one participant would not agree to utilize the NCCNs guidelines in practice. The NP who did not agree to utilize the guidelines did not provide rationale behind this decision and was not contacted for further details; however, according to Shaneyfelt and Centor (2009), reasons clinicians choose to not utilize guidelines vary. During their research, Shaneyfelt and Centor found that providers felt guidelines were too comprehensive and not patient specific (2009). Research has also shown that provider's attitudes and beliefs about patient care limit their use of practice guidelines (Shaneyfelt & Centor, 2009). Many guidelines have also been found to expire or have newer versions, leading to confusion amongst providers on which version to follow (Shaneyfelt & Centor, 2009).

Previous studies have shown that more than 70 percent of new NPs working in an oncology setting believed they were not proficient in managing cancer related pain (Rosenzweig et al., 2010). The project findings add to the body of knowledge that more education is needed amongst NPs entering into an oncology setting. The lack of education in oncology could be due to a number of reasons, including a lack of training in graduate school, a lack of on-the-job training, or the need for specialty certification in oncology. Prior to discussing the recommendations for future projects and education, the limitations of the project will be discussed.

Limitations

There were several limitations of this project. This project was limited to only the NPs working in North Dakota and thus cannot be generalized to the entire United States.

The project only looked at NPs in the oncology setting, which also prohibits the results from being generalized to the entire NP population as a whole. Nine NPs were initially found to be working in an oncology setting in North Dakota; however, two of those NPs left oncology for other specialty areas. Reasons for leaving the oncology field were not looked at in this project but may be beneficial for other projects in the future. Due to the small sample of the project, the results found could not be considered statistically significant and statistical calculations could not be completed.

The timing and duration of the project's intervention was another key limitation. The intervention took place over three months and was in place over the summer months of June through August. Participants may not have felt they had adequate time to utilize the guidelines in practice, or possibly worked less in the summer months than they do at other times during the year. Although duration of the intervention was short, adequate time was not indicated as a barrier to utilization on the post-intervention survey. In fact, 50 percent of the participants indicated that they used the guidelines in practice after they were distributed.

A lack of prior research on the use of the NCCN guidelines can also be viewed as a limitation of this project. The relatively recent development of the guidelines makes this limitation somewhat unavoidable. The guidelines were developed in 2011 and there was no literature found on their use in practice within North Dakota oncology care NPs. This project does provide background about the benefit of using the guidelines in NP practice for future projects and research.

Recommendations & Implications for Practice

While these project findings have contributed to the body of knowledge regarding NP management of cancer related pain and the use of the NCCN guidelines, replication of this project would help to confirm the results. Modifying the project to include all NPs practicing in oncology within the United States would give more generalized results. Increasing the duration of time of future projects would allow us to see if the guidelines were beneficial long term and whether NPs would continue to utilize the guidelines when caring for patients with cancer. Following patient charts after the intervention was in place would be a good indicator if the guidelines proved to be beneficial in treating cancer related pain. This would need to be done as a longitudinal study to focus on the different types of cancer pain and stage of disease being treated. In addition, further research with other NP specialties and the use of evidence based guidelines within those specialties would be beneficial to see if similar results ensued. This would allow us to see if having guidelines helped improve NP practice as a whole or just within certain specialties.

In addition to future project recommendations, the results indicate that a lack of education is a key barrier when treating cancer related pain. In addition to obtaining a generalized degree, specialized training courses, certifications, and continuing education related to the oncology field should be considered as a part of an oncology NPs requirements for practice. Including courses related to oncology care within graduate schools' curriculums would also provide new graduate NPs with more knowledge on pain types and management techniques.

Although this project was limited to NPs practicing in an oncology setting, all NPs play a role in pain management. According to the American Academy of Pain Medicine (AAPM), over 100 million Americans suffer from chronic, non-cancer pain (2011). Pain has been shown to affect more Americans than coronary heart disease and diabetes combined (American Academy of Pain Medicine [AAPM], 2011). Many of the common diagnoses seen routinely in family practice will be associated with pain. Some of the diagnoses include osteoarthritis, diabetes, migraines, sports-related injuries, and infections. Research has shown that chronic non-cancer pain is seen in a primary care setting 33% of the time (Nicholson & Passik, 2007). Nicholson and Passik (2007) also found that many primary care providers are hesitant in prescribing opioids for treating chronic pain due to concerns about possible disciplinary action. The guidelines provided by the NCCN on the treatment of adult cancer related pain provide an in-depth look at opioid prescribing and how to convert between opioids. Primary care providers, including NPs, could become skilled at managing chronic pain with opioids if they were provided with the NCCNs conversion charts and guidelines which explain how and when to utilize each opioid therapy in practice.

Conclusion

Cancer is one of the most rapidly growing chronic illnesses in the United States (ACS, 2012). According to the American Cancer Society (2012), the lifetime risk for developing any form of cancer ranges from 38 to 48 percent, with males at a higher risk than females. Advances in pharmacotherapy and technology have allowed cancer patients to live longer; however, symptoms related to cancer remain prevalent and difficult to manage. According to the NCCN (2011) more than 25% of patients with a new diagnosis

of cancer exhibited pain, more than 50% of patients undergoing cancer treatment have pain, and more than 75% of patients with advanced disease experience pain. In order to help alleviate cancer related pain, the NCCN has provided NPs and other providers with a comprehensive set of guidelines to follow in practice. These guidelines are evidence based from years of research on the treatment of cancer related pain and have been reviewed by the world's leading clinicians in oncology care. NPs can continue to advocate for patients on all levels by encouraging other members of the healthcare workforce to utilize the most current evidence based guidelines in practice.

This project can be used for future research into cancer related pain treatment options and their benefit in NP practice. NPs have the compassion and knowledge to work in oncology settings; however, the results from this project show that it is equally important to educate NPs on how to treat cancer related pain and what guidelines are available to follow in their specialty practice. With the increase of NPs entering the oncology workforce and the prevalence of cancer related pain, further education and practice requirements on treatment modalities are needed. Patients with cancer will benefit greatly from the extra knowledge and skills NPs obtain when they utilize evidence based guidelines in practice.

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**APPENDIX A. PROPOSED PROJECT TIMELINE WITH APPROXIMATE
DATES**

	Feb. 2012	Mar. 2012	Apr. 2012	May 2012	Jun. 2012	Jul. 2012	Aug. 2012	Sept. 2012	Oct. 2012	Nov. 2012	Dec. 2012
Proposal meeting			X								
Secure IRB approval				X							
Send out letter to population				X							
Send out reminder to population					X						
Send out intervention						X					
Send out post survey							X				
Send out finalized material, gift cert., & thank you letter									X		
Analyze results								X			
Draft Ch. 4								X			
Draft Ch. 5								X			
Submit draft of clinical dissertation to committee members									X		
Revisions made & finalized for dissertation										X	
Final defense											X

APPENDIX B. PRE-INTERVENTION QUESTIONNAIRE

The following questionnaire attempts to identify the methods used to treat adult cancer related pain. A cancer diagnosis is further defined as any malignant disorder in which cells abnormally grow. Adults are considered to be persons 18 years of age and older.

The following responses will be in a variety of forms, including multiple choices, yes or no questions, and open ended.

Name: _____

Address: _____

Phone number: _____

Demographics

1. Which category below includes your age?
 - a. 25-35
 - b. 36-45
 - c. 46-55
 - d. 56-65
 - e. 66 or older
2. What is your gender?
 - a. Male
 - b. Female
 - c. I decline to answer this question
3. What NP certification do you hold?
 - a. Family practice (FNP)
 - b. Oncology (ONP)
 - c. Women's health (WHNP)
 - d. Pediatric (PNP)
 - e. Geriatric (GNP)
 - f. Other _____
4. What is your primary area of practice?
 - a. Oncology ambulatory care
 - b. Primary ambulatory care
 - c. Inpatient hospital care
 - d. Other _____

5. How many years have you been practicing as a NP?
 - a. 0-5 years
 - b. 6-10 years
 - c. 11-15 years
 - d. 16-20 years
 - e. >20 years
6. How many hours do you spend in clinical practice per week?
 - a. 10 or less
 - b. 11-20 hours
 - c. 21-30 hours
 - d. 31-40 hours
 - e. 41 hours or more
7. What is the average number of oncology patients you see per week?
 - a. 1-10
 - b. 11-20
 - c. 21-30
 - d. 31-40
 - e. 41-50
 - f. >50

National Comprehensive Cancer Network (NCCN) Guidelines

8. What guidelines do you currently follow when treating cancer related pain?
-
9. How familiar are you with the National Comprehensive Cancer Network's (NCCN) 2011 guidelines on the treatment of adult cancer related pain?
 - a. Very familiar, I utilize them frequently in practice
 - b. Somewhat familiar, I have utilized them a couple times in practice
 - c. Somewhat unfamiliar, I have heard of them but have never utilized them in practice
 - d. Very unfamiliar, I have never heard of them and do not utilize them in practice
 10. What, if any, barriers have you encountered in utilizing the 2011 NCCN adult cancer pain guidelines?
 - a. Lack of education on the guidelines
 - b. Use different guidelines for treating cancer related pain
 - c. Have not heard of the 2011 NCCN adult cancer pain treatment guidelines
 - d. Have not had time to look over the specific recommendations of the NCCN 2011 guidelines
 - e. Other _____

11. In your opinion, do you feel that having the algorithms and guidelines provided by the NCCN on the treatment of adult cancer related pain will increase utilization and understanding?
- a. Yes
 - b. Somewhat
 - c. Maybe
 - d. Probably not
 - e. Definitely not
12. What challenges have you encountered during the management of cancer related pain?

ONLINE VERSION ONLY:

13. By clicking 'Yes', you agree to utilize the National Comprehensive Cancer Network's guidelines for the treatment of adult cancer related pain in practice. This agreement is for the minimum duration of one month and not longer than 3 months. You can utilize the guidelines in any of the provided forms you desire. You understand that no punishment will be inflicted upon you by choosing to utilize these guidelines. You may, at any time, stop using the guidelines if you find they are not benefiting your practice.
- a. Yes
 - b. No

APPENDIX C. POST-INTERVENTION QUESTIONNAIRE

The following questionnaire attempts to identify the methods used to treat adult cancer related pain. A cancer diagnosis is further defined as any malignant disorder in which cells abnormally grow. Adults are considered to be persons 18 years of age and older.

The following responses will be in a variety of forms, including multiple choices, yes or no questions, and open ended.

Name: _____

Address: _____

Phone number: _____

National Comprehensive Cancer Network (NCCN) Guidelines

Please answer the following four questions based on UTILIZATION of the guidelines:

- 1. I utilized the guidelines in practice after they were distributed.

1	2	3	4	5
Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree

- 2. I continue to utilize the guidelines in practice.

1	2	3	4	5
Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree

- 3. The guidelines and algorithms provided increased my knowledge of cancer related pain treatment modalities.

1	2	3	4	5
Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree

4. The guidelines and algorithms are a useful tool to have in practice.

1	2	3	4	5
Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree

5. What helped to enable your usage of the guidelines in practice?

- a. Having the full set of guidelines available
- b. Having a pocketbook available of the algorithms and treatment options
- c. Having the option to utilize a phone application of the guidelines
- d. Having a desire to learn more about treatment options
- e. Other

6. What, if any, barriers have you encountered in utilizing the 2011 NCCN adult cancer pain guidelines?

- a. Lack of education on the guidelines
- b. Use different guidelines for treating cancer related pain
- c. Have not heard of the 2011 NCCN adult cancer pain treatment guidelines
- d. Have not had time to look over the specific recommendations of the NCCN 2011 guidelines
- e. Other

7. Please provide specific information on how you feel the guidelines helped to improve your practice.

8. Please provide any additional comments you have in regards to the NCCN guidelines or suggestions which would help improve pain management outcomes in cancer care.

APPENDIX D. NCCN PERMISSION FOR REDISTRIBUTION



National
Comprehensive
Cancer
Network®

275 Commerce Drive
Suite 300
Fort Washington, PA 19034
215.690.0300
Fax: 215.690.0280
For Clinicians: NCCN.org
For Patients: NCCN.com

March 6, 2012

Lisa Schoenberg
NDSU DNP Student
North Dakota State University
4518 10th St W
West Fargo, ND 58078

On behalf of the National Comprehensive Cancer Network® (NCCN®), I am writing to grant you permission to reproduce the **NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®) for Adult Cancer Pain (V.2.2011)** as described in your original request to distribute the guideline in a professional printed, spiral-bound book for use in practice.

Permission is

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Thank you for your interest in the work of the NCCN.

Sincerely,



Nicole B. Fair
Manager, Continuing Education and Grants
National Comprehensive Cancer Network

Additional Information on the NCCN Guidelines:

The NCCN Guidelines[®] - the recognized standard for clinical policy in oncology - are the most comprehensive and most frequently updated clinical practice guidelines available in any area of medicine. Covering 97 percent of all patients with cancer and updated on a continual basis, the NCCN Guidelines are developed through an explicit review of the evidence integrated with expert medical judgment and recommendations by multidisciplinary panels from NCCN Member Institutions. There are 44 individual panels, comprising nearly 900 clinicians and oncology researchers from the 21 NCCN Member Institutions and their affiliates. Specific treatment recommendations are implemented through performance measurement. NCCN Guidelines Panels address cancer detection, prevention and risk reduction, workup and diagnosis, treatment, and supportive care.

NCCN Guidelines have become the most widely used guidelines in oncology practice and have been requested by cancer care professionals in more than 115 countries. There has also been substantial international interest in translating the NCCN Guidelines into a variety of languages. Select NCCN Guidelines have been translated into Chinese, German, Italian, Japanese, Korean, Polish, Portuguese, Russian, Spanish, and Turkish.

APPENDIX E. AGREEMENT FOR USE OF THE NCCN GUIDELINES

I, _____, agree to utilize the National Comprehensive Cancer Network’s guidelines in the treatment of adult cancer related pain in practice. This agreement is for the minimum duration of one month and not longer than 3 months. I can utilize the guidelines in any of the provided forms I desire. I understand that no punishment will be inflicted upon me by choosing to utilize these guidelines. I may, at any time, stop using the guidelines if I find they are not benefiting my practice.

Name

Signature

Date _____

APPENDIX F. INSTRUCTIONS FOR PHONE APPLICATION OF THE NCCN GUIDELINES



Access the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) anywhere and at anytime through free NCCN Guidelines mobile apps for iPhone and Android.

Recent data continues to indicate that clinicians are increasingly using smartphones to access medical information and bring faster, more informed decision-making to the point of care.

These new NCCN apps enable clinicians to easily access the NCCN Guidelines, which are updated on a continual basis and developed through an explicit review of the evidence integrated with expert medical judgment and recommendations by multidisciplinary panels from NCCN Member Institutions.

The NCCN Guidelines apps for iPhone and Android are free to download through the iTunes Store and Android Market. To use the NCCN Guidelines apps, an individual must be a registered user on NCCN.org. There is no fee to become a registered user on NCCN.org and to view the NCCN Guidelines.

iPhone Installation Instructions

To download the NCCN Guidelines™ app to your iPhone or iPod touch, follow these simple steps:

- Open the App store, select Search at the bottom and enter NCCN in the search box.
- Tap the Get App button.
- Tap the Install button.
- Enter iTunes user ID and password (these are different from your NCCN username and password).
- Return to your iPhone home screen and tap on the NCCN Guidelines™ icon.

- When application is installed, tap on the NCCN icon and follow the on-screen instructions.
- Once the NCCN Guidelines™ app launches, you will see a License Agreement. You will need to read and accept the license agreement to continue.
- You must be a registered user on the NCCN.org web site to access the guidelines. On the log in page, you can either enter you log in information or you can select the register button to register as a new user on NCCN.org.

Android Installation Instructions

This application is compatible with Android devices with version 1.5 or higher.

To download the NCCN Guidelines™ app to your Android, follow these simple steps:

1. You can use the bar code scanner on the phone to scan the bar code at the bottom of this page. This will automatically load the page from the Android Market with the NCCN Guidelines™ app.
2. Alternatively, tap the “Market” icon and search for “NCCN”
3. Select NCCN Guidelines™ and tap on “Install”. When the warning appears, tap the “Ok” button.
4. When application is installed, tap on the NCCN icon and follow the on-screen instructions.
5. Once the NCCN Guidelines™ app launches, you will see a License Agreement. You will need to read and accept the license agreement to continue.
6. You must be a registered user on the NCCN.org web site to access the guidelines. On the log in page, you can either enter you log in information or you can select the register button to register as a new user on NCCN.org.