

PAIN ASSESSMENT AND MANAGEMENT
IN PEDIATRIC ONCOLOGY PATIENTS

By

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Abstract

The purpose of this honors thesis is to propose an evidence based best practice protocol for pain assessment and pain management in pediatric oncology patients. Pain is one of the most distressing aspects of treatment of cancer. Many pediatric oncology patients' pain is undertreated or not treated as effectively as possible. The protocol presented was created to improve the quality of care and reduce the amount of pain experienced in this patient population. A literature review was performed on 11 studies retrieved from PubMed and CINAHL databases related to pain assessment, pharmacological pain management, and non-pharmacological alternative therapies for pain management. The evidence based recommendations for pain assessment were to use the Wong-Baker FACES® Pain Scale, FLACC scale, PQRST scale and Brief Pain survey depending on the age and developmental level of the patient. The pharmacological pain management was recommended for nurses to properly administer scheduled analgesia and administer pain medication per request. The recommended alternative therapies for pain management included are meditation, music therapy, massage therapy, and hypnosis. Evaluation of pain management will be performed by the patients and nurses' assessment of the effectiveness of the pain management interventions.

Chapter One: Introduction

Pain is one of the most distressing aspects of suffering related to cancer treatment. With new technology and treatment modalities, pediatric cancer patients have a better chance of surviving, however pain is still a major side effect of treatment. Over 10,000 children are diagnosed with cancer each year in the United States. Survival is at an all-time high with a rate of over 80% survival rate over 5 years. The increase of the rate of survival can be attributed to the progressively more aggressive treatment procedures and protocols. However, this increased survival rate has resulted in some chronic issues for many of these patients. There has also been an increase in the incidence of side effects and reduced quality of life during and after treatment of cancer (Fortier, Wahi, Bruce, Maurer, & Stevenson 2013).

With the rising incidence of cancer survivors and pediatric oncology patients, pain is a major priority of care. Effective pain assessment is essential in order to treat pain successfully. It is essential for providers and nurses to use evidence-based methods to best alleviate or reduce pain in pediatric oncology patients. However, this is not always as easy as it may seem. Pain management is very complex and has many aspects that must be considered (Fortier et al., 2013). One main aspect that is critically important for health care providers is having the knowledge of effective pain management of cancer-related pain. Palliative care nurses in addition to all nurses must ensure to address and treat pain to the best of their abilities (Fielding, Sanford, & Davis, 2013).

Skilled health care professionals who care for children with cancer use the World Health Organization (WHO) approach to pain management. The WHO approach to pain management is step-wise national and international guidelines that aim to alleviate pain related to cancer and

cancer treatments. The current guidelines typically go beyond the one-dimensional WHO model to provide the best care possible. By addressing a comprehensive assessment of the patient, the pharmacologic use of opioid medications, the pharmacological use of adjuvants, and the use of non-pharmacological pain management methods physicians and nurses can provide the best care possible for pediatric cancer patients. It is essential for health care providers to advocate for patient centered care and make a unique care plan for each patient to reach optimal cancer pain management (Fielding et al., 2013).

The purpose of the honor's thesis is to provide a best practice protocol for pain assessment and management in pediatric oncology patients. Chapter Two is a literature review of studies focused on different methods for pain assessment and the different pain management techniques tested in practice. Chapter Two also includes a holistic care approach for the patient and includes both pharmacological and nonpharmacological methods of pain management. Chapter 3 includes a best practice protocol proposed with targeted outcomes after evaluation of the literature on this topic. Finally, included is a plan for implementation and evaluation of the proposed protocol in Chapter Four.

Chapter Two: Literature Review

Pain is one of the most distressing aspects of suffering related to cancer treatment. Pain management is critical in pediatric oncology patients who experience chronic pain. However, prior to pain management it is necessary for an individual's pain to be properly assessed. In the following literature review the author describes 11 studies that discuss different areas of pain assessment and management. Ten of the studies were published between 2012 and 2015. One study was published in 1998. However, this study examined the Wong- Baker FACES® Pain Rating Scale. There has not been much research recently on the Wong- Baker FACES® Pain Rating Scale since it has been widely accepted as an effective pain assessment tool. The 11 studies were retrieved using PubMed and CINHALL databases with the search terms "pain assessment", "pain management," "pediatric oncology," and "alternative pain management methods." The purpose of this honor's thesis is to make a best practice model for pain assessment and pain management in pediatric oncology patients.

The Fifth Vital Sign: Chronic Pain Assessment of the Adolescent Oncology Patient

Neale (2012) performed a literature review that focused on the essential methods to evaluate pain in pediatric oncology patients. This literature review includes research involving adolescents with nonmalignant chronic pain and adolescents with pain associated with a pediatric tumor. Children with chronic pain especially pediatric oncology patients require holistic management of pain that includes multimodal therapies, family-centered treatment, and interdisciplinary care. Since adolescents are at different stages of development, assessment techniques that are developmentally appropriate and that include the child's opinion are essential in treating chronic pain.

Findings from the literature review include the importance of a comprehensive physical exam in order to determine the source and intensity of pain in the pediatric patients (Neale, 2012). The PQRST method is a tool for pain assessment that investigates the provoking factors, quality of pain, radiation, site and symptoms of the pain, and the timing and triggers of the pain. The PQRST method was found to be effective for determining the source and intensity of the pain in children and is recommended for use with pediatric oncology patients (Neale, 2012). Additional findings from the literature review include the importance of cultural background for how the patient experienced pain and should be considered by the provider when assessing the pain level. The patient's and his or her family's beliefs, religion, family roles, and values were essential in how the patient experienced pain and expressed the pain he or she was experiencing (Neale, 2012). Some cultures view pain as punishment that is justified from a higher power, while others view pain as an imbalance in the body that one must accept and endure. Some cultures avoid expressing pain due to traditional cultural beliefs. Providers must be aware of the different cultural beliefs when assessing pain in order to ensure the pain is being treated correctly and effectively (Neale, 2012).

Non-verbal cues were also found to be critical for assessing pain of a patient in addition to the reported pain level with the PQRST method. Especially in cultures that do not admit to experiencing pain, the health care provider must consider the non-verbal cues of the patient to determine if the patient was experiencing pain. Finally, the gender of the patient also greatly influenced the pain reported and experienced by the patient. Gender roles are prominent in the American culture, which is translated into how the patient reported his or her pain level (Neale, 2012). Males are taught by society to be stoic and to endure pain without complaints. Therefore,

males may underreport their pain levels. In contrast, society perceives females as sensitive beings especially in the aspect of pain tolerance. Females were found to report a significant higher intensity of pain compared to males of the same diagnosis, age and treatment. Males and females were found to have differing methods of coping with pain as well (Neale, 2012).

Neale (2012) discussed the need for further research in pediatric oncology pain assessment due to the individualized population. While her results had clinical significance in the methods used for pain assessment, Neale stated the importance of separating data depending on the child's specific developmental stage. Adolescents included in studies are grouped with other pediatric oncology patients of differing developmental stages, which will affect the results. The experiences of adolescents in varying developmental stages can be extremely different and the developmental stage must be considered when determining the best method to treat chronic pain. Neale stated the importance in having an accurate assessment of pain in order to properly manage the pain of the patient (Neale, 2012).

Systematic Review of Face, Legs, Activity, Cry and Consolability Scale for Assessing Pain in Infants and Children: Is it reliable, valid, and feasible for use?

A systematic review performed by Crellin, Harrison, Santamaria, and Babl (2015) looked at the suitability of using the face, legs, activity, cry, consolability (FLACC) scale to assess pain in infants and children. This review analyzed 78 full-text articles with 26 of the articles being psychometric evaluation studies (Crelin et al., 2015). The purpose of the study was to evaluate the effectiveness of the FLACC scale to assess postoperative pain in infants and children. The authors of the study focused their study on the psychometric properties of the FLACC scale (Crelin et al., 2015).

The systematic review stated that the FLACC scale is a suitable pain assessment method in infants and children aged 2 months to 7 years experiencing postoperative pain. It is also effective in children between the ages of four to nineteen years old that have cognitive impairment. However, this systematic review found that the FLACC scale has limited validity when used to assess pain in infants under the age of 2 months (Crelin et al., 2015). However, the authors recognize and discuss the possibility of a positive publication bias. Almost all of the data discusses the reliability and validity of the FLACC scale while there is limited data discussing areas of the FLACC scale that do not effectively evaluate pain (Crelin et al., 2015).

Impact of Research on Pediatric Pain Assessment and Outcome

A study by Boughton et al. (1998) was performed to compare the effect of standardized pain assessment related to the lack of effective pain management of children postoperatively. The study focused on the use of Wong-Baker FACES® Pain Rating Scale as the form of standardized pain assessment by (Boughton et al., 1998). A convenience sample of 36 children between the ages five and 17 years old, that could speak English, and had a minimum of 48-hour postoperative study were chosen for the sample group. The individuals of the sample group had their pain assessed at least every 4 hours when awake by using the Wong-Baker FACES® Pain Rating Scale. The control group was created by doing a retrospective chart review of 50 pediatric patients (Boughton et al., 1998).

The authors of this article stated that children in the study were able to describe the degree of pain experienced and were able to differentiate between different pain levels at various times. While young children have a hard time assigning a numeric value to the level of pain they are experiencing, the children of the study demonstrated understanding of the concept of pain and

that the level of pain had varying levels (Boughton et al., 1998). By using the Wong-Baker FACES® Pain Rating Scale it was determined to be a better method of differentiating the levels of pain instead of using the PQRST method in children. The authors believe that the Wong-Baker FACES® Pain Rating Scale is a standardized method of pain assessment that can be used easily and in a variety of settings (Boughton et al., 1998).

The study did not find a statistical difference between the reliability of pain assessment between the study group and the control group. However, the authors believe that while it lacked statistical significance the study was able to determine clinical significance in the effectiveness of the Wong-Baker FACES® Pain Rating Scale. The authors recommend use of the Wong-Baker FACES® Pain Rating Scale due to its adaptability and consistency to use in various settings of pediatrics. A limitation of the study was the small sample size that was not randomly selected. The authors stated that this limitation could have contributed to the lack of statistical significance of the results (Boughton et al., 1998).

Screening for Pain in Pediatric Brain Tumor Survivors Using the Pain Thermometer

Different tools have been developed to measure pain in various population groups, however there is a limited understanding of the effectiveness of these tools with pediatric oncology patients. The study performed by Chordas, Manley, Modest, Chen, Liptak and Recklitis (2013) measured the effectiveness of Pain Thermometer (PT) in comparison with the Brief Pain Survey (BPS). The Pain Thermometer is a modification of the verbal numeral descriptor scale that combines a visual thermometer with a numeric rating scale to assess the intensity of pain in the patient. The visual thermometer was labeled from 0 to 10 with 0 labeled as “no pain” and 10 labeled as “pain as bad as you can imagine.” The researchers thought it

would be an effective method to measure the pain level especially in patients that had mild to moderate cognitive dysfunction (Chordas et al., 2013). In comparison the Brief Pain Survey was a set of questions pertaining to the severity of the pain, the intensity of the pain, and the impact of the pain on functioning in daily activities. The BPS was modeled after the Brief Pain Inventory that has previously been found to be reliable and valid in a large variety of cultures and languages (Chordas et al., 2013).

The study sample included childhood brain tumor survivors. There were 46 male survivors and 53 female brain tumor survivors. The median age of the sample was 19.95 years. The participants included brain tumor survivors with 54 that had low-grade gliomas, 23 patients that had embryonal tumors, 8 patients that had ependymomas, 6 that had germ cell, 3 patients that had craniopharyngiomas, and 1 patient that had a high-grade glioma. The participants of the study were recruited as a part of a larger longitudinal cohort study called Project REACH. During the recruitment process for Project REACH, 280 brain tumor survivors were recruited as a convenience cohort. Then during the second year of the study 163 participants were approached by mail or by person, in which only 116 of the 163 original participants completed the second year pain survey measures. Of the 116 participants, 17 had incomplete assessments, which left 99 participants whose data was included in this study. The data was analyzed with descriptive statistics to describe the cohort's prevalence of pain (Chordas et al., 2013).

BPS was found to be an effective method for assessing pain while the PT was not effective. The researchers compared the results of the BPS with the PT and determined that many participants that demonstrated clinically significant pain did not report their pain with the PT. The Pain Thermometer was determined to not be an accurate method to identify pain levels

in pediatric oncology patients. To evaluate the reliability of the two different pain assessment measures the researchers compared the pain intensity data reported from the patients in the PT versus the BPS. There were 57 participants that reported no pain (PT score of 0) and 29 participants that reported low pain (PT score between 1 and 3) with the pain thermometer. The PT found only 13 participants to report significant pain with this method of pain assessment. In contrast the BPS found 37 participants that met the criteria for having significant pain. The researchers found that brain tumor survivors were more likely to report high pain scores on the BPS compared to the PT (Chordas et al., 2013).

A limitation of this study was that the Pain Thermometer rated pain on a 1-dimensional scale. This method of assessing pain may only reflect the patient's current pain but not accurately reflect total pain and chronic pain of the patient. Additionally, the BPS measure has not been found to be reliable or valid in the clinical setting. Both tests have limited use in the clinic and the reliability and validity of the results provided by these tests cannot be proven by this research test alone. Finally, there was a limitation that the study did not include participants with neurocognitive impairments. Many brain tumor survivors experience neurocognitive impairment from the tumor itself or the related therapy and make up a critical part of this population. Therefore, this test did not include the most ideal representation for the population of brain tumor survivors. Further research should determine the effectiveness of these methods on participants with neurocognitive impairments in order to generalize this data for the population of brain tumor survivors (Chordas et al., 2013).

Development and Testing of a Multidimensional iPhone Pain Assessment Application for Adolescents with Cancer

A study performed by Stinson et al. (2013) was done to test the usability, feasibility and compliance, of a smartphone pain assessment tool for pediatric oncology patients. The investigators created an application called “Pain Squad” that was game centered and used to assess pain in the sample of 18 pediatric oncology patients. The Pain Squad application acted as an electronic pain diary that collected data on the pain location, duration, and intensity of each participant. It also collected data on the impact the pain has had on the participants’ life in the area of school, sleep schedule, relationships, and overall mood. Pain Squad evaluates the pain management of the patients including medications and psychological pain management strategies. The participants were prompted to answer 20 questions relating to their pain twice a day. The application then submitted the results reported by each participant to a database (Stinson et al., 2013). Qualitative semi-structured, audio-taped interviews and iterative cycles was used to analyze the data obtained from this study.

The findings revealed that the application “Pain Squad” was overall appealing to the participants. One aspect, which made this method of pain assessment appealing, was the game based nature of the application. The participants also found the application both easy to understand and easy to navigate because of their familiarity with smart phones and technology. The study demonstrated a high level of compliance with the adolescents using the application. The researchers of this study believe that “Pain Squad” could be a possible resource used in the future to determine pain of pediatric oncology patients.

A limitation of this study was that the compliance of participants might have been due to

alarms set to remind participant to complete the pain assessment tool routinely. Additionally, the test was only done twice daily for 2 weeks. The researchers question if the high level of compliance was due to the short period of the study and are not sure if compliance would be affected if the application were used for a longer period of time. Furthermore, this application was only tested at one cancer center and had a small sample size. This may have caused a bias in the data and results that cannot be trusted to be reliable and valid. Further testing is needed to use this method of assessment in the clinic to determine if the results of this study can be generalized for the population of pediatric oncology patients (Stinson et al., 2013).

Pain Management at Home in Children with Cancer: A Daily Diary Study

A daily diary protocol developed by Fortier, Wahi, Bruce, Maurer, and Stevenson (2013) was used to test the barriers of pain management of children's cancer pain while at home. Since pediatric cancer pain is undermanaged the researchers were interested in improving pain management. After the transition from the hospital to home, parents are responsible for pain management for their children. However, there can be a misunderstanding and consequently an under-treatment of pain for these pediatric oncology patients (Fortier et al., 2013). The researchers found there was little data on pain management in the home setting and wanted to improve pain management for pediatric patients in the home setting. The purpose of the study was to use a daily diary method to examine the barriers of pain management by parents at home for children with cancer (Fortier et al., 2013).

The study sample included parent-child dyads that were recruited from the Cancer Institute. The participants were between four and 17 years old and were receiving treatment for cancer. Half of the children included in the study were being treated for leukemia. The other

participants included children with nervous system tumors, sarcomas, lymphomas, germ-cell tumors and other rarer types of childhood cancer. There were 45 patient/parent pairs that completed baseline data on personality characteristics, children's quality of life, and parental beliefs about analgesia used in children. The participants completed daily diaries reporting pain and analgesia for 14 consecutive days (Fortier et al., 2013).

The study found most patients reported chronic pain while at home, yet few used analgesia while at home. The median dose frequency throughout the two-week study was zero. Additionally, every day of the study at least one participant (and up to five participants) that reported a clinically significant level of pain did not receive analgesia. Many parents stated that pain medication was not given because the child was either not in pain or the child's pain was not severe enough to require a pain medication. Through further examination of the children's self reported pain severity, children in the study that proved to have clinically significant pain levels did not receive pain medication. Parents that had misconceptions about analgesia were less likely to give their children pain medications. These parents were more likely to have their children try to manage their pain with physical pain management strategies of using massage, heat, or ice to reduce pain. In terms of the pediatric patient's age, the researchers found there to not be a difference in the analgesic administration depending on the age of the patient. However, the personality characteristics of the child did impact the frequency and amount of pain medication administered. The children that were more social and less shy were more likely to receive analgesia (Fortier et al., 2013).

An implication of this study shows the importance of the role of parental beliefs of analgesia and its effects on the pain management of their child's pain at home. This is essential

for providers to know to help improve the pain management of pediatric oncology patients at home. Health care providers at the hospital must educate the parents on the importance and need for analgesia for these children. It is also important for parents to be educated on the safety of analgesic medications to promote the administration of these medications at home when their child reports a clinically significant level of pain (Fortier et al., 2013).

Perioperative Epidural Analgesia in Children Undergoing Major Abdominal Tumor Surgery: A Single Center Experience

This purpose of this study was to assess continuous epidural analgesia in pediatric patients undergoing a major abdominal tumor surgery (Warmann, Lang, Fideler, Blumenstock, Schlisio, Kumpf, Ebinger, Seitz & Fuchs, 2013). Epidural analgesia is thought to be superior to other methods of pain management and has been proven to be effective in adults. There is limited use and research on the use of epidural analgesia in pediatric patients even though surgery is a common and key procedure for abdominal pediatric tumors. The use of epidural analgesia for perioperative management of pain is increasing and has been described by some other research studies to be a superior method of pain management. The purpose of the study was to test epidural anesthesia's effectiveness in children with abdominal tumors (Warmann et al., 2013).

The design of the study was retrospective and included patients who had undergone resection of an abdominal tumor between July of 2008 and March of 2012. The study included 40 children in the study group and 44 children in the control group. The subjects of the study group had received continuous epidural analgesia through a thoracic catheter that was placed preoperatively. The postoperative analgesia management administered through the epidural for

the intervention group included “ropivacaine 0.2% plus sufentanil 0.4 µg/ml together with a fixed administration of oral or IV paracetamol (45 mg/kg/d) and metamizole (45 mg/kg/d).” The control group received “IV or oral paracetamol (45 mg/kg/d), ibuprofen (30 mg/kg/d), and metamizole (4 mg/kg/d)... and piritramide was applied either as a continuous IV infusion (0.3–0.5 mg/kg/d) or as an IV bolus via patient (parent) controlled analgesia (PCA).” The study compared surgical trauma scores, pain scores, and clinical data of the intervention group with a pair-matched historical control group (Warmann et al., 2013).

The study found the pain levels in the intervention group were lower compared to the control group on days 1 and 3 post-op, but there was no statistical significant difference. The participants in the intervention group also received lower doses of morphine and piritramide compared to the control group. An advantage of providing analgesia through an epidural allowed for lower dosages of medications in comparison to the unspecified administration of medication through the enteral or parenteral route. This method of analgesia also showed to have benefits in the aspect of the patient’s ability to overcome surgical stress through blocking nociceptive signals. There was a reported diminished release of cortisol and catecholamines (stress hormones) and a lower incidence of postoperative morbidity and mortality in the intervention group. Finally, there were no statistical differences in mechanical ventilation time, time on intensive care unit, or total hospital stay between the intervention or control group (Warmann et al., 2013).

Even though there was no catheter related complications in the study, this is a concern when using this form of analgesia especially with small children (Warmann et al., 2013). The lack of complications is contributed to the experienced health care providers that engaged in the

patients' analgesia (Warmann et al., 2013). The nurses, pain management team, surgical team, and pediatric anesthesiologist were all key components in making sure routine pain management prevented any complications from occurring (Warmann et al., 2013). If this type of analgesia is used routinely in patients, the entire health care team must make sure to provide the best level of care to prevent complications in all patients (Warmann et al., 2013). Using an epidural for analgesia may be viable in pediatric oncology patients but more research studies need to be performed to determine if the benefits outweigh the risks of this procedure (Warmann et al., 2013).

Ketamine for Pain in Adults and Children with Cancer: A Systematic Review and Synthesis of the Literature

A systematic review done by Bredlau, Thakur, Korones, and Dworkin (2013) examined ketamine as a medication for refractory cancer pain in pediatric and adult patients. The study included five randomized, double blind, controlled trials of ketamine use in cancer pain. It also included six prospective, uncontrolled trials in cancer pain. The systematic review did not include randomized control trials due to the lack of this type of research in regards to treating pain in pediatric oncology patients (Bredlau et al., 2013).

Ketamine was shown to be effective for reducing pain in some patients (Bredlau et al., 2013). The researchers concluded that ketamine is a possibly viable option for analgesia for both adult and pediatric patients. Some adverse events associated with ketamine among adult patients include somnolence, feelings of insobriety, vomiting, nausea, drowsiness, and hallucinations. However, children treated with ketamine have few reported adverse effects. Some adverse effects that occur in pediatric patients receiving ketamine are sedation, urinary retention,

anorexia, and myoclonic movements. The recommended ketamine infusion dose ranges from 0.05 to 0.5 mg/kg/hour given subcutaneously or intravenously. Ketamine can also be given orally with a dose of 0.2-0.5 mg/kg/dose administered two or three times a day with a maximum dose of 50 mg three times daily. A limitation of the study was the amount and depth of data pertaining to using ketamine as an analgesic medication for pediatric oncology patients.

Therefore, there is limited validity from this systematic review in order to use ketamine routinely in the hospital. Further research on the use of ketamine in pediatric oncology patients will be needed to ensure the safety and efficacy of ketamine for this population (Bredlau et al., 2013).

Acute Pain Relief After Mantram Meditation in Children with Neuroblastoma Undergoing Anti-GD2 Monoclonal Antibody Therapy

This research study performed by Ahmed, Modak, and Sequeira (2014) tested the feasibility of Mantram meditation in pediatric oncology patients as an acute pain management therapy. Many nonpharmacological interventions can be useful for decreasing pain and anxiety in patients. The researchers in this study wanted to test the effectiveness of the nonpharmacological mind-body intervention of Mantram meditation. This meditation used in this study was focused on the concentration of repeating rhythmic melodic sounds in order to slow the breathing and induce relaxation in the participants (Ahmed, Modak, & Sequeira, 2014).

The design was a retrospective analysis of children undergoing anti-GD2 MoAb 3F8 treatment who received guided meditation to treat pain. This is an antibody treatment used primarily with pediatric neuroblastoma (Ahmed et al., 2014). The anti-GD2 MoAb 3F8 treatment was administered intravenously in a 30-minute period at the outpatient clinic. The sample included 34 children with high-risk neuroblastoma undergoing anti-GD2 MoAb 3F8

treatment. Pain from this treatment usually began 15 to 20 minutes into the infusion. The pain experienced during this procedure was usually visceral and started in the abdominal area. The pain then spread to the spine, skull, and extremities. For many of the patients when the onset of pain began, tachycardia developed and the patients receive hydromorphone or other intravenous opioids. For the patients that dealt with the pain nonpharmacologically, music therapy, play therapy, dance therapy, or Mantram meditation were most often used. These nonpharmacological interventions were usually started prior to the anti-GD2 MoAb 3F8 treatment. For the individuals that receive Mantram mediation, the number of sessions and the timing of the sessions differed on a day-to-day basis. However, the researchers only included children in their results who had only participated with Mantram mediation and no other nonpharmacological interventions (Ahmed et al., 2014).

The Mantram meditation is focused on peace, resilience, and building self-esteem. Some practices used were long exhalations, alternate nostril breathing, and left nostril breathing to reduce tension and enhance relaxation. The meditation instructor typically stayed for 30 minutes with each of the participants. The study found that the pediatric oncology patients that did Mantram mediation received fewer doses of analgesia when receiving anti-GD2 MoAb 3F8 therapy for their illness (Ahmed et al., 2014). Pain in this study was not evaluated using a pain scale but rather was quantified by the heart rate of the patient during the therapy and the number of opioid rescues received. The Mantram meditation was found to be an effective outpatient intervention to reduce acute pain and to reduce analgesic therapy needs. Of the patients practicing Mantram mediation during their therapy 71% were able to successfully complete the 11 minutes of Mantram mediation on their first or second try (Ahmed et al., 2014).

To better describe the mechanism of pain relief from Mantram, one would need to compare this with the physiological measures of pain and inflammation. A limitation of the study was the small sample size. However, the results of the study are encouraging and provide a possible pain management method that may be useful in the clinic. The researchers believe this study provides a basis for prospective studies. In further research studies, Ahmed et al. (2014) recommend that additional physiological measures of pain and inflammation should be included. Findings did illustrate how the effects of Mantram mediation are immediate; however, with a routine practice the researchers believe this could further reduce anxiety and fear in childhood pediatric patients as well (Ahmed et al., 2014).

Hypnosis for the Management of Chronic and Cancer Procedure-Related Pain in Children

A systematic review done by Tomé-Pires and Miró (2012) studied the use of hypnosis for treatment of pain in children with chronic illnesses or cancer. It included 12 randomized control trials that tested hypnosis in treating chronic pain or pain related to cancer in children. The trials that were included were randomized trials of children 18 years old or younger that had chronic pain or cancer related pain. The researchers believed hypnosis would be an effective nonpharmacological method of pain management. Hypnosis is an inductive procedure that provides the participant with suggestions to alter their perception, emotion, sensation and behaviors. The three main components involved are focused concentration, the suspension of the peripheral environment, and hypnotizability (Tomé-Pires & Miró, 2015).

Hypnosis by itself or combined with other therapies proved to be an effective method to reduce pain in pediatric oncology patients. The studies that calculated the effect size revealed a decrease of 20% to 80% in pain intensity of the participants. The magnitude of the reduction of

pain and pain management differed in each of the studies. However, the researchers found that hypnosis was less effective when compared to other psychological-type treatments such as play for the pediatric oncology patients. Hypnosis may be a possible nonpharmacological method to help manage pain of pediatric oncology patients but should be used in addition to other nonpharmacological pain management methods (Tomé-Pires & Miró, 2015).

The results of each trial could have been affected by the hypnotizability of each participant and the differences between the researchers leading the hypnosis therapy. This could have given the data a bias and made the results not as reliable. This method of pain management may be harder to implement into practice because of the need for people with hypnosis abilities. More research studies would need to be performed in order to have more concrete data on the effectiveness of hypnosis as a pain management technique in patients. If further research shows the effectiveness of this nonpharmacological method of pain management, hospitals may be more willing to hire and obtain trained professionals in hypnosis (Tomé-Pires & Miró, 2015).

How Effective Are Spiritual Care and Body Manipulation Therapies in Pediatric Oncology? A Systematic Review of the Literature

A systematic review by Poder and Lemieux (2013) included 42 studies on alternative therapies for pediatric oncology patients. The alternative therapies included were: distraction, imagery, hypnosis, massage therapy, aromatherapy, acupuncture, art therapy and music therapy. The purpose of the study was to evaluate the effectiveness of the use of spiritual care and body manipulation used to improve the health of pediatric oncology patients (Poder & Lemieux, 2013).

The study found that hypnosis was effective to reduce pain, anxiety, and distress related

to painful procedures. The study also determined that hypnosis reduced the incidence of chemotherapy-induced vomiting (Poder & Lemieux, 2013). Massage therapy was determined to reduce anxiety in patients. However, the systematic review noted that the degree of anxiety reduction related to massage therapy varied per patient (Poder & Lemieux, 2013). Essential oils were determined to be no more effective than simple fragrances in the reduction of anxiety (Poder & Lemieux, 2013). Acupuncture had variable effectiveness per patient but reduced pain and the incidence of vomiting in this patient population (Poder & Lemieux, 2013). Art therapy was found to improve the quality of life in addition to reducing anxiety and depression in pediatric oncology patients. Art therapy also had a positive effect on pain, facial expression, excitement, happiness, nervousness and anxiety in this patient population (Poder & Lemieux, 2013). Finally, interactive music therapy in which the child participated in the creation of music was found to be effective in children. It was determined to reduce anxiety, distress, stress and pain (Poder & Lemieux, 2013).

A limitation for this systematic review was the lack of randomization in several of the studies included. Additionally, several studies had small sample sizes or lacked a clear description of the participants included in the study. Finally, some studies lacked a clarity of the intervention and how the intervention would be consistently implemented. This could have skewed the results if the intervention was not implemented the same in all the participants of the study (Poder & Lemieux, 2013).

Summary

Pain associated with cancer is very complex and cannot simply be treated. Many pediatric oncology patients have a decreased quality of life due to the chronic pain experienced

because of cancer treatments. It is essential for the entire health care team to figure out the best method to help the patient manage his or her pain both in the hospital and in the home setting. A major aspect of pain management is the pain assessment and the health care providers must also ensure to assess the pain appropriately prior to managing the present pain.

Chapter Three: Evidence Based Practice Protocol

Chapter Two discussed studies of different pain assessment and pain management techniques used for pediatric oncology patients. Chapter Three will propose a best practice protocol for the implementation of these techniques into standard nursing practice. This best practice protocol will include pain assessment techniques, pharmacological methods of pain management, nonpharmacological methods of pain management, and teaching for the patient and parents.

Purpose

The purpose of this best practice protocol is to create a model for pain assessment and pain management in pediatric oncology patients. Pain is one of the most distressing aspects of suffering related to cancer treatment. However, there is still a need for improvement in the clinical assessment and management of pain in this population. Many pediatric oncology patients suffer chronic issues and chronic pain due to their treatment. Some chronic issues experienced by oncology patients are peripheral neuropathy, lung damage, hypertension, osteoporosis, learning deficits, memory deficits, dental problems, vision problems, and fatigue. These chronic issues can also contribute to the pain the patient's experience long term (Long term side effects, 2010). By improving the assessment of pain, nurses will be able to better manage pain both pharmacologically and nonpharmacologically. Additionally, some of the reasons for the lack of pain management for pediatric oncology patients in an outpatient setting are related to parents' misconceptions of pain medications. This best practice protocol outlines some main teaching opportunities nurses can use at the hospital to better educate parents on pain management.

Target Population

The target population for the best practice protocol is children ranging from infants to children 18 years old who are undergoing cancer treatments. The evidence based practice protocol applies to pediatric oncology patients that are suffering from acute or chronic pain. The pain assessment and management can be due to the patient's cancer or to the patient's cancer treatments. The protocol is general in order to apply to pediatric oncology patients that suffer from pain of many different types of cancer. Additionally, the protocol includes interventions that apply to patients that are inpatient and outpatient in order to provide a more complete pain management protocol for patients' battles with cancer.

Pain Assessment Method

A proper assessment of pain is essential in order to most effectively decrease the pain in the patient. It is necessary to determine the intensity level of the pain using the best method that is appropriate for the child's age and developmental level. For nonverbal infants and children, the use of FLACC scale is the most appropriate method to evaluate the level of pain. It is recommended to be used in children 2 months old to 7 years old and can be used ages 4 years - old to 19 years old if a cognitive impairment is present (Crelin et al., 2015). For children ages three up to about eight years old the Wong-Baker Faces® scale is the recommended tool for pain assessment (Boughton et al., 1998). For children ages eight and older using the PQRST method is recommended (Alcala, Ceja, Christensen, Do, Driver, Gettys & Madden, 2015).

Assess medical history. It is necessary to obtain information on the child's medical history to gain a better insight into the patient's illness and treatment modalities that have been used previously. This will assist the nurse to understand the type of treatment the child has

experienced and better predict the type of pain the child may experience. This will help the nurse to select a pain management method that will best accommodate for the child's needs. Assessing the medical history of the patient would be included in the comprehensive pain assessment. The Brief Pain Survey is a useful tool in order for the health care provider to learn about the pain of the patient. The Brief Pain Survey is a set of questions about the severity of the pain, the intensity of the pain, and the impact of the pain on functioning in daily activities. It is reliable and valid in a large variety of cultures and languages and helps give the health care provider an insight into how the pain is affecting the daily activities of the patient (Chordas et al., 2013).

FLACC scale. The FLACC scale stands for face, legs, activity, cry and consolability (Crelin et al., 2015). The infant is scored on a scale of zero to two in each of the previously listed categories in order to give the infant a nonverbal pain score. For the face category an infant scores a zero if there is no expression or the infant is smiling, scores a one if there is an occasional grimace or frown, and scores a two if there is frequent quivering chin or clenched jaw. In the legs category the infant scores a zero if he or she is in a relaxed or normal position, scores a one if uneasy restless or tense, and scores a two if the legs are kicking or drawn up. In the activity category the infant scores a zero if he or she is lying quietly and moving positions easily, scores a one if the baby is squirming and shifting back and forth, and scores a two if his or her movements are rigid and jerking. In the category of cry the infant scores a zero if there is no cry, scores a one if the infant moans or whimpers, and scores a two if the infant is crying steadily with frequent screams or sobs. Finally, in the category of consolability, the infant scores a zero if content and relaxed, scores a one if he or she can be reassured by occasional touching or hugging, and scores a two if he or she is difficult to console or comfort. Once the infant has been

given a score in each of the five categories the nurse adds up the scores to get a nonverbal pain score out of 10 (FLACC scores, 2015).

Wong-Baker FACES® Pain Rating Scale. For children ages three to approximately age eight the use of the Wong-Baker FACES® Pain Rating Scale is recommended (see Appendix B). This pain rating scale has six different illustrations of faces ranging from “no hurt” to “hurts worst” (Wong-Baker FACES®, 2015). This scale is useful in children that are not be able to rate their pain on a linear scale of 0-10 like the PQRST method but can express what he or she is feeling. By having illustrations of what each of the different numbers on the pain scale mean, the child can more accurately tell the nurse the amount of pain the child is experiencing (Boughton et al., 1998). Additionally, if a child is older than eight years old but is developmentally delayed, the Wong-Baker FACES® Pain Rating Scale would be an appropriate way to assess the child’s pain (Wong-Baker FACES®, 2015).

PQRST method. The PQRST method is a tool for pain assessment that is best to use with children over eight years of age. Initially the nurse asks the patient to rate his or her pain on a scale of 0-10. Then the nurse investigates the provoking factors, quality of pain, radiation, site and symptoms of the pain, and the timing and triggers of the pain. This helps the nurse to determine the source and intensity of the pain the patient is experiencing in order to best help the patient manage his or her pain. This method is recommended for use with pediatric oncology patients that are at the appropriate developmental level and age to describe the pain that he or she is experiencing (Neale, 2012).

Assess cultural background. Finally, it is essential to consider the importance of cultural background while assessing the patient for pain. Similar to the assessment of medical

history and its impacts on pain, the assessment of cultural background would be included in the nurse's comprehensive pain assessment. A patient's beliefs, religion, family roles, and values affect how a patient experiences pain and expresses the pain he or she is experiencing to his or her health care provider. Several cultures view pain as a punishment from a higher power while other cultures view pain as an imbalance of the body that an individual must accept and endure. Since some cultures avoid expressing pain, it is important for nurses to look at nonverbal pain indicators in patients in order to ensure the patient's pain is being treated correctly and effectively. Nonverbal pain indicators in which the nurse will need to look for are facial grimaces, restlessness, moans, sighs, and rubbing the affected area (Neale, 2012).

Pharmacological Pain Management

The use of pharmacological pain management is often the first intervention for pain reduction in patients. The nurse must take the information from the patient's pain assessment in order to give the patient the correct pain medication to reduce pain. The specific medication that is given to patients depends on the attending physician's orders and the medications used by the facility. The attending physician will provide orders for the patient's pain management with scheduled pain medications and most likely additional pain medications per request (PRN) of the patient. It is crucial for the nurse to know which medications the patient has orders for in order to provide additional PRN medications for the patient when it seems as if additional analgesia is necessary.

Additionally, according to the literature epidural analgesia has proven to be effective in pain management for patients undergoing surgery for abdominal tumors. Epidural analgesia is a superior method of pain management that has been proven to be effective in adults and some

studies of children. Even though the nurse will not be prescribing epidural analgesia for a patient, he or she could talk to the attending physician for the possibility of using it as a pain management method. It is essential for the nurse to be the patient's advocate and try to get the best analgesia possible for each patient (Warmann et al., 2013).

Nonpharmacological Pain Management

In addition to the use of pharmacological management the use of nonpharmacologic management is necessary. Distraction therapies assist the patient to not focus on the pain but focus on the task or activity at hand. The suggested types of distraction therapy from the literature are hypnosis, massage therapy, music therapy, and meditation (Poder & Lemieux, 2013).

Hypnosis. By altering their perception, emotion, sensation and behaviors, hypnosis has been shown to decrease pain in pediatric oncology patients. Hypnosis by itself or combined with other alternative therapies is an effective method to reduce pain in pediatric oncology patients. The three main components involved with hypnosis are focused concentration, the suspension of the peripheral environment, and hypnotizability (Tome-Pires, & Miro, 2012). The exact mechanisms of how hypnosis reduces pain is thought to involve activating areas of the brain related to decreased arousal, increase in visual imagery and a reinterpretation of perceptual experiences. Hypnosis can be implemented by a professional hypnotist or can be informally done by a nurse at bedside. Reading a story or fairy tale and encouraging the patient to participate in the story or fairy tale is an effective way to distract the pediatric oncology patient from his or her pain. By incorporating the use of hypnosis in therapy, either informal or formal

methods of hypnosis, the patient will hopefully have an outcome of reducing stress, develop coping strategies, and block the pain sensations (Poder & Lemieux, 2013).

Massage therapy. Massage therapy has also been found to be effective in decreasing the level of pain in pediatric oncology patients (Poder & Lemieux, 2013). Massage has shown to cause weight gain, reduce cortisol levels, decrease anxiety, improve sleep, improve immune function, and finally reduce the level of pain. Additionally, according to the literature, massage therapy helps to positively affect the emotional state of the patient by reducing muscle pain, discomfort and respiratory rate in the patient. The effects of massage therapy lasted longer than periods of silence and rest to prove its usefulness with patients (Poder & Lemieux, 2013).

Massage therapy would be offered to pediatric oncology patients once a day by a Licensed Massage Therapist. Patients would be offered between 15 and 20 minutes of massage therapy once a day. Time adjustments would be made for patients that need an increased length of massage. Additionally, the Licensed Massage Therapist would teach the patients' parents and family members simple massage therapy techniques that could be done in addition to the daily massage if the child requested.

Music therapy. The systematic review by Poder & Lemieux (2013) determined the effectiveness of music therapy in decreasing pain in pediatric oncology patients. Interactive music therapy that includes participatory activities that involve the patient in a creative process were found to be most effective. The various forms that make up interactive music therapy include improvisation, songwriting, and remaking of a song. The exact mechanism of how music therapy helps to reduce pain is unknown but some theorists believe music therapy increases the release of endorphins. Other theorists think music therapy increase the secretion of

catecholamines to reduce heart rate and blood pressure. Even though the mechanism of how music therapy is effective in patients is unknown, it has been proven to reduce pain in addition to anxiety, distress and stress of the patient (Poder & Lemieux, 2013).

Meditation. The use of Mantram mediation was also found to be an effective tool for pain reduction in pediatric oncology patients on an outpatient basis. It is a meditation method that is focused on peace, resilience, and building self-esteem. Some of the methods that were proven to be most effective included the use of long exhalations, alternate nostril breathing, and left nostril breathing in order to reduce tension and enhance relaxation. This intervention was led by a meditation instructor that stayed with each of the patients for 30 minutes once a day. The patients received less analgesia and showed to have a decreased pain level. Mantram meditation was proven to be effective as an outpatient intervention to reduce the need for pharmacological pain management and reduce acute pain (Ahmed et al., 2014).

Patient and Family Teaching

Lastly it is essential for the nurse to provide patient and family teaching in the aspect of pain assessment and pain management. Many patients experience pain when they are in an outpatient setting due to their parent's fears of addiction to analgesic medications or decreased assessment of pain. It is essential for families to know the proper pain management techniques that can be used when the child is not hospitalized to improve the quality of life for pediatric oncology patients.

In order to have proper pain management at home it is necessary to first assess the pain. The nurse must teach the families how to properly assess their child for pain. The nurse should recommend the appropriate method of assessment of either FLACC, Wong-Baker FACES® Pain

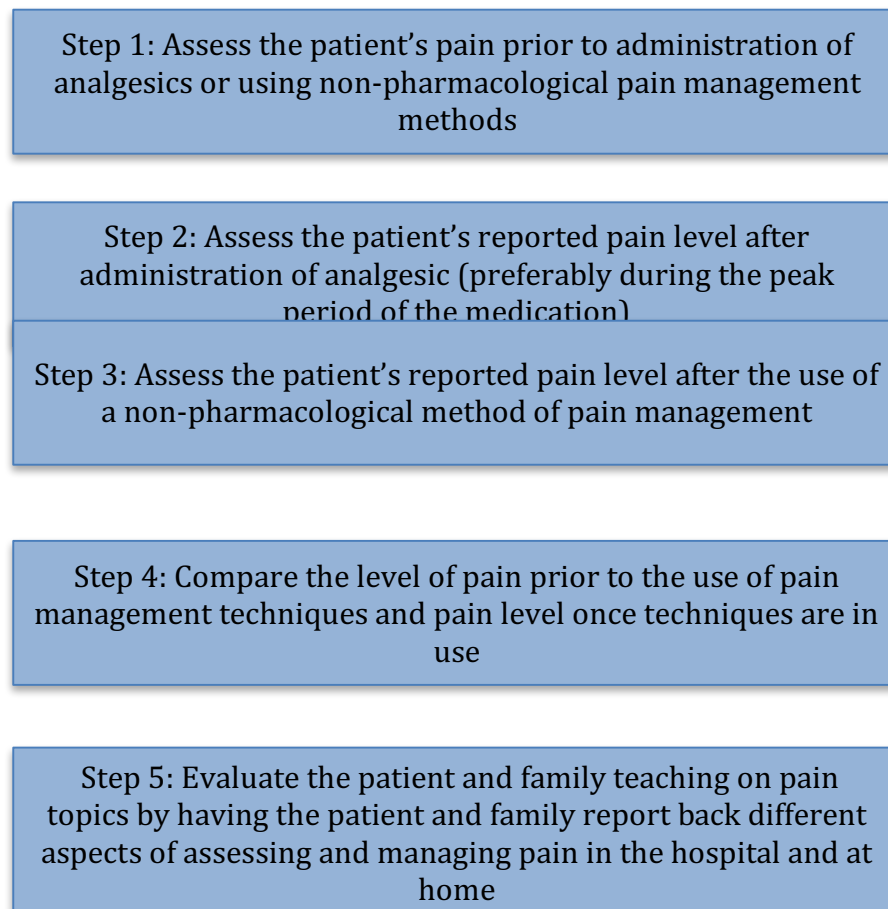
Rating Scale, or PQRST scale depending on the age and developmental level of the patient. The nurse will also teach the parents nonverbal signs of pain listed earlier in Chapter Three so the parents will be able to assess pain even if the child will not admit to being in pain. Next, the nurse will need to teach the parents the importance of the relief of pain. The nurse will need to explain that there are no benefits of suffering with pain and pain's side effects. The nurse will explain how the quality of life will improve with pain management and the importance of pain management in the outpatient setting. Finally, the nurse will need to explain how addiction to opioid pain medications is rarely problematic. If a patient is prescribed an opioid analgesic and the parents are not comfortable with giving it to their child the nurse must discuss with the physician another option of pain medications for the patient. If the patient however is taking an opioid analgesic, it is important to make sure the parents know the precautions of opioid analgesics in the house to keep the medications properly safeguarded (Alcala et al., 2015).

Protocol Evaluation

The patient will be assessed for his or her pain level both before and after pain management techniques are started. The diagram 3.1 demonstrates the step of the protocol evaluation and is included on pages 33 and 34. The effectiveness of the pain assessment will be evaluated on the nurse's understanding of the intensity and severity of the pain. The pharmacological pain management methods will be evaluated during the peak period of the drug. The nurse will need to assess if pain management has occurred when the drug is most effective and has the highest concentration in the body. The nonpharmacologic pain management techniques will be assessed during the treatment and after the treatment by the nurse reassessing the patient's pain level at these times. The nurse will need to assess the patient's pain

management while at home by asking the patient questions during routine checkups to ensure the pain management method for outpatient is appropriate. Finally, the nurse will evaluate the effectiveness of the teaching by asking the patient and/or parents to demonstrate their knowledge on the topics the nurse taught.

Diagram 3.1: Flow Diagram of Evaluation of Pain Management



Summary

Chronic pain associated with cancer and cancer treatments is very complex and difficult to treat. It needs to both be assessed properly and treated with a variety of pharmacological and nonpharmacologic treatments. The best practice protocol previously listed a suggested method to assess patients of different ages and developmental stages. It listed the suggested methods of pharmacological and non-pharmacological pain management methods that can be individualized for each patient. Finally, it included essential topics of teaching that are necessary for discharge. A proper assessment, management, and teaching are crucial to promote the optimal pain reduction in pediatric oncology patients.

Chapter Four: Implementation and Evaluation

Chapter Four will discuss the implementation and evaluation of the best practice protocol that was presented in Chapter Three for the pain assessment and pain management of pediatric oncology patients. The intervention is to be implemented by the Registered Nurses. The implementation process will be based on Roger's Diffusion of Innovations Theory. This theory consists of a five-stop process of knowledge, persuasion, decision, implementation and confirmation (Rogers, 2003).

In order to implement the best practice protocol, the nursing staff at the given hospital must evaluate the current procedures of pain assessment and pain management. By assessing the current procedures, the nursing leadership can identify areas in which the nursing staff at that specific hospital could improve to provide better pain management. A key component emphasized in this protocol is a thorough pain assessment by the nurse. The recommended pain assessment includes an age appropriate pain rating scale (Basic Pain Survey, FLACC scale, Wong-Baker FACES® Scale or PQRST method) assessing medical history, and assessing cultural background. When an extensive pain assessment is performed the nurse can better understand the pain the patient is experiencing in attempt to best manage the pain through pharmacological and non-pharmacological methods. The pharmacological pain management will depend on the hospitals analgesia protocols and the desired analgesia prescribed by individual physicians. The proposed non-pharmacological methods include hypnosis, massage therapy, music therapy, and meditation. Finally, the final proposed aspect to be implemented is patient and family teaching. By using Roger's Diffusion of Innovations Theory, Chapter Four will describe the necessary steps needed to implement the proposed protocol.

Knowledge

The first phase of Roger's Diffusion of Innovations Theory, is knowledge. In this phase the individual learns "what the innovation is and how and why it works" (Rogers, 2003). In this phase it will be essential for nurses in leadership roles in addition to the patient care nurses to learn about the best practice protocol. The educational training will be lead by Nurse Practitioners and Physicians that are experts in the field of pediatric oncology. There will be the best outcomes and better adherence to the change in protocol if the innovation is lead by influential individuals (Rogers, 2003). It is very important for the nursing leadership and physicians to understand the reason why the proposed practice protocol should be implemented for implementation process to occur (Rogers, 2003). If the nursing leadership and physicians understand the motive behind the protocol, they will be more likely to support it and encourage other nurses to support it as well. There will be education on the long term effects of chemotherapy treatment and an emphasis on how the nurses could improve patient outcomes by assessing and managing pain more effectively.

The nurses, including the charge nurses, of the pediatric oncology floor will attend an educational, hands-on workshop. The informational workshop will last four hours and will be offered on three different dates. It will meet in person and attendance will be required for all pediatric oncology nurses. The training will begin with the assessment methods of FLACC scale, Wong Baker FACES® Pain Rating Scale, the PQRST method to assess pain, and the Brief Pain Survey. The nurses will learn about the importance of pain assessment and how a more thorough assessment of pain will fit into the clinical process. The educational session will review the protocol of pharmacological pain management in use. Even though the nurses will not be able to

prescribe medications for their patients, it is essential for the nurses to know the medications being prescribed for their pediatric oncology patients. Nurses will need to be well informed on the medications in order to advocate for their patients if they appear to need a different medication for their pain management. The nurses will be educated on the additional PRN medications for their patient when additional analgesia is necessary. Furthermore, the nurses will have education on the non-pharmacological methods of pain management. For the method of massage therapy there will be hands on learning for the nursing leadership on the different techniques that can be used. Licensed Massage Therapist will be implementing 15 to 20 minutes of massage therapy for patients each day. However, it is important for nurses to be knowledgeable of massage therapy techniques they can use or can teach the families to use on the patients. Unfortunately, music therapy and hypnosis require specialists in each of the designated areas in order to perform the intervention. The designated hospital will need to determine which specialist and type of therapy would be best accepted by the population of the hospital and hire or train an individual to perform this intervention for patients. Additionally, the hospital will find outpatient resources for hypnosis and music therapy that can be referred to patients once discharged from the hospital.

Persuasion

The next phase of the Roger's Diffusion of Innovations Theory is persuasion. This phase consists of the individual creating a negative or positive attitude towards the innovation. The attitude that the individuals create will have a significant degree of influence in deciding if the proposed innovation will be adopted or rejected (Rogers, 2003). However, it is important to know that "the formation of a favorable or unfavorable attitude toward an innovation does not

always lead directly or indirectly to an adoption or rejection” (Rogers, 2003). In this stage the nurses must be convinced that the new protocol will be more effective than the previous protocol. This phase will occur during the educational session discussed in the previous section. The nurses in the educational information session will form their opinion on the proposed protocol compared to the protocol previously in place. In order for the nurses to formulate a positive attitude towards the innovation, they will need to understand how the protocol will improve patient outcomes and be inspired to make a change in the pain assessment and pain management methods. A technique that will assist in this phase is having experts in the area of pediatric oncology present the rationale of the innovation to the nurses. This will help the proposal have more validity and credibility when presented to the nursing staff at the hospital.

Decision

The third stage of Roger’s Diffusion of Innovations Theory is decision. In this phase the individual chooses to either adopt or reject the innovation (Rogers, 2003). Rogers defines an adoption of an innovation as the “full use of an innovation as the best course of action available,” while a rejection of an innovation is the act of not adopting an innovation (Rogers, 2003). The key aspect of this phase to make it successful is the use of a partial trial. When individuals can first try the innovation and then decide if adoption of the innovation would be desirable. This helps the innovation become adopted more quickly and lets the staff test the effectiveness of the protocol prior to agreeing to the adoption of the protocol (Rogers, 2003). The registered nurses will have a trial period to follow the proposed protocol for four weeks before the protocol is adopted by the unit. To determine the efficacy of the protocol there will be satisfaction surveys completed by patients and nurses. The patients will rate their pain management while the

protocol is in effect and the nurses will rate their perceived efficacy of the protocol. This data will be compared to patient surveys when the protocol was not in place to compare the results and pain management prior to the protocol and after the protocol was in effect. The nurses will also collect data on the pain scales of the patient before and after the interventions implemented. If the nurses see an improvement in the pain management of the patients with the protocol in place, they will be more likely to support the protocol adoption by their unit.

Implementation

Implementation is the fourth phase of Roger's Diffusion of Innovations Theory. In this phase the innovation is put into practice. This phase includes reinvention of the innovation in which the innovation is changed or modified as needed (Rogers, 2003). After the protocol is implemented the hospital will hold feedback sessions within the first six months to determine which aspects of the protocol work well for the nurses and in which areas improvement could be made. The surveys mentioned in the decision phase will also be used to determine which areas of the protocol need further improvement. Additionally, patient feedback will be evaluated to determine which aspects of pain management were the most effective and which aspects were not affective in the management of their pain. In this stage it is essential to be flexible to allow the protocol to be adapted and changed.

Confirmation

The final phase of Roger's Diffusion of Innovation Theory is confirmation. In this phase the decision of adoption or rejection of the innovation has been made and the individual looks for support for his or her decision. The decision of adoption or rejection can be reversed at any time if the individual receives conflicting information regarding the innovation (Rogers, 2003). If

conflicting information or results are presented it is possible to discontinue the innovation or replace the innovation with a different innovation (Rogers, 2003). As stated in the implementation phase, feedback methods will be used to determine the efficacy of the protocol from the patients' and nurses' point of view. This feedback will be evaluated to determine if the protocol should continue to be used or if the hospital should return to the prior protocol for pain assessment and pain management.

Summary

The purpose of the proposed protocol for pain assessment and pain management for pediatric oncology patients is intended to improve the pain management in this patient population. Pain related to cancer treatment has been described to be one of the most distressing aspects of suffering. In the 21st century there have been many improvements in technology and the treatment modalities which has given pediatric cancer patients a much better chance of survival. Currently there is an 80% survival rate over 5 years with pediatric oncology patients (Fortier, 2013). However, this high survival rate has resulted in chronic issues for these patients and a reduced quality of life during and after treatment of cancer (Fortier, Wahi, Bruce, Maurer, & Stevenson 2013). The goal of this protocol is to improve the quality of life of patients during and after treatment by providing better pain assessment and pain management.

APPENDIX A
TABLE OF FINDINGS

APPENDIX A

TABLE OF FINDINGS

Title, Author(s) and Date	Questions, variables Objectives, hypothesis	Design, sample, setting	Findings	Notes
<p><i>The fifth vital sign: chronic pain assessment of the adolescent oncology patient</i> Neale, 2012</p>	<ul style="list-style-type: none"> Literature review about the essential methods to evaluate pain in pediatric oncology patients 	<ul style="list-style-type: none"> The review discusses research performed on adolescents with nonmalignant chronic pain, and adolescents in pediatric oncology units 	<ul style="list-style-type: none"> Comprehensive physical exams were effective to determine the source and intensity of pain. Cultural background affects how the patient experiences pain and should be considered by the provider when doing assessments Non verbal cues were also very critical in assessing pain of a patient in addition to the reported pain level with the PQRSTU method Gender of the patient also greatly effected the pain reported and pain experienced by the patient 	<ul style="list-style-type: none"> Author discusses the need for further research in this area due to the individualized population of pediatric oncology patients
<p><i>Systematic review of the face, legs, activity, cry and consolability scale for assessing pain in</i></p>	<ul style="list-style-type: none"> Systematic review to evaluate the effectiveness of the FLACC scale to assess postoperative pain in infants and children. 	<ul style="list-style-type: none"> The review included data from 78 full-text articles with 26 articles being psychometric evaluation 	<ul style="list-style-type: none"> The study found the FLACC scale a suitable pain assessment method in infants and children aged 2 months to 7 years experiencing postoperative pain. The descriptors of the 	<ul style="list-style-type: none"> There may be a positive publication bias with almost all of the data discussing

<p><i>infants and children: Is it reliable, valid, and feasible for use?</i> Crellin, Harrison, Santamaria & Babl, 2015</p>	<p>This was done by assessing the psychometric properties of the FLACC scale.</p>	<p>studies</p>	<p>FLACC scale are open to interpretation of the individual</p> <ul style="list-style-type: none"> • The scale has not been determined to be effective in infants under the age of 2 months • FLACC was found to be effective in children ages 4-19 that have cognitive impairment 	<p>the reliability and validity of the FLACC scale.</p>
<p><i>Impact of research on pediatric pain assessment and outcome</i> Boughton, Blower, Chartrand, Dircks, Stone, Youwe, & Hagen, 1998</p>	<ul style="list-style-type: none"> • The purpose was to compare the effect of standardized pain assessment related to the lack of effective pain management of children postoperatively. The standardized pain assessment tool used was the Wong-Baker FACES® Pain Rating Scale. 	<ul style="list-style-type: none"> • The study group consisted of a convenience sample of 36 children ages 5-17 years old that had at least a minimum of 48 hours of postoperative care. • The control group consisted of a retrospective case study of 50 patients that met the same criteria of the study group. 	<ul style="list-style-type: none"> • The study did not find a statistical difference between the reliability of pain assessment between the study group and the control group • The authors believe that the study was able to determine clinical significance in the effectiveness of the Wong- Baker FACES® Pain Rating Scale • The authors recommend use of the Wong- Baker FACES® Pain Rating Scale due to its adaptability and consistency to use in various setting of pediatrics. 	<ul style="list-style-type: none"> • A limitation of the study was a small sample size that was not randomly selected.

<p><i>Screening for pain in pediatric brain tumor survivors using the pain thermometer</i> Chordas, Manley, Modest, Chen, Liptak and Recklitis, 2013</p>	<ul style="list-style-type: none"> • Measure the effectiveness of Pain Thermometer (PT), compared with the Brief Pain Survey (BPS) • PT is brief and easy and researchers thought it would be effective 	<ul style="list-style-type: none"> • Childhood brain tumor survivors • 46 male and 53 female survivors of brain tumors, median age was 19.95 years • Participants used for a larger longitudinal cohort study called Project REACH 	<ul style="list-style-type: none"> • BPS was clinically significant in assessing pain, but PT was not accurate to identify pain 	<ul style="list-style-type: none"> • Limitation that Rating pain on a 1-dimensional scale as used with PT may only reflect the patient's current pain but not accurately reflect total pain • Limitation with BPS measure is that it is a new measure that has not proven to be reliable or proven validity
<p><i>Development and testing of a multidimensional iPhone pain assessment application for adolescents with cancer</i> Stinson, Jibb,</p>	<ul style="list-style-type: none"> • To test the usability, feasibility and compliance, of a smartphone pain assessment tool for pediatric oncology patients. 	<ul style="list-style-type: none"> • Qualitative semi-structured, audio-taped interviews and iterative cycles to test the iPhone application called "Pain Squad" 	<ul style="list-style-type: none"> • The application was overall appealing to the participants • Participants liked the game based nature of the app • Compliance was high for the adolescents using the application and could be a possible 	<ul style="list-style-type: none"> • Limitation that the compliance of participants was due to alarms set to remind participants

<p>Nguyen, Nathan, Maloney, Dupuis, Gerstle, Alman, Hopyan, Strahlendorf, Portwine, Johnston, and Orr, 2013</p>		<ul style="list-style-type: none"> • 18 pediatric oncology patients were included in the study 	<p>resource used to determine pain of patients</p>	<p>nt to complete the pain assessment toll routinely</p> <ul style="list-style-type: none"> • This app was only tested at one cancer center and had a small sample size questioning the validity and reliability of the data
<p><i>Pain management at home in children with cancer: a daily diary study</i> Fortier, Wahi, Bruce, Maurer, and Stevenson, 2014</p>	<ul style="list-style-type: none"> • A daily diary protocol was used to test the barriers of pain management of children's cancer pain while at home • Pediatric cancer pain is undermanaged, but there is little data on pain management in 	<ul style="list-style-type: none"> • Parent-child dyads were recruited from the Cancer Institute • 45 patient/parent pairs completed baseline data on personality characteristics, children's quality of life, and parental beliefs about 	<ul style="list-style-type: none"> • Most patients reported chronic pain while at home, yet few used analgesia while at home • Parents that had misconceptions about analgesia were less likely to give their children pain medications • Children that were more social and less 	<ul style="list-style-type: none"> • An implication of this study shows the importance of the role of parental beliefs of analgesia and its effects on the pain management of

	the home setting	analgesia used in children <ul style="list-style-type: none"> Participants completed daily diaries reporting pain and analgesia for 14 consecutive days 	shy were more likely to receive analgesia	their child's pain at home
<i>Perioperative epidural analgesia in children undergoing major abdominal tumor surgery--a single center experience</i> Warmann, Lang, Fideler, Blumenstock, Schlisio, Kumpf, Ebinger, Seitz, Fuchs, 2013	<ul style="list-style-type: none"> assess continuous epidural analgesia in pediatric patients undergoing a major abdominal tumor surgery Epidural analgesia is thought to be superior to other methods of pain management and has been proven to be effective in adults Researchers want to test its effectiveness in children 	<ul style="list-style-type: none"> Retrospective study Surgical trauma scores, pain scores, and clinical data of the intervention group were compared in a pair-matched historical control group Continuous epidural analgesia was given to the intervention group via a preoperatively placed thoracic catheter 	<ul style="list-style-type: none"> Pain levels in the study group were lower compared to the control group on days 1 and 3 post-op, but there was no statistical significance Participants received lower doses of morphine and piritramide No statistical differences in mechanical ventilation time, time on intensive care unit, or total hospital stay 	<ul style="list-style-type: none"> Even though there was no catheter related complications in the study, this is a concern when using this form of analgesia especially with small children
<i>Ketamine for pain in adults and children with cancer: a systematic review and synthesis of</i>	<ul style="list-style-type: none"> Systematic review of ketamine for refractory cancer pain in pediatric and 	<ul style="list-style-type: none"> Five randomized, double-blind, controlled trials of ketamine use in cancer pain 	<ul style="list-style-type: none"> Ketamine was shown to be effective to reduce pain in some patients Researchers believe ketamine is a 	<ul style="list-style-type: none"> Limitation in the amount of data on using ketamine

<p><i>the literature</i></p> <p>Bredlau, Thakur, Korones, and Dworkin, 2013</p>	<p>adult patients</p>	<ul style="list-style-type: none"> • Six prospective, uncontrolled trials in cancer pain 	<p>possibly viable option for analgesia</p>	<p>effecting its validity</p>
<p><i>Acute pain relief after Mantram meditation in children with neuroblastoma undergoing anti-GD2 monoclonal antibody therapy</i></p> <p>Ahmed, Modak, and Sequeira, 2012</p>	<ul style="list-style-type: none"> • Test the feasibility of Mantram meditation in pediatric oncology patients as an acute pain management therapy 	<ul style="list-style-type: none"> • Retrospective analysis of children undergoing anti-GD2 MoAb 3F8 treatment who received guided meditation to treat pain. 	<ul style="list-style-type: none"> • Patients received fewer doses of anti-GD2 MoAb 3F8- to manage pain when participating in meditation • Mantram meditation is an effective outpatient intervention to reduce acute pain and reduce analgesic therapy needs. 	<ul style="list-style-type: none"> • To better describe the mechanism of Mantram, one would need to compare this with the physiological measures of pain and inflammation

<p><i>Hypnosis for the management of chronic and cancer procedure-related pain in children</i></p> <p>Tomé-Pires and Miró, 2012</p>	<ul style="list-style-type: none"> • Systematic review of studies that used hypnosis for treatment of pain in children with chronic illnesses or cancer 	<ul style="list-style-type: none"> • 12 randomized control trials that tested hypnosis in treating chronic pain or pain related to cancer in children 	<ul style="list-style-type: none"> • Hypnosis by itself or combined with other therapies proved to be an effective method to reduce pain in pediatric oncology patients • Hypnosis was less effective when compared to other psychological-type treatments such as play 	<ul style="list-style-type: none"> • The results of each trial could have been effected by the hypnotizability of each participant and the differences between the researchers leading the hypnosis therapy
<p><i>How Effective Are Spiritual Care and Body Manipulation Therapies in Pediatric Oncology? A Systematic Review of the Literature</i></p> <p>Poder & Lemieux, 2013</p>	<ul style="list-style-type: none"> • Systematic Review of complementary and alternative medicine for children suffering from cancer. The systematic review looks at how spiritual care and body manipulation can be used to improve the 	<ul style="list-style-type: none"> • 42 studies were chosen for the literature review. Topics for the alternative therapies included: distraction, imagery, hypnosis, massage therapy, aromatherapy, 	<ul style="list-style-type: none"> • Hypnosis was found to reduce pain, anxiety, and distress during painful procedures. It also was shown to reduce the occurrence of chemotherapy-induced vomiting. • Massage therapy was determined to reduce anxiety but to a varying degree in patients. • Essential oils were found to be no more effective than simple 	<ul style="list-style-type: none"> • Some limitations found in the studies were lack of randomization, small sample sizes, lack of description of

	health of pediatric oncology patients	acupuncture, art therapy and music therapy	<p>fragrances in the reduction of anxiety.</p> <ul style="list-style-type: none"> • Acupuncture was found to have variable effectiveness but was found to reduce pain and incidence of vomiting. • Art therapy was found to improve the quality of life and reduce anxiety and depression in pediatric oncology patients. It also was determined to have a positive effect on pain, facial expression, excitement, happiness, nervousness and anxiety in this patient population. • Interactive music therapy in which the child participates in the creation of music was found to be effective in children. It was determined to reduce anxiety, distress, stress and pain. 	participants and a lack of clarity with the intervention and how the intervention would be consistently implemented.
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APPENDIX B

WONG-BAKER FACES® PAIN RATING SCALE

APPENDIX B

WONG-BAKER FACES® PAIN RATING SCALE



Retrieved from Wong-Baker FACES® Pain Rating Scale. (n.d.). Retrieved September 12, 2015, from <http://wongbakerfaces.org>

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