2019

Systematic Review of Alternative Therapies to Treat Cancer Pain

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This is to certify that the doctoral study by

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has been found to be complete and satisfactory in all respects,
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2019

Abstract

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Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Cancer pain is a complex symptom that affects the quality of life of oncology patients, caregivers, and families. The limitations of pain management treatment for cancer patients can be attributed to the lack of knowledge and availability of nonpharmacological treatments. The purpose of this project was to identify and gather evidence on the effectiveness of nonpharmacological interventions in the treatment of cancer pain using the methodology of a systematic review. Watson's theory of human caring supported the project by incorporating the perception of treating the human being holistically during the illness process. The Johns Hopkins nursing evidence-based practice model provided a structured approach to address the practice problem and practice-focused question. The tools used to assess the quality and synthesize the findings of the studies were the Research and Evidence Appraisal Tool and the Synthesis Process and Recommendations Tool. The practice-focused question explored whether nonpharmacological interventions could be used to complement opioid treatments for cancer pain. A systematic review of the literature indicated 11 studies in which 2 interventions--music therapy and exercise--addressed the practice-focused question. Psychological distress, decreased physical function, and decreased involvement in social activities can all be attributed to the poor management of cancer pain. The study of alternatives to opioids could support social change by increasing the knowledge of healthcare professionals and the range of treatment options for pain management in cancer patients.

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Dedication

I would like to dedicate this DNP project to my children, Kaylee and Bryan. Thank you for being my motivation in everything I do in life!

Acknowledgments

I would like to acknowledge my parents for always believing in me and encouraging me to never give up on my dreams. I would also like to thank my brothers, sister, and my best friends for always supporting me through this difficult journey. A special thank you to my DNP committee chair, Dr. Lilo Fink, for helping me stay on track and motivating me each step of the way. Finally, I would like to thank the rest of my DNP committee for all their support, Dr. Courtney Nyange and Dr. Mary Garner.

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Section 1: Nature of the Project

Introduction

Cancer pain is a complex symptom that affects the quality of life of oncology patients, caregivers, and families. The limitations of pain management treatments for cancer patients can be attributed to the lack of knowledge and availability of alternative nonpharmacological treatments (Kwon, 2014). Cancer patients do not often receive adequate pain relief from traditional opioid medications, and their pain symptoms remain undermanaged (Kwon, 2014). Pain is considered one of the most challenging symptoms of cancer patients because of its degenerating effects on the human body (American Cancer Society, 2018). A decrease in physical function is one limitation that people who suffer from cancer pain face. The main goal of pain treatment is to improve physical function and reduce pain (Smith & Saiki, 2015). As evidenced in the practicum site, there was a need for the development and implementation of practice guidelines for nonpharmacological interventions to manage cancer pain.

The aim of this doctoral project was to identify nonpharmacological pain management interventions that can be used alone or in conjunction with traditional analgesic and opioid treatments to better manage cancer pain. The project was conducted in the form of a systematic review with findings to be disseminated in the practicum setting among health care practitioners and allied professionals who treat patients with cancer pain. Based on my personal observation during the practicum experience, health care providers at the practicum site demonstrated a lack of knowledge of nonpharmacological treatments for managing chronic cancer pain. According to Kwon

(2014), adequate pain relief is the cornerstone of the management of the symptoms of cancer patients. The treatment of pain in cancer patients is a challenging task, and complementary nonpharmacological pain treatments can improve the quality of life and health of patients (Dowell & Haegerich, 2016). Relief of a patient's pain may promote positive social change by improving quality of care and quality of life for that patient and his or her support system.

Problem Statement

According to the National Cancer Institute (2018), there will be approximately 1,735,350 new cases of cancer in the United States diagnosed by the end of the year 2018. Although not all cancer patients suffer from pain, most will experience some type of pain symptoms at different intensities throughout the course of their condition (Scarborough & Smith, 2018). Patients suffering from cancer pain deteriorate faster, and cancer pain is considered by most patients as emotional, social, and physical distress (Van den Beuken-van Everdingen, Hochstenbach, Joosten, Tjan-Heijnen, & Janssen, 2016). The American Cancer Society (2018) described three categories of cancer pain: acute, chronic, and breakthrough. Acute pain is a severe pain that lasts less than 3 months; typically, cancer patients experience this pain upon the initiation of their treatments or upon the progression of the disease (American Cancer Society, 2018). Chronic pain is persistent and lasts for longer than 3 months (American Cancer Society, 2018). This is the most common type of pain in cancer patients, and the standard treatment has been prescription opioid analgesics (American Cancer Society, 2018). According to the American Cancer Society, patients experiencing chronic pain may also

have breakthrough pain, which occurs when the patient is taking regular pain medications and experiences spontaneous flare-ups of pain. Breakthrough pain has varied intensities and is unpredictable; it is controlled with alternative doses of pain medications that the patient takes upon the onset of pain (American Cancer Society, 2018).

Despite the availability of pain management guidelines from various health care associations, such as the Oncology Nursing Society, World Health Organization (WHO), and the American Academy of Pain Medicine, health care providers struggle to align treatment options to provide enough pain relief for cancer patients (Eaton, Meins, Mitchell, Voss, & Doorenbos, 2015). According to the WHO's (2018) cancer pain ladder for adults, to achieve optimal pain relief in adults, treatment should begin with nonopioids such as aspirin and paracetamol if not contraindicated, followed by codeine opioids, and lastly stronger opioids such as morphine. To manage other symptoms associated with cancer pain such as anxiety and fear, adjuvant drugs may be used in conjunction (WHO, 2018). Pain management interventions can be combined with relaxation therapies and exercise to help patients achieve optimal comfort despite their condition (Fink & Lewis, 2017).

During the time of the project, the practicum setting lacked interventions for pain management that do not involve the use of medications. Health care professionals and patients may benefit from nonpharmacological interventions such as music therapy, acupuncture, exercise, and aromatherapy. The implementation of evidence-based interventions for cancer pain management is complex and requires professionals to use comprehensive tools to conduct pain assessments and determine the needed level of care

for each individual patient based on assessment findings (Eaton et al., 2015). Using assessment findings, health care professionals can develop a holistic treatment plan with a combination of pharmacological interventions and adjunctive therapies to achieve pain relief and the best patient health care outcomes.

Purpose

The purpose of this Doctor of Nursing Practice (DNP) evidence-based project (EBP) was to identify and gather evidence on the effectiveness of nonpharmacological interventions in the treatment of cancer pain. A gap in practice and literature existed regarding effective pain relief in cancer patients using nonpharmacological interventions. I conducted a systematic review and evaluated the literature on nonpharmacological pain treatments to treat cancer pain so that health care providers at the practicum site could implement new interventions into their patient's plan of care. Pain management is key in the treatment of cancer symptoms; the use of alternative therapies in cancer pain management may help practitioners achieve optimal pain relief and may reduce the need for progressive opioid therapies (Nahin, Boineau, Khalsa, Stussman, & Weber, 2016).

Practice-Focused Question

What nonpharmacological interventions can be used to complement opioid treatments for cancer patients with pain?

Nature of the Doctoral Project

When conducting or prescribing pain management interventions, health care practitioners rely on evidence regarding the effectiveness of the treatments. A systematic review of nonpharmacological pain treatments may aid health care providers in

identifying the appropriate nonpharmacological interventions to manage chronic pain in cancer patients based on their specialized needs and perceptions of pain relief. The systematic review consisted of an extensive search of relevant articles related to nonpharmacological pain management interventions. The literature search was conducted using the Walden University databases including CINAHL Plus, PubMed, Allied and Complementary Medicine Database, Science Direct, and Natural and Alternative Treatments. Literature from the past 10 years (2010-2019) was reviewed. The articles for this EBP were analyzed using the John Hopkins Research and Evidence Appraisal Tool (Appendix A). The findings from the systematic review were used to recommend interventions for chronic pain management. The data quality was assessed by judging it against the practice-focused question and by using the Research and Evidence Appraisal Tool and the Synthesis Process and Recommendations Tool (Appendix B). The data synthesis was presented in a narrative summary, and results were presented using a table created in Microsoft Excel.

Significance

With the increasing number of patients being diagnosed with cancer, health care professionals should explore the different treatment options available for cancer pain for the development of individualized treatment plans (Scarborough & Smith, 2018). The complex health demands of cancer patients and the lack of knowledge on pain treatments besides the traditional analgesia impedes health care professionals in helping their patients achieve pain relief and a better quality of life (Scarborough & Smith, 2018). According to Scarborough and Smith (2018), pain is a contributing factor in the health-

related quality of life of cancer patients because it provides valuable information regarding prognosis and survival. The poor management of cancer pain causes psychological distress, decreased physical function, and decreased involvement in social activities (Scarborough & Smith, 2018). The study of alternatives to opioids may increase the knowledge and the range of treatment options for pain management in cancer patients.

Summary

The current gap in knowledge regarding cancer pain management is a major issue that affects cancer patients all over the world (Scarborough & Smith, 2018). Evidence from the current literature is needed to close the practice gap. A systematic review is used to bring together research evidence to improve practice and the understanding of interventions and their impact (Seers, 2015). Complimentary therapies that provide nonpharmacological pain relief may improve the quality of life for cancer patients. The fundamental concepts of the theory of caring guided this DNP project to promote the holistic well-being of cancer patients and the moral commitment of health care providers to protect and enhance their patients' dignity. Section 2 provides an in-depth discussion of the background and context of the doctoral project as well as the role of the DNP student.

Section 2: Background and Context

Introduction

The management of cancer pain is a complex task that requires health care professionals to assess patients in a holistic manner and collaboratively set pain relief goals (Nahin, Boineau, Khalsa, Stussman, & Weber, 2016). The use of complementary pain management interventions may help cancer patients improve their physical function and quality of life (Nahin et al., 2016). Although the gold standard treatment for treating chronic cancer pain is prescription opioids, these medications do not completely relieve chronic pain and can lead to undesired health complications (Nahin et al., 2016). This doctoral EBP project was conducted to identify the most effective nonpharmacological pain management interventions to improve the current pain management practices in cancer care. The practice focused question was the following: What nonpharmacological interventions can be used to complement opioid treatments for patients experiencing cancer pain? This section of the doctoral project includes the theoretical framework, relevance of the project to nursing practice, local background and context of the practice problem, and the role of the DNP student.

Theoretical Framework

To support this project, Watson's theory of human caring was used. The theory of caring was founded on the principles of unity of life, and its framework encompasses the dimensions of mind, body, and spirit medicine (Watson, 2018). *Human* was initially described by Watson (1999) as a "dynamic human-to-human transaction" (p. 27). Over the years, Watson's theory has evolved to include human caring, a more in-depth human

connection from one person to another (Watson, 2018). One core concept of Watson's theory is the transpersonal caring relationship that promotes the "moral commitment to protect and enhance human dignity" and maintain human balance (Watson, 2018, para. 3). A major component of the theory of human caring is the Caritas Processes.

The Carita Processes are modalities in nursing practice that enhance the overall patient-nurse relationship to cultivate consciousness about caring for self and others (Costello, 2018). In addition, the Caritas Processes help in the facilitation of a holistic healing approach that supports nursing practice and humanity (Costello, 2018). The theory of human caring supported the DNP project through perceptions of treating the human being holistically during the illness process and influencing the decision-making capacities of health care providers when prescribing treatments to manage chronic pain in cancer patients.

Conceptual Model

The John Hopkins nursing evidence-based practice (JHNEBP) model was used to guide the doctoral project. This model was designed to provide a strong problem-solving approach for nursing professionals to make complex clinical decisions (Dang & Dearholt, 2017). The framework consists of developing a practice question, searching for evidence, and translating the evidence into practice (Dang & Dearholt, 2017). The JHNEBP model provided the DNP project with a structured approach to addressing the practice problem and practice-focused question. In addition, the JHNEBP model provided several tools for the literature appraisal, analysis, and synthesis. The tools used to assess the quality of the studies and synthesize the findings were the Research and Evidence Appraisal Tool and

the Synthesis Process and Recommendations Tool. My chair and second committee member were reviewers for the quality of the studies.

Relevance to Nursing Practice

Nursing professionals find implementing interventions to alleviate cancer pain symptoms to be a major challenge (Eaton et al., 2017). According to van den Beuken-van Everdingen et al. (2016), approximately one third of oncology patients describe their pain symptoms as intolerable and distressing. In a systematic review, van de Beuken-van Everdingen et al. (2016) found that effective pain management improves the quality of life of oncology patients suffering from chronic pain. Patients suffering from chronic pain often receive opioid medications as stand-alone pain therapies or with adjunct medications (van den Beuken-van Everdingen et al., 2016). However, current practices do not involve nonpharmacological interventions to further the patients' pain relief. The WHO (as cited in Brant, Eaton, & Irwin, 2017) estimated that 90% of chronic cancer pain is controllable with the use of nonpharmacological interventions.

Nurses play an important role in effective pain management for cancer patients. According to Bartoszczyk and Gilbertson-White (2015), nurses also play a significant role in creating barriers in cancer pain management. These barriers include opioid dependence and specialized training/education in cancer pain management, pharmacological pain treatments, nonpharmacological interventions, and pain assessments (Bartoszczyk & Gilbertson-White, 2015). Research has been conducted to identify the barriers to effective pain management; however, there was a lack of evidence to support the effectiveness of interventions to reduce those barriers.

This doctoral project was conducted to identify effective nonpharmacological pain management interventions that nurses and health care providers can incorporate into their patients' plan of care. By implementing new interventions that have the potential to alleviate pain in conjunction with traditional pharmacological interventions, health care professionals may improve the quality of life of cancer patients and decrease the limitations that chronic pain causes in these cancer patients. Pain causes limitations in physical mobility as well as psychological, moral, and psychosocial distress (Bartoszczyk & Gilbertson-White, 2015). This systematic review was intended to provide health care professionals with the most current nonpharmacological pain management interventions to promote the best patient outcomes.

Local Background and Context

Cancer causes an invasion and destruction of healthy cells and tissues, inflammation, compressions, irritations, and obstructions to vital human organs (Sidy, Diouf, Niang, Diallo, & Dieng, 2017). Pain is one of the most complex symptoms of cancer; if left untreated, pain can lead to other serious complications such as fatigue, respiratory distress, anxiety, nausea, physical immobility, sleep disturbances, depression, weakness, decreased sexual function, and irritability (American Society of Clinical Oncology, n.d.). For each patient, the perception of pain is different, and the intensity and duration can vary due to the localization of the cancer and the body structures affected (American Society of Clinical Oncology, n.d.). Cancer pain can be categorized into three different types: acute, chronic, and breakthrough.

The standard pain treatment for cancer patients is prescription opioid medications. Opioids are medications that are classified as narcotics and have been proven to be effective in managing pain for a short period of time (National Institute of Health, 2011). Usually, patients with long-term prescribed opioids, such as morphine, oxycodone, and codeine, need to be monitored for addiction (National Institute of Health, 2011). Opioid addiction refers to the compulsive urge a person develops over time to continue using opioid medications without any medical indication (U.S. National Library of Medicine, 2018). According to the National Institute of Health (2011), over 5% of patients with long-term opioid treatments develop dependence over time. The WHO (2018) developed guidelines for the management of cancer pain. One of the guidelines includes the WHO analgesic ladder, which gives health care providers guidance on how to approach the various types of pain (WHO, 2018). Despite the wide distribution and implementation of these guidelines, ineffective pain management is still an issue among the cancer patient population (Carlson, 2016). There is a need to implement nonpharmacological interventions that can be used as adjunct or alternative therapies to help patients achieve optimal pain relief (Carlson, 2016). The practicum site was an appropriate setting for the implementation of this doctoral project because it is specialized in oncology. This facility treats adult patients from the age of 18. In addition, it is in a centralized location that provides easy access to all members of the community.

Role of the DNP Student

As an administrative nurse, I use evidence-based practice interventions to update and develop nursing protocols and interventions that will produce the best patient

outcomes. Throughout my nursing career, I have worked in multiple care settings with different levels of care and have witnessed that cancer patients suffering from chronic pain need specialized care. Close to half of the cancer patient population experiences unsatisfactory pain relief with traditional pharmacological treatments (Eaton et al., 2015). The goal for nurses caring for cancer patients suffering from pain is to help the patient reach an optimal level of comfort and improve his or her quality of life.

In this doctoral project, my role was to conduct a systematic review to present evidence-based recommendations to the health care providers and organizational leaders at the practicum site. The desired outcome was to inspire health care professionals to adopt and implement the recommended pain management interventions and to conduct studies to assess their effectiveness. I intend to publish the findings in a scholarly journal so that health care professionals can use this information to improve their practice in other patient care settings.

One potential bias for this project was publication bias in choosing search terms that led to literature with positive outcomes rather than literature with positive and negative outcomes for nonpharmacological pain management interventions. According to Montori, Smieja, and Guyatt (2000), this type of bias occurs from the publication of studies based on the specific outcomes of the results of the studies that lead in the same direction. To reduce the probability of publication bias in my project, I used a professional librarian to facilitate the literature search. Also, the search terms, inclusion criteria, and exclusion criteria were reviewed by my committee chair and librarian.

Summary

Given the complexity of managing cancer pain, there was a need to identify and implement interventions that can be used with standard pain treatments to benefit the health outcomes of cancer patients. Nursing and health care professionals have the responsibility of applying the best interventions to satisfy their patients' needs. The evidence from the literature that supported the practice-focused question of this doctoral project is discussed in Section 3.

Section 3: Collection and Analysis of Evidence

Introduction

Despite the advances in medicine in recent years, cancer pain management is known to be one of the challenges of oncology (Seers, 2015). Although patients receive pharmacological treatments for their malignant pain, most do not receive adequate pain relief from medications alone (Brant et al., 2017). The need for alternative nonpharmacological pain management interventions to treat patients with cancer pain is great among health care professionals (Seers, 2015). This doctoral project included a systematic review of the literature to provide health care professionals with the most effective nonpharmacological interventions to alleviate cancer pain and improve patient health care outcomes.

The most complex symptom of cancer is pain, which left untreated can lead to other health complications (Seers, 2015). Each patient experiences pain in different ways at varied intensities and durations. Opioids are the standard treatment for malignant pain; the most common types are narcotics that have been proven to control pain for a short period of time but in the long term can lead to other health complications and dependence (Brant et al., 2017). Despite the availability of treatment guidelines for cancer pain management, studies indicated an increasing need for other interventions to effectively manage malignant pain (Greco et al., 2014).

This section provides an overview of how the evidence was collected and analyzed for the doctoral project. I present the practice-focused question's operational definitions, and sources of evidence. Additionally, this section covers the methodology

used for the literature search, including key terms, scope of the review, analysis of the literature, and synthesis of the evidence.

Practice-Focused Question

Lack of adequate pain relief in cancer patients is an increasing issue worldwide. Health care professionals rely on the most recent evidence to formulate and implement interventions that will translate into positive outcomes for their patients (Seers, 2015). Effective pain management for cancer patients means that they will have better physical function and quality of life. The practice-focused question was the following: What nonpharmacological interventions can be used to complement opioid treatments for cancer patients with pain?

The purpose of conducting a systematic review for the identified gap in practice was to provide a comprehensive review and critical appraisal of studies that addressed nonpharmacological interventions for managing chronic pain. In addition, I wanted to offer recommendations to health care professionals for improving their current practice of cancer pain management. According to Walden University (2017),

> A systematic review is prepared using a systematic approach to minimizing biases and random errors and arbitrariness by making explicit the review process, to that, in principle, another reviewer with access to the same resources could undertake the review and reach broadly the same conclusions. (p. 2)

Sources of Evidence

The only sources of evidence that were used were the studies found through the literature search. The purpose of this doctoral project was to identify relevant evidence on

the effectiveness of nonpharmacological interventions to manage cancer pain and improve health outcomes. According to Robertson- Malt (2014), the methodology used in a systematic review is rigorous and comprehensive with the aim of uncovering all the available evidence to answer a question. On November 28, 2018, I received permission to begin the study from the Walden University Office of Research Ethics and Compliance and was assigned the institutional review board approval number 11-28-18-0451786.

Upon reviewing the literature, I found many articles that supported the effectiveness of nonpharmacological interventions on chronic pain management. In one systematic review, the most effective interventions demonstrated by evidence included psychoeducation, celiac plexus block, and radiotherapy (Eaton et al., 2017). Priyanka and Aditi (2015) found that complementary and alternative medicine (CAM) therapies such as acupuncture can be effective in releasing joint pain and stiffness, which can be a common symptom of chemotherapy. Priyanka and Aditi also suggested that massage therapy increases the reduction of anxiety and stress, thereby contributing to pain relief.

Mehl-Madrona, Mainguy, and Plummer (2016) tested the effectiveness of group medical visits to provide education about CAM therapies to patients living in rural areas. Mehl-Madrona et al. tested a sample of 42 patients for a period of 6 months and provided education on movement, the use of guided imagery, relaxation techniques, yoga, tai chi, and qigong. Mehl-Madrona et al. found that during the 6 months none of the participants had an increase in their opioid doses, and 17 participants had a decrease in their opioid doses. Eyigor, Uslu, Apaydın, Caramat, and Yesil (2018) assessed the effectiveness of a 10-week Hatha yoga program in breast cancer patients for short- term and long-term

effects on shoulder pain. The results of the randomized controlled trial indicated that yoga had positive effects in alleviating pain symptoms in breast cancer patients (Eyigor et al., 2018).

According to Yakovlev and Resch (2012), 15% to 40% of chronic pain patients have a neuropathic component. Yakovlev and Resch suggested that spinal cord stimulation (SCS) and intrathecal therapy can increase the sustainment of pain relief. Yakovlev and Resch tested the effectiveness of a percutaneous SCS placement in study participants, and after a 2-day trial patients reported having excellent pain relief. The same participants were implanted with permanent SCS leads and a generator, and they reported sustained pain relief a year after the placement (Yakovlev & Resch, 2012).

Published Outcomes and Research

Search Terms

For the search of evidence, the following terms were used with Boolean operators: *cancer pain*, *spinal cord stimulation*, *exercise*, *yoga*, *tai chi*, *meditation*, *music therapy*, and *aromatherapy*.

Databases

To search for relevant literature on the practice-focused question, I used the following databases through the Walden University library: CINAHL Plus, Medline/PubMed, Cochrane, and ProQuest.

Scope and Search Strategies

The evidence collected was from literature published within the past 10 years (2009-2019) in English and Spanish. The types of literature and sources searched

included randomized controlled trials, meta-analyses, systematic reviews, quasi-experimental studies, qualitative studies, and prospective comparative studies. To ensure that the literature search was exhaustive and comprehensive, I consulted a professional research librarian from the Walden University library. To ensure reliability and validity, I used a two-person review (me and the project committee chair) to ensure the studies met the inclusion criteria.

Analysis and Synthesis

A data collection table created in a Microsoft Excel spreadsheet was used to record, organize, and analyze the literature. To ensure the integrity of the evidence, I analyzed each study for strengths, limitations, internal and external risks to validity, and bias. In addition, studies were assessed by the method used to conduct the study; by interventions used to treat pain; by the age, sex, and race of the target population; and by final outcomes.

The Research and Evidence Appraisal Tool and the Synthesis Process and Recommendations Tool were used to analyze and synthesize the studies (see Appendix A and Appendix B). Permission to use the tools was requested and granted by The Johns Hopkins Hospital/ The John Hopkins University on October 4, 2018 through an online form (Appendix C). The Research and Evidence Appraisal Tool is a comprehensive form that allows reviewers to conduct an unbiased in-depth analysis of the literature based on the level of evidence and other factors. The Synthesis Process and Recommendations Tool facilitates the compiling of the results of the evidence appraised to answer the practice-focused question (Dang & Dearholt, 2017).

Summary

The standardized methodology of the systematic review was used to conduct a thorough review, synthesis, and analysis of the evidence to support the doctoral project objectives. Identifying the most appropriate studies based on the inclusion and exclusion criteria revealed the most effective interventions to answer the practice-focused question: What nonpharmacological interventions can be used to complement opioid treatments for cancer patients with pain? Section 4 includes the findings, strengths, limitations, conclusions, recommendations, and implications for practice of this doctoral project.

Section 4: Findings and Recommendations

Introduction

According to Smith and Saiki (2015), over the past 20 years little has changed in cancer pain treatment. As evidenced by the literature, there are many limitations to cancer pain treatment. In most cases, treatment is limited to opioid medications and does not include nonpharmacological interventions (Smith & Saiki, 2015). This is attributed to the lack of training of health care providers in assessing and treating pain, overestimation of providers' skills, and lack of specialty referrals (Smith & Saiki, 2015). The implementation of nonpharmacological pain management interventions may increase treatment options for cancer patients while improving their quality of life. This DNP project focused on identifying nonpharmacological interventions for the management of cancer pain to answer the practice-focused question: What nonpharmacological interventions can be used to complement opioid treatments for cancer patients with pain?

A Walden librarian was consulted throughout the process of this systematic review. The following terms were used using Boolean search strings: *cancer pain* and *spinal stimulation* or *exercise* or *yoga* or *tai chi* or *meditation* or *music therapy* or *aromatherapy*. The literature was extracted from the following Walden University library databases: CINAHL Plus, Medline/PubMed, Cochrane, and ProQuest.

The articles were selected based on the following inclusion criteria: published within the past 10 years (2009-2019), sample population was over the age of 18 years, qualitative studies, randomized controlled trials, meta-analyses, systematic reviews, quasi-experimental studies, and prospective comparative studies. All studies that did not

meet the inclusion criteria were excluded from this systematic review. The initial search yielded 205 studies. After applying the inclusion and exclusion criteria, 11 articles remained to be critically appraised (see Figure 1).

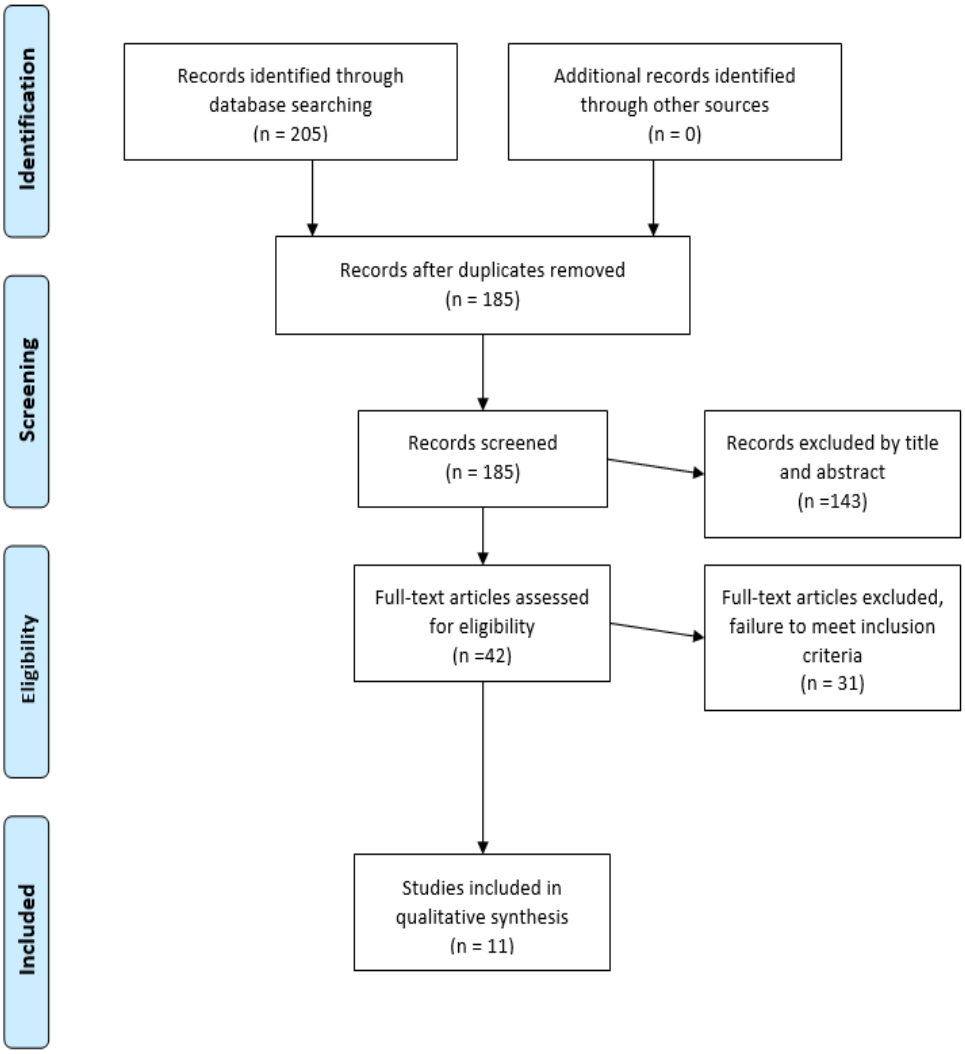

Figure 1. PRISMA flow diagram (preferred reporting items for systematic reviews and meta-analyses).

Findings and Implications

All articles were analyzed using the Research and Evidence Appraisal Tool and the Synthesis Process and Recommendations Tool. To ensure the reliability and validity

of the extracted studies, I consulted the DNP project chair. The selected studies were organized into a table that summarizes the findings (see Table 1). Two major themes with the most articles were identified (exercise and music therapy).

Table 1

Summary of Evidence

APA Reference	*Study Design*	Sample Size	Intervention	Findings
Bilgiç, Ş., & Acaroğlu, R. (2017). Effects of listening to music on the comfort of chemotherapy patients. *Western Journal of Nursing Research*, 39(6), 745–762. https://doi.org/10.1177/0193945916660527	Controlled Trial	70 patients	Music Therapy	The experimental group was subjected to listen to music from a CD prepared by the Turkish Psychological Association with relaxation exercises for 30 min for 3 times a week. After the study participants reported that listening to the relaxation exercises diminished the severity of symptoms caused by chemotherapy such as pain. Also, there was a significant improvement in the overall comfort of the patients during the chemotherapy sessions.
Arruda, M. A. L. B., Garcia, M. A., & Garcia, J. B. S. (2016). Evaluation of the effects of music and poetry in oncologic pain relief: A randomized Clinical Trial. *Journal Of Palliative Medicine*, *19*(9), 943–948. https://doi-org.ezp.waldenulibrary.org/10.1089/jpm.2015.0528	Randomized Controlled Trial	65 patients	Music Therapy	The study was conducted over 3 months in adults hospitalized in a cancer facility. Researchers used the Visual Analog Scale to assess the pain in the cancer patients. 22 patients were included in the music therapy group, upon the end of the study participants reported an improvement in their pain ($p<0.001$). Patients who participated in poetry also saw a significant increase in pain reduction.
Krishnaswamy, P., & Nair, S. (2016). Effect of music therapy on pain and anxiety levels of cancer patients: A pilot study. *Indian Journal of Palliative Care*, 22(3), 307–311. https://doi-org.ezp.waldenulibrary.org/10.4103/0973-1075.185042	Controlled Trial	14 patients	Music Therapy	Fourteen study subjects were administered music thru headphones for 20 minutes. When the interventions were completed pain and anxiety scores were measured using the NRS and HAM-A scales. There was a statistically significant decrease in pain in the intervention group.
Li, X., Yan, H., Zhou, K., Dang, S., Wang, D., & Zhang, Y. (2011). Effects of music therapy on pain among female breast cancer patients after radical mastectomy: Results from a randomized controlled trial.	Randomized Controlled Trial	120 patients	Music Therapy	Experimental group n=60 received music therapy and nursing care from the first day following the radical mastectomy until the third admission for chemotherapy to

Breast Cancer Research and Treatment, 128(2), 411-9. doi:http://dx.doi.org.ezp.waldenulibrary.org/10.1007/s10549-011-1533-z				the hospital. The control group n=60 only received routine nursing care. Pain was measured using the McGill pain questionnaire in a short Chinese version. The experimental group reported a significant decrease in their pain scores compared to the control group. Researchers suggest that music therapy has both long term and short term positive effects on cancer pain management.
Backman, M., Wengström, Y., Johansson, B., Sköldengen, I., Börjesson, S., Tärnbro, S., & Berglund, Å. (2014). A randomized pilot study with daily walking during adjuvant chemotherapy for patients with breast and colorectal cancer. *Acta Oncologica*, 53(4), 510–520. https://doi-org.ezp.waldenulibrary.org/10.3109/0284186X.2013.873820	Randomized Controlled Trial	162 patients	Exercise	A randomized controlled trial with a group of cancer patients n=162 that were receiving adjuvant chemotherapy diagnosed with breast cancer or colorectal cancer stage 1-4 and spoke Swedish. The control group n= 81 was educated on physical therapy and were not restricted on their activities, the intervention group n= 81 were encouraged by their nurses and physicians to walk approximately 8 km daily in a supervised group walk activity that took place one hour each week for ten weeks total. At the end of the ten weeks the intervention group had achieved an average of eighty-three percent of the 8-km daily goal for the ten-week program. Participants also reported a significant increase in pain breast-cancer related pain and increase in physical activity.
Cantarero-Villanueva, I., Cuesta-Vargas, A. I., Lozano-Lozano, M., Fernández-Lao, C., Fernández-Pérez, A., & Galiano-Castillo, N. (2017). Changes in pain and muscle architecture in colon cancer survivors after a lumbopelvic exercise program: A secondary analysis of a randomized controlled trial. *Pain Medicine*, 18(7), 1366–1376. https://doi-org.ezp.waldenulibrary.org/10.1093/pm/pnx026	Randomized Controlled Trial	46 patients	Exercise	46 colon cancer patients were selected to be part of the CO-CUIDATE program that lasts eight weeks that offers physical therapy by two physical therapy experts specialized in oncology. During the eight weeks, participants received a total of 24 sessions that included stretching, lumbopelvic stabilizations exercises, and aerobics. During the interventions, an electronic algometer was used to measure the participant's pain threshold. Additionally, a ten-

				item questionnaire was given to the participants to assess their levels of pain and validate the detectability of chronic pain in the participants. After the program patients did not report any significant changes in their pain threshold or severity.
Tatham, B., Smith, J., Cheifetz, O., Gillespie, J., Snowden, K., Temesy, J., & Vandenberk, L. (2013). The efficacy of exercise therapy in reducing shoulder pain related to breast cancer: A systematic review. *Physiotherapy Canada*, 65(4), 321–330. https://doi-org.ezp.waldenulibrary.org/10.3138/ptc.2012-06	Systematic Review	6 studies	Exercise	Only six studies were included in the review that met the inclusion criteria and were appraised by two reviewers. All the studies the interventions focused on shoulder movements and range of motion exercises to reduce breast cancer related shoulder pain. Although the study participants reported a significant increase on pain relief and mobility; one limitation to this systematic review is that in the studies the specific exercises were separated or specified to demonstrate the effectiveness on shoulder pain relief related to breast cancer.
Kwekkeboom, K., Abbott-Anderson, K., & Wanta, B. (2010). Feasibility of a patient-controlled cognitive-behavioral intervention for pain, fatigue, and sleep disturbance in cancer. *Oncology Nursing Forum*, 37(3), E151-9. Retrieved from https://ezp.waldenulibrary.org/login?url=https://search-proquest-com.ezp.waldenulibrary.org/docview/223115655?accountid=14872	Mixed Methods	30 patients	Controlled cognitive behavior	30 participants at an oncology clinic received education and training to use an MP3 player with 12 cognitive-behavioral exercises such as guided imagery, nature sounds and relaxation exercises. The intervention lasted 2 weeks and the participants kept a log of their symptom ratings. After the study period participants reported that they had gained useful skills to manage their symptoms and reported an improvement of their pain ratings immediately after the use of the cognitive-behavioral exercises.
Yakovlev, A. E., & Resch, B. E. (2012). Spinal cord stimulation for cancer-related low back pain. *American Journal of Hospice & Palliative Medicine*, 29(2), 93–97. https://doi-org.ezp.waldenulibrary.org/10.1177/1049909111410414	Randomized Controlled Trial	15 patients	Spinal Cord Stimulation	Patients reported an initial pain relief within 2 days of the spinal cord electrode placement and within 12 months the pain relief sustained.
Eaton, L. H., Brant, J. M., McLeod, K., & Chao Yeh. (2017). Nonpharmacologic Pain	Systematic Review	154 studies	Varied	Among the interventions recommended for practice were celiac plexus block and

Interventions: A review of evidence-based practices for reducing chronic cancer pain. *Clinical Journal of Oncology Nursing*, 21, 54-A9. https://doi-org.ezp.waldenulibrary.org/10.1188/17.CJON.S3.54-70				radiation therapy. These interventions had the most evidence to support their effectiveness. The rest of the interventions had insufficient evidence to support their effectiveness on cancer pain.
Sharma, M., Haider, T., & Knowlden, A. P. (2013). Yoga as an alternative and complementary treatment for cancer: A systematic review. *Journal of Alternative & Complementary Medicine*, 19(11), 870–875. https://doi-org.ezp.waldenulibrary.org/10.1089/acm.2012.0632	Systematic Review	13 studies	Yoga	For this review 13 studies were chosen that met the inclusion criteria. In this review there were mixed results regarding the use of yoga for managing cancer pain. Limitations to this study was the use of multiple tools in the studies to measure effectiveness which does not give credibility to the final outcomes.

Exercise

Three studies addressed the effects of exercise on cancer pain relief. Two of these studies were Level II: Randomized Control Trials and one was a Level I: Systematic Review. Backman et al. (2014) conducted a study with 162 cancer patients who were receiving adjuvant chemotherapy for breast cancer or colorectal cancer Stage 1-4. The participants spoke Swedish. The control group (n = 81) were educated on physical therapy and were not restricted on their activities; the intervention group (n = 81) were encouraged by their nurses and physicians to walk approximately 8 km daily in a supervised group walk that took place 1 hour each week for 10 weeks (Backman et al., 2014). At the end of the 10 weeks, the intervention group had achieved an average of 83% of the 8 km daily goal for the 10-week program. Participants also reported a significant decrease in breast-cancer-related pain and an increase in physical activity (Backman et al., 2014).

In a study by Cantarero-Villanueva et al. (2017), 46 colon cancer patients were selected to be part of a lumbopelvic exercise program that lasts 8 weeks and offers physical therapy by two physical therapy experts who specialize in oncology. During the 8 weeks, participants received a total of 24 sessions that included stretching, lumbar-pelvic stabilization exercises, and aerobics (Cantarero-Villanueva et al., 2017). During the interventions, an electronic algometer was used to measure the participants' pain threshold. Additionally, a 10-item questionnaire was given to the participants to assess their levels of pain and validate the detectability of chronic pain in the participants (Cantarero-Villanueva et al., 2017). After the program, patients did not report any significant changes in their pain threshold or severity (Cantarero-Villanueva et al., 2017).

In the third study, Tatham et al. (2013) conducted a systematic review of articles published between 1996 and 2011. Inclusion criteria included adults over the age of 18 years with a diagnosis of breast cancer. Only six studies met the inclusion criteria. In these studies, interventions focused on shoulder movements and range-of-motion exercises to reduce breast-cancer-related shoulder pain. Although the participants reported a significant increase in pain relief and mobility, the exercises were limited to shoulder pain related to breast cancer (Tatham et al., 2013).

Music Therapy

Four studies addressed music therapy as an intervention to provide pain relief for cancer pain. Two of the studies were Level II: Randomized Controlled Trials, and the two other studies were Level III: Controlled Trials without Randomization. Bilgiç and Acaroğlu (2017) conducted a controlled trial to test the effectiveness of music therapy on

cancer patients during chemotherapy sessions. The intervention group (n = 70) was asked to listen to music from a CD prepared by the Turkish Psychological Association with relaxation exercises for 30 minutes, three times a week (Bilgiç & Acaroğlu, 2017). Participants reported that listening to the relaxation music diminished the severity of pain symptoms caused by chemotherapy. Also, there was a significant improvement in the overall comfort of the patients during the chemotherapy sessions (Bilgiç & Acaroğlu, 2017).

Arruda, Garcia, and Garcia (2016) conducted a study over 3 months of adults hospitalized in a cancer facility to examine the effects of music therapy and poetry on cancer patients. A group of participants (n = 22) listened to music, another group (n = 22) listened to poetry, and the third group (n = 21) was the control group. The interventions lasted for three consecutive days, and researchers used the Visual Analog Scale to assess the pain in the cancer patients upon completion (Arruda et al., 2016). The participants included in the music therapy group reported improvement in their pain ($p < 0.001$) (Arruda et al., 2016). Patients who participated in poetry also experienced a significant increase in pain reduction (Arruda et al., 2016).

Krishnaswamy and Nair (2016) conducted a study to examine the effectiveness of music therapy on cancer patients suffering from pain in a palliative care hospital unit. The study participants (N = 14) were administered music through headphones for 20 minutes. Upon the completion of the intervention, pain and anxiety scores pre and post intervention were measured using the Hamilton Anxiety Rating Scale and the Numeric Rating Scale (NRS) (Krishnaswamy & Nair, 2016). Researchers reported a statistically

significant decrease in the pain scores in the NRS compared to the test group. However, there was no significant reduction in anxiety levels in the intervention group (Krishnaswamy & Nair, 2016).

Li et al. (2011) conducted a randomized control trial. An experimental group (n = 60) received music therapy combined with nursing care from the first day following a radical mastectomy until the third admission for chemotherapy to the hospital. The control group (n = 60) received routine nursing care during the same time period. Pain was measured using the McGill Pain Questionnaire in a short Chinese version (Li et al., 2011). The experimental group reported a significant decrease in pain scores compared to the control group (Li et al., 2011). Li et al. suggested that music therapy has both long-term and short-term positive effects on cancer pain management.

Recommendations

Based on the literature search and review of the selected articles for this systematic review, there was not enough evidence to support the effectiveness of nonpharmacological interventions to manage cancer pain. One recommendation to address this knowledge gap is for health care researchers to conduct more studies on nonpharmacological interventions for cancer pain management. Another recommendation would be to conduct a qualitative study on the attitudes and perceptions of nursing and cancer patients regarding nonpharmacological interventions for cancer pain management.

Strengths and Limitations of the Project

A strength of this project was the use of systematic review methodology. The Johns Hopkins EBP model facilitated an in-depth analysis and synthesis of the studies,

and only those that met the inclusion criteria were included in the final study. Another strength of this project was that most of the literature consisted of randomized controlled trials and systematic reviews that provide the highest form of evidence (see Thomas & Harden, 2008). One limitation of this project was that only a few articles addressed nonpharmacological interventions for cancer patients. As a result, there was not enough evidence to support the effectiveness of nonpharmacological interventions in alleviating cancer pain.

Summary and Conclusions

Nonpharmacological pain management interventions should be considered upon initiating pain treatment to cancer patients (Kwon, 2014). Health professionals who provide care and services to cancer patients should be educated on the benefits of nonpharmacological pain management interventions and how they can be implemented within their scope of practice to better achieve patient health outcomes by reducing opioid use and improving the quality of life of cancer patients. The lack of evidence supporting the use of nonpharmacological interventions to alleviate cancer pain indicated that there is a need for further research to explore their effectiveness on cancer pain. Additional research is needed to close the knowledge gap and identify best practices related to nonpharmacological pain interventions for cancer patients.

Section 5: Dissemination Plan

Introduction

The DNP project creates an opportunity for nurses to develop evidence-based practice projects for the improvement of health care quality and population health outcomes. According to Majid et al. (2011), EBP shifts the methods of patient care from personal experiences and opinions of health care professionals to practices based on data from studies. The dissemination of project findings, conclusions, and recommendations will play a vital role in the implementation and translation to practice. According to Forsyth, Wright, Scherb, and Gaspar (2010), to apply or replicate EBP findings in health care and other settings, nurses must disseminate the findings to stakeholders and other health care professionals. Section 5 includes the plan to disseminate and publish the findings from the current DNP project, a systematic review. I also provide an analysis of self in various professional nursing roles.

Dissemination of Findings

One of the most appropriate methods to disseminate the findings from this project is to develop a poster presentation for the practicum site, the institution experiencing the practice problem. This presentation will be offered in the Nursing Research Symposium of the University of Puerto Rico, a conference in which nursing professionals from different health care and educational institutions exhibit their scholarly work. There are advantages to using a poster as a dissemination tool; for instance, posters are usually presented in an open forum to a wide audience, and posters provide an opportunity for presenters to share in-depth information regarding the project. In addition, posters serve

as an effective method to educate stakeholders and the public on the project findings (Forsyth et al., 2010).

The practicum site may benefit from a poster presentation because the format of a poster board will facilitate the sharing of information in a storyboard format in the Spanish language. Health care professionals, organizational stakeholders, and patients will easily understand the practice problem, methods of the project, findings of the systematic review, and the main nonpharmacological interventions supported by the evidence to treat cancer pain. After the presentation, the poster board can be used by stakeholders to display the first EBP project completed by a DNP student at the institution during accreditation surveys. Due to the nature of the project, the ideal audience includes palliative and oncology nurses, physicians, and allied health care professionals. The appropriate venues to disseminate the project in the form of a scholarly article are nursing and medical journals such as the *Clinical Journal of Oncology Nursing* and the *International Journal of Palliative Nursing*. Also, PowerPoint and poster presentations can be used to disseminate the work at national nursing conferences.

Analysis of Self

Throughout the process of developing and completing the DNP project, I have developed many leadership skills applicable to my area of practice in quality management and rehabilitation medicine. One major skill I have developed is being an effective project manager and facilitator. Nurses who work in complex health care organizations must be able to identify issues and develop projects to improve the quality

of care and health care outcomes of the population they serve. The preparation I received as a DNP student has provided me with the knowledge, experience, and expertise needed to lead projects with multidisciplinary teams in the areas of performance improvement, accreditation, patient safety, and clinical aspects of care. The development of this project on improving the quality of care for cancer patients has increased my knowledge of the negative consequences of pain and how it affects the physical, social, and psychological well-being of patients dealing with this condition. One important lesson learned while doing this DNP project was the importance of translating evidence into practice. Though my dissemination of the project findings, nurses and other health care professionals will benefit from implementing the suggested interventions based on their patients' needs to help them cope and manage their pain to increase their physical function, participate in activities of daily living, and improve their quality of life.

I plan to continue to develop projects within my current organization and advocate for the involvement of nurses in EBP projects. In addition, I will serve as a mentor for DNP students. While attending Walden University, I adopted a transformational leadership style. This leadership styles enables me to motivate and empower others to align their professional interests with the organization to improve the provision of care to improve organizational performance, achieve optimal population health outcomes, and promote a culture of safety. "Transformational leadership is a distinct model that provides an empirically supported approach to foster organizational and personal change" (Ross, Fitzpatrick, Click, Krouse, & Clavelle, 2014, p. 201).

Transformational nurse leaders create a meaningful vision to motivate followers and encourage them go beyond their interests (Ferguson, 2015).

My long-term plan is to develop a cross training program for clinical nurses that will increase their knowledge in the areas of health care data analytics, quality management, and performance improvement. It is important that nurses go beyond their clinical scopes of care and become more involved in other aspects that affect patient health outcomes and organizational performance (Ferguson, 2015). According to Ferguson (2015), "transformational nurse leaders will need to develop innovations and evidence-based strategies and policies to strengthen health systems worldwide and increase human resources to meet current and future global health challenges" (p. 351).

There were several challenges in completing this DNP project. Puerto Rico, the geographical setting for this project, was hit by two major hurricanes, Irma and Maria, in September and October of 2017. Access to the Internet and other communication methods made it difficult to communicate with faculty and access my courses. There were also many difficulties with access to the practicum site, such as lack of transportation, electricity, and communication lines. I faced many personal hardships during this time due to the lack of resources such as water, food, gasoline, transportation, and electricity. Additionally, as a public servant, my duty was to serve the public during this time of hardship in which the threats to public health and spread of diseases were limitless. Once the electricity was returned to the area where I live, I was able to make progress on my project. During this process, I learned that resilience is the key to success and that a person must never give up hope. The completion of my project was my goal

and the key to obtaining my DNP, so it was important for me to stay on track and meet the objectives for each course. I will take this experience and use it to teach other nurses that even though the road might be difficult to obtaining a DNP, it is possible with hard work and dedication.

Summary

Chronic pain in cancer is a complex symptom to manage. Each patient experiences pain at different intensities and in different forms. It is important that health care professional become more aware of nonpharmacological therapies that can be used in conjunction with standard treatments to help patients reach adequate pain relief and be able to continue with their activities of daily living. This DNP project addressed the available evidence from the past 10 years regarding alternative therapies to opioid treatments that can improve the quality of care and population health outcomes of oncology patients. The complexity of cancer care is increasing, which also increases the need for further research and EBP projects to implement interventions aimed at alleviating malignant pain. The aim of this EBP project was to improve the knowledge of health care professionals regarding the alternatives for chronic pain management and to integrate the modalities of the self-care theory into a holistic approach for assessing patient needs and creating a specialized patient-centered plan of care. My plan to publish this project with the help of my DNP committee in a scholarly journal will disseminate the knowledge learned to nurses, other health care professionals, patients, and caregivers interested in alternative care of oncology patients. With the disseminated findings, health care professionals may develop and update current practice guidelines for cancer pain

management and promote the use complementary alternative interventions in the treatment of cancer care.

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Appendix A: Research Evidence Appraisal Tool

Johns Hopkins Nursing Evidence-Based Practice

Research Evidence Appraisal Tool

Evidence level and quality rating:	
Article title:	Number:
Author(s):	Publication date:
Journal:	
Setting:	Sample (composition and size):

Does this evidence address my EBP question?

☐ Yes

☐ No-*Do not proceed with appraisal of this evidence*

Is this study:

☐ **QuaNtitative** (collection, analysis, and reporting of numerical data)
Measurable data (how many; how much; or how often) used to formulate facts, uncover patterns in research, and generalize results from a larger sample population; provides observed effects of a program, problem, or condition, measured precisely, rather than through researcher interpretation of data. Common methods are surveys, face-to-face structured interviews, observations, and reviews of records or documents. Statistical tests are used in data analysis.

➡ Go to ***Section I: QuaNtitative***

☐ **QuaLitative** (collection, analysis, and reporting of narrative data)
Rich narrative documents are used for uncovering themes; describes a problem or condition from the point of view of those experiencing it. Common methods are focus groups, individual interviews (unstructured or semi structured), and participation/observations. Sample sizes are small and are determined when data saturation is achieved. Data saturation is reached when the researcher identifies that no new themes emerge and redundancy is occurring. Synthesis is used in data analysis. Often a starting point for studies when little research exists; may use results to design empirical studies. The researcher describes, analyzes, and interprets reports, descriptions, and observations from participants.

➡ Go to ***Section II: QuaLitative***

☐ **Mixed methods (**results reported both numerically and narratively)
Both quaNtitative and quaLitative methods are used in the study design. Using both approaches, in combination, provides a better understanding of research problems than using either approach alone. Sample sizes vary based on methods used. Data collection involves collecting and analyzing both quaNtitative and quaLitative data in a single study or series of studies. Interpretation is continual and can influence stages in the research process.

➡ Go to ***Section III: Mixed Methods***

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Research Evidence Appraisal Tool

Section I: QuaNtitative		
Level of Evidence (Study Design)		
A Is this a report of a single research study?	☐ Yes	☐No **Go to B**
1. Was there manipulation of an independent variable?	☐ Yes	☐ No
2. Was there a control group?	☐ Yes	☐ No
3. Were study participants randomly assigned to the intervention and control groups?	☐ Yes	☐ No
If **Yes to questions 1, 2, and 3,** this is a randomized controlled trial (RCT) or experimental study.		**LEVEL I**
If **Yes to questions 1 and 2 and No to question 3** or **Yes to question 1 and No to questions 2 and 3,** this is quasi-experimental. *(Some degree of investigator control, some manipulation of an independent variable, lacks random assignment to groups, and may have a control group).*		**LEVEL II**
If **No to questions 1, 2, and 3,** this is nonexperimental. *(No manipulation of independent variable; can be descriptive, comparative, or correlational; often uses secondary data).*		**LEVEL III**
Study Findings That Help Answer the EBP Question		
Skip to the **Appraisal of QuaNtitative Research Studies** section		

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Research Evidence Appraisal Tool

Section I: QuaNtitative (continued)		
B Is this a summary of multiple sources of research evidence?	☐ Yes *Continue*	☐ No **Use Appendix F**
1. Does it employ a comprehensive search strategy and rigorous appraisal method? *If this study includes research, nonresearch, and experiential evidence, it is an integrative review (see Appendix F).*	☐ Yes *Continue*	☐ No **Use Appendix F**
2. For systematic reviews and systematic reviews with meta-analysis (see descriptions below):		
a. Are all studies included RCTs?		**LEVEL I**
b. Are the studies a combination of RCTs and quasi-experimental, or quasi-experimental only?		**LEVEL II**
c. Are the studies a combination of RCTs, quasi-experimental, and nonexperimental, or non- experimental only?		**LEVEL III**
A **systematic review** employs a search strategy and a rigorous appraisal method, but does not generate an effect size. A **meta-analysis**, or systematic review with meta-analysis, combines and analyzes results from studies to generate a new statistic: the effect size.		
Study Findings That Help Answer the EBP Question		
Skip to the **Appraisal of Systematic Review** (With or Without a Meta-Analysis) section		

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Research Evidence Appraisal Tool

Appraisal of QuaNtitative Research Studies			
Does the researcher identify what is known and not known about the problem and how the study will address any gaps in knowledge?	☐ Yes	☐ No	
Was the purpose of the study clearly presented?	☐ Yes	☐ No	
Was the literature review current (most sources within the past five years or a seminal study)?	☐ Yes	☐ No	
Was sample size sufficient based on study design and rationale?	☐ Yes	☐ No	
If there is a control group: • Were the characteristics and/or demographics similar in both the control and intervention groups?	☐ Yes	☐ No	N/A
• If multiple settings were used, were the settings similar?	☐ Yes	☐ No	N/A
• Were all groups equally treated except for the intervention group(s)?	☐ Yes	☐ No	N/A
Are data collection methods described clearly?	☐ Yes	☐ No	
Were the instruments reliable (Cronbach's α[alpha] ≥ 0.70)?	☐ Yes	☐ No	N/A
Was instrument validity discussed?	☐ Yes	☐ No	N/A
If surveys or questionnaires were used, was the response rate ≥ 25%?	☐ Yes	☐ No	N/A
Were the results presented clearly?	☐ Yes	☐ No	
If tables were presented, was the narrative consistent with the table content?	☐ Yes	☐ No	N/A
Were study limitations identified and addressed?	☐ Yes	☐ No	
Were conclusions based on results?	☐ Yes	☐ No	
Complete the **Quality Rating for QuaNtitative Studies** section			

Appraisal of Systematic Review (With or Without Meta-Analysis)

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Research Evidence Appraisal Tool

Were the variables of interest clearly identified?	☐ Yes	☐ No
Was the search comprehensive and reproducible? • Key search terms stated	☐ Yes	☐ No
• Multiple databases searched and identified	☐ Yes	☐ No
• Inclusion and exclusion criteria stated	☐ Yes	☐ No
Was there a flow diagram that included the number of studies eliminated at each level of review?	☐ Yes	☐ No
Were details of included studies presented (design, sample, methods, results, outcomes, strengths, and limitations)?	☐ Yes	☐ No
Were methods for appraising the strength of evidence (level and quality) described?	☐ Yes	☐ No
Were conclusions based on results?	☐ Yes	☐ No
• Results were interpreted	☐ Yes	☐ No
• Conclusions flowed logically from the interpretation and systematic review question	☐ Yes	☐ No
Did the systematic review include a section addressing limitations **and** how they were addressed?	☐ Yes	☐ No
Complete the **Quality Rating for QuaNtitative Studies** section (below)		

Quality Rating for QuaNtitative Studies

Circle the appropriate quality rating below:

A High quality: Consistent, generalizable results; sufficient sample size for the study design; adequate control; definitive conclusions; consistent recommendations based on comprehensive literature review that includes thorough reference to scientific evidence.

B Good quality: Reasonably consistent results; sufficient sample size for the study design; some control, and fairly definitive conclusions; reasonably consistent recommendations based on fairly comprehensive literature review that includes some reference to scientific evidence.

C Low quality or major flaws: Little evidence with inconsistent results; insufficient sample size for the study design; conclusions cannot be drawn.

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Research Evidence Appraisal Tool

Section II: QuaLitative		
Level of Evidence (Study Design)		
A Is this a report of a single research study?	☐ Yes **this is Level III**	☐ No **go to II B**
Study Findings That Help Answer the EBP Question		
Complete the **Appraisal of Single QuaLitative Research Study** section (below)		

Appraisal of a Single QuaLitative Research Study		
Was there a clearly identifiable and articulated: • Purpose?	❑Yes	❑No
• Research question?	❑Yes	❑No
• Justification for method(s) used?	❑Yes	❑No
• Phenomenon that is the focus of the research?	❑Yes	❑No
Were study sample participants representative?	❑Yes	❑No
Did they have knowledge of or experience with the research area?	❑Yes	❑No
Were participant characteristics described?	❑Yes	❑No
Was sampling adequate, as evidenced by achieving saturation of data?	❑Yes	❑No
Data analysis: • Was a verification process used in every step by checking and confirming with participants the trustworthiness of analysis and interpretation?	❑Yes	❑No
• Was there a description of how data were analyzed (i.e., method), by computer or manually?	❑Yes	❑No
Do findings support the narrative data (quotes)?	❑Yes	❑No
Do findings flow from research question to data collected to analysis undertaken?	❑Yes	❑No
Are conclusions clearly explained?	❑Yes	❑No
Skip to the **Quality Rating for QuaLitative Studies** section		

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Research Evidence Appraisal Tool

B For summaries of multiple quaLitative research studies (meta-synthesis), was a comprehensive search strategy and rigorous appraisal method used?	□Yes **Level III**	□No go to **Appendix F**
Study Findings That Help Answer the EBP Question		
Complete the **Appraisal of Meta-Synthesis Studies** section (below)		

Appraisal of Meta-Synthesis Studies		
Were the search strategy and criteria for selecting primary studies clearly defined?	❑Yes	❑No
Were findings appropriate and convincing?	❑Yes	❑No
Was a description of methods used to: • Compare findings from each study?	❑Yes	❑No
• Interpret data?	❑Yes	❑No
Did synthesis reflect:	❑Yes	❑No
• New insights?	❑Yes	❑No
• Discovery of essential features of phenomena?	❑Yes	❑No
• A fuller understanding of the phenomena?	❑Yes	❑No
Was sufficient data presented to support the interpretations?	❑Yes	❑No
Complete the **Quality Rating for QuaLititative Studies** section (below)		

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Research Evidence Appraisal Tool

Quality Rating for QuaLitative Studies

Circle the appropriate quality rating below:

No commonly agreed-on principles exist for judging the quality of quaLitative studies. It is a subjective process based on the extent to which study data contributes to synthesis and how much information is known about the researchers' efforts to meet the appraisal criteria.

For meta-synthesis, there is preliminary agreement that quality assessments should be made before synthesis to screen out poor-quality studies[1].

A/B <u>High/Good quality</u> is used for single studies and meta-syntheses[2].

The report discusses efforts to enhance or evaluate the quality of the data and the overall inquiry in sufficient detail; and it describes the specific techniques used to enhance the quality of the inquiry.

Evidence of some or all of the following is found in the report:

- **Transparency**: Describes how information was documented to justify decisions, how data were reviewed by others, and how themes and categories were formulated.
- **Diligence**: Reads and rereads data to check interpretations; seeks opportunity to find multiple sources to corroborate evidence.
- **Verification**: The process of checking, confirming, and ensuring methodologic coherence.
- **Self-reflection and self-scrutiny**: Being continuously aware of how a researcher's experiences, background, or prejudices might shape and bias analysis and interpretations.
- **Participant-driven inquiry**: Participants shape the scope and breadth of questions; analysis and interpretation give voice to those who participated.
- **Insightful interpretation**: Data and knowledge are linked in meaningful ways to relevant literature.

C <u>Lower-quality</u> studies contribute little to the overall review of findings and have few, if any, of the features listed for High/Good quality.

1 https://www.york.ac.uk/crd/SysRev/!SSL!/WebHelp/8_4_ASSESSMENT_OF_QUALITATIVE_RESEARCH.htm
2 Adapted from Polit & Beck (2017).

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Research Evidence Appraisal Tool

Section III: Mixed Methods

Level of Evidence (Study Design)

You will need to appraise both the quaNtitative and quaLitative parts of the study independently, before appraising the study in its entirety.

1. Evaluate the quaNitative part of the study using **Section I**.	**Level**	**Quality**
Insert here the level of evidence and overall quality for this part:		
2. Evaluate the quaLitative part of the study using **Section II**.	**Level**	**Quality**
Insert here the level of evidence and overall quality for this part:		

3. To determine the level of evidence, circle the appropriate study design:

- **Explanatory** sequential designs collect quaNtitative data first, followed by the quaLitative data; and their purpose is to explain quaNtitative results using quaLitative findings. The level is determined based on the level of the quaNtitative part.
- **Exploratory** sequential designs collect quaLitative data first, followed by the quaNtitative data; and their purpose is to explain quaLitative findings using the quaNtitative results. The level is determined based on the level of the quaLitative part, and it is always Level III.
- **Convergent** parallel designs collect the quaLitative and quaNtitative data concurrently for the purpose of providing a more complete understanding of a phenomenon by merging both datasets. These designs are Level III.
- **Multiphasic** designs collect quaLitative and quaNtitative data over more than one phase, with each phase informing the next phase. These designs are Level III.

Study Findings That Help Answer the EBP Question

Complete the **Appraisal of Mixed Methods Studies** section (below)

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Research Evidence Appraisal Tool

Appraisal of Mixed Methods Studies[3]			
Was the mixed-methods research design relevant to address the quaNtitative and quaLitative research questions (or objectives)?	❑Yes	❑No	❑N/A
Was the research design relevant to address the quaNtitative and quaLitative aspects of the mixed-methods question (or objective)?	❑Yes	❑No	❑N/A
For convergent parallel designs, was the integration of quaNtitative and quaLitative data (or results) relevant to address the research question or objective?	❑Yes	❑No	❑N/A
For convergent parallel designs, were the limitations associated with the integration (for example, the divergence of quaLitative and quaNtitative data or results) sufficiently addressed?	❑Yes	❑No	❑N/A
Complete the **Quality Rating for Mixed-Method Studies** section (below)			

3 National Collaborating Centre for Methods and Tools. (2015). Appraising Qualitative, Quantitative, and Mixed Methods Studies Included in Mixed Studies Reviews: The MMAT. Hamilton, ON: McMaster University. (Updated 20 July, 2015) Retrieved from http://www.nccmt.ca/resources/search/232

Quality Rating for Mixed-Methods Studies

Circle the appropriate quality rating below

A **High quality:** Contains high-quality quaNtitative and quaLitative study components; highly relevant study design; relevant integration of data or results; and careful consideration of the limitations of the chosen approach.

B **Good quality:** Contains good-quality quaNtitative and quaLitative study components; relevant study design; moderately relevant integration of data or results; and some discussion of limitations of integration.

C **Low quality or major flaws:** Contains low quality quaNtitative and quaLitative study components; study design not relevant to research questions or objectives; poorly integrated data or results; and no consideration of limits of integration.

Appendix B: Synthesis Process and Recommendations Tool

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Synthesis Process and Recommendations Tool

Key Points:

- Evidence synthesis is best done through group discussion. All team members share their perspectives, and the team uses critical thinking to arrive at a judgment based on consensus during the synthesis process. The synthesis process involves both subjective and objective reasoning by the full EBP team. Through reasoning, the team:
  - Reviews the quality appraisal of the individual pieces of evidence
  - Assesses and assimilates consistencies in findings
  - Evaluates the meaning and relevance of the findings
  - Merges findings that may either enhance the team's knowledge or generate new insights, perspectives, and understandings
  - Highlights inconsistencies in findings
  - Makes recommendations based on the synthesis process
- When evidence includes multiple studies of Level I and Level II evidence, there is a similar population or setting of interest, and there is consistency across findings, EBP teams can have greater confidence in recommending a practice change. However, with a majority of Level II and Level III evidence, the team should proceed cautiously in making practice changes. In this instance, recommendation(s) typically include completing a pilot before deciding to implement a full-scale change.
- Generally, practice changes are not made on Level IV or Level V evidence alone. Nonetheless, teams have a variety of options for actions that include, but are not limited to: creating awareness campaigns, conducting informational and educational updates, monitoring evidence sources for new information, and designing research studies.
- The quality rating (see Appendix D) is used to appraise both individual quality of evidence and overall quality of evidence.

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Synthesis Process and Recommendations Tool

EBP Question:

Category (Level Type)	Total Number of Sources/Level	Overall Quality Rating	Synthesis of Findings Evidence That Answers the EBP Question
Level I • Experimental study • Randomized controlled trial (RCT) • Systematic review of RCTs with or without meta-analysis • Explanatory mixed method design that includes only a Level I quaNtitative study			
Level II • Quasi-experimental studies • Systematic review of a combination of RCTs and quasi-experimental studies, or quasi-experimental studies only, with or without meta-analysis • Explanatory mixed method design that includes only a Level II quaNtitative study			
Level III • Nonexperimental study • Systematic review of a combination of RCTs, quasi-experimental and nonexperimental studies, or nonexperimental studies only, with or without meta- analysis • QuaLitative study or meta- synthesis • Exploratory, convergent, or multiphasic mixed-methods studies • Explanatory mixed method design that includes only a level III QuaNtitative study			

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Synthesis Process and Recommendations Tool

Category (Level Type)	Total Number of Sources/Level	Overall Quality Rating	Synthesis of Findings Evidence That Answers the EBP Question
Level IV • Opinions of respected authorities and/or reports of nationally recognized expert committees or consensus panels based on scientific evidence			
Level V • Evidence obtained from literature or integrative reviews, quality improvement, program evaluation, financial evaluation, or case reports • Opinion of nationally recognized expert(s) based on experiential evidence			

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Synthesis Process and Recommendations Tool

Based on your synthesis, which of the following four pathways to translation represents the overall strength of the evidence?
❑**Strong, compelling evidence, consistent results**: Solid indication for a practice change is indicated. ❑**Good and consistent evidence**: Consider pilot of change or further investigation. ❑**Good but conflicting evidence**: No indication for practice change; consider further investigation for new evidence or develop a research study. ❑**Little or no evidence**: No indication for practice change; consider further investigation for new evidence, develop a research study, or discontinue project.
If you selected either the first option or the second option, ***continue****. If not,* ***STOP****, translation is not indicated.*
Recommendations based on evidence synthesis and selected translation pathway
Consider the following as you examine fit:
Are the recommendations: • Compatible with the unit/departmental/organizational cultural values or norms? • Consistent with unit/departmental/organizational assumptions, structures, attitudes, beliefs, and/or practices? • Consistent with the unit/departmental/organizational priorities?
Consider the following as you examine feasibility:

• Can we do what they did in our work environment?
• Are the following supports available?
  ◦ Resources
  ◦ Funding
  ◦ Approval from administration and clinical leaders
  ◦ Stakeholder support
• Is it likely that the recommendations can be implemented within the unit/department/organization?

Appendix C: Permission to Use Johns Hopkins Nursing EBP Model and Tools

JOHNS HOPKINS NURSING EVIDENCE-BASED PRACTICE MODEL AND TOOLS

HERE ARE YOUR JHNEBP TOOLS (AND A SURPRISE GIFT)!

Thank you for your submission. We are happy to give you permission to use the JHEBP model and tool in adherence of our legal terms mentioned noted below:

- You may not modify the model or the tools without written approval from Johns Hopkins.
- All reference to source forms should include "©The Johns Hopkins Hospital/The Johns Hopkins University."
- The tools may not be used for commercial purposes without special permission.
- If interested in commercial use or discussing changes to the tool, please email ijhn@jhmi.edu.

Click **HERE** to access the zipped file of the tools.

Please note: If you choose to use the Johns Hopkins Nursing Evidence-Based Practice Model and Tools in any other way, another form will need to be submitted.