FACTORS THAT AFFECT ADEQUATE ANALGESIA IN AFRICAN AMERICANS WITH CANCER PAIN

by

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DISSERTATION

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Advisor __________________________ Date __________________________
DEDICATION

This research is dedicated to all the patients in this study who shared their story in the difficulties of managing cancer pain. It is my deepest hope that your stories will not go in vain, and that the knowledge that you shared will bring about real change.

To my father, Dr. Harpreet Singh, who inspired me to pursue a PhD and showed me the numerous meanings of what it means to be an educator.

To my wife, Parveen Kaur, who sacrificed so much of herself so that I could always accomplish any goals I set out in life.

To my son and unborn twin daughters, may this research inspire you to pursue a life that will benefit mankind, raise awareness of inequities, and be a voice for those who feel they do not have one.
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Chapter 1: Introduction

Chronic pain affects more than 100 million American adults, which is greater than the number of individuals affected by heart disease, cancer, and diabetes combined. Pain is one of the most common reasons why adults seek medical treatment (Schappert & Burt, 2006). Individuals who live with chronic pain are more likely to have problems with mobility (Smith et al., 2001), report reduced quality of life, and are more likely to have symptoms of depression and anxiety (Gureje et al., 1998). Pain costs the United States $635 billion each year in lost productivity due to medical treatment (Relieving Pain in America: A Blueprint for Transforming Prevention, Care, Education, and Research, 2016). When pain is moderate to severe, it has been associated with increased depressive symptoms such as lower quality of life, decreased function to work, and increased health care expenses (Bair et al., 2003). Pain has also been associated with sleep impairments (Finan et al., 2013). Pain severity has been linked with impaired attentional capacity, poorer performance on memory tests, and overall impaired cognitive function, and inability to participate in activities of daily living (Berryman et al., 2014; Higgins et al., 2018; Merlin et al., 2013; van der Leeuw et al., 2016). Despite all the problems associated with general pain, cancer pain continues to be the most debilitating.

Cancer Pain

Cancer pain is one of the most feared symptoms of having cancer (Wiffen et al., 2017). This is significant as an estimated 1.8 million people will be diagnosed with cancer and 606,520 deaths due to cancer are expected in the United States in 2020 (American Cancer Society, 2020). Even internationally, cancer pain has been shown to create a negative correlation in quality of life in patients in China (Deng et al., 2012), Palestine (Dreidi & Hamdan-Mansour, 2016), and
Japan (Mikan et al., 2016). In general, medical treatment tends to ease symptoms, yet patients with cancer report receiving chemotherapy and radiation can increase pain 30%-50% (van den Beucken-van Everdingen et al., 2007). Pain may present at any time during the course, but intensity and frequency often increase when the cancer progresses (van den Beucken-van Everdingen et al., 2016). Although cancer pain is debilitating in all patient populations, African Americans have repeatedly been shown to carry the most significant burden with pain.

**Statement of Problem: Cancer pain disparities with African Americans**

There are numerous studies that demonstrate disparities with African Americans in pain management (Cruz-Almeida et al., 2014; Dickason et al., 2015; Ndao-Brumblay & Green, 2005; Rahim-Williams et al., 2007; Shah et al., 2015; Swift et al., 2019; Todd et al., 2000; Todd et al., 1993). There is a belief that providers face stigma when providing opioids for noncancer pain, and therefore disparities may be decreased when the cause of pain is cancer. However, these disparities continue to exist even when the pain is cancer-related in origin.

African American patients with cancer pain have reported greater pain-related distress, increased pain intensity, and more pain-related functional interference than Caucasians (Vallerand et al., 2005). African Americans patients with cancer are significantly less likely to have their pain recorded compared to Caucasian counterparts (Mack et al., 2018). Additionally, African Americans were less likely to be treated for their cancer pain when compared to Caucasians, and less likely to have their pain scores even recorded (Bernabei et al., 1998). In an internet study looking at experience with cancer pain, symptoms, and functional status among ethnic groups in the United States, African Americans also reported more problematic symptoms than Caucasians (Im et al., 2013). Another study looking at socioeconomically disadvantaged minority groups demonstrated that physicians underestimated pain severity for 74% of African American patients
with cancer pain (Anderson et al., 2000). A study by the American Cancer Society (ACS) demonstrated minorities were more likely to report discomfort in talking with providers, lack of health insurance reimbursement in covering pain services and medications, and that pharmacies simply didn’t carry prescribed pain medications in minority areas (Stein et al., 2016). In order to assess for any pertinent correlations to these disparities, an examination of the literature regarding what is adequate analgesia is necessary.

**Adequate Analgesia**

Adequate pain relief has previously been defined as a “reduction of 50% or more of the initial pain level score on the numerical scale within one hour after receiving the first analgesic” (Sokoloff et al., 2014, p. 2). Opioids have long been the main treatment for cancer pain due to their rapid effectiveness in treating moderate pain and lack of ceiling effect (Wiffen et al., 2017) and models exist to help patients receive appropriate analgesia for reported pain. In 1986, the World Health Organization (WHO) developed three main principles in order for patients to receive adequate analgesia which were “by the clock, by the mouth, and by the ladder” (Raina et al., 2018) which translates to giving the medication around the clock, through the oral route, and administer the drug for the given reported intensity respectively. To identify the drug for the given reported intensity, the WHO analgesic ladder was developed consisting of nonopioids, mild or mixed opioids, and strong opioids based on the intensity of pain. To determine if the patients are receiving adequate analgesia per the WHO guidelines, the Pain Management Index (PMI) was then developed. This tool correlates verbal pain scores (at patient’s worst pain) with drug classification of prescribed analgesics (Cleeland et al., 1994).
Research has shown that there are disparities in cancer pain for African Americans have yet a gap exists. Why do some African Americans have better pain management, and some do not? Are certain patient characteristics responsible for patient receiving analgesia?

**Patient Characteristics**

Patient characteristics may influence prescribers providing adequate analgesia. Patients often have characteristics that have been shown to have a significant relationship in either improving or worsening pain management. Minority patients with less than a high school education have greater odds of unrelieved pain (Stein et al., 2016). Employment status or a lack thereof has also been shown to play a role in obtaining adequate analgesia (Brandao et al., 2019). Age (Lavin & Park, 2014; Prommer, 2015), gender (Bertakis et al., 2004; Chou et al., 2018), matrimonial status (Brandao et al., 2019), and race (Vallerand et al., 2005) also have consistently been shown to have an effect on pain management.

**Statement of Purpose**

The current literature has identified that disparities exists and has made certain hypothesis as to why they exist, with some attempt at trying to provide causation. Suggested hypotheses range from a lack of provider training and understanding of managing pain (Chen et al., 2010; Kheshti et al., 2016; Oldenmenger et al., 2009), a reluctance by patients to talk about pain with their provider (Im et al., 2008), and fears of addiction or diversion from either the patient or the provider (Anderson et al., 2002; Maly et al., 2018; Meghani & Keane, 2007; Oldenmenger et al., 2009; Vallerand et al., 2018).

**Gaps**

A key area missing in research is looking specifically at identifying factors that contribute to African American patients receiving adequate analgesia. The current literature predominately
tends to attribute someone receiving adequate pain management from just pain scores alone. However, this is misguided and should not be the sole criteria if deciding if African American patients are truly receiving adequate analgesia. Along with pain scores, a closer look at the drug type, frequency and patient characteristics were needed.

Most of the current literature looks to highlight disparities by comparing two racial groups (i.e. African Americans vs Caucasians) and then simply reports which population is lacking in care. Once the disparity has been identified, there has been little attention to delve deeper into the specific patient characteristics to uncover correlation or causation for the disparity. There is a lack of knowledge looking specifically within one racial group to determine if any characteristics lead to improved pain management by obtaining adequate analgesia. This study addressed the current gap that exists by expanding and further identifying which patient factors exist that contributed to adequate analgesia for African Americans with cancer pain. This study will improve outcomes and actively reduce disparities instead of just highlighting their existence. This was the first study looking solely at one racial group (African Americans) and identifying what patient characteristics exist that contributed to receiving adequate analgesia for cancer pain.

**Specific Aims**

Aim 1: Determine the adequacy of analgesic prescriptions, as measured by the Pain Management Index (PMI), received by African American adults with cancer pain.

Hypothesis 1: Patients with higher pain intensity (indicated by the Brief Pain Inventory) will receive stronger analgesics than those with lower pain scores.

Aim 2: Determine the relationships between the characteristics of African American patients with cancer pain (age, gender, presence of caregiver, employment status, educational level, perceived
control over pain, pain-related distress, pain intensity, functional status) and adequacy of their analgesia as measured by the PMI

**Conceptual Framework**

The theory used to guide this study is the Symptom Management Model. This model consists of three corroborating circles which are the (1) symptom experience, (2) symptom management strategies, and (3) symptom outcomes (see Figure 1).

**Figure 1**

*Conceptual Model of Symptom Management*

Symptom experience refers to the patients’ perception, evaluation, and response to a symptom which can involve the patient to “develop their own symptom strategies such as increasing or decreasing their medication” (A Model for Symptom Management, 1994, p. 273).
The symptom experience further breaks down to perception of symptoms, evaluation of symptoms, and response to symptoms. How an individual perceives a symptom can fluctuate depending on the basic demographic variables of “age, sex, ethnicity, marital status, and financial status” (A Model for Symptom Management, 1994, p. 274) of which all are variables to be examined in this study. Evaluation of symptoms include characterizing the symptom experience by its intensity, location, frequency, and pattern of disability, which is equivalent to the variables of pain intensity, pain-related distress in this study.

A response to symptoms includes behavioral components that include changes in personal function and role performance which is equivalent to measuring functional status and perceived control this study. Patients with higher perceived control can advocate that cancer pain requires long acting medications instead of only short acting. Perceived control over pain is another variable that was studied to see its effect on adequacy of analgesia. The symptom experience can be jeopardized when the evaluation of patient’s symptom is mismatched with the healthcare provider, such as believing patients’ pain to be significantly lower than the patients reported pain (Dodd et al., 2001). This was unequivocally demonstrated in the qualitative analysis of the parent study, (Maly et al., 2018) and therefore is pertinent to the conceptual framework.

Symptom management involves avoiding or delaying a negative outcome through self-care, medical, or other professional strategies. A professional strategy to assess for adequacy of analgesia is the pain management index, a variable in this study. Symptom outcomes involves outcomes in 10 multidimensional factors which are “symptom status, self-care ability, financial status, morbidity, and comorbidity, mortality, quality of life, health service utilization, emotional status, and functional status” (A Model for Symptom Management, 1994, p. 275). An African
American with cancer pain goes through the numerous physical and psychological burdens from cancer and therefore this theory is unequivocally best suited for the study.

Significance

The outcomes in this study as well as the conceptual framework have been chosen to advance the discipline of nursing. In order for “continued growth, significance, and utility of the discipline of nursing, researches must place their research within the context of the discipline” (Donaldson & Crowley, 1978, p. 120). Both the outcomes and conceptual framework are needed to improve the domains of nursing: person, health/illness, and environment. The outcomes of patient characteristics such as age, gender, and African American race are linked to person. The cancer diagnosis and associated pain is linked to health/illness. The environment is linked to obtaining adequate analgesia while navigating through financial burdens, hospital system, and being a patient in the era of increased opioid scrutiny.

There is a plethora of research that states pain-related disparities are present yet less research into pain treatment and how to alleviate these disparities. Additionally, as healthcare is not guaranteed in the United States, an examination was needed if certain patient characteristics have a significant causal effect on whether optimal care will be received.

African Americans are more likely to be discriminated against and are less likely to report opioid misuse (Swift et al., 2019), yet disparities continue to exist in receiving prescriptions for adequate analgesia in the treatment of cancer pain (Meghani et al., 2020). Additionally, minorities are more likely to have negative PMI scores (Cintron & Morrison, 2006; Meghani et al., 2015; Stephenson et al., 2009) indicating potentially inappropriate analgesics were chosen to treat their pain. This study looked at the etiology as to why this phenomenon is happening by examining the
relationship between patient characteristics and adequate analgesia in order to reduce these disparities.
Chapter 2: Literature Review

Cancer Prevalence

Cancer is a group of several diseases due to abnormal proliferation of cells that can cause death if not controlled. Worldwide, one in six deaths are due to cancer which is more than HIV/AIDS, malaria, and tuberculosis combined (Lancet, 2018). Globally, an estimated 17.0 million cases of cancer were diagnosed in 2018, with 9.5 million cancer deaths (Ferlay et al., 2019). This is expected to get worse with 27.5 million new cancer cases and 16.2 million cancer deaths expected by 2040 (American Cancer Society, 2020). In the US, cancer is currently the second deadliest disease exceeded only by heart disease as more than 1.8 million new diagnoses for cancer are expected in 2020 with approximately 605,520 Americans expected deaths (American Cancer Society, 2020). Advancements have been done in educating the public on cancer treatment and side effects. With technological advances, several cancer mobile apps now are available to monitor symptoms, side effects, treatments and ways to manage chronic pain (Charbonneau et al., 2020). Despite the technological advancements, disparities exist in cancer related outcomes. This chapter reviews cancer epidemiology, disparities with pain management with African Americans, and the theoretical framework for this study.

Cancer Epidemiology

Socioeconomic Factors of Cancer

In 2016, there was an estimated 15.5 million cancer survivors with a projected increase to 26.1 million by 2040 (Bluethmann et al., 2016). The CDC, American Cancer Society, and National Cancer Institute analyzed data from the 2011-2016 Medical Expenditure Panel Survey (MEPS) showing average annual out of pocket expense was significantly higher among cancer survivors than those without a cancer history and that patients with cancer reported difficulty paying medical
bills which further exacerbated functional limitations and psychological distress (Ekwueme et al., 2019).

Education also plays a role as patients with twelve or fewer years of education are 3 times more likely than college graduates to die of cancer (American Cancer Society, 2020). Jayadevappa et al. (2007) looked at 214 (72 African American and 142 Caucasians) elderly adults with newly diagnosed prostate cancer from 2002 to 2004 at an urban academic hospital and a Veterans Hospital examining outcomes such as health related quality of life. In this sample, African Americans were less likely to have greater than a high school education, be married, work full time, or have an income greater than $40,000. Consequently, this population was more likely to report urinary problems, worsening health, and poor overall health related quality of life (Jayadevappa et al., 2007).

**Disparities with African Americans and Cancer Prevalence**

The Institute of Medicine (IOM) serves as an independent nonprofit organization outside government to provide unbiased decision makers to lawmakers and the public. The IOM released a 2002 report, *Unequal Treatment*, which recognized disparities as “differences in the quality of health care that are not due to access-related factors or clinical needs, preferences or appropriateness of intervention” (Institute of Medicine Committee on et al., 2003, pp. 3-4). There are several racial and ethnic disparities that exist even when insurance, age, and disease state were comparable to Caucasians. Currently, Black males have the highest cancer incidence with both the incidence (8%) and death rate (20%) being higher than White males. Cancer mortality with African Americans is twice than that of Asians and Pacific Islanders. Prostate cancer in Blacks is also double than any other racial group (American Cancer Society, 2020). African Americans are more
likely to get colorectal cancer and therefore have subsequently lower hemoglobin and increased weight loss than non-African Americans (Lapumnuaypol et al., 2018).

Although Black women have similar incidence rate of breast cancer than Whites, they are still faced with 40% higher death rates. A meta-analysis on 20 studies from January 1980 to June 2005 investigating survival of breast cancer determined that African Americans’ ethnicity was associated with increased mortality risk than Caucasians. This remained even when adjusting for age, state, and socioeconomic status. A disparity exists with screening as African American elderly women are less likely to undergo BRCA (BReast CAncer gene) counseling and testing (Thompson et al., 2012). African American women are less likely to be diagnosed with stage 1 breast cancer, and therefore may be diagnosed at later stages which are far more detrimental. African American women also have a lower chance of survival for every stage of breast cancer (Miller et al., 2019). With uterine cancer, White women have substantially higher survival rates than Black women in all different stages (Miller et al., 2019). Fortunately, interventions to address racial disparities in African American breast cancer survivors are successful at improving breast cancer surveillance (Thompson et al., 2009). Ultimately, one of the worst disparities that continues to exist is managing cancer pain.

Cancer Pain

Cancer pain differs from noncancer pain as a new or worsening pain may represent cancer recurrence or an emergency such as a spinal cord compression. The pain can also be from associated treatment such as radiation, chemotherapy, and postsurgical pain (Rodrigue et al., 2020). Despite growing attention in alleviating cancer pain, The Institute of Medicine (IOM) continued to recognize pain as a public health problem affecting at least 100 million American adults and costing $560-635 billion annually (Institute of Medicine Committee on Advancing Pain
In keeping with the National Pain Strategy’s effort to acquire better estimates of pain, the CDC reported an estimated 20.4% of adults in the United States are living with chronic pain and 8% had high-impact chronic pain in 2016 (Dahlhamer et al., 2018). Pain is one of the most distressing symptoms that affect people with cancer, with an analysis of 26 studies demonstrating that 43% of cancer pain being undertreated (Deandrea et al., 2008). A systematic review demonstrated 40% of patients continued to suffer pain after curative treatment, 55% during treatment, and 66% when there was disease progression. Approximately 75% to 90% of patients will experience pain that has a major impact on daily living (van den Beuken-van Everdingen et al., 2016). A systematic review demonstrated that minority groups face barriers to cancer pain management such as communication problems and inadequate pain assessment (Kwok & Bhuvanakrishna, 2014). Another examination of systematic review from 2005-2015 demonstrated that evidenced based pain management with cancer survivors is still lacking (Wang & Lee, 2015). Cancer pain may be due to the cancer, associated diagnostic procedures, and/or from the treatments itself. For example, neuropathic pain, a complication from cancer and chemotherapy agents, severely impacts quality of life and costed the United States approximately $2.3 billion in 2001 (Lema et al., 2010).

A systematic review of 52 studies reviewed prevalence of pain according to different disease stage and types of cancer. Results demonstrated 33% of patients in remission reported continued pain, 59% reported pain who were underdoing active treatment, and 64% had pain in all different disease stages. Of all the patients who reported pain, more than one-third reported their pain as moderate to severe. Prevalence of pain was greater than 50% in all different types of cancer, with the highest prevalence in head and neck cancer patients (van den Beuken-van Everdingen et al., 2007). While 33-50% of patients reported cancer pain at some point during treatment, those in
palliative care and pain management settings reported the highest pain (70-100%), reflecting worsening disease in those settings. Other groups who are at higher risk for pain included the elderly, underserved, and women (McGuire, 2004) which have global consequences.

**Global Concern**

This problem of ineffective pain management with cancer is not unique to the United States alone. Across Europe and Israel, a survey of 5,084 adult patients in 2006-2007 with cancer demonstrated 69% reported difficulties completing every day activities due to pain and 50% believing that quality of life was not viewed as a priority by their healthcare professional (Breivik et al., 2009). Another Israeli cross-sectional study looked at 410 female breast cancer survivors from January 2002 to December 2012 and examined quality of life and managing symptoms of pain. Approximately 74% of these patients reported chronic pain, 84% had moderate pain, and 97% reported pain at least 1-3 days a week. Patients also completed a Hebrew version of the 36 Item Short-Form Health Survey, where concepts of general health, functioning, mental health, and social function were evaluated. Pain was significantly associated with poorer quality of life (p<0.001) (Hamood et al., 2018). This demonstrates that chronic pain remains with breast cancer survivors. Ironically, the treatment done to alleviate breast cancer often causes persistent pain even while in remission (Hamood et al., 2018). Even with global attention on the severity of cancer pain, many barriers continue to exist in providing prescriptions for adequate analgesia.

**Barriers to pain management in cancer**

There are several barriers to adequate pain management in the cancer setting. A University of Pennsylvania internet-based questionnaire from November 2005 to July 2008 was placed on OncoLink, one of the largest general cancer information sources available on the internet. A total of 1107 patients responded with various different cancers, with the majority being breast cancer.
In total, 67% of cancer patients reported pain with specifically 48% reporting pain from cancer itself, and another 47% reporting pain from treatment. Those less likely to utilize analgesics were men, minorities, and the less educated. Reasons for not taking medications included inability to pay, fear of addiction, and reported failure of the provider to offer medication (Simone et al., 2012).

A systematic review of barriers to cancer pain management also echoed the idea that providers are less likely to offer pain medication citing 34% to 86% of providers overestimated chances of addiction, tolerance, and that 35% of providers thought morphine had an upper dose limit (Oldenmenger et al., 2009). Physicians and nurses also named existing barriers to effective pain management ranging from inadequate assessment of pain, lack of knowledge of pain, and patients’ reluctance to report pain (Oldenmenger et al., 2009).

The American Cancer Society Study of Cancer Survivors-II (SCS-II) conducted a cross sectional study of 4,707 cancer survivors between August 2002 and July 2005 at 18 state and regional central cancer registries across the United States specifically looking at barriers in managing cancer pain. These barriers were separated into patient-level barriers, provider-level barriers, and system-level barriers. With patient-level barriers, minorities with less than a high school education had greater odds of believing their pain could not be relieved. With provider-level barriers, minorities had greater discomfort talking with their doctor, felt talking about pain would distract their doctor from treating the cancer, and were more likely to report physicians not asking about their pain. On the contrary, patients with greater than a high school education were much less concerned about upsetting their doctor and were less likely to report their physician not asking about their pain. They were also less likely to report their treatment to be costly, that their health insurance would not cover treatment, or that their pharmacy didn’t carry pain medication. With system-level barriers, all minorities reported that medication was too expensive, health
insurance would not pay for pain medications or treatments, and that the pharmacy didn’t carry pain medications. Additionally, Non-Hispanic minorities had more difficulty finding a pain expert. This study had 97.7% reporting some form of health coverage, demonstrating that a lack of coverage for pain management services exists even when a patient has insurance. Additionally, older patients had greater odds reporting that physicians didn’t ask about their pain, or that pain wasn’t bad enough to seek treatment (Stein et al., 2016). This demonstrates that patient characteristics play a major role in receiving prescriptions for adequate analgesia, and further supports the justification of this study.

**Health Professionals Lack of Pain Education**

There has been a lack of training cited by providers when managing pain internationally as well (Kheshti et al., 2016; Oldenmenger et al., 2009). Providers and nurses often cite barriers of reluctance of patients to report their pain, possessing inadequate knowledge of pain and analgesic therapies, and a lack of training specific to pain management (Oldenmenger et al., 2009). A cross-sectional study evaluating attitudes and knowledge of medical residents and nurses from various specialties including internal medicine, rehabilitation, and psychiatry was done in Iran. Shockingly, 62.4% incorrectly believed opioids were not good and it was better for patients to tolerate pain as much as possible. Additionally, 63% of medical residents and 95% of nurses overestimated the likelihood for addiction. Another 65.3% of medical residents and 86.0% of nurses incorrectly believed using a placebo was a useful test for determining pain. Ultimately, only 9% of participants believed they had received adequate education on pain management (Kheshti et al., 2016).

Similar findings were reported in an Italian study looked at knowledge and attitudes of 669 nurses and 225 doctors by completing a novel questionnaire. Results showed 70% incorrectly
thought it was okay to give a placebo to assess for legitimate pain (Visentin et al., 2001). Furthermore, a Tasmanian study had nurses complete the Pain Management Nurses’ Knowledge and Attitude survey reporting insufficient continuing education, as nurses from all age groups reported information from nursing school significantly higher (p < 0.001) than information received from workplace programs (Van Niekerk & Martin, 2001). Health professionals reporting incorrect beliefs about pain as well as reporting a lack of proper training are barriers for patients in receiving adequate analgesia.

A lack of education was further demonstrated in another literature review focused on managing breakthrough cancer pain specifically. Oncologists reported medical residency and academic education was insufficient to manage pain (Camps Herrero et al., 2020). One particular study in this review was developed by the New Hampshire State Cancer Pain Initiative, where a survey was conducted regarding knowledge and attitudes of cancer pain management of physicians, nurses, and pharmacists. Interestingly, results demonstrated that nurses were the most knowledgeable about pain management and pharmacists were the least knowledgeable as many pharmacists believed that most cancer pain cannot be adequately relieved (p=.04). Nurses also were the most committed to providing opioid relief and physicians were the least committed (Furstenberg et al., 1998).

A survey given to Spanish Association of Medical Oncology was done to gain perspective on cancer pain management from September 2015 thru January 2016. Although oncologists reported confidence on knowledge of analgesics, mechanism of action of opioids, and how to manage side effects, only 30% reported collaborating with pain clinics, and just 9.6% participated in multidisciplinary pain teams (Garcia-Mata et al., 2018). This lack of collaboration with
multidisciplinary roles can be a significant barrier in ensuring patients receive prescriptions for adequate analgesia.

**Patient Characteristics**

**Age and Gender**

There are mixed findings with the effect of age and gender on receiving adequate analgesia. A study looked at demographic predictors of pain sensitivity in measures of pressure, mechanical, and thermal pain sensitivity. It showed women were significantly more pain sensitive than men in 29 out of the 34 measures. There was also a trend of decreased sensitivity with increasing age, although not statistically significant (Ostrom et al., 2017). Patients at greatest risk for undertreatment in pain are younger African American men. Although women have been found more likely to complain of pain, young African American men have reported the worst pain suggesting undertreatment (Institute of Medicine Committee on Advancing Pain Research & Education, 2011). A study looking at Georgia Medicaid pharmacy database from 2009 to 2014 demonstrated that average number of opioid prescriptions and average days’ supply of opioids increased in all demographic categories, with older, fee-for-service, and males experiencing higher use in the six year period compared to all other counterparts (Jayawardhana et al., 2018).

Younger patients experience more cancer pain and tend to have more pain flares than elderly patients (Prommer, 2015). However, other studies demonstrated minority elder adults had higher pain and intensity (Lavin & Park, 2014; Singh et al., 2017). Finally, one review looking at undertreatment of cancer pain demonstrated that age was not a significant predictor for undertreatment of pain (Deandrea et al., 2008). With gender, men have better pain management by having greater adherence to analgesics when prescribed, as women have been found to be hesitant to utilize analgesics leading to inadequate pain management (Chou et al., 2018). Another
study showed female patients reported more pain than male patients and this pain was more easily recognized by physicians (Bertakis et al., 2004). On the contrary, another study demonstrated physicians were more likely to underestimate female pain severity as compared to males (Anderson et al., 2000). This demonstrates that there are mixed results as to the effects of age and gender on receiving adequate analgesia.

**Socioeconomic Status and Education**

Patients with at least a high school education or greater were less concerned about upsetting their doctor when asking about pain medications (Stein et al., 2016), suggesting they are better at advocating for adequate pain management. Patients with higher education may be more articulate and may be more confident in having a conversation with their physician and more successful at getting their specific needs addressed. Pain reports from patients with higher socioeconomic status (SES) have been taken more seriously by nurses than those with low SES (Brandao et al., 2019). Uninsured people with cancer are at greater risk for metastasis and death than insured patients (Aizer et al., 2014). Even with insurance, nonpharmacologic therapy such as access to pain psychologists and physical therapy often require preauthorizations or are limited in sessions. In addition, insurance companies may limit the number of pills, type of medications, or a specific choice of medication and therefore limiting chances of receiving adequate analgesia. Additionally, complementary therapies such as acupuncture, hypnosis, and massage are often excluded by insurance companies citing lack of understanding of treatment efficacy (Pellino et al., 2006). A study looking at Georgia Medicaid pharmacy database from 2009 to 2014 demonstrated that average number of opioid prescriptions and average days’ supply of opioids increased in all demographic categories, with older, fee-for-service, and males experiencing higher use in the six year period compared to all other counterparts (Jayawardhana et al., 2018). A study looking at
commercially insurance (HealthCore) vs Alabama Medicaid demonstrated from 2000 to 2005 that cumulative yearly dose of opioids was greater for Medicaid than commercial insurance (191% vs 95%) (Sullivan et al., 2008). A Norwegian study demonstrated that having a disability pension was more likely to be associated with persistent opioid users as compared to short-term opioid users, odds ratio was 6.41 and 5.77 for women, and men, respectively (Svendsen et al., 2014).

Support

There are many studies demonstrating that a means of support can improve pain. A study had individuals exposed to 15-second heat blocks and undergo thermal pain while looking at pictures of either their romantic partner, familiar acquaintance, or perform a word association task as a means of distraction. Viewing pictures of their romantic partner was significantly able to reduce experimental pain as demonstrated by neural activations of the brain from function magnetic resonance imaging (FMRI) (p=0.026) (Younger et al., 2010).

Another study looking at middle-aged men diagnosed with chronic pelvic pain syndrome from chronic prostatitis demonstrated that being married had a positive effect on symptom relief rate (p<0.1), and symptoms did not worsen unlike unmarried or widowed patients regardless of treatment prognosis (Zhang et al., 2019). One study examining women with breast cancer looked at daily mood, pain, and fatigue and demonstrated that although positive mood and fatigue were significantly improved with support, pain did not (Boeding et al., 2014). In a study looking at male patients with nonmuscle-invasive bladder cancer (NMIBC), matrimonial status was strongly associated with all types of disease coping. Patients with active relationships had higher scores in the fighting spirit and had lower scores in using destructive styles of coping (Krajewski et al., 2018). However, it has also been shown that marital status has not had any effect on improving
coping or acceptance of illness (Nowicki et al., 2015). This demonstrates mixed results with a support system on obtaining adequate analgesia.

The patient characteristics of age, gender, education, support system, and SES playing a role in adequacy of analgesia had mixed results in the current literature. However, race seems to consistently have negative correlation with pain management, in particular African Americans have unequivocally faced additional burdens in managing cancer pain.

**Disparities of African Americans with Cancer Pain**

**Race**

Despite national attention to existing health disparities, racial disparities with managing cancer pain continue to exist. The classic study by Cleeland et al. (1994) demonstrated that minorities (Blacks and Hispanics) were 3 times more likely to receive inadequate pain management than nonminority patients. Since then, inadequate treatment within cancer pain management has been well documented for decades with most studies being cross-sectional investigations comparing two racial groups showing minority patients have more severe pain than nonminority patients (Anderson et al., 2009).

Black and multiracial patients with cancer are more likely to report increased pain severity than White patients (Martinez et al., 2014). An examination of patients with prostate, breast, lung, and colon cancer found that minority patients had approximately double the chances of receiving inadequate pain management (Fisch et al., 2012).

Renal impairment is prevalent from consequences of cancer treatment and African Americans are often already predisposed to chronic kidney disease (CKD) due to underlying factors such as diabetes and hypertension. Morphine is known to be harmful in the presence of chronic kidney disease (CKD), therefore other analgesics such as oxycodone may be substituted.
for cancer pain (Meghani et al., 2014). However, a study looking at 182 African American and Caucasian patients in the University of Pennsylvania Health System demonstrated that African Americans had 71% lower odds of receiving oxycodone than Caucasian patients (p<0.001). The effect of private health insurance was insignificant, and race was a strong predictor in analgesic prescriptions (Meghani et al., 2014). This further demonstrates that prescribing may be due to an implicit bias against African Americans where implicit bias is defined as “actions or judgements that are under the control of automatically activated evaluation, without the performer’s awareness of that causation” (Greenwald et al., 1998, p. 1464).

Meghani et al. (2012) also conducted a meta-analysis review on 20 years of disparities in the United States on acute and chronic pain treatment. A total of 34 articles were reviewed, with results showing Black patients were 29% more likely to not receive opioid analgesia than White patients for the same painful conditions (Meghani et al., 2012). This review demonstrated that race has a direct link in receiving opioids, and therefore is a factor in obtaining adequate analgesia.

A study using face-to-face interviews of 116 women who underwent breast cancer surgery showed African American women and Latinas had increased pain and other symptoms such as depression and fatigue, suggesting an increased rate of cancer treatment symptoms in low income and ethnic minority women (Eversley et al., 2005). Castel et al. (2008) asked 1,124 women with metastatic breast cancer and bone metastases from October 1998 to January 2001 to complete the Brief Pain Inventory (BPI) repeatedly over the course of one year. The BPI was completed at baseline, first month, second month, and alternate months until reaching week 51 of the study. The authors grouped Black, Oriental, and “Other” into a category of Non-Caucasian race. Results demonstrated that non-Caucasian women had the greatest pain severity and interference in daily activities. These differences in race were statistically significant for pain severity (p<0.001) and
for pain interference (p=.003) (Castel et al., 2008). In this study, it is noteworthy to mention that grouping all races into one category as “other” demonstrates a lack of focus on individual races, and more studies are needed addressing individual racial disparities with cancer pain.

A longitudinal study examining patients with breast, prostate, colorectal, lung cancer and stage III-IV multiple myeloma on dealing with breakthrough pain. Participants completed surveys at initiation, three months, and six months rating their breakthrough pain, coping, and health related quality of life. Results showed nonwhites (Blacks, Arabic, Hispanic, and Native American) reported significantly worse pain severity for all categories: pain at its least (p <0.001), average (p=0.004), and worst times (p=0.009). Nonwhites also reported significantly more dyspnea (p = 0.05). Again, this study tended to group all minorities into one group, further beckoning the need for increased minority recruitment and representation in future studies. (Green et al., 2009).

Access

Pharmacies that are located in zip codes with increased minority presence are less likely to carry opioids needed to manage pain (Green et al., 2005; Morrison et al., 2000). A random selection of 30% of New York City pharmacies was done to take stock of supply of opioids. A total of 347 out of the 431 eligible pharmacies responded with a result of at least 51% demonstrating insufficient supply of opioids to treat patients in predominantly nonwhite neighborhoods. In fact, only 25% of pharmacies had sufficient supply of opioids to treat patients in severe pain as opposed to 72% of pharmacies in neighborhoods where population was at least 80% White (p < 0.001) (Morrison et al., 2000).

A similar cross-sectional survey-based study looking at pharmacies in Michigan demonstrated similar results. A sufficient opioid supply was defined as having at least one long-acting, short-acting, and a combination opioid analgesic. Pharmacies that were noncorporate and
located in predominantly White neighborhoods were more likely to carry sufficient opioid analgesic supplies \((p < .005\)). Ultimately, Michigan pharmacies in minority zip codes were 52 times less likely to have sufficient opioid analgesic than pharmacies located in predominantly White areas (Green et al., 2005)

African Americans have also reported pharmacies refusing prescriptions if the patient didn’t have insurance or if their insurance would not cover a specific medication even if the patient was willing to pay for it out of pocket (Maly et al., 2018). This qualitative inquiry was part of a larger mixed methods study looking at the experience of urban African Americans with cancer pain (Vallerand et al., 2018). In the open-ended interviews, one patient stated that although she had a prescription for oxycodone, her insurance would not cover it. When the patient stated she would pay the $100 cost out of pocket, the pharmacy replied “No, if insurance doesn’t cover it….you can’t buy it” (Maly et al., 2018, p. 75). However, it is common knowledge that patients can always pay out of pocket for medications even if insurance does not cover it.

Additionally, another qualitative study of 35 African American patients from three outpatient oncology clinics demonstrated increased difficulty with obtaining prescriptions. These patients completed surveys including demographics, Brief Pain Inventory-Long Form, and in-depth semistructured interviews. One patient stated that “where I live, they don’t deal with Percocet and Oxycontin. I don’t know why but they don’t deal with it….I have to go to the town I used to live in…to get my pain medicine” (Meghani & Keane, 2007).

A qualitative study by the same author done over a decade later demonstrated that access continues to be a problem. Meghani et al. (2020) conducted a multimethod study recruiting adult ambulatory patients with solid malignancies or multiple myeloma from an urban national cancer center in Philadelphia. Lack of access was demonstrated with a 74-year-old African American
patient with metastatic kidney cancer stating “I was taking the medicine for the leg pain, the joint pain, the ache. I haven’t found anything that really comes close to stopping that pain but oxycodone. My insurance won’t give it to me. I’m trying to deal with all of this” (Meghani, Wool, et al., 2020, p. 622). Another African American patient reported difficulty with preauthorizations, “Usually when something happens, its 3:00 or 4:00 in the morning…which makes it difficult because you need a preauthorization for your treatments before they will fill anything-make any kind of approval or prescription. That makes it difficult. It makes it extremely difficult for the pain management piece” (Meghani, Wool, et al., 2020, p.622). This was in contrast to another 62 year old White patient with breast cancer in the study who reported “immediately, I had a prescription [of oxycodone] available” or “I never had a situation where I didn’t call up and get whatever I wanted” (Meghani, Wool, et al., 2020, p.622).

**World Health Organization Analgesic Ladder**

Although there are several pharmacologic and nonpharmacologic ways to treat pain, the National Comprehensive Cancer Network (NCCN) recommends opioids to be used for cancer pain (Rodrigue et al., 2020). Yet even with these guidelines in place, patients are having difficulty obtaining opioids given the current environment of increased scrutiny on opioid prescriptions (Kata et al., 2018). The impetus to use opioids for cancer pain is used internationally.

In order to combat cancer pain, the World Health Organization (WHO) created the analgesic ladder with the framework for treating cancer pain (See Figure 2). Initially, these guidelines were compiled from 664 cases that were from 15 different countries, and it showed that pain control was 75% higher when using the ladder (Ventafridda, 1990). The WHO guidelines were designed for simplicity with the goal of not creating complex guidelines for cancer pain that
would not be easily disseminated (Carlson, 2016). The ladder has been effective in treating different types of pain including cancer pain as well as noncancer pain (Barakzoy & Moss, 2006).

This ladder has three steps. Step 1 utilizes nonopioids (such as aspirin or acetaminophen) and/or adjuvants. An adjuvant is a medication that’s primary role is not to treat pain such as an anticonvulsant or antidepressant, yet it is used to treat pain. For example, gabapentin is an anticonvulsant but is widely used in treating neuropathic pain (Rosenberger et al., 2020). Step 2 then utilizes mild opioids such as codeine with adjuvants, and step 3 uses strong opioids such as morphine along with adjuvants. If a patient reports severe pain, then the nurse should start at the appropriate level of the ladder, and it is not necessary to start at step 1. For example, if someone reports 10/10 pain, starting with acetaminophen may delay administration of another analgesic that could offer significant relief quicker. However with all of its progress, the stepladder approach gives unrealistic expectations to those living with chronic pain which is highly complex and for which no glove fits all (Ballantyne et al., 2016). It is important to note that this stepwise approach was questioned as it does not address breakthrough pain (Clark, 2018). In order to compensate for this, modified versions of the ladder with a fourth step including adding a nerve block, epidural, PCA pump, and spinal stimulator were also developed (Vargas-Schaffer, 2010). Although it is not appropriate or comprehensive for all pain scenarios, these guidelines help with two things (1) choosing the correct type of analgesic for the level of pain and (2) to easily teach health professions globally how to relieve suffering in a method that is easy and not convoluted.
A tool developed to determine if the patients are receiving adequate analgesia, or an analgesic that corresponded with their reported pain intensity, per the WHO guidelines for cancer is known as the Pain Management Index (PMI). This tool correlates verbal pain scores (at patient’s worst pain in last 24 hours) with drug classification of prescribed analgesic: no drugs, nonopioid drugs such as acetaminophen or nonsteroidal anti-inflammatory drugs (NSAIDS), weak opioids, or strong opioids (Cleeland et al., 1994). These drugs correspond with different levels of pain using the 0 to 10 scale with 0 being no pain and 10 equaling the worst pain imaginable: 0=no pain, 1-3 = mild pain, 4-6 = moderate pain, 7-10 = severe pain. No pain, mild pain, moderate pain, and severe pain are then scored 0, -1, -2, and -3 respectively. Likewise, no drugs, acetaminophen or
NSAID, combination opioids such as hydrocodone-acetaminophen, and strong opioids such as morphine correspond with level 0, 1, 2, and 3 respectively. The scores are then added together with the range being -3 to +3 with more negative scores indicating inadequate pain management. The PMI has been used internationally and in the pediatric population (Plummer et al., 2017). A systematic review looking at adequacy of cancer pain management utilizing the Pain Management Index (PMI) demonstrated that although the amount of undertreatment in pain decreased 25% from 2007 to 2013, one third of patients still did not receive an analgesic that corresponded with their reported pain intensity (Greco et al., 2014).

**PMI Correlating with Other Factors**

A study of patients with cancer in Japan demonstrated that the more negative the PMI (more inadequate analgesia), the greater the pain interference (p < 0.001), which is pain preventing the individual from doing something meaningful (Sakakibara et al., 2018). Another study found that depression was a significant predictor (p= 0.003) of inadequate analgesia, as measured by the PMI (Fujii et al., 2017). An Indian study focused on inadequate cancer pain using the PMI and found more inadequate pain being linked to (1) NSAIDS as no strong opioids were prescribed to any patient in the study, (2) males, and (3) increased body mass index (BMI) (Singh et al., 2017). A review on undertreatment of cancer pain demonstrated more negative PMI scores to be associated with studies published before 2001, studies originating from Europe and Asia or countries with gross national income less than $40,000, and settings that did not have a setting specific for cancer (Deandrea et al., 2008). This demonstrates that inadequate pain management can be linked to many different factors, and further research is needed to see if these relationships are merely correlational or indeed casual in nature.
Consequences of Inadequate Cancer Pain Management

Unrelieved pain can have long-term effects on quality of life. One study looking at 142 hospitalized gastrointestinal (GI) cancer patients (98 having pain and 44 without pain). Having cancer pain was associated with lower levels of role functioning, emotional functioning, and overall quality of life. Patients with cancer pain had higher levels of depression than those patients with cancer who did not have pain. Patients with higher pain consistency were significantly associated with worse global quality of life (Tavoli et al., 2008). Insomnia often occurs with patients having cancer and has been correlated with depression and anxiety. Insomnia also increases cortisol secretion and significantly depresses the immune system, particularly the system which helps fights tumors (Theobald, 2004). Another literature review demonstrated increased cancer pain led to increased catastrophizing which also further intensified cancer pain. Increased cancer pain was also associated with decreased level of social support (Zaza & Baine, 2002).

Cancer pain continues to be a global problem, with prodigious evidence of African Americans reporting insurmountable barriers in receiving adequate analgesia. The literature is abundant with studies comparing African Americans with Caucasians and reporting disparities in care. What is lacking is a detailed examination within the African American population of what barriers exist in receiving adequate analgesia. This study is measuring adequacy of analgesia and how African Americans manage the symptom of cancer pain, therefore a theory focused on symptoms and symptom management is warranted.

Theoretical Framework

The theory used to guide this study is the Symptom Management Model. Symptoms are the most common reason people seek healthcare. Healthcare providers often have difficulty with symptom management as there are few tested models for symptom management. This model
consists of three corroborating circles which are the (1) symptom experience, (2) symptom management strategies, and (3) symptom outcomes (A Model for Symptom Management, 1994). Please refer to Figure 1 in Chapter 1. While the author discusses all three major concepts, the current study will only focus on the relationship between two concepts: symptom experience and symptom management strategies.

**Symptom experience**

*Perception of Symptoms*

*Person.* Symptom experience is then broken down into (a) perception of symptoms, (b) evaluation of symptoms, and (c) response to symptoms. The perception refers to whether a person notices a new symptom that is not normal. Variables that affect perception of symptoms include demographic, psychological, sociological, and physiological symptoms. Psychological variables include personality traits, cognitive capacity, and physical capacity. Physiological variables include activity, rest, and the physical capacity to withstand given symptom. Attributes that affect this perception are demographic variables of age, sex, ethnicity, marital status, and financial status (A Model for Symptom Management, 1994). These personal variables have been present before the symptom and therefore have a major influence on the perception of the symptom. For example, an elderly person may notice that a cough to be more burdensome than a younger individual. Therefore, this study will look at demographic variables to understand its effect on the symptom experience of African Americans with cancer pain. For the purpose of this study, marital status will be combined with caregiver.

*Environment.* Environment refers to the atmosphere and background to which a symptom is experienced. It includes physical, social, ethnic, and cultural variables. The physical environment includes all locations that affect the individual including work, home, and play. The
social environment is one’s social support network. Cultural aspects of the environment include the values, beliefs, and practices of the individual. The beliefs of the individual are how one handles their symptoms, such as either deciding to take their analgesic or avoid it due to fear of addiction.

Health/Illness. The health illness categories represent variables that pose a risk to disease or injury. These can be behavioral such as cigarette smoking or hereditary such as a risk of heart disease in the family. The person, environment, and health/illness all represent variables that influence the perception of an individual’s symptoms. The outcomes of patient characteristics such as age, gender, and African American race are linked to person. The cancer diagnosis and associated pain is linked to health/illness. The environment is linked to obtaining adequate analgesia while navigating through financial burdens, hospital system, and being a patient in the era of increased opioid scrutiny.

Evaluation of Symptom

The evaluation of symptoms represents the intensity, location, and frequency. The intensity of pain will be measured as a variable in this study by examining individual pain scores at worst intensity. This will be assessed by the Brief Pain Inventory (BPI) - Pain Intensity Subscale. Evaluation of Symptoms also includes an individual’s “associated pattern of disability…. evaluation of the threat posed by a symptom, such as danger or disabling effect” (A Model for Symptom Management, 1994, p. 274-275). This disabling effect is equivalent to pain-related distress, and will be measured by the Distress Thermometer, Memorial Symptom Assessment Scale (MSAS) and two items from the Patient Pain Questionnaire (PPQ).
**Response to Symptoms**

The response to symptoms include the physiological, psychological, and behavioral components. Physiological responses include heart rate, respiratory rate, and sleep patterns. Psychological responses are reflected in cognitive and affected changes such as inability to concentrate, mood changes, or altered self-esteem. Physiologic and psychological responses were not measured in this study, but behavioral components were measured in this study. Behavioral components include verbal or social communication such as including crying, yelling, dealing with conflicts, socially withdrawing, changing sleep patterns, or change in role performance or alternations in personal function. This alteration to personal function and role performance is linked to **perceived control over pain** and **functional status**. If an individual is able to deal with pain and not catastrophize (crying, yelling), they have increased perceived control over pain. If an individual is then able to increase their role performance, they have an increase in functional status. Perceived Control is measured by four constructs: pharmacological (Perceived Control Scale), cognitive (SOPA), catastrophizing (Pain Catastrophizing Scale), and feelings of control (PPQ). Function status is measured by the seven-item interference subscale of the BPI, the Short-Form 12 Physical and Mental Health Composite, the Quality of Life scale of the American Chronic Pain Association (2003), and the Karnofsky Performance Status scale.

**Symptom Management Strategies**

The goal of symptom management is to delay or avoid a negative outcome by biomedical, professional, and/or self-care strategies. Management begins from an assessment of the symptom from the patient’s perspective. Assessment is then planning an appropriate intervention, evaluating the outcome and management process. The relationship often is represented by the patient, nurse, and physician. Symptom management is often a dynamic process, where changes in strategies over
time are needed depending on the acceptance or lack of acceptance of the given treatment (A Model for Symptom Management, 1994). This change in strategies to achieve optimal symptom management is equivalent to the Pain Management Index’s attempt to get a patient to achieve adequate pain control. The Pain Management Index is effectively a symptom management strategy, by seeing if the patient is receiving adequate analgesia. For pain relief, patients may need a strong opioid when only being prescribed an NSAID. Therefore, for effective symptom management, constant reevaluation and monitoring is needed depending on the context of the situation.

**Symptom Outcomes**

The symptom outcome is conceptualized as 10 multidimensional indicators including “symptom status, self-care ability, financial status, morbidity, comorbidity, mortality, quality of life, health service utilization, emotional status, and functional status” (A Model for Symptom Management, 1994, p. 275). When a patient feels that a physician does not take their pain seriously or is reluctant to prescribe due to the increased pressure on opioid prescribing in the current climate of opiophobia. Patients with cancer pain have faced the consequences of the latest CDC recommendations for pain management, even though that the guidelines were not written for patients with cancer pain (Meghani & Vapiwala, 2018). This crisis has caused increased scrutiny for opioid prescribing for many physicians regardless of their specialty and many health systems have mandated opioid tapering for patients with chronic pain (Matthias et al., 2017). Healthcare system variables “may hinder the use of the most effective symptom management strategy” (A Model for Symptom Management, 1994, p. 275). Even before the COVID-19 outbreak, more than 37 million Americans did not have health insurance creating inequity in obtaining adequate care (Galvani et al., 2020). System level barriers of inequity of healthcare, lack of opioids in pharmacies
located in minority dense zip codes, fear of prescribing in the climate of opiophobia are all part of the healthcare system variable within system outcome in this theory. All of these factors play a role in determining what type of outcome the patient will achieve in receiving adequate analgesia. This study is not measuring any specific variables of lack of access to opioids in pharmacies, insurance, or consequences of opiophobia specifically. Therefore, no variables are measured in this category. Figure 3 provides the theoretical substruction diagram.
Figure 3

Theoretical Substruction Diagram

Symptom Experience
- Perception of Symptoms
- Evaluation of Symptoms
- Response to Symptoms

Symptom Management
- Patient
- Family
- Healthcare Provider
- Healthcare System

Perception of Symptoms
- Demographics
- Evaluation of Symptoms
- Pain Intensity, Pain-Related Distress
- Response to Symptoms
- Functional Status, Perceived Control Over Pain

Adequacy of Analgesia

Demographics
- Age, Gender, Caregiver, Employment, Education
- Pain Intensity
- BPI- Pain Intensity Subscale
- Pain Related Distress
- Distress Thermometer, MSAS, PPQ
- Functional Status
- BPI - Interference, Quality of Life, Karnofsky Performance
- Perceived Control Over Pain
- PS, SQPA, PPQ, PCatSS

Pain Management Index

Model

Theoretical

Empirical
Summary

Cancer pain continues to be undertreated in current society. Disparities in managing cancer pain have been consistently documented with minimal signs of improvement. However, it has been shown that improvements in cancer pain with minorities are achievable (Anderson et al., 2004; Vallerand et al., 2018). Most studies compare two racial groups and highlight a disparity of pain management. However, there is a lack of knowledge looking specifically within one racial group to determine if any characteristics lead to improved pain management by obtaining adequate analgesia. This study was the first of its kind to identify which patient factors (symptom experience) contribute to adequate analgesia (symptom management) for African Americans with cancer pain, with the potential to improve outcomes and actively reduce disparities instead of just highlighting their existence.
Chapter Three: Methods

The purpose of the study was to determine which symptom experience factors led to the symptom management strategy of prescriptions for adequate analgesia in African Americans with cancer pain. Currently, African Americans with cancer have expressed concerns about feeling vulnerable in the healthcare system, reporting ineffective pain management and having low perceived control over pain (Maly et al., 2018). Vallerand et al. (2018) demonstrated that improving perceived control over pain leads to improvements in pain, pain related distress, and functional status. However, does one’s perceived control over pain lead to increased likelihood of obtaining adequate analgesia? Are there other patient characteristics that can be identified to help alleviate cancer pain within the African American population? This chapter will explain the research design, setting, sample, and method of analysis for the study.

Specific Aims

Aim 1: Determine the adequacy of analgesic prescriptions, as measured by the Pain Management Index (PMI), received by African American adults with cancer pain.

Hypothesis 1: Patients with higher pain intensity (indicated by the Brief Pain Inventory) will receive stronger analgesics than those with lower pain scores.

Aim 2: Determine the relationships between the characteristics of African American patients with cancer pain (age, gender, presence of caregiver, employment status, educational level, perceived control over pain, pain-related distress, pain intensity, functional status) and adequacy of their analgesia as measured by the PMI.

Research Design

The study was a secondary analysis of the parent study, a longitudinal randomized control trial which sought to improve functional status in African Americans with cancer pain (Vallerand
et al., 2018). This parent study tested the efficacy of the Power Over Pain – Coaching (POP-C) intervention to improve pain, pain-related distress, and functional status by improving perceived control over pain in adult African American patients with cancer. This study used only the baseline data from the parent study. The research design for this study is explorative and correlational.

**Human Subjects Considerations**

**Sample**

Participants were recruited from the waiting room of Karmanos Cancer Institute in Detroit, MI. The inclusion criteria were being 18 years or older, self-identifying as African American, and having cancer related pain of four or greater on a zero to 10 scale within the past two weeks. Exclusion criteria were those not meeting inclusion criteria, declining to participate in the study, or being unavailable at the time of consent. The Institutional Review Board (IRB) of Wayne State University in Detroit, MI approved the parent study and data were collected through home visits as well as telephone calls. For this study, IRB approval was exempt as patient data has been deidentified. Patients reported what medications they were being prescribed through interviews. Only the names of the drugs were recorded. The doses as well as the frequency taken were not recorded. There was no actual witnessing of medications being taken, so there was no confirmation that patients were taking the drug as prescribed. However, patients did report rationing medication out of fear of running out (Maly et al., 2018). Inclusion criteria of the study was all 310 participants of the parent study. Exclusion criteria was any participant that did not have any medication or pain level recorded at baseline, as it was impossible to calculate the Pain Management Index. The power analysis was done using G*Power 3.1. Apriori with hierarchical regression with 8 predictors demonstrated that a sample size of 109 is needed. Since all 310 patients were originally included
in this study, a post hoc analysis demonstrated that this sample gave a power of 0.99, seen in Figure 4.
Figure 4

Power Analysis

Test family: F tests
Statistical test: Linear multiple regression: Fixed model, $R^2$ deviation from zero
Type of power analysis: Post hoc: Compute achieved power - given $\alpha$, sample size, and effect size

Input parameters:
- Effect size $R^2$: 0.15
- $\alpha$ err prob: 0.05
- Total sample size: 310
- Number of predictors: 8

Output parameters:
- Noncentrality parameter $\lambda$: 46.5000000
- Critical F: 1.9692197
- Numerator df: 8
- Denominator df: 301
- Power (1-$\beta$ err prob): 0.9997411

Test family: F tests
Statistical test: Linear multiple regression: Fixed model, $R^2$ deviation from zero
Type of power analysis: A priori: Compute required sample size - given $\alpha$, power, and effect size

Input parameters:
- Effect size $R^2$: 0.15
- $\alpha$ err prob: 0.05
- Power (1-$\beta$ err prob): 0.8
- Number of predictors: 8

Output parameters:
- Noncentrality parameter $\lambda$: 16.3500000
- Critical F: 2.0323276
- Numerator df: 8
- Denominator df: 100
- Total sample size: 109
- Actual power: 0.8040987
Procedure

The parent study demonstrated that improving perceived control over pain was able to decrease pain-related distress, reduce pain intensity, and improve functional status. The study had a specific outcome of adequate analgesia with eight predictors as patient characteristics receiving prescriptions for adequate analgesia. A potential confounder could be race on the effect of education or employment status on the adequacy of analgesia, yet this was controlled for as all participants are African American. Another potential confounder is the presence of a caregiver on marital status influencing adequacy of analgesia, yet this was controlled for as participants who identify having a spouse were combined with the caregiver category. There is minimal risk to study participants as all data is already collected. The risk of loss of privacy is only possible if data is mishandled or compromised. Therefore, all data has been deidentified and was stored on password protected devices and hardcopy data was locked in the research office at the College of Nursing. Inclusion criteria were all 310 patients in the study, and the only exclusion criteria were if there is missing data on recorded analgesics or pain scores.

Instruments in Substruction Model - Predictors

This goal of the study was to identify patient characteristics that are associated with obtaining adequate analgesia. These characteristics include age, gender, employment, education level, marital status, and access to caregiver, pain intensity, perceived control over pain, pain-related distress, and functional status. Marital status was combined with caregiver. A hierarchical regression was done in the order of the theoretical model: perception of symptoms, evaluation of symptoms, and followed by response to symptoms.
**Perception of symptoms**

The perception of symptoms were evaluated from the covariates of age, gender, employment, educational level, and access to caregiver. These were recorded by the demographics survey.

**Evaluation of Symptoms**

**Pain Intensity**

The measures for pain were the Brief Pain Inventory (BPI) and the PPQ. Before the BPI, the McGill Pain Questionnaire (Melzack, 1975) was used historically, but these measures were primarily designed to assess with nonmalignant disease. Patients reported these measures to be too complex and too long, and therefore burdensome to complete especially in a population already in chronic pain. Patients also reported the questions asked were not relevant to cancer pain (Cleeland, 1985) and therefore another tool was needed which gave rise to the BPI.

The BPI also known as the Wisconsin Brief Pain Questionnaire (see Appendix A) was administered to more than 1200 patients at the Wisconsin Clinical Cancer Center in Madison, Wisconsin. These patients had cancer that were either located at the breast, prostate, colon-rectal or gynecological regions. Patients were asked to rate their pain intensity (worst, least, and average in past 2 weeks and current pain) on a 0 to ten scale with 0 being no pain and ten being the worst pain they could imagine (Daut et al., 1983). The first development was the long form of the Brief Pain Inventory (Cleeland & Ryan, 1994a). Interference items were added with 0-10 scales with 0=no interference and 10= interferes completely. The long form also asked about nonmedical methods to relieve pain and the percentage and duration of pain relief obtained. This BPI long form became lengthy for repeated use in clinical research, and therefore a short form was created. The test-retest reliability of BPI has been studied. The short-term (1 day to 1 week) reliability for
pain at “worst” was .93, and for “usual” and “average” pain it is .78, which demonstrates acceptable reliability (Daut et al., 1983). The parent study used the BPI short form (four items) and one item from the PPQ to measure pain intensity (Vallerand et al., 2018) which had a reliability of .9.

**Pain Related Distress**

Pain Related distress was measured by the Distress Thermometer (DT) (see Appendix A), one item from the Memorial Symptom Assessment Scale (MSAS) and two items from the PPQ. The Distress Thermometer allows patients to report psychological distress on a drawing of a thermometer with no distress (0) to extreme distress (10) (Ransom et al., 2006). A score of five or greater should trigger evaluation to a psychosocial service. A multi-institutional study with the Hospital Anxiety and Depression Scale (HADS) was compared with the DT in a sample of patients with various cancer diagnoses. Findings showed that the DT cutoff score of four was the most sensitive (.77) and specific (.68) than the HADS score of 14 (Ransom et al., 2006). The MSAS was developed to provide multidimensional information of common symptoms. A study evaluating 246 patients with cancer of prostate, colon, breast, or ovarian was done using the MSAS. Groups comprised of psychological symptoms or physical symptoms. Internal consistency was high in physical and psychological groups with Cronbach alpha coefficients of 0.88 an 0.83 respectively. The parent study used the combined items from the distress thermometer, the MSAS, and the PPQ and had a reliability of .76.

**Response to Symptoms**

**Perceived control over pain**

In this study, four constructs were used to measure perceived control over pain. They are Cognitive Control (Survey of Pain Attitudes Control Scale), Pharmacologic Control (the Perceived
Control Scale), Catastrophizing (Pain Catastrophizing Scale) and Feelings of Control (one question from the PPQ and two additional questions from the demographic form). The PPQ questions asks how much the patient believes they can control their pain. The two additional questions ask the patient whether they believe their pain is controllable and whether they believe their pain is controlled.

**Perceived Control Scale.** The Perceived Control Scale (see Appendix A) was initially developed in a study to determine perceived control of taking medications and of pain in patients from a postoperative orthopedic unit (Pellino, 1997). Patients reported their pain severity, perception of control over pain and taking analgesics, and the relief they obtained. The instrument measuring perceived control had 8 items, with three items were altered from the internal scale of the Headache of Locus of Control Scale to reflect perceived control after postoperative pain. Participants reported their perception of postoperative pain control on a seven-point Likert scale with (1) as extremely disagree and (7) as “extremely agree.” Responses were added and divided by 8 to get an overall score for control. The reliability (Cronbach’s alpha) of the scale was .80. In the sample, women perceived they had more control over pain than men (Pellino & Ward, 1998).

With permission from the author, the parent study then modified the scale for cancer pain. The scale measures the patient’s sense of perceived control by taking analgesics with questions such as “having control over taking enough medications to keep my pain at an acceptable level has been easy.” The Perceive Control Scale in the parent study had a reliability of .68.

**Survey of Pain Attitudes Control subscale (SOPA).** The SOPA (see Appendix A) was developed examining several beliefs in mind: (a) a medical cure for pain, (b) ability to control pain, (c) responsibility to help in assisting patients with pain, (d) pain can cause disability, (e) medications are best strategy for pain. The scale was developed by surveying 55 patients with
chronic pain having an average duration of chronic pain greater than 5.75 years at St. Joseph’s Hospital in Phoenix, Arizona. The coefficient alpha reliability of the subscales varied from 0.56 to 0.73 (Jensen et al., 1987). SOPA Control Subscale focuses on cognitive ability to control pain with questions such as “I believe that I can control how much pain I feel by changing my thoughts” (Jensen et al., 1994). It uses a 5-point scale (0) very untrue to (4) very true and focusing whether the patient has the ability to influence the pain experienced. The SOPA was able to show that patients who ultimately had an incremental theory of pain (pain is changeable) vs an entity theory (pain is fixed) had reported less pain and disability (Summers et al., 2019). In the parent study, the SOPA Subscale was used with 10 items and a reliability of .80.

**Pain Catastrophizing Scale (PCS).** The opposite of having control is considered catastrophizing or negative control and can be measured by the Pain Catastrophizing Scale (see Appendix A). The PCS was developed and validated over a series of four studies (Sullivan et al., 1995). In the first study, 432 psychology students volunteered to complete the PCS. The PCS instructions were to reflect on painful experiences and rate among 13 different thoughts and feelings when experiencing pain on a 5-point scale from 0 (not at all) to 4 (all the time). The coefficient alpha for the total PCS was .87. The subscale scores for rumination, magnification, and helplessness were .87, .60, and .79 respectively. Participants who are catastrophizing are more likely to agree with statements “I think there is nothing I can do to improve my pain” (Gauthier et al., 2011; Sullivan et al., 2001). In the parent study, the Pain Catastrophizing Scale had a reliability of .92.

**Feelings of Control.** The parent study used an additional 3 items to measure the construct and feelings of control over pain. One question from the Patient Pain Questionnaire (PPQ) asked to what extent the patients believed they could control their pain, and two questions from the
demographic survey asked how controllable the patients believed their pain was, and whether they believed their pain was controlled. In the parent study, reliability was .71 when looking at the 3 items in total.

**Adequacy of Analgesia**

Adequacy of analgesia was measured by the Pain Management Index. The Pain Management Index (PMI) (see Figure 5) compares the most potent analgesic prescribed with the patient’s worst level of pain.

**Figure 5**

*Pain Management Index*

<table>
<thead>
<tr>
<th>World Health Organization Drug Level</th>
<th>No drugs (0)</th>
<th>Nonopioid (1)</th>
<th>Weak opioid (2)</th>
<th>Strong Opioid (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain Intensity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No pain</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td>Mild (1-3)</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
</tr>
<tr>
<td>Moderate (4-7)</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
<tr>
<td>Severe (8-10)</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
<td>+3</td>
</tr>
</tbody>
</table>

The four levels of analgesics are as follows: (0) no analgesics, (1) a non-opioid (such as acetaminophen or a nonsteroidal anti-inflammatory drug), (2), a weak opioid such as codeine or a combination opioid/nonopioid (hydrocodone/acetaminophen) and (3) a strong opioid such as morphine. This is then compared to the level of pain from the Brief Pain Inventory (1 to 3, mild; 4 to 7, moderate; and 7 to 10, severe). The absence of pain is scored 0, mild pain as 1, moderate
pain as 2, and severe pain as 3. The PMI is calculated from subtracting the pain level from the analgesic level, with ranges from -3 (severe pain and receiving no analgesics) to +3 (a patient receiving morphine or an equivalent and reporting no pain). The negative scores represent inadequate orders for analgesics, 0 or higher is a conservative indicator of acceptable treatment (Cleeland et al., 1994). The PMI measures the healthcare provider’s response to a patient’s pain in terms of the correct class of analgesics but does not go as far as to consider the dose or frequency of the medications or if the patient is not compliant with taking their medication. This classic study demonstrated that 42% (250 of the 597) of patients were not given adequate analgesic therapy (Cleeland et al., 1994). Patients at centers with predominantly minority populations were three times more likely than other locations to have an inadequate pain management index. Other factors contributing to inadequate pain management included physicians not attributing pain to cancer, patients having an age greater than 70, and being female sex. Patients with less adequate analgesia were more likely to report less pain relief and more impairment of function (Cleeland et al., 1994).

**Functional Status**

Function status was measured by the seven item interference subscale of the BPI, the Short-Form 12 Physical and Mental Health Composite (Ware et al., 1996), the Quality of Life scale of the American Chronic Pain Association (2003), and the Karnofsky Performance Status scale (see Appendix A) (Schag et al., 1984). The BPI pain interference subscale measures how pain interferes with seven daily activities including general activity, walking, work, mood, enjoyment of life, relationships with others, and sleep. The BPI interference subscale is scored as the mean of these seven interference items. The SF-12 is a 12 item survey that was developed from the longer SF-36 Health Survey (Ware et al., 1996). These questions look at mental and physical functioning as well as overall health related quality of life. The Short-form 12 Physical and Mental Component
Summary had test-retest correlations of .89 and .76 respectively. Both physical and mental component summaries of the SF-12 showed relative validity estimates to be .67 and .97 respectively (Ware et al., 1996). The American Chronic Pain Association’s Quality of Life (QOL) Scale is a single item scale describing various levels of activity with a range of 0 to ten, with 0 representing non-functioning such as staying in bed all day, and ten as normal quality of life (American Chronic Pain Association, 2003).

The Karnofsky Performance Status (KPS) has been used wildly to assess functional status of a patient. Originally introduced by David Karnofsky and Joseph H. Burchenal in 1949, it describes a patient’s functional status using a comprehensive 11-point scale with percentage values ranging from 100% (not having symptoms) to 0% (death) (Peus et al., 2013). The Cronbach’s coefficient alpha was used and showed an inter-observer reliability greater than .97 (Peus et al., 2013). In the parent study, the combined BPI Interference (7 items), SF12, QOL, and KPS had a reliability of .82 for functional status.

**Data Collection**

All data had already been collected as this is was a secondary analysis. No data was removed from the parent study prior to analysis.

**Data Analysis By Specific Aim**

Aim 1: Determine the adequacy of analgesic prescriptions, as measured by the Pain Management Index (PMI), received by African American adults with cancer pain.

Hypothesis 1: Patients with higher pain intensity (indicated by the Brief Pain Inventory) will receive stronger analgesics than those with lower pain scores.

An analysis using the analgesics taken by the patient and their reported worst pain score was done. If the patient is taking multiple analgesics, the strongest was chosen. For example, if a
patient is taking ibuprofen, acetaminophen, hydrocodone-acetaminophen, and oxycodone, then the oxycodone will be selected. From the data, all 310 patients will have their PMI calculated to assess for adequacy of analgesia.

Aim 2: Determine the relationships between characteristics of African American patients with cancer pain (age, gender, presence of caregiver, employment status, educational level, perceived control over pain, pain-related distress, pain intensity, functional status) and adequacy of their analgesia as measured by the PMI.

To determine which factors predict adequate analgesia, a hierarchical regression using SPSS version 26 was done on the PMI and eight factors recorded at baseline. These factors were age, gender, employment status, education level, presence of caregiver, perceived control over pain, pain intensity, pain-related distress, and functional status. For gender, patients could select “male” or “female.” For age, patients simply recorded their age. Marital Status was either single, married, separated, divorced, widowed, or single and divorced. Caregiver was listed as either father, mother, brother, sister, husband, wife, grandson, granddaughter, significant other, relative, and friend. Marital status was combined with caregiver, so if a patient was married or identified a caregiver, they would be labeled 1 and patients that were not married and did not identify a caregiver would be labeled 0. Education level was recorded as the highest level completed. For example, twelve was considered a high school education, fourteen was an Associate’s degree, sixteen was a Bachelor’s degree, and seventeen and above was considered a graduate degree. For employment, patients wrote what their occupation was. These were then coded into either full time, part time, retired, student, unemployed, disabled, full time and part time, full time and retired, full time and disabled, retired and disabled, part time and retired, full time and student, unemployed and disabled, medical leave, part time, retired, and disabled, laid off, or retired, unemployed, and
disabled. For this study, gender, marital status, and employment status were all simplified to be dichotomous variables.

A hierarchical regression was done first with the predictors that belong to the following groups in three steps (1) perception of symptoms, (2) evaluation of symptoms, and (3) response to symptoms. Internal validity of this study was maintained by choosing scales and measurements that are widely used and to have good reliability. There was less chance of confounding as the study only measured African Americans and by combining variables such as marital status and caregiver. Furthermore, the parent study maintained internal validity as the sampling was randomized and followed the protocols of a randomized control trial. Threats to external validity are that since this population is only African Americans, findings from this study cannot be applicable to other racial groups. This was also done in an urban setting and cannot be applicable to rural settings. This study also happened before the opioid crisis and pre-CDC guidelines, and therefore outcomes may be even worse in the current ophiophobic climate.
Chapter 4: Results

The purpose of this study was to characterize the adequacy of analgesia received by African Americans with cancer pain and determine which characteristics contribute to receiving adequate analgesia. In this chapter, the results will be presented. This was a secondary analysis from the parent study which created the Power Over Pain – Coaching (POP-C) intervention, which was a multicomponent, five-week, nurse-delivered home and telephone intervention (Vallerand et al., 2008).

In this chapter, the setting, sample demographics, and modeling results are presented. Initially, hierarchical regression was conducted based on the theoretical model. With further exploration of the results, the final output utilized Structured Equation Modeling (SEM) which transitioned the Pain Management Index (PMI), initially conceived of as an outcome, to a mediator with perceived control over pain as an outcome. The parent study utilized an intervention that improved perceived control over pain, pain intensity, pain-related distress, and functional status. This study looked at the antecedents of the parent study at baseline, specifically the demographic variables and the influence on perceived control over pain. These variables include age, gender, presence of a caregiver, employment status, educational level, perceived control over pain, pain-related distress, pain intensity, and functional status. The rationale for using these variables was to see which factors contribute to receiving adequate analgesia within the African American population having cancer pain. The following chapter will discuss the study’s findings within the context of the specific aims and hypothesis.

Sample

The parent study sample utilized individuals who were 18 years or older, self-identifying as African American, and had cancer-related pain of four or greater on a zero to 10 scale within
the past two weeks. Three hundred ten patients were included in the parent study. For the current study, exclusion criteria were any participant that did not have any medication or pain level recorded at baseline, as it would be impossible to calculate the Pain Management Index. In this sample, seven patients had no analgesics listed at baseline and one patient had no worst pain score listed at baseline. Therefore a total of 8 patients were removed from the 310 sample, leading to a total sample of 302 patients as seen in Figure 6.

**Figure 6**

*Flowchart of Participants*

![Flowchart](chart.png)

**Descriptive Statistics**

Demographic data are reported for the sample of 302 participants and include age, gender, spouse or caregiver as a support system, presence of metastasis, employment, and years of education completed. There were missing data with the predictors of age (n=3), metastasis (n=10), employment (n=12), and education (n=3). Imputing, replacing the missing value with an estimated
value, was not done. Pairwise estimation in the regressions was done so all available data was used in estimating the regression coefficients.

Overall, this was a very small proportion of missing data (12/302) for the variables with employment being the highest at 3.9%. Instead of imputing, pairwise deletion was used in the regression procedure. Mean (SD) participant age was 56.30 (11.63) years. Participants ages ranged from 20 to 87 years of age. Most participants self-reported as female, with 190 females (62.9%) and 112 (37.1%) males in the study. The majority of participants did have a support system of either a spouse or caregiver, with 256 reporting presence of a caregiver (84.8%) and 46 reporting no caregiver at all (15.2%). There was a sizable portion of participants who had not completed the minimal governmental education requirements as 106 (35.1%) reported not finishing high school. There was a very low representation (n=11 or 3.7%) of individuals who obtained a graduate degree or higher as seen in Table 1.
Table 1

Descriptive Statistics

<table>
<thead>
<tr>
<th>Demographic Variables</th>
<th>N</th>
<th>Mean or %</th>
<th>SD</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>299, missing 3</td>
<td>56.30</td>
<td>11.63</td>
<td>20-87</td>
</tr>
<tr>
<td>Gender</td>
<td>302</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>112</td>
<td>37.1%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>190</td>
<td>62.9%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Support System</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Presence of Caregiver</td>
<td>256</td>
<td>84.8%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No Caregiver</td>
<td>46</td>
<td>15.2%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metastasis</td>
<td>292, missing 10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Present</td>
<td>106</td>
<td>35.1%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absent</td>
<td>186</td>
<td>61.6%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employment</td>
<td>290, missing 12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>41</td>
<td>14.1%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unemployed</td>
<td>249</td>
<td>85.9%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>299, missing 3</td>
<td></td>
<td>2.30</td>
<td>5-19 years</td>
</tr>
<tr>
<td>&lt; High School</td>
<td>109</td>
<td>36.5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High School</td>
<td>76</td>
<td>25.4%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; High School</td>
<td>36</td>
<td>12%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Associates</td>
<td>37</td>
<td>12.3%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; Associates</td>
<td>12</td>
<td>4%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bachelors</td>
<td>18</td>
<td>6%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Graduate Degree</td>
<td>2</td>
<td>0.7%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Graduate</td>
<td>9</td>
<td>3%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Pain intensity was calculated on a 0-10 scale with 0 equaling no pain and 10 equaling worst pain imaginable (Cleeland & Ryan, 1994b). The mean worst pain score of participants was 7.4 (range of 0 – 10), suggesting severe pain, and most patients were prescribed weak opioids (n=145) as seen in Figures 7 and 8.

According to the WHO analgesic ladder, analgesics are classified as nonopioids (acetaminophen and NSAIDs), weak opioids (hydrocodone-acetaminophen combinations), and strong opioids (morphine) (see Figure 8). Weak opioids, such as hydrocodone in combination with acetaminophen, were the most commonly prescribed analgesics for patients in this study, despite worst pain scores in the severe range.

**Figure 7**

*Worst Pain Scores*
Specific Aims

This exploratory and correlational research had two specific aims.

Aim 1: Determine the adequacy of analgesic prescriptions, as measured by the Pain Management Index (PMI), received by African American adults with cancer pain.

Hypothesis 1: Patients with higher pain intensity (indicated by the Brief Pain Inventory) will receive stronger analgesics than those with lower pain scores.

Aim 2: Determine the relationships between the characteristics of African American patients with cancer pain (age, gender, presence of caregiver, employment status, educational level, perceived control over pain, pain-related distress, pain intensity, functional status) and the adequacy of their analgesia as measured by the PMI.
Adequate Analgesia

The Pain Management Index was used to achieve Aim 1. The PMI determines if patients are receiving adequate analgesia by linking the class of analgesic being prescribed with the patient’s reported pain intensity, based on the WHO Guidelines for cancer pain (Patrick et al., 2015). This tool correlates self-reported pain scores (at patient’s worst pain in last 24 hours) with drug classification of prescribed analgesic: no analgesics, Level 1: nonopioid drugs such as acetaminophen or nonsteroidal anti-inflammatory drugs (NSAIDS), Level 2: weak opioids, or Level 3: strong opioids based on the WHO Analgesic Ladder (Cleeland et al., 1994). These drugs correspond with different levels of pain using the 0 to 10 scale with 0 being no pain and 10 equaling the worst pain imaginable: 0=no pain, 1-3 = mild pain, 4-6 = moderate pain, 7-10 = severe pain. No pain, mild pain, moderate pain, and severe pain are then scored 0, -1, -2, and -3 respectively. Likewise, no analgesics, acetaminophen or NSAID, combination opioids such as hydrocodone-acetaminophen, and strong opioids such as morphine correspond with level 0, 1, 2, and 3 respectively. The scores are then added together with the range being -3 to +3 with more negative scores indicating inadequate pain management. The PMI (see Table 2) was calculated by two different researchers separately to determine interrater reliability. Both researchers confirmed the same sample size of 302 and both obtained the exact same output with PMI, indicating interrater reliability of 100%.
Table 2

*Calculated Pain Management Index*

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>-3.00</td>
<td>11</td>
<td>3.6</td>
<td>3.6</td>
</tr>
<tr>
<td></td>
<td>-2.00</td>
<td>14</td>
<td>4.6</td>
<td>8.3</td>
</tr>
<tr>
<td></td>
<td>-1.00</td>
<td>96</td>
<td>31.8</td>
<td>40.1</td>
</tr>
<tr>
<td></td>
<td>.00</td>
<td>132</td>
<td>43.7</td>
<td>83.8</td>
</tr>
<tr>
<td></td>
<td>1.00</td>
<td>40</td>
<td>13.2</td>
<td>97.0</td>
</tr>
<tr>
<td></td>
<td>2.00</td>
<td>9</td>
<td>3.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>302</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Negative scores indicate inadequate pain management while 0 or positive scores indicate adequate pain management. Overall, most patients (n=181, 59.9%) had a score of 0 or a positive score meaning that most patients received adequate or more aggressive analgesia for their level of pain. However, there were still 121 patients (40%) who had negative scores and therefore received inadequate analgesia, meaning that many patients received the incorrect category of analgesics for the intensity of their pain, based on WHO guidelines for the level of pain (Cleeland et al., 1994). This is quite alarming as these patients were being managed at a leading cancer institute in the Metropolitan Detroit area.

Hypothesis 1 proposed that patients with higher pain intensity (indicated by the Brief Pain Inventory) will receive stronger analgesics than those with lower pain scores, which was supported by the data. Patients reporting higher pain scores were prescribed stronger analgesics (see Table 3). As the mean of the worst pain scores (6.2 to 7.8) increased, the drug classifications increased.
from no opioids to stronger opioids (0 to 3). Therefore Hypothesis 1 was supported. The average worst pain score of the study was 7.41. The partial eta- squared indicated that analgesia level accounted for 7% of the variance in pain intensity (see Table 4). Post-hoc analysis with Student-Newman-Keuls showed that level 0 and 1 were not significantly different from one another but that drug levels 2 and 3 were significantly higher than levels 0 and 1. This may be due to smaller sample size of patients who were taking no drugs (n = 22) and those taking nonopioids such as acetaminophen (n = 23) and the fact that the majority of patients reported worst pain scores in the severe range and were prescribed opioids. Figure 9 show the 95% confidence intervals for each analgesic category.
Table 3

*WHO Drug Scores and Worst Pain Level*

<table>
<thead>
<tr>
<th>WHODrugScore</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>.00</td>
<td>6.2273</td>
<td>3.55811</td>
<td>22</td>
</tr>
<tr>
<td>1.00</td>
<td>5.5217</td>
<td>3.40947</td>
<td>23</td>
</tr>
<tr>
<td>2.00</td>
<td>7.5816</td>
<td>2.35762</td>
<td>147</td>
</tr>
<tr>
<td>3.00</td>
<td>7.8364</td>
<td>2.09642</td>
<td>110</td>
</tr>
<tr>
<td>Total</td>
<td>7.4189</td>
<td>2.54479</td>
<td>302</td>
</tr>
</tbody>
</table>

Table 4

*Significance of Worst Pain Level and WHO Analgesic Scores*

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
<th>Partial Eta Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected Model</td>
<td>137.085$^a$</td>
<td>3</td>
<td>45.695</td>
<td>7.514</td>
<td>.000</td>
<td>.070</td>
</tr>
<tr>
<td>Intercept</td>
<td>7040.651</td>
<td>1</td>
<td>7040.651</td>
<td>1157.786</td>
<td>.000</td>
<td>.795</td>
</tr>
<tr>
<td>WHODrugScore</td>
<td>137.085</td>
<td>3</td>
<td>45.695</td>
<td>7.514</td>
<td>.000</td>
<td>.070</td>
</tr>
<tr>
<td>Error</td>
<td>1812.178</td>
<td>298</td>
<td>6.081</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>18571.250</td>
<td>302</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrected Total</td>
<td>1949.262</td>
<td>301</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. R Squared = .070 (Adjusted R Squared = .061)
Hierarchical Regression

Hierarchical regression was initially used to achieve Aim 2. A hierarchical regression aligned with the theoretical model was conducted (see Figure 10). The hierarchical regression was initially done in the 5 steps according to the theoretical model. The primary variables were in the first block and these were forced into the regression (enter). The succeeding steps used forward stepwise regression so that only variables that contributed were allowed to enter. For the forward entry blocks, entry was set at \( p = .05 \) while \( p = .10 \) was to remove. These were the SPSS system defaults.
The hierarchical regression demonstrated that only one variable from the Model 2, BPI-pain intensity subscale (p < .001) and one variable from Model 3, Distress Thermometer (p = .042) were significant in predicting adequate analgesia (Table 5). Model 1, demographic factors, was not significant (p = .087) and only accounted for approximately 4% of the variance. However, adding Model 2 (Pain Intensity) was significant (p = .001) and accounted for 14% of the variance (R square change = .142). With these two variables in the equation, in addition to the primary variables that were included in Step 1, no other variables contributed significantly to the prediction of adequate analgesia (PMI).

Figure 10
First Hierarchical Regression

Perception of Symptoms
Model 1: Demographics *Enter*
Age, Gender, Support System (Caregiver Combined with Marriage), Employment, Education, Cancer Metastasis

Evaluation of Symptoms
Model 2: Pain Intensity *Forward*
BPI- Pain Intensity Subscale, 1 PPQ

Model 3: Pain Related Distress *Forward*
Distress Thermometer, MSAS, PPQ (2 item)

Response to Symptoms
Model 4: Functional Status *Forward*
BPI- Interference, Quality of Life, Karnofsky, SF12 (2 scale)

Model 5: Perceived Control Over Pain *Forward*
PS (Pharm), SOPA (Cognitive), Feelings (1PPQ +2DEM), PCats (Catastrophizing)
However, it was then realized that the variable, pain intensity, used to calculate the PMI, caused tautological confounding with measures of pain intensity. The hierarchical regression was then reduced from 5 to 4 models (see Figure 11) with pain intensity being removed. This reduced hierarchical model, (Table 7) demonstrated that only one variable, Distress Thermometer, (p = .001) was significant over and above the primary covariates.
Figure 11

Second Hierarchical Regression

**Perception of Symptoms**
**Model 1: Demographics *Enter***
Age, Gender, Support System (Caregiver Combined with Marriage), Employment, Education, Cancer Metastasis

**Evaluation of Symptoms**
**Model 3: Pain Related Distress *Forward***
Distress Thermometer, MSAS, PPQ (2 item)

**Response to Symptoms**
**Model 4: Functional Status *Forward***
BPI- Interference, Quality of Life, Karnofsky, SF12 (2 scale)

**Model 5: Perceived Control Over Pain *Forward***
PS (Pharm), SOPA (Cognitive), Feelings (1PPQ +2DEM), PCats (Catastrophizing)

Table 5 and Table 6 shows the first hierarchical regression model and the effect of distress thermometer. Before adding distress, only cancer metastasis was significant ($p = .043$). After adding distress thermometer, cancer metastasis ($p = .042$), employment ($p = .009$), and distress thermometer ($p = .000$) were significant.
Table 6

*Final Hierarchical Regression Model Results*

<table>
<thead>
<tr>
<th>Model</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Beta</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>-2.140</td>
<td>.033</td>
</tr>
<tr>
<td></td>
<td>Age</td>
<td>.045</td>
<td>.740</td>
</tr>
<tr>
<td></td>
<td>Gender</td>
<td>-.007</td>
<td>-.110</td>
</tr>
<tr>
<td></td>
<td>CombinedCaregiverMarriage</td>
<td>.082</td>
<td>1.354</td>
</tr>
<tr>
<td></td>
<td>Employment (1= , 0 = )</td>
<td>-.121</td>
<td>-1.940</td>
</tr>
<tr>
<td></td>
<td>Education (Last Year Completed)</td>
<td>.053</td>
<td>.839</td>
</tr>
<tr>
<td></td>
<td>Has the Cancer Metastasized (spread) (1 = , 0 = )</td>
<td>.122</td>
<td>2.031</td>
</tr>
<tr>
<td>2</td>
<td>(Constant)</td>
<td>-.677</td>
<td>.499</td>
</tr>
<tr>
<td></td>
<td>Age</td>
<td>.001</td>
<td>.010</td>
</tr>
<tr>
<td></td>
<td>Gender</td>
<td>-.014</td>
<td>-.229</td>
</tr>
<tr>
<td></td>
<td>CombinedCaregiverMarriage</td>
<td>.075</td>
<td>1.271</td>
</tr>
<tr>
<td></td>
<td>Employment</td>
<td>-.161</td>
<td>-2.623</td>
</tr>
<tr>
<td></td>
<td>Education (Last Year Completed)</td>
<td>.067</td>
<td>1.100</td>
</tr>
<tr>
<td></td>
<td>Has the Cancer Metastasized (spread)</td>
<td>.119</td>
<td>2.040</td>
</tr>
<tr>
<td></td>
<td>Distress Thermometer: How much distress have you been experiencing in the past week including today?</td>
<td>-.254</td>
<td>-4.317</td>
</tr>
</tbody>
</table>

Note: *p<.05. **p<.001

The first set of six variables (age, gender, support system, employment, education, and cancer metastasis) were forced in. This is demonstrated in Table 7 by seeing the six degrees of freedom in Model 1. These six variables in step one only accounted for 4% of the variance (R square = .041). This was not significant. However, when adding distress thermometer, we were able to see that it now accounted for 10% (R square = .103) and was significant (p = .001). This demonstrates that distress, had a greater correlation to adequate analgesia, than any of the initial demographic variables.
Examination of the bivariate partial correlations from this model showed that before entering the distress thermometer variable, most of the proposed model predictors from each block/model were significant (see Table 8). Only KPS, SF12, and Feelings of Control were not significant. After controlling for the distress thermometer, none of the secondary predictors were significantly related to the PMI.
Table 8

**Bivariate Partial Correlations from Second Hierarchical Regression Model**

<table>
<thead>
<tr>
<th>Evaluation of Symptoms (Model 3)</th>
<th>Beta</th>
<th>t</th>
<th>Sig.</th>
<th>Partial Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distress Thermometer</td>
<td>-.254</td>
<td>-4.317</td>
<td>&lt;.001**</td>
<td>-.253</td>
</tr>
<tr>
<td>MSAS: Memorial Symptom Assessment Scale</td>
<td>-.227</td>
<td>-3.811</td>
<td>&lt;.001**</td>
<td>-.225</td>
</tr>
<tr>
<td>PPQ: Items 13 and 14</td>
<td>-.205</td>
<td>-3.426</td>
<td>&lt;.001**</td>
<td>- .203</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Response to Symptoms (Model 4 and 5)</th>
<th>Beta</th>
<th>t</th>
<th>Sig.</th>
<th>Partial Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>BPI_Interference</td>
<td>-.231</td>
<td>-3.821</td>
<td>&lt;.001**</td>
<td>-.226</td>
</tr>
<tr>
<td>Quality of Life Scale</td>
<td>.137</td>
<td>2.233</td>
<td>.026*</td>
<td>.134</td>
</tr>
<tr>
<td>KPS: Karnowsky Performance</td>
<td>.028</td>
<td>.450</td>
<td>.653</td>
<td>.027</td>
</tr>
<tr>
<td>SF12</td>
<td>.096</td>
<td>1.582</td>
<td>.115</td>
<td>.096</td>
</tr>
<tr>
<td>PCS_PPharm_WithReverseQuestion6</td>
<td>-.163</td>
<td>-2.724</td>
<td>.007**</td>
<td>-.163</td>
</tr>
<tr>
<td>SOPA_Cognitive</td>
<td>.163</td>
<td>2.714</td>
<td>.007**</td>
<td>.162</td>
</tr>
<tr>
<td>Catastrophizing</td>
<td>-.221</td>
<td>-3.612</td>
<td>.000**</td>
<td>-.214</td>
</tr>
<tr>
<td>FeelingsOfControl_1PPQ_and_2Dem</td>
<td>.028</td>
<td>.469</td>
<td>.640</td>
<td>.028</td>
</tr>
</tbody>
</table>

**Bivariate partial correlations controlling for all Model 1 variables plus Distress Thermometer from Model 3**

<table>
<thead>
<tr>
<th>Evaluation of Symptoms (Model 3)</th>
<th>Beta</th>
<th>t</th>
<th>Sig.</th>
<th>Partial Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSAS: Memorial Symptom Assessment Scale</td>
<td>-.109</td>
<td>-1.424</td>
<td>.156</td>
<td>-.086</td>
</tr>
<tr>
<td>Distress_PPQ_13 and 14</td>
<td>-.100</td>
<td>-1.448</td>
<td>.149</td>
<td>-.088</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Response to Symptoms (Model 4 and 5)</th>
<th>Beta</th>
<th>t</th>
<th>Sig.</th>
<th>Partial Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>BPI_Interference</td>
<td>-.131</td>
<td>-1.874</td>
<td>.062</td>
<td>-.113</td>
</tr>
<tr>
<td>Quality of Life Scale</td>
<td>.054</td>
<td>843</td>
<td>.400</td>
<td>.051</td>
</tr>
<tr>
<td>KPS: Karnowsky Performance Status</td>
<td>-.051</td>
<td>-.817</td>
<td>.415</td>
<td>-.050</td>
</tr>
<tr>
<td>SF12</td>
<td>-.081</td>
<td>-1.116</td>
<td>.266</td>
<td>-.068</td>
</tr>
<tr>
<td>PCS_PPharm_WithReverseQuestion6</td>
<td>-.079</td>
<td>-1.248</td>
<td>.213</td>
<td>-.076</td>
</tr>
<tr>
<td>SOPA_Cognitive</td>
<td>.070</td>
<td>1.074</td>
<td>.284</td>
<td>.065</td>
</tr>
<tr>
<td>Catastrophizing</td>
<td>-.114</td>
<td>-1.610</td>
<td>.109</td>
<td>-.097</td>
</tr>
<tr>
<td>FeelingsOfControl_1PPQ_and_2Dem</td>
<td>.008</td>
<td>.135</td>
<td>.892</td>
<td>.008</td>
</tr>
</tbody>
</table>

Notes: SF12= Short Form 12 v2 Health and Well-Being
*p<.05,**p<.001
Regression Plots with PMI as a Predictor

BPI Interference, Catastrophizing, and measures of Distress were the variables with the strongest partial correlations (Table 8). Changing roles and regressing these on PMI while controlling for the sociodemographic and medical variables, showed a relatively linear relationship between having adequate analgesia (PMI) and decreases in functional interference, catastrophizing, and distress (see Figures 12, 13, 14).

Figure 12

Partial Regression of BPI Interference on PMI
Figure 13

*Partial Regression of Perceived Control (Catastrophizing) on PMI*
Figure 14

Partial Regression of Distress on the PMI

Distress Thermometer: How much distress have you been experiencing in the past week?

PMI_With_No_Missing_Data

$R^2$ Linear = 0.071
Factors that Affect Adequate Analgesia

The goal of Aim 2 was to look specifically at which preexisting sociodemographic and medical variables affected the prescription of adequate analgesia as measured by the PMI. There were some concerns with the model: (1) tautological confounding as pain intensity is used to calculate PMI, (2) when adding distress variable, no other variable in the response to symptoms (perceived control) or evaluation to symptoms (functional status) seemed to matter. With the initial analysis, it seemed that patients who reported distress were more likely to receive adequate analgesia.

These results further caused a shift in thinking about the initial theoretical model. The hierarchical regression modeled the constructs (Pain Related Distress (M3), Response to Systems (perceived control over pain (M4), and Function (M5) as potential predictors of adequate analgesia measured by the PMI within the context of the Symptom Management Model. As noted earlier, symptoms are the most common reason people seek healthcare. Healthcare providers often have difficulty with symptom management as there are few tested models for symptom management. This model consists of three corroborating circles which are the (1) symptom experience, (2) symptom management strategies, and (3) symptom outcomes ("A Model for Symptom Management," 1994). Please refer to Figure 1 in Chapter 1. While the author described all three major concepts, the study had originally planned to focus on the relationship between two concepts: symptom experience and symptom management strategies.

From these regression results, it became clear that these constructs (Pain Related Distress, Response to Systems (perceived control over pain and Function) were just as likely to be outcomes of adequate analgesia. The sociodemographic variables (age, gender, presence of a caregiver, metastasis, employment, and education) clearly remained as predictors of adequate analgesia. It
made as much sense to regard patients who received adequate analgesia as less distressed than to regard patients with low distress as receiving stronger medication. It became clear to the author that it is just as likely that having adequate analgesia leads to improved perceived control over pain, as it is that perceived control over pain leads to adequate analgesia. Therefore, the PMI was evaluated as both an outcome and a predictor, in other words a possible mediator in a structural equation model.

Hierarchical regression to Structural Equation Modeling (SEM)

The goal of Aim 2 was to look specifically at which preexisting sociodemographic and medical variables affected adequate analgesia. In the Structural Equation Modeling process sociodemographic and medical variables were modeled as exogenous predictors of PMI. PMI was modeled as a mediating construct between the exogenous predictors and the construct of Perceived Control Over Pain (PCP). The original study showed that this construct was well represented by the four indicators, Cognitive Control, Pharmacological Control, Catastrophizing, and Feelings of Control. The usual approach was taken to estimating the model parameters which includes ML estimation the raw coefficients and standard errors followed by estimation of modification indices. Examination of modification indices revealed that a path was needed between age and PCP. This path was added, and the model was re-estimated with good fit (Chi square = 36.08 (df = 28, p = .14); CFI = .976, and RMSEA = .031). Standardized path coefficients and standard errors were estimated using the percentile bootstrap method. The results are shown in Table 9.

As shown in the structural equation model (see Table 10 and Figure 15), only cancer metastasis (p = .03) was a significant predictor in affecting analgesic prescriptions.
Table 9

*Standardized Regression Weights: (Bootstrapped Estimates)*

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Estimate</th>
<th>Lower</th>
<th>Upper</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMI_With_No_Missing_Data &lt;--- agex</td>
<td>.05</td>
<td>-.07</td>
<td>.16</td>
<td>.50</td>
</tr>
<tr>
<td>PMI_With_No_Missing_Data &lt;--- female</td>
<td>.01</td>
<td>-.09</td>
<td>.09</td>
<td>.96</td>
</tr>
<tr>
<td>PMI_With_No_Missing_Data &lt;--- education (yrs)</td>
<td>.05</td>
<td>-.04</td>
<td>.16</td>
<td>.42</td>
</tr>
<tr>
<td>PMI_With_No_Missing_Data &lt;--- metastasizedx</td>
<td>.12</td>
<td>.03</td>
<td>.22</td>
<td>.04*</td>
</tr>
<tr>
<td>PMI_With_No_Missing_Data &lt;--- support</td>
<td>.08</td>
<td>.00</td>
<td>.18</td>
<td>.13</td>
</tr>
<tr>
<td>PMI_With_No_Missing_Data &lt;--- employedx</td>
<td>-.12</td>
<td>-.22</td>
<td>-.01</td>
<td>.09</td>
</tr>
<tr>
<td>PC &lt;--- PMI_With_No_Missing_Data</td>
<td>.22</td>
<td>.11</td>
<td>.34</td>
<td>.01*</td>
</tr>
<tr>
<td>PC &lt;--- agex</td>
<td>.26</td>
<td>.15</td>
<td>.35</td>
<td>.01*</td>
</tr>
<tr>
<td>Pharm. Control_</td>
<td>.69</td>
<td>.61</td>
<td>.77</td>
<td>.01*</td>
</tr>
<tr>
<td>Mean_PC_SOPA_Cognitivex &lt;--- PC</td>
<td>.80</td>
<td>.73</td>
<td>.87</td>
<td>.01*</td>
</tr>
<tr>
<td>Mean_PC_Catastrophizingx &lt;--- PC</td>
<td>-.69</td>
<td>-.75</td>
<td>-.62</td>
<td>.01*</td>
</tr>
<tr>
<td>Mean_PC_FeelingsOfControl_1PPQ_and_2Dem &lt;--- PC</td>
<td>.17</td>
<td>.07</td>
<td>.27</td>
<td>.01*</td>
</tr>
</tbody>
</table>

Note: *p<.05.**p<.001
### Table 10

**Significant Correlations**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Estimate</th>
<th>Lower</th>
<th>Upper</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>age x</td>
<td>support</td>
<td>-.004</td>
<td>-.085</td>
<td>.098</td>
</tr>
<tr>
<td>female</td>
<td>year_edux</td>
<td>.185</td>
<td>.115</td>
<td>.265</td>
</tr>
<tr>
<td>female</td>
<td>metastasizedx</td>
<td>-.084</td>
<td>-.197</td>
<td>.007</td>
</tr>
<tr>
<td>year_edux</td>
<td>metastasizedx</td>
<td>.027</td>
<td>-.069</td>
<td>.138</td>
</tr>
<tr>
<td>year_edux</td>
<td>support</td>
<td>.092</td>
<td>-.004</td>
<td>.197</td>
</tr>
<tr>
<td>metastasizedx</td>
<td>support</td>
<td>-.085</td>
<td>-.186</td>
<td>.013</td>
</tr>
<tr>
<td>female</td>
<td>support</td>
<td>-.135</td>
<td>-.212</td>
<td>-.016</td>
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<tr>
<td>age x</td>
<td>female</td>
<td>-.137</td>
<td>-.217</td>
<td>-.049</td>
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<td>metastasizedx</td>
<td>-.004</td>
<td>-.097</td>
<td>.093</td>
</tr>
<tr>
<td>female</td>
<td>employedx</td>
<td>.063</td>
<td>-.024</td>
<td>.149</td>
</tr>
<tr>
<td>year_edux</td>
<td>employedx</td>
<td>.244</td>
<td>.142</td>
<td>.335</td>
</tr>
<tr>
<td>support</td>
<td>employedx</td>
<td>.010</td>
<td>-.102</td>
<td>.098</td>
</tr>
<tr>
<td>age x</td>
<td>employedx</td>
<td>-.184</td>
<td>-.274</td>
<td>-.092</td>
</tr>
<tr>
<td>metastasizedx</td>
<td>employedx</td>
<td>-.081</td>
<td>-.161</td>
<td>.028</td>
</tr>
</tbody>
</table>

Note: *p<.05,**p<.001
Figure 15 shows standardized path coefficients and correlations among exogenous predictors. The significant path coefficients are shown in bold italics and the significant correlations are shown in italics (p<.05).

**Figure 15**

*Structural Equation Model*

The results of this study demonstrated that those patients with metastasis were more likely to receive stronger analgesics and receive adequate analgesia than those patients without metastases. The PMI was also positively associated with having perceived control over pain (p = .01), the sense of knowing what to do if the pain increased. This demonstrates that patients with adequate analgesia are more likely to feel in control of managing their cancer pain. Age was
positively associated with having perceived control over pain \( (p = .01) \), with older patients having higher levels of perceived control over pain. Additionally, as reported in the parent study, perceived control over pain was also positively associated with all its indicators (pharmacologic, cognitive, catastrophizing) except the feelings of control subscale.

There was no linear dependence among the variables, but it is also worth noting that five pairs of exogenous predictors were significantly intercorrelated. Women were younger, had higher education, were less likely to name a significant support person as shown in Table 10. Employment was positively related to education and negatively related to metastases. Figure 15 shows standardized path coefficients and correlations among exogenous predictors. The significant path coefficients are shown in bold italics and the significant correlations are shown in italics \( (p<.05) \).

**Summary**

This study was explorative and correlational. The results from this study demonstrated that the presence of metastasis is a significant predictor of receiving adequate analgesia. No specific patient characteristics were found that predicted adequate analgesia. Older age and receiving adequate analgesia (as measured by the PMI) were significant in having improved perceived control over pain. Even though 60% of the study population received adequate analgesia, the PMI had limitations. The PMI only identified the level of the analgesic, it does not describe the dose or frequency at which the analgesics were prescribed or are being taken. Many of the patients in the study were only receiving one pill a day. This study demonstrated that within an African American population with cancer pain, 40% of patients did not receive adequate analgesia which was supported by earlier studies (Cleeland & Ryan, 1994b).
Chapter 5: Discussion

The purpose of this study was to determine which symptom experience factors led to the symptom management strategy of prescriptions for adequate analgesia in African Americans with cancer pain. This was the first study looking solely at one racial group (African Americans) and identifying what patient characteristics exist that contributed to receiving adequate analgesia for cancer pain. This chapter serves as a discussion of the findings, limitations, implications for clinical practice and future research.

The first aim and hypothesis sought to determine the adequacy of analgesic prescriptions, as measured by the Pain Management Index (PMI) and show that patients with higher pain intensity (indicated by the Brief Pain Inventory) received stronger analgesics than those with lower pain scores among African American adults with cancer pain. Sixty percent of the participants received adequate pain analgesia; regardless, it is clear that 40% of the African American patients with cancer pain in this study did not receive even the proper analgesic class based on their given pain score. The hypothesis was supported as patients who reported higher pain intensity did receive a stronger analgesic.

The second aim, to determine the relationships between the characteristics of African American patients with cancer pain (age, gender, presence of caregiver, employment status, educational level, perceived control over pain, pain-related distress, pain intensity, functional status) and adequacy of their analgesia as measured by the PMI was initially only partially supported. Only two predictors in the initial regression model, pain intensity and pain related distress, significantly predicted pain analgesia adequacy. Due to tautological confounding in which the pain intensity scores being needed to calculate PMI and not a single variable from the response
to symptoms (perceived control over pain) and evaluation of symptoms (functional status) predicting adequate analgesia, a revision in model planning was needed.

**Aim 1 / Hypothesis 1**

This study adds to the literature as this is the first study that utilized the Pain Management Index solely looking at the African American population. The first aim was achieved by calculating the PMI. The PMI determines if patients are receiving adequate analgesia by ascertaining whether the class of analgesic being prescribed are appropriate for the patient’s reported pain intensity, based on the WHO Guidelines for cancer pain (Patrick et al., 2015). In this study, patients who reported more pain did receive a stronger analgesic (Hypothesis 1). However, 40% of African Americans with cancer pain did not even receive the proper drug class for the pain reported at an accredited urban cancer center. (Aim 1).

These findings add to the already existing plethora of research demonstrating pain-related disparities with African American patients. The classic study by Cleeland et al. (1994) demonstrated that minorities (Blacks and Hispanics) were 3 times more likely to receive inadequate analgesia than nonminority patients. Since then, inadequate treatment within cancer pain management has been well documented for decades with most studies being cross-sectional investigations comparing two racial groups showing minority patients with cancer are at greater risk for more severe pain than nonminority patients (Anderson et al., 2009). The high levels of pain have been suggested to be due to inadequate doses and/or noncompliance with the analgesic regimen (Anderson et al., 2002). Black and multiracial patients with cancer are more likely to report higher pain severity than White patients (Martinez et al., 2014; Vallerand et al., 2005). A 25-item measure of pain and functional interference was completed by 3,123 patients with prostate, breast, lung, and colon cancer at initial assessment and at a four to five week follow up. These
patients were registered at 38 institutions, which included six academic sites and 32 community clinics. Sites were coded as minority sites if they treated 40% or greater minority patients. Of the sites, 3 academic and 10 community sites were coded as minority centers. Minority patients had approximately double the odds of receiving inadequate pain management. Another significant predictor of receiving inadequate pain management was being treated at a minority treatment site. Interestingly, even Caucasian patients at centers classified as minority centers were more likely to be undertreated. Additionally, at initial assessment, 41% of all patients who reported moderate or severe pain still were not receiving an opioid analgesic. (Fisch et al., 2012).

One of the limitations of the PMI is that the tool is rudimentary and only considers the analgesic drug classification. It does not consider the dose or the frequency of the analgesic. For example, a patient may be prescribed oxycodone and therefore be given the maximum score, +3, for having a strong opioid. However, it is not known if the patient was prescribed oxycodone 5mg, 10mg, or 30 mg. It is also not known if they were prescribed it once a day, twice a day, three times a day, or every four to six hours as needed. This creates a significant barrier in understanding if patients are truly receiving adequate analgesia because dose and frequency are not considered in the calculation. Nonetheless, if the incorrect analgesic classification is prescribed, it is unlikely that the patient will receive adequate analgesia, even if the dose and frequency are high. It was quite alarming that 40% of the sample did not even receive the appropriate analgesic class for their reported pain score. The severity of inadequate analgesia may also be heightened as patients may be receiving a strong opioid but take it in scarce quantity, such as oxycodone 5 mg prescribed once a day for severe pain, when 5 mg is a dose for moderate pain and the duration of oxycodone is only three to six hours (Vallerand & Sanoski, 2021). It is also plausible that the remaining 60% may have received the appropriate analgesic drug class, but still lack in adequate analgesia as they
may not have received either adequate dose or frequency of the given analgesic. Regardless, it is not acceptable that 40% of the African American patients with cancer pain in this study did not receive even the proper drug class based on their given pain score.

**Aim 2**

This study was the first study to identify what factors lead to African Americans with cancer pain to receiving adequate analgesia. The second aim sought to examine relationships between the characteristics of African American patients with cancer pain (age, gender, presence of caregiver, employment status, educational level, perceived control over pain, pain-related distress, pain intensity, functional status) and the adequacy of their analgesia as measured by the PMI.

In the first hierarchical regression, pain intensity and pain related distress were the only variables that were significantly linked to receiving adequate analgesia. As expected, patients who reported a higher pain intensity and higher distress were more often receiving a prescription for an analgesic appropriate for the given pain score. However, it was then realized that the variable, pain intensity, is needed to calculate the PMI, and therefore there was a need to rethink how the variables fit the theoretical model. This variable, pain intensity, was then dropped from the regression. Although distress was significant, model 2 (evaluation of symptoms – pain-related distress), only accounted for total 14% of the total variance. In the original design, perceived control over pain and functional status were included as potential predictors of adequate analgesia, but they were more likely functioning as outcomes of adequate analgesia. Originally, it was thought that patients who had better perceived control over pain could advocate for themselves and would be more likely to receive adequate analgesia. However, the author later realized that patients who had received adequate analgesia could manage their pain more effectively and
therefore have better perceived control over pain. The same logic could be used for functional status. This change in thinking is what led to the Pain Management Index being tested as mediator in the new SEM model.

This reevaluation is consistent with the theoretical model in Figure 3. The demographics continue to represent factor that affect perception of symptoms. For example, a person’s age, gender, education, and employment can all affect how one perceives pain. The Pain Management Index measures the adequacy of analgesia being received by the patient for the reported pain score and continues to represent the symptom management variable. The adequacy of analgesia received by the patient can affect perceived control over pain and the functional status of a patient which is consistent with the symptom experience variable. Patients who receive adequate analgesia are more likely to feel empowered knowing if they take their analgesic, their pain will decrease and allow them to improve their function. Patients who do not receive adequate analgesia are more likely to catastrophize or cope negatively knowing that the regimen being prescribed does not provide significant relief to improve their functional status.

From the SEM, only cancer metastasis (p = .03) was a significant predictor in affecting analgesic prescriptions. Patients with metastatic cancer were significantly more likely to receive adequate analgesia, which is consistent to what is seen in clinical practice. Although most cancers may cause pain, it is often seen clinically that as the cancer advances, the pain increases. The spread or metastasis of cancer, therefore, causes more pain (van den Beuken-van Everdingen et al., 2007) and may elucidate why providers feel justified in prescribing stronger analgesics. Even without metastases, cancer causes pain, and needs to be treated with adequate analgesia based on the patient’s reported level of pain. Research has shown that African Americans often receive less
analgesia and have more pain than Caucasian patients (**REF). Therefore prescribing analgesics based on metastases may add to biases already experienced by African Americans.

Unexpectedly, none of the demographic characteristics were significant predictors of adequate analgesia reflected by the PMI (regression analysis) and in the SEM, age was a significant predictor of perceived control over pain but not adequate analgesia. During the first step in the regression analysis and before adding pain distress, only cancer metastasis was a significant predictor (p = .043) of adequate analgesia. After adding the distress thermometer variable, cancer metastasis (p = .042), employment (p = .009), and pain-related distress (p = .000) were significant predictors of adequate analgesia. However, only metastases was significant in the SEM analysis. Since these results were unexpected, these findings deserve further discussion.

Women

When examining correlations from Table 10, it was quite clear that the results demonstrated that women in this study were (a) younger, (b) had higher education, and (c) were less likely to have a caregiver when compared to men in this study. This sample echoed other research that African American women tend to be more educated than African American men (McDaniel et al., 2011).

This study did not show any significant findings linking gender to receiving adequate analgesia. Just as this study did not have any significant finding on gender, much of the existing literature has mixed results regarding gender and adequate analgesia. One study had a sample of 509 patients, with 62% female and 38% male, prospectively randomized to 105 physicians at the University of California, Davis, Medical Primary Care Center. The racial breakdown was 63% Caucasian, 22% African American, 8% Hispanic, 4% Asian, and 3% Native American. The study concluded that when women were in severe pain, it was more easily recognized by physicians
(Bertakis et al., 2004). On the contrary, another study that looked at 108 African American and Hispanic patients with cancer pain and showed physicians were more likely to underestimate female pain severity as compared to males (Anderson et al., 2000). The current study found no significant differences between men and women regarding adequate analgesia. More research will be needed that focuses solely on gender and race to uncover the continued confounding results.

Support Systems

The current study demonstrated that women were less likely to have a caregiver than men. This is unfortunate as studies have shown that a support system can help improve pain. For example, patients with active relationships have been shown to have higher scores in the fighting spirit and had lower scores in using destructive styles of coping (Krajewski et al., 2018). However, it has also been shown that marital status has not had any effect on improving coping or acceptance of illness (Nowicki et al., 2015). The literature demonstrates mixed results with a support system on obtaining adequate analgesia, and this study did not find a significant relationship with support system and adequate analgesia.

Age

Age was positively associated with having perceived control over pain (p = .01), with older patients having higher levels of perceived control over pain. One possible explanation is that patients who are older may have had more life experience and are more knowledgeable in understanding how to get needs addressed. This is supported by the finding that patients at greatest risk for undertreatment in pain are younger African American men (Institute of Medicine Committee on Advancing Pain Research & Education, 2011). The current study demonstrated that older patients had more perceived control over pain, and perceived control over pain was shown to reduce pain in the parent study (Vallerand et al., 2018). However age is not always linked to
receiving adequate analgesia, as a recent cross-sectional study of 244 patients with cancer pain showed that older adults were less likely to receive adequate analgesia and had worse comorbidities and functional status (Gauthier et al., 2018). Opioid pain medications have been shown to be safe and effective in older adults as long as these patients are monitored and titrated appropriately, therefore advanced age should not prohibit someone from receiving adequate analgesia (Guerard & Cleary, 2017).

**Employment**

As expected, patients who were employed were more likely to have completed increased years of education. Another finding is that employment was negatively linked to metastases. This negative correlation can be attributed to the fact that patients who have metastasis are usually sicker and with more pain, therefore are less likely to work. In addition, African Americans are more likely to be diagnosed with cancer at a later stage often due to lack of screening and access to health care (Hines & Markossian, 2012). In a study of patients with metastatic disease, patients with advanced cancer are more likely to include racial and ethnic minorities and are more likely to be low income and uninsured (Rotter et al., 2019).

This current study did not find any significant effect of education and employment towards receiving adequate analgesia. This is contrary to much of the existing literature demonstrating that higher education and employment were factors that were potentially linked to receiving adequate analgesia. For example, pain reports from patients with higher socioeconomic status (SES) have been taken more seriously by nurses than those with low SES (Brandao et al., 2019). Patients with at least a high school education were less concerned about upsetting their doctor when asking about pain medications (Stein et al., 2016), suggesting they are better at advocating for adequate pain management. Patients with higher education may be more articulate and may be more confident
in having a conversation with their physician and more successful at getting their specific needs addressed. One possible reason for the lack of significance may be due to skewed sample findings as 85% were unemployed and 60% had a high school education or less. Future research needs to examine African Americans with a more diverse background in education and employment.

**Adequate Analgesia**

Function, catastrophizing and pain-related distress were the variables with the strongest partial correlations with the PMI. This demonstrates that patients with inadequate analgesia were more likely to have (a) have poorer function, (b) report more pain-related distress, and (c) cope using negative or catastrophic thinking. The only significant factor that led to patients receiving adequate analgesia was the diagnosis of cancer metastasis. Patients with metastatic cancer were significantly more likely to receive adequate analgesia (p <.04), which is consistent to what is often seen in clinical practice. Although most cancers may cause pain, it is often seen clinically that as the cancer advances, the pain increases. The spread or metastasis of cancer, therefore, is thought to cause more pain (van den Beuken-van Everdingen et al., 2007). In the current opiophobic climate, providers may be reluctant to prescribe opioids for generalized pain. However, once a patient has a confirmed diagnosis of metastasis, providers may feel empowered and justified in prescribing stronger opioids.

Adequate analgesia led to and was significantly related (p <.01) to improved perceived control over pain. This demonstrates that when patients receive adequate analgesia, perceived control over pain increases as patients know how to control their pain when taking their prescribed medication. Likewise, receiving inadequate analgesia leads a patient to understand that even if they take their medication, their pain will likely not be controlled which may lead to catastrophizing and poorer function. The parent study demonstrated that improved perceived
control over pain led to decreased pain, pain related distress, and improved functional status (Vallerand et al., 2018). This study serves as the antecedent to the parent study. The parent study showed which then leads to improved pain, reduced distress, and improved functional status as shown in the parent study (Vallerand et al., 2018). Additionally, as reported in the parent study, this study reinforced that perceived control over pain was also positively associated with all of its indicators (pharmacologic control, cognitive control, catastrophizing, and feelings of control).

**Limitations**

This study was a secondary analysis. Benefits of doing a secondary analysis are that it is low cost and the raw data have often already been cleaned. This current study did not cost any additional funding and was exempt from IRB approval. Disadvantages of doing a secondary analysis are that data was not collected with the intention of answering the new research question. Oftentimes, the researchers who are analyzing the data are not involved in the data collection process, therefore certain nuances in data collection process will require some increased guidance and education (Cheng & Phillips, 2014) however, the PI from the parent study was readily available for this secondary analysis. One of the changes that would improve the study would be to have recorded the dose and strength of the analgesics and opioids being prescribed instead of just the name of the drug.

As previously mentioned, the PMI has limitations in not reporting dose or frequency of the analgesic being prescribed. There was no actual witnessing of medications being taken by the patients, so there was no confirmation that patients were taking the drug as prescribed. However, patients did report rationing medication out of fear of running out (Maly et al., 2018).
Implications for Clinical Practice

In the future, clinicians should be well aware of the effect of racial disparities on clinical practice. Forty percent of African Americans with cancer pain in this study did not receive adequate analgesia. Clinicians must be aware of implicit biases and how they affect prescribing practices. Using the PMI to determine if their analgesic prescriptions are adequate for the level of pain is a beginning. Recognizing rote decisions based on previous training and potential biases should be reconsidered. Is there an implicit bias among providers that only cancer patients who have metastases deserve stronger analgesics? Research has shown that providers who are aware of their implicit biases are able to change the way they practice (Green et al., 2007; Milam et al., 2020). A decrease in implicit bias may improve the health and outcomes of minority patients and improve analgesic management of African American patients. For example, being aware of the increased risk of undertreatment in minorities is essential for providers. Providers of all patients must be especially careful to include a risk assessment to determine if the patient is receiving adequate analgesia, but this is especially important for minority patients due to the risk of implicit bias.

Patients who receive adequate analgesia are more likely to have perceived control over pain which leads to multiple positive outcomes: reduced pain, less distress, and improved functional status. This study also demonstrated that many African American patients with cancer pain are lacking a support system and that placed extra expectations on nurses to advocate on patient’s behalf. The current opiophobic climate does not delegitimize patients’ needs for adequate analgesia in managing their cancer pain. It is important that providers continue to be cognizant of that fact and become a patient advocate themselves. Providers must realize that just as smoking
would cause an increased need for screening for cancer, African American patients with cancer pain should be screened for receiving inadequate analgesia. (Meghani & Vapiwala, 2018)

**Implications for Future Research**

This was the first research to study a solely African American population and decipher what factors increased the likelihood of receiving adequate analgesia. In this study the PMI was used to determine adequate analgesia. Further research needs to examine how to improve the PMI so that dosing and frequency are considered. Analgesic classification in itself is not enough to understand the full scope of receiving adequate analgesia.

The findings of this study demonstrate that increased age leads to higher perceived control over pain. Since perceived control over pain has been shown to lead to improved outcomes, future research should examine a diverse age range of African American participants. There is little research in this field leaving only the hypothesis that older patients have more lived experience and therefore know how to deal with pain.

The results of the study showed no demographic or personal characteristics specific to the African American population that lead to them receiving adequate analgesia. Prescribing stronger analgesics for metastases is to be expected, as metastases have been shown to cause increased pain (Ahmad et al., 2018). Metastases are not specific to any race. However, there were no characteristic or groups of characteristics (age, gender, education, employment, or presence of caregiver) found to affect adequate analgesia. What was found was that 40% of African Americans with cancer pain in this study did not receive adequate analgesia. This suggests that the only factor common among those receiving inadequate analgesia was their race alone. Future studies should explore adequate analgesia in other races (Caucasian, Asian, Hispanic) and determine what percent of patients do
not receive adequate analgesia and if there are groups of characteristics within and across those populations that led to receiving adequate analgesia.

Another goal of future research is to examine why only cancer metastasis and not all cancer pain, leads to receiving adequate analgesia. Research has shown that medical students were less likely to diagnose a Black woman’s symptoms as angina despite it being identical symptoms to a Caucasian male (Rathore et al., 2000). This finding alone is in of itself another health disparity for African American patients. Given the insurmountable evidence regarding racial disparities, it is plausible that Caucasian patients may receive adequate analgesia even without metastasis, but African American patients are only likely to receive adequate analgesia only if they have cancer metastasis. As noted in the implications for clinical practice, implicit bias can play a role in prescribing in that providers may require more objective data before giving African Americans with cancer pain adequate analgesia. Future research needs to evaluate the providers’ actions in the PMI decision making as well as the African American participants self-dosing of analgesia to fully understand the implications of adequate analgesia.

This study was conducted early in the opioid crisis. As the opioid crisis has worsened, increased scrutiny on prescribers has led to inadequate analgesia often by decreased prescriptions of opioids with the potential that even more patients could receive inadequate analgesia in the current opiophobic climate (Samuel et al., 2019). This study demonstrated that even at a well-established cancer institute, 40% of African Americans with cancer pain did not receive prescriptions for even the right classification of analgesic for their reported pain score. Future studies need to examine how the opioid crisis has affected the prescription of adequate analgesia.

This study demonstrated, once again, that 40% of patients did not even receive the correct analgesic classification for the reported level pain, arguing that this disparity in care was based on
race alone. Future studies must be done to determine whether this is the same for other races to elucidate (or solidify) that the disparity identified in this study was solely based on race. Multifactorial interventions, like those in the parent study, must then be developed to change provider behavior, and possibly, enhance patient uptake of adequate analgesia with the overall goal of reducing the disparities.

Conclusions

Although there is a plethora of existing disparities, there is a lack of research exploring the complex and multifactorial etiologies of disparities and the effects on treatment. The fact that 40% of African American patients with cancer pain in this study did not receive adequate analgesia was startling; however, it supported the existing reality of poor pain management (and ongoing disparities) for African Americans. Many studies have identified that Black patients report more pain than White patients and often receive less analgesia, even those with cancer pain, remains a recalcitrant problem.

This study was the first study to identify that no demographic characteristics specific to African Americans with cancer pain led to receiving adequate analgesia. This study demonstrated that cancer metastasis was the only factor that significantly contributed to receiving adequate analgesia. The findings require a wakeup call for providers, larger systemic structures and society at large. Since we know that patients with inadequate analgesia are more likely to have poorer function and report pain-related distress, the health system can no longer justify and allow these built in racist (albeit often implicit) practices to continue. More important to this study is the reality that African American patients with adequate analgesia were more likely to have improved perceived control over pain, which included reduced pain and distress, and improved function. Adequate pain control is possible for African American patients. The next step in the research,
which is beginning to occur, is to understand the implicit biases and systemic patterns that perpetuate this study’s persistent finding that 40% of African Americans received inadequate analgesia.
APPENDIX A: INSTRUMENTS

Brief Pain Inventory

1) Throughout our lives, most of us have had pain from time to time (such as minor headaches, sprains and toothaches). Have you had pain other than these everyday kinds of pain today?
   1. Yes          2. No

2) On the diagram, shade every area where you feel pain. Put an X on the area that hurts the most.

3) How long have you been in pain? .............days ............months..............years

4) Please rate your pain by circling the one number that best describes your pain at its worst in the past 2 weeks.

   0  1  2  3  4  5  6  7  8  9  10
   No pain                               Pain as bad as you can imagine

5) Please rate your pain by circling the one number that best describes your pain at its least in the past 2 weeks.

   0  1  2  3  4  5  6  7  8  9  10
   No pain                               Pain as bad as you can imagine
6) Please rate your pain by circling the one number that best describes your pain on the average.

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7) Please rate your pain by circling the one number that tells how much pain you have right now.

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8) In the past 24 hours, how much relief have pain treatments or medications provided? Please circle the one percentage that most shows how much relief you have received.

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9) Circle the one number that describes how, during the past 24 hours, pain has interfered with your:

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9.4 Normal work (includes both work outside the home and housework)

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<td>Does not interfere</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Completely interferes</td>
<td></td>
<td></td>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>

9.6 Sleep

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
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<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does not interfere</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Completely interferes</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 9.7 Enjoyment of life

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does not interfere</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Completely interferes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Symptom Distress Scale**

Each of the two items below lists 5 different statements. Think about what each statement says, then place a circle around the one statement that most closely indicates how you have been feeling during the past week. Please circle one statement for each item.

**Pain (a)**

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>I almost never have pain</td>
<td>I have pain once in a while</td>
<td>I frequently have pain several times</td>
<td>I am usually in some degree of pain a week</td>
<td>I am in some degree of pain almost constantly</td>
</tr>
</tbody>
</table>

**Pain (b)**

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>When I do have pain, it is very mild</td>
<td>When I do have pain, it is mildly distressing</td>
<td>The pain I do have is usually fairly intense</td>
<td>The pain I have is usually very intense</td>
<td>The pain I have is almost unbearable</td>
</tr>
</tbody>
</table>
Distress Thermometer (DT)

SCREENING TOOLS FOR MEASURING DISTRESS

Instructions: First please circle the number (0-10) that best describes how much distress you have been experiencing in the past week including today.

Extreme distress

No distress
MEMORIAL SYMPTOM ASSESSMENT SCALE – Short Form [MSAS-SF]

I. **INSTRUCTIONS:** If you had pain, please check the box that tells us how much the pain DISTRESSED or BOTHERED you.

<table>
<thead>
<tr>
<th>Pain</th>
<th>Yes</th>
<th>IF YES: How much did it DISTRESS or BOTHER you?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>[    ]</td>
<td>Not at Bit A little Some- what Quite a Bit Much</td>
</tr>
<tr>
<td>Pain</td>
<td>[0]</td>
<td>[1]    [2]     [3]     [4]</td>
</tr>
</tbody>
</table>
SF-12 v2 Health and Well-Being

For each of the following questions, please circle or X the best possible answer.

1.) In general, would you say your health is:
   Excellent  Very Good  Good  Fair  Poor

2.) The following questions are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?
   Yes, Limited  Yes, Limited  No, Not Limited
   A Lot  A little  Limited At All
   • Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf . . . . . . . .
   • Climbing several flights of stairs . . . . . . . . . . . . . .

3.) During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of your physical health?
   All of  Most of  Some of  A little of  None of the time  the time  the time  the time  the time
   • Accomplished less than you would like . . . . . . . .
   •Were limited in the kind of work or other activities . . . . . . . .

4.) During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?
   All of  Most of  Some of  A little of  None of the time  the time  the time  the time  the time
   • Accomplished less than you would like . . . . . . . .
   • Were limited in the kind of work or other activities . . . . . . . .

5.) During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?
   Not at all  A little bit  Moderately  Quite a bit  Extremely

6.) These questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling. How much of the time during the past 4 weeks . . .
   All of  Most of  Some of  A little of  None of the time  the time  the time  the time
   • Have you felt calm and peaceful? . . . . . . . .
   • Did you have a lot of energy? . . . . . . . . . . .
   • Have you felt downhearted and depressed? . . . . . . . .
7.) During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting friends, relatives, etc.)?

| All of the time | Most of the time | Some of the time | A little of the time | None of the time |
### Quality Of Life Scale
A Measure Of Function
For People With Pain

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Non functioning</td>
</tr>
<tr>
<td></td>
<td>Stay in bed all day</td>
</tr>
<tr>
<td></td>
<td>Feel hopeless and helpless about life</td>
</tr>
<tr>
<td>1</td>
<td>Stay in bed at least half the day</td>
</tr>
<tr>
<td></td>
<td>Have no contact with outside world</td>
</tr>
<tr>
<td>2</td>
<td>Get out of bed but don’t get dressed</td>
</tr>
<tr>
<td></td>
<td>Stay at home all day</td>
</tr>
<tr>
<td>3</td>
<td>Get dressed in the morning</td>
</tr>
<tr>
<td></td>
<td>Minimal activities at home</td>
</tr>
<tr>
<td></td>
<td>Contact with friends via phone, email</td>
</tr>
<tr>
<td>4</td>
<td>Do simple chores around the house</td>
</tr>
<tr>
<td></td>
<td>Minimal activities outside of home two days a week</td>
</tr>
<tr>
<td>5</td>
<td>Struggle but fulfill daily home responsibilities</td>
</tr>
<tr>
<td></td>
<td>No outside activity</td>
</tr>
<tr>
<td></td>
<td>Not able to work/volunteer</td>
</tr>
<tr>
<td>6</td>
<td>Work/volunteer limited hours</td>
</tr>
<tr>
<td></td>
<td>Take part in limited social activities on weekends</td>
</tr>
<tr>
<td>7</td>
<td>Work/volunteer for a few hours daily. Can be active at least five hours a day. Can make plans to do simple activities on weekends</td>
</tr>
<tr>
<td>8</td>
<td>Work/volunteer for at least six hours daily</td>
</tr>
<tr>
<td></td>
<td>Have energy to make plans for one evening social activity during the week</td>
</tr>
<tr>
<td></td>
<td>Active on weekends</td>
</tr>
<tr>
<td>9</td>
<td>Work/volunteer/be active eight hours daily</td>
</tr>
<tr>
<td></td>
<td>Take part in family life</td>
</tr>
<tr>
<td></td>
<td>Outside social activities limited</td>
</tr>
<tr>
<td>10</td>
<td>Normal Quality of Life</td>
</tr>
<tr>
<td></td>
<td>Go to work/volunteer each day</td>
</tr>
<tr>
<td></td>
<td>Normal daily activities each day</td>
</tr>
<tr>
<td></td>
<td>Have a social life outside of work</td>
</tr>
<tr>
<td></td>
<td>Take an active part in family life</td>
</tr>
</tbody>
</table>
Patient Pain Questionnaire (P.P.Q.)
Below are a number of statements about cancer pain and pain relief. Please circle a number on the line to indicate your response.

### Knowledge

1. Cancer pain can be effectively relieved.

<table>
<thead>
<tr>
<th>agree</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>disagree</th>
</tr>
</thead>
</table>

2. Pain medicines should be given only when pain is severe.

<table>
<thead>
<tr>
<th>disagree</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>agree</th>
</tr>
</thead>
</table>

3. Most cancer patients on pain medicines will become addicted to the medicines over time.

<table>
<thead>
<tr>
<th>disagree</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>agree</th>
</tr>
</thead>
</table>

4. It is important to give the lowest amount of medicine possible to save larger doses for later when the pain is worse.

<table>
<thead>
<tr>
<th>disagree</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>agree</th>
</tr>
</thead>
</table>

5. It is better to give pain medications around the clock (on a schedule) rather than only when needed.

<table>
<thead>
<tr>
<th>agree</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>disagree</th>
</tr>
</thead>
</table>

6. Treatments other than medications (such as massage, heat, relaxation) can be effective for relieving pain.

<table>
<thead>
<tr>
<th>agree</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>disagree</th>
</tr>
</thead>
</table>

7. Pain medicines can be dangerous and can often interfere with breathing.

<table>
<thead>
<tr>
<th>disagree</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>agree</th>
</tr>
</thead>
</table>
8. Patients are often given too much pain medicine.

<table>
<thead>
<tr>
<th>disagree</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>agree</th>
</tr>
</thead>
</table>

9. If pain is worse, the cancer must be getting worse.

<table>
<thead>
<tr>
<th>disagree</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>agree</th>
</tr>
</thead>
</table>

**Experience**

10. Over the past week, how much pain have you had?

<table>
<thead>
<tr>
<th>no pain</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>a great deal</th>
</tr>
</thead>
</table>

11. How much pain are you having now?

<table>
<thead>
<tr>
<th>no pain</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>a great deal</th>
</tr>
</thead>
</table>

12. How much pain relief are you currently receiving?

<table>
<thead>
<tr>
<th>a great deal</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>no relief</th>
</tr>
</thead>
</table>

13. How distressing is the pain to you?

<table>
<thead>
<tr>
<th>not at all</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>extremely</th>
</tr>
</thead>
</table>

14. How distressing is your pain to your family members?

<table>
<thead>
<tr>
<th>not at all</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>extremely</th>
</tr>
</thead>
</table>
15. To what extent do you feel you are able to control your pain?

<table>
<thead>
<tr>
<th>not at all</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>extremely</th>
</tr>
</thead>
</table>

16. What do you expect will happen with your pain in the future?

<table>
<thead>
<tr>
<th>pain will get better</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>pain will get worse</th>
</tr>
</thead>
</table>
Perceived Control Scale (Patient)

Please check an answer that best indicates your response.

1. I have complete control over taking pain medication.
   agree _____: _____: _____: _____: _____: _____: _____ disagree
   extremely quite slightly neither slightly quite extremely

2. I am in control of my pain.
   agree _____: _____: _____: _____: _____: _____: _____ disagree
   extremely quite slightly neither slightly quite extremely

3. If I take the right actions, I avoid pain.
   agree _____: _____: _____: _____: _____: _____: _____ disagree
   extremely quite slightly neither slightly quite extremely

4. Having control over taking enough pain medication to keep my pain at an acceptable level has been easy.
   agree _____: _____: _____: _____: _____: _____: _____ disagree
   extremely quite slightly neither slightly quite extremely

5. Whether I take enough pain medication to keep my pain at an acceptable level is mostly up to me.
   agree _____: _____: _____: _____: _____: _____: _____ disagree
   extremely quite slightly neither slightly quite extremely

6. Whether or not my pain medication works is a matter of chance.
   agree _____: _____: _____: _____: _____: _____: _____ disagree
   extremely quite slightly neither slightly quite extremely

7. What I do myself is the main thing that affects my pain.
   agree _____: _____: _____: _____: _____: _____: _____ disagree
   extremely quite slightly neither slightly quite extremely

8. Although my doctor prescribes pain medicine, I decide whether to take it.
   agree _____: _____: _____: _____: _____: _____: _____ disagree
   extremely quite slightly neither slightly quite extremely
SOPA – Control Scale

Instructions:
Please indicate how much you agree with each of the following statements about your pain problem by using the scale.

Statements:

(1) There are many times when I can influence the amount of pain I feel.

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
</table>
| untrue | somewhat | neutral | somewhat | very
| untrue | somewhat | neutral | somewhat | true
| untrue | somewhat | neutral | somewhat | true
| untrue | somewhat | neutral | somewhat | true
| untrue | somewhat | neutral | somewhat | true

(2) The amount of pain I feel is completely out of my control.

<table>
<thead>
<tr>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>0</th>
</tr>
</thead>
</table>
| untrue | somewhat | neutral | somewhat | very
| untrue | somewhat | neutral | somewhat | true
| untrue | somewhat | neutral | somewhat | true
| untrue | somewhat | neutral | somewhat | true
| untrue | somewhat | neutral | somewhat | true

(3) There is little that I or anyone can do to ease the pain I feel.

<table>
<thead>
<tr>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>0</th>
</tr>
</thead>
</table>
| untrue | somewhat | neutral | somewhat | very
| untrue | somewhat | neutral | somewhat | true
| untrue | somewhat | neutral | somewhat | true
| untrue | somewhat | neutral | somewhat | true
| untrue | somewhat | neutral | somewhat | true

(4) Just by concentrating or relaxing I can "take the edge" off of my pain.

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
</table>
| untrue | somewhat | neutral | somewhat | very
| untrue | somewhat | neutral | somewhat | true
| untrue | somewhat | neutral | somewhat | true
| untrue | somewhat | neutral | somewhat | true
| untrue | somewhat | neutral | somewhat | true

(5) I am unable to control a significant amount of my pain.

<table>
<thead>
<tr>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>0</th>
</tr>
</thead>
</table>
| untrue | somewhat | neutral | somewhat | very
| untrue | somewhat | neutral | somewhat | true
| untrue | somewhat | neutral | somewhat | true
| untrue | somewhat | neutral | somewhat | true
| untrue | somewhat | neutral | somewhat | true

(6) I believe that I can control how much pain I feel by changing my thoughts.

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
</table>
| untrue | somewhat | neutral | somewhat | very
| untrue | somewhat | neutral | somewhat | true
| untrue | somewhat | neutral | somewhat | true
| untrue | somewhat | neutral | somewhat | true
| untrue | somewhat | neutral | somewhat | true

(7) I have learned to control my pain.

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
</table>
| untrue | somewhat | neutral | somewhat | very
| untrue | somewhat | neutral | somewhat | true
| untrue | somewhat | neutral | somewhat | true
| untrue | somewhat | neutral | somewhat | true
| untrue | somewhat | neutral | somewhat | true

(8) I know for sure I can learn to manage my pain.

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
</table>
| untrue | somewhat | neutral | somewhat | very
| untrue | somewhat | neutral | somewhat | true
| untrue | somewhat | neutral | somewhat | true
| untrue | somewhat | neutral | somewhat | true
| untrue | somewhat | neutral | somewhat | true

(9) I am not in control of my pain.
(10) I have noticed that if I can change my emotions I can influence my pain.
Pain Catastrophizing Scale

When I have pain,

1. I worry all the time whether pain will end.
   Not at all    mildly    moderately    severely    extremely

2. I feel I can’t go on.
   Not at all    mildly    moderately    severely    extremely

3. I feel terrible and think it’s never going to get better.
   Not at all    mildly    moderately    severely    extremely

4. I feel awful and feel it takes over me.
   Not at all    mildly    moderately    severely    extremely

5. I can’t stand it anymore.
   Not at all    mildly    moderately    severely    extremely

6. I am afraid that pain will get worse.
   Not at all    mildly    moderately    severely    extremely

7. I keep thinking of other painful events.
   Not at all    mildly    moderately    severely    extremely

8. I want the pain to go away.
   Not at all    mildly    moderately    severely    extremely

9. I can’t keep it out of my mind.
   Not at all    mildly    moderately    severely    extremely

10. I keep thinking about how much it hurts.
    Not at all    mildly    moderately    severely    extremely

11. I keep thinking about how much I want the pain to stop.
12. I think that there is nothing I can do to reduce the pain.

13. I wonder whether something serious may happen.
Demographic Data – Patient

1. **Gender:**  ____Female  ____Male

2. **Age at last birthday:** ________________

3. **Marital Status:**  ____Single  ____Married/Partnered  ____Separated
                   ____Divorced  ____Widowed

4. **Race/Ethnicity:**  ____Caucasian  ____African American  ____Hispanic/Latino
                   ____Asian/Pacific Islander  ____Native American (American Indian)
                   ____Other (Please specify):________________________________

5. **Education:** 1  2  3  4  5  6  7  8  9  10  11  12  13  14  15  16  17  18  19
                   HS      AD      BS     Grad

6. **Occupation:** ________________________________________________________________

7. **Employment:**  ____Full time  ____Part time  ____Retired
                   ____Student  ____Unemployed  ____Disabled

8. **Duration of Pain:** ____________________________________________________________

9. **Cause of Pain:** ________________________________________________________________

10. **Pain Quality:** _________________________________________________________________

11. **Months since cancer diagnosis:** ________________________________________________

12. **Site of cancer:** ________________________________________________________________

13. **Has the cancer metastasized (spread)?**  ____Yes  ____No

14. **If yes, to what sites did it spread?** ______________________________________________

15. **Please circle a number that best reflects how controllable you believe your pain is**
   0   1   2   3   4   5   6   7   8   9   10
   Not at all controllable  Completely controllable

16. **Please circle a number that best reflects how controllable you believe your pain is**
    **controlled at this time**
<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Not at all controllable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Completely controllable</td>
</tr>
</tbody>
</table>
Demographic Data - Caregiver

1. Gender: ___ Female ___ Male

2. Age at last birthday: ____________

3. Marital Status: ___ Single ___ Married ___ Separated
   ___ Divorced ___ Widowed

3. Race/Ethnicity: ___ Caucasian ___ African American ___ Hispanic
   ___ Asian/Pacific Islander ___ Native American

4. Education: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
   HS AD BS Grad

5. Occupation: ____________________________________________________________

6. Employment: _____ Full time _____ Part time _____ Retired
   _____ Student _____ Unemployed _____ Disabled

7. Average Household Income: _____ <$10,000 _____ $10,000-$25,000
   _____ $25,000-$50,000 _____ $50,000-$75,000
   _____ $75,000-$100,000 _____ >$100,000

8. Relation to Patient: ____________________________________________________

   Other (please specify) ______________________________________________________

10. Pain Control:
    Please circle a number that best reflects how controllable you believe your family member’s
    pain is.
    0 1 2 3 4 5 6 7 8 9 10
    Not at all controllable Completely controllable

11. Please circle a number that best reflects how controlled you believe your family member’s
    pain is at this time.
    0 1 2 3 4 5 6 7 8 9 10
    Not at all controlled Completely controlled
12. What is your current contact phone number_______________________________
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ABSTRACT

FACTORS THAT AFFECT ANALGESIC PRESCRIPTIONS IN AFRICAN AMERICANS WITH CANCER PAIN

by

NAVDEEP SINGH

MAY 2021

Advisor: Dr. April Hazard Vallerand

Major: Nursing

Degree: Doctor of Philosophy

Statement of the Problem

Receiving adequate analgesia has been shown to be problematic for African Americans with cancer pain. The vast majority of studies only simply highlights the existing disparities between African Americans and Caucasians in pain management. There is a lack of research focusing on the etiology of these disparities, specifically on what causes prescriptions for inadequate analgesics, especially for African Americans. The purpose of this study was to characterize the adequacy of analgesia received by African Americans with cancer pain and to elucidate what patient characteristics contributed to receiving adequate analgesia.

Methods

This was a secondary analysis of baseline data from an intervention study of African Americans with cancer pain. The Pain Management Index (PMI) was calculated for 302 African Americans with cancer pain to characterize the adequacy of the analgesics they received for their reported pain score. Structure equation modeling was utilized to determine which patient factors
(age, gender, presence of caregiver, employment status, educational level, perceived control over pain, pain-related distress, pain intensity, functional status) led to adequate analgesia.

**Results**

Patients who reported worse pain received stronger analgesics. Unfortunately, 40% of African Americans with cancer pain in this study did not receive adequate analgesia based on the analgesic class prescribed. Cancer metastasis (p = .03) was the only significant predictor of a greater likelihood of receiving adequate analgesia. No other patient factors were found that affected analgesic prescriptions.

**Conclusions**

Despite a plethora of research highlighting racial disparities that exist with pain management, 40% of African Americans with cancer pain in this study received inadequate analgesia. This study was the first study to identify that no characteristics specific to African Americans with cancer pain led to receiving adequate analgesia. Cancer metastasis was the only factor that significantly contributed to receiving adequate analgesia. Future studies must be done to determine whether this is the same for other races to elucidate if the disparity identified in this study was solely based on race. Interventions must then be developed to reduce the disparities.
AUTOBIOGRAPHICAL STATEMENT

Navdeep Singh, PhD, AGACNP-BC, CCRN, a Robert Wood Johnson Foundation Future of Nursing Scholar, is interested in studying pain in African Americans, specifically management of pain caused by cancer and sickle cell.

Degrees

Doctor of Philosophy in Nursing, Wayne State University, May 2021

Master of Science in Nursing, Madonna University, April 2016

Graduate Certificate in Nursing Education (CNED), Wayne State University, December 2014

Bachelor of Science in Nursing, Wayne State University, December 2009

BS Biological Sciences Honors / Magna Cum Laude. Wayne State University, May 2008

Professional Experience:

2017-current: Nurse Practitioner, Anesthesia Associates of Ann Arbor

2017: Adjunct Clinical Faculty, University of Detroit Mercy

2010-2021: Registered Nurse, SICU, Detroit Receiving Hospital

Publications and posters:


