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Empowering Nurses to Use Non-Pharmacological Measures to Help Control Pain in the  
Postoperative Period

by

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Bachelor of Science in Nursing, Dickinson State University, 2006

An Independent Study

Submitted to the Graduate Faculty

of the

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Master of Science

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## PERMISSION

Title: Empowering Nurses to Use Non-Pharmacological Measures to Help Control Pain  
in the Postoperative Period

Department: Nursing

Degree: Master of Science

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Date December 3, 2017

### Abstract

Pain is the most common reason people seek medical care (King & Fraser, 2013). Pain after surgery is inevitable. Despite there being more known about pain and new pain treatments, patients' satisfaction with pain management has not improved (Bernhofer, 2011). Inadequately treated pain can have negative short- and long-term effects on the patient (King & Fraser, 2013). Opioids are commonly prescribed to treat postoperative pain. Lately, opioids have come under scrutiny as a result of the nation-wide opioid epidemic. Postoperative pain may be inadequately treated by healthcare providers for a variety of reasons, including fear causing an addiction, personal biases from prior experiences, and lack of information (Paschkis & Potter, 2015). This independent study researched the effectiveness of several different non-pharmacological modalities in the treatment of postoperative pain. Non-pharmacological interventions are not a new concept, but are often overlooked by healthcare providers. Unlike with opioids, non-pharmacological interventions have very few, if any, side effects, and are found to be effective in managing postoperative pain. Katharine Kolcaba's Comfort Theory provided a theoretical framework and was used to help staff identify the states and contexts of comfort. A review of literature was conducted using the CINAHL and PubMed databases to identify the effectiveness of the non-pharmacological interventions of massage, aromatherapy/essential oils, music therapy, guided imagery, and cryotherapy on postoperative pain. The findings were used to host a continuing education event for staff nurses. Strong evidence was found to support the use of the researched non-pharmacological interventions. Using non-pharmacological interventions in conjunction with opioids will hopefully improve patient satisfaction while reducing the amount of opioids necessary to properly manage postoperative pain.

## Introduction

Pain is something every person experiences at some point in their life and is the most common reason people seek medical care (King & Fraser, 2013). It is estimated that there are 100 million adults living with chronic pain in the United States alone (Institute of Medicine of The National Academies, 2011). The number of people living with chronic pain is more than the number of U.S. adults living with diabetes mellitus, coronary heart disease, stroke, and cancer combined (The American Academy of Pain Medicine, n.d.).

Understanding pain management methods is important for nurses and other healthcare providers. Hospitals have been gathering patient satisfaction information for years, but until the early 2000s, there was no national standard for comparing one hospital to another (Hospital Consumer Assessment of Healthcare Providers and Systems [HCAHPS], n.d.). The Centers for Medicare and Medicaid Services (CMS) and the Agency for Healthcare Research and Quality (AHRQ) collaborated with each other to develop and test a standardized questionnaire which is now known as the Hospital Consumer Assessment of Healthcare Providers and Systems, or HCAHPS (HCAHPS, 2015). Pain management is one of the areas assessed by the HCAHPS survey. Hospitals that receive Medicare reimbursement dollars, known as an Inpatient Prospective Payment System (IPPS), have an incentive to achieve high patient satisfaction scores in order to receive full reimbursement (HCAHPS, 2015).

Pain management has become a hot button issue for healthcare providers in the last few years. One does not have to go far to hear or read about the “opioid epidemic” that is sweeping the nation (Rudd, Aleshire, Zibbell, & Gladden, 2016; U.S. Department of Health and Human Services [HHS], 2016). Nurses and other healthcare professionals form opinions or beliefs on

pain and pain management from what they see in the news and from their own experiences. Unfortunately, these beliefs may cause patients to receive less than optimal treatment of their pain.

An extensive literature review was conducted to provide evidence based recommendations to identify non-pharmacologic methods of pain management that nurses can implement to aid patient's pain management. Katharine Kolcaba's Comfort Theory provided the theoretical framework for the program recommendations. The recommendations were presented at a continuing education event for nursing staff. The facility where the continuing education event was held is a 200+ bed, Level II trauma center in Midwestern North Dakota.

### **Purpose**

The purpose of this project was to develop a continuing education session for hospital nurses that identifies non-pharmacological methods for pain management. Sixty-seven percent of the patients, at the facility where the continuing education event was held, responded to the HCAHPS survey question "their pain was "Always" well controlled", which is below the state (73%) and national average (71%) (Medicare.gov, n.d.). It should be noted that this question is currently under review by CMS (Medicare.gov, n.d.).

Education is important in pain management (Montgomery & McNamara, 2016). Nurses have identified lack of education as a barrier (Gatlin & Schulmeister, 2007; Gropelli & Sharer, 2013). Nurses who have received education on pain management are disposed to care for the patient holistically and manage their pain more effectively (Gropelli & Sharer, 2013). Educating nurses about non-pharmacologic options they can initiate without needing a physician or advanced practice provider (APP) allows for greater autonomy, which is psychologically

empowering for nurses. Nurses who feel empowered report higher job satisfaction and have a lower rate of turnover (Cicolini, Comparcini, & Simonetti, 2014).

### **Significance**

Proper management of patients' pain is important for all healthcare providers. Under-treated or untreated pain can have severe repercussions for patients. In the postoperative patient, untreated or under-treated pain can put the patient at increased risk for respiratory complications such as atelectasis and pneumonia, thrombi events such as a deep vein thrombosis (DVT) or pulmonary embolus (PE), and cardiac issues such as an infarct or heart failure (King & Fraser, 2013). Physical sequela of improperly treated pain can also cause issues with sleep quality, mobility, immunity, and nutrition, to name a few (King & Fraser, 2013; Malec, Knoebel, & Shega, 2012; Patterson, n.d.). Moreover, inadequately treated pain can also have a psychological impact on the patient. Patients whose pain is not managed adequately suffer from depression and anxiety at a rate four times higher than patients without pain (King & Fraser, 2013). They also have more issues with confusion or delirium, have difficulty concentrating on tasks, and can be more irritable or short-tempered (Integrative Pain Center of Arizona, n.d.; King & Fraser, 2013; Patterson, n.d.).

The impact of inadequately treated acute pain, which may become chronic pain (Lin, Reid, Liu, Chused, & Evans, 2015), extends past the individual to create social and economic consequences. Absenteeism rates are higher in people with untreated or under-treated chronic pain and they are at a significantly higher risk of losing their job (seven fold) (International Association for the Study of Pain [IASP] & European Federation of IASP Chapters [EFIC], n.d.).

Nurses' practice is guided by the American Nurses Association's (ANA) Code of Ethics. Included in the Code of Ethics is the provision that nurses will act with respect and compassion

for all patients (ANA, 2015). A nurse's opinions on pain and pain management are formed by his or her past experiences. Olsen (2016) believes that nurses have an ethical obligation to react to a patient's report of pain. It is important for nurses to set aside their personal beliefs and have a non-judgmental attitude toward pain management (Bockhold & Hughes, 2016). The nurse can do this by remembering to incorporate the ethical principles of beneficence, nonmaleficence, fidelity, and justice into her practice.

Healthcare providers rely on, and sometimes over-rely on, opioids to manage patients' pain because of the well-known effectiveness of opioids or because of their comfort with them (Montgomery & McNamara, 2016). A multimodal approach to pain management can benefit both patients and healthcare providers. Multimodal approaches can include treatment with an opioid and non-opioid medication, or it can include pharmacological options in combination with non-pharmacological options. Using a multimodal approach allows for lower doses of an individual medication, shorter recovery periods and hospital stays, better quality of life, and improved patient satisfaction (Montgomery & McNamara, 2016).

This continuing education session was developed to help educate nurses and other healthcare staff about pain and about effective pain management through the use of non-pharmacologic methods. The goal for this education session was ultimately to enhance tools available to nurses in their efforts toward providing better pain management for patients.

### **Theoretical Framework**

Florence Nightingale recognized that comfort was an essential component of patient care, but technological advances in the 20<sup>th</sup> century relegated many of the traditional comfort methods to the backburner (Kolcaba, 2003). The focus of medicine was on curing the patient and comfort was considered the main goal only when curing the patient wasn't possible (Kolcaba, 2003). It



wasn't until the 1980s and 1990s when comfort became an important concept again. Now, American Association of Colleges of Nursing (AACN) and by the National League for Nurses (NLN), identify caring as a core value for nurses by the (ANA, 2011).

In the early 1990s, Katharine Kolcaba published her Comfort Theory, which looks at the patient and their family holistically. She based her theory off of the works of three other theories (a) Orlando's work on relief, (b) Henderson's work on ease, and (c) Paterson and Zderad's work on transcendence (Kolcaba, 2001; Parker & Smith, 2010). Kolcaba identified that health care situations, such as having surgery or being hospitalized, are stressful for patients and that comfort is a basic human need (Alligood, 2014; Parker & Smith, 2010). The Comfort Theory has three assumptions:

- (1) Human beings have holistic responses to complex stimuli;
- (2) Comfort is a desirable holistic outcome that is germane [sic] to the discipline of nursing; and
- (3) Human beings strive to meet, or to have met, their basic comfort needs (Kolcaba, 1994, p. 1178).

Kolcaba (1994) believed that there are four contexts of comfort: physical, psychospiritual, social, and environmental. The physical context relates to one's body. The psychospiritual context includes, but is not limited to, one's internal self-awareness, self-esteem, and spiritual beliefs. One's friends, family, and other social contacts are included in the social context. The physical space surrounding the patient, including room temperature, noises, smells, and lighting, to name a few, constitute the environmental context (Kolcaba, 1994).

Kolcaba also believed that there are three states of comfort: relief, ease, and transcendence (Kolcaba, n.d.; Kolcaba, 1994; Parker & Smith, 2010). According to Kolcaba

(1994), relief means to have one's need or needs met and is necessary in order to "return to former function or a peaceful death" (p. 1179). She defined ease as "the state of calm or contentment" (Kolcaba, 1994, p. 1179). Ease is necessary for an individual to perform efficiently. Transcendence is when the individual can rise above his or her current state, or the "potential for extraordinary performance" (Kolcaba, 1994, p. 1179). These states do not have to be met sequentially. They can overlap and be dependent on the other states. Together, the four contexts and the three states create 12 "facets of comfort" (Kolcaba, 1994, p. 1179).

Cares provided by nurses are divided into three categories, or comfort interventions. The comfort intervention categories include technical interventions, coaching, and "Comfort Food for the Soul" (Parker & Smith, 2010, p. 394). Examples of technical interventions include performing a physical assessment, monitoring vital signs, and administering medications (Alligood, 2014; Parker & Smith, 2010). Technical interventions are used most often by nurses, but are not often remembered by the patients (Parker & Smith, 2010). Providing education, reassurance, and emotional support are examples of coaching interventions (Alligood, 2014). A lot of the non-pharmacological options, such as massage, guided imagery, and music therapy, are the interventions that fall in the Comfort Food for the Soul category (Alligood, 2014; Parker & Smith, 2010).

Utilizing the Comfort Theory is also beneficial to the nurse. According to Kolcaba, nurses want to and know how to practice comforting care; many do it intuitively (Alligood, 2014; Parker & Smith, 2010). Parker and Smith (2010) state that nurses and patients and their families want to have meaningful interactions with each other, or what they call "wow moments" (p. 394), which are meaningful and satisfying moments that the patient and nurse will remember.

Kolcaba proposed that nurses who incorporate the Comfort Theory into their practice experience greater creativity and satisfaction (Alligood, 2014).

The target population for this continuing education was primarily nurses at the in-patient facility, although all staff were invited to attend. A majority of the nurses at the facility hold a Bachelor's of Science in Nursing. The nurses' work experience varied from new nurses just starting their careers to nurses who have twenty or more years of experience. Comfort has been described as "nursing's unique contribution to health care" (Richeson & Huch, 1988, as cited by Kolcaba, 1994, p. 1181), "a distinguishing characteristic of the nursing profession" (Ferrell & Ferrell, 1990, p. 67), and "the ultimate purpose of nursing" (Morse, 1992, as cited by Kolcaba, 1994, p. 1181). It is for this reason that Katherine Kolcaba's Comfort Theory, a middle range nursing theory, was chosen for the theoretical framework.

### Definitions

- **Acute pain** – Pain that begins suddenly in response to an injury or trauma to the body. It is usually sharp in quality and resolves when the injury has healed (Cleveland Clinic, n.d.).
- **Chronic pain** – Pain that persists after the injury or trauma has healed. Chronic pain may last weeks, months, years, or a patient's lifetime (Cleveland Clinic, n.d.).
- **Coaching** – One of three types of comforting interventions according to the Comfort Theory. Parker & Smith (2010) identify nursing actions such as active listening, advocacy, referrals, and reassurance as examples of coaching. They are implemented by nurses if time permits (Parker & Smith, 2010).

- **Comfort Food for the Soul** – One of three types of comforting interventions according to the Comfort Theory. Comfort Food for the Soul interventions include massage, guided imagery, etc. (Parker & Smith, 2010).
- **Holistic nursing** – nursing that provides care to the whole person including the physical, emotional, and spiritual aspects.
- **Non-pharmacological** – treatments that do not involve medications

### Process

The focus of this literature search was on evidences of the efficacy of non-pharmacologic measures. Databases searched included the Cumulative Index to Nursing and Allied Health Literature (CINAHL) and PubMed databases. Search terms included, but were not limited to, (a) “pain management”, (b) “postoperative pain”, (c) “non-pharmacological”, (d) “massage”, and (e) “guided imagery”. The search was limited to articles written in the English language, peer reviewed, adult populations, and published within the last 10 years. Some articles were identified by looking at the reference lists of other pertinent articles. These were searched for in CINAHL and PubMed using the title or author mechanism. The final article selection is described in the “Review of Literature” section below.

### Review of Literature

This literature review was conducted to identify the effectiveness of different non-pharmacological measures on pain. The literature search described in the “Process” generated 154 articles for review. Preliminary article abstract review eliminated 54 articles. A majority of the eliminated articles had a focus on other areas (i.e. postoperative nausea). Some of the articles were eliminated because they had an interoperative pain management focus, while others were eliminated because they had a medication focus. In total 43 articles, consisting of 42 studies,

were reviewed. The articles were rated using Melnyk and Fineout-Overholt's Hierarchy of Evidence (Melnyk & Fineout-Overholt, 2014). See Table 1. for a breakdown of the findings.

The review of literature was organized according to the non-pharmacological options.

Table 1.

Level of Evidence	Research Design	No. of each
I	Meta-analysis	0
	Systematic Review	1
	National Practice Guidelines	0
II	Randomized Controlled Trial	30
III	Quasi-experimental	8
IV	Retrospective	0
	Case-control	0
	Cross-sectional	0
	Cohort Comparison	0
	Prospective	0
	Descriptive	1
	Correlational Single Study	1
V	Meta-synthesis	0
VI	Single Qualitative Study	1
VII	Expert Opinion	0
	Non-research based Evidence	0
	Expert Committee Reports	0
	Specialists' Opinions	0
	Case Studies	0
	Narrative Reviews/Literature Reviews	0

### Massage

Searches for massage and postoperative pain resulted in a total of 71 articles. Fifteen of the articles were duplicated between the searches. Thirty-nine articles were eliminated. Two of these articles were unavailable. The rest were eliminated because they had a focus on something other than the effects of massage on pain in the postoperative period. Two further articles were eliminated upon closer review as they focused on the feasibility of massage rather than on pain control and one was eliminated because of poor quality. In the end, 14 articles were included in this review.

Three studies used hand and foot massage as an intervention for pain control post-cesarean section (C-section). Two of the studies divided the participants into three groups, one control and two intervention. Various pain scales were used to assess the effectiveness of the use of hand and foot massage for addressing post-operative pain, but all three found the intervention to be effective. All of the studies also looked at the duration of relief experienced by the use of massage of hands and feet. The description of these studies follow.

Abbaspoor, Akbari, and Najari (2014) evaluated the effect of hand and foot massage on postoperative pain in a randomized controlled trial (RCT) with 80 elective postoperative C-section cases. The control and intervention groups were divided equally and were found to be similar in baseline characteristics. The intervention group received a 20-minute hand and foot massage (5 minutes per limb) plus the standard care. All massages were performed by one of the investigators. The control group received the standard care. Patients used the commonly applied, reliable and valid Numeric Rating Scale (NRS) to rate their pain. Pain ratings between the groups were similar before the intervention. Patients in the massage group reported significantly lower pain scores both immediately after the massage and 90 minutes. At the 90-minute reading, the intervention group's pain ratings saw a drop more than 4.5 times greater than the control.

Saatsaz, Rezaei, Alipour, and Beheshti (2016) also conducted a RCT on the effects of massage in post C-section pain control. The 156 women included in this study were divided into three equal groups. The control group received the standard care, while one group received a foot massage, and the third group received a foot and hand massage. The same massage therapist provided all the massages. The participants used a validated Visual Analog Scale (VAS) to rate their pain. Patients' pain data was collected immediately before and after the

massage and 90 minutes after the intervention. Participants did not receive any analgesia during this time. Patients' pain ratings were similar prior to the intervention. The control group's mean pain ratings increased by almost one point during the 90-minute period. Both massage groups saw over a 1.5 point drop in their pain scores immediately after the massage. Although the interventions groups experienced a slight rebound in pain at the 90-minute mark, both intervention groups' mean pain rating was still more than one point lower than their pre-intervention rating. No significant differences were noted between the two intervention groups. This study also monitored anxiety levels with the reliable and validated Spielberger's State Anxiety Inventory (STAI) tool. The intervention group displayed anxiety levels significantly lower compared to the control group. The hand and foot massage group reported slightly lower anxiety levels compared to the foot only massage group, but the difference was not statistically significant.

Another group of researchers conducted a 4-month long RCT on the effects of hand and foot massage in reducing postoperative C-section pain (Degirmen, Ozerdogan, Sayiner, Kosgeroglu, & Ayranci, 2010). Seventy-five women were divided equally into 3 groups: including a control group, which received standard care, a foot only massage group, and a foot and hand massage group. A physiotherapist provided theoretical and practical training in massage to one of the researchers. This researcher conducted all the massages for reliability of data. Patients in the massage groups received a 5 minute per limb massage. Patients rated their pain using a NRS, like the scale used by Abbaspoor et al. (2014), and a Verbal Rating Scale (VRS). The VRS was a 5-point scale with 1 meaning "no pain" and 5 meaning "very severe pain" (Degirmen et al., 2010, p. 154). Data was gathered immediately before and after the treatment and 60 minutes after the treatment. The intervals at which the data was collected was

unclear in the report; however, pain scores reportedly decreased in both of the intervention groups at 60 minutes post-intervention with a greater reduction noted in the foot and hand massage group. Inconsistent reporting of data collection significantly limited the results of this study in terms of duration of pain relief secondary to the use of massage.

Five Level II studies were found examining the effect of massage on postoperative pain in cardiac surgery patients (Albert, Gillinov, Lytle, Feng, Cwynar, & Blackstone, 2009; Bauer et al., 2010; Boitor, Martorella, Arbour, Michaud, & Gélinas, 2015; Braun et al., 2012; Cutshall et al., 2010). In three of the studies, patients were allowed to choose the area massaged (Bauer et al., 2010; Cutshall et al., 2010; Braun et al., 2012). All of the studies used the VAS to rate pain except for one. Boitor et al. (2009) used 3 different scales to gather both objective and subjective pain data. All of the studies but the one conducted by Albert et al. (2009) showed massage significantly decreased patients' pain. The description of these studies follow.

Albert et al. (2009) conducted a large (n=252) RCT to study the effect of massage on pain, anxiety, postoperative mood, and physiologic measurements (heart rate, blood pressure, and respiratory rate). The control group received standard care. The intervention group received standard care plus two massages that were delivered on postoperative days 2 or 3 and postoperative days 4 or 5. Two licensed massage therapists performed the massages and gathered data of the patient's physiologic state and cardiac rhythm, while a study coordinator collected data from the control group. A VAS was used to rate pain and the Beck Anxiety Index (BAI) collected data on anxiety levels. Results showed no significant difference in pain or anxiety scores between the groups. However, participants who rated their pain higher before surgery also reported higher pain scores after surgery.



A group of researchers conducted two RCTs in an effort to extend this body of knowledge. The first was a pilot study, with the goal to establish the feasibility to study the effects of massage on pain, anxiety and tension in postoperative cardiac patients. The second study evolved from the pilot study. These studies found different results than the study conducted by Albert et al. (2009).

The pilot study conducted by Cutshall et al. (2010) consisted of 58 patients undergoing scheduled coronary artery bypass grafting (CABG) or valve surgery. The patients in the intervention group (n=30) received a 20-minute massage at a site of their choosing by a trained massage therapist who was familiar with the care of postoperative cardiac patients. Control patients received standard care and had a 20-minute rest session to mirror the time the intervention group spent with the massage therapist. The study design used VASs to measure pain, anxiety, and tension. Data was gathered before and after the massage. The intervention group reported a five and a half times greater decrease in pain ratings versus the control group. The intervention group's mean anxiety scores dropped by more than 50 percent after the massage, whereas the control group's mean anxiety score rose by more than 4 percent.

Bauer et al. (2010) conducted the second study with 113 patients and investigated the same outcomes as the pilot study and used the same data collection tools, but with slight study design differences. Control patients received standard care. Intervention patients received standard care plus a 20-minute massage on postoperative days 2 and 4. Patients were allowed to choose the part of the body massaged. A certified massage therapist, who had a background in occupational therapy and was familiar with the care of postoperative cardiac patients, performed the massages. The intervention group had a significant drop in their pain scores immediately after the massage. Patients were assessed on postoperative day 3 to evaluate long term effects

from the massage. Control group patients did not report significant changes in their pain. The intervention group reported an increase in their pain on postoperative day 3, but the value was not statistically significant. Researchers attributed the increase in pain to the massage releasing some of the tension or knots and the willingness or mobility of the patients, which leads to soreness the following day.

Boitor et al. (2015) conducted a RCT with 40 patients to evaluate the effects of a hand massage on postoperative pain in cardiac surgery patients. One of the researchers was trained by a professional massage therapist and performed all the interventions. The trained researcher applied a small amount of lavender cream and massaged each hand for 5 minutes. The trained researcher also applied a small amount of lavender cream to the control patients' hands and then held their hands, but did not massage them, for 10 minutes. This was followed by a 30-minute rest period for each group. The goal was to repeat the intervention 3 times within a 24-hour period. All participants received the treatment twice, but because patients were transferred off the unit, only 12 participants received 3 treatments. Investigators used 3 tools to evaluate pain: (a) Faces Pain Thermometer (FPT), (b) the Critical-Care Pain Observation Tool (CPOT), and (c) the Brief Pain Inventory (BPI). The FPT and CPOT assessments were conducted before the intervention, immediately after the intervention, and 30 minutes after the rest period. The BPI was conducted 24-48 hours postoperatively. Researchers noted a significant difference in pain scores after the second and third massage. The CPOT scores for the control groups increased between pre- and post- measurements for all three sessions, while the CPOT scores for the intervention group decreased after the first two massages interventions. No significant differences were noted in the BPI, which researchers attributed to the delay in data collection.

Braun et al. (2012) conducted a RCT with the purpose of assessing the effect of massage on pain, anxiety, and muscle tension in postoperative CABG and valve repair/replacement patients. The researchers randomly assigned the 152 patients to groups. The control group contained 71 participants and the intervention group contained 75 participants. The control group received standard care plus a 20 minute rest period. Patients in the intervention group received a 20-minute massage from a massage therapist at the site of their choosing. The treatments were carried out twice, once on postoperative day 3 or 4 and again on postoperative day 5 or 6. Pain, anxiety, and muscle tension were scored using VASs. A research nurse gathered this data immediately before the intervention and within 10 minutes after the intervention. On postoperative days 3 or 4, massage patients reported a drop of 52 percent from their average pre-massage score. By comparison, the control group only saw a 13 percent decrease in average pain score in the same time period. On postoperative days 5 or 6, the intervention group reported a 38 percent decrease in their average pain score, compared to about a 24 percent decrease in the control groups' average pain scores.

Evidence was also identified that massage was used in interventional studies focused on other post-operative patient populations such as colorectal surgery (Dreyer et. al., 2015), orthopedic surgery (Miller et al., 2015), abdominal surgery (Mitchinson et al., 2007). Miller et al. (2015) focused on a brief massage, identifying that massage times of 20+ minutes seen in other studies may not be feasible for nursing staff. Miller et al.'s (2015) study design used crossover intervention between the control group and the intervention group. These studies found massage to have a positive effect on patients' pain ratings.

Researchers interested in the effects of massage on postoperative pain, anxiety, relaxation, and tension of colorectal surgical patients conducted a RCT with an n of 127 divided

into control and intervention groups (Dreyer et al., 2015). The massage therapists also spent time with the control group. The massage therapists and the patients had a 20-minute conversation that focused on positive topics such as the patient's past, family, and hobbies. No massage was performed for the control group. The intervention group (n=61) received a 20-minute massage on a body part of their choosing. Interventions were conducted on postoperative days 2 and 3. Nurses or patient care assistants blinded to patient assignment collected survey data before and after the intervention. They collected data with the same NRSs described in the Abbaspoor et al. (2014) study. Researchers noted significant differences in pain scores between the two groups. The change in the intervention group's average pain was more than two times greater than the control group on postoperative day 2 and more than seven times on postoperative day 3.

Miller et al. (2015) conducted a convenience sample RCT study evaluating the effects of a brief massage (5 minute) on pain in 25 postoperative orthopedic patients. Unlike the other studies described thus far, participants were included in both groups in a crossover intervention design. They were randomly assigned to group 1 or group 2. In group 1, with the patient's first pain episode, they received analgesia only. Analgesia and massage were provided for the patient's second pain episode. The order was reversed for the patients assigned to group 2. Patients rated their pain immediately before analgesia administration, which was followed immediately by the massage. Pain was rated again at 5 and 45 minutes after the analgesia administration. Mean pain scores decreased by 37.5 percent by the 45-minute mark when patients received both analgesics and massage compared to a 27.5 percent decrease with analgesics only. Patient satisfaction with pain management was found to be significantly higher when patients received both analgesia and massage.

A large RCT (n = 605) was conducted at two Department of Veterans Affairs hospital (Mitchinson et al., 2007). The purpose was to evaluate the effect of back massage on postoperative pain, anxiety, and functional recovery in patients who had undergone surgery requiring either a sternotomy incision or abdominal incision of a minimum of 8 cm. Patients were divided into 3 groups, a control group (n = 203) that received standard care, a group that received 20 minutes of individualized attention, but no massage, from a massage therapist (n = 202), and a group that received a 20-minute back massage (n = 200). The interventions (individualized care and massage) were conducted on postoperative days 1 through 5 by nationally certified massage therapists. Pain and anxiety were measured using VASs (previously described in Albert et al., 2009). Research assistants collected the data within 30 minutes before and after the intervention. Significant improvements in pain ratings were noted in all groups, but the massage group showed the greatest change both in short-term and long-term evaluations.

Ucuzal and Kanan (2014) used a quasi-experimental design (Level III) to study the effects of foot massage on pain in postoperative breast surgery patients. Patients (n=70) were included in the study if they rated their pain a 4 or greater on the McGill Pain Questionnaire Short-Form (MPQ-SF) upon admittance to the recovery room. The MPQ-SF consists of three sections: the first assesses the quality of pain, the second assesses the present severity of the pain using the VAS, and the third assesses the general severity of the pain. Patients were divided equally into the control group and the experimental group. Patients in the experimental group received a 20-minute foot massage. The primary researcher gathered all the data and performed the massage. Data was gathered immediately before the massage and 5, 30, 60, 90, and 120 minutes after the intervention. The intervention group experienced greater than a 5.5-point drop in pain ratings versus a 2-point drop in the control group by the 2 hour mark.

Dion et al. (2011) conducted a descriptive pilot study (Level IV) on the effects of massage on thoracic surgery patients (n=160). Nurses identified patients who might benefit based on pain scores, anxiety, and length of hospital stay. Patients reporting a pain rating of 4 or higher on the NRS and with an expected hospital stay of greater than 3 days were given top priority for the massage. Massages were provided by two massage therapists, but they were only available for one hour in the morning between Monday and Friday. Patients picked the body part massaged while the massage therapist decided the style. All the patients received one massage while 19 patients received two or more massages. Pain ratings were gathered immediately before and after the massage. Only one patient reported an increase in pain and requested the massage end early. Patients mean pain scores decreased by almost 3.5 points from their pre-massage scores.

One small (n=46) Level VI study was conducted evaluating the effects of massage on pain, anxiety, and overall well-being of postoperative mastectomy patients as well as the feasibility of “fee-for-service model” (Drackley et al., 2012, p. 121). Of the 33 participants who returned the survey, 30 were very satisfied and 3 were satisfied with the massage and reported decreased pain, anxiety and tension levels. All of the respondents indicated that he or she would recommend massage to other surgical patients.

In addition to evaluating the effects of massage on pain, nine of the reviewed studies also evaluated the effects of massage on anxiety, which is important to the purpose of this review, because anxiety impacts the perception and intensity of pain. Although not directly relevant to the purpose of this review, eight of the studies evaluated the effects of massage on patients’ vital signs (Abbaspoor et al., 2014; Albert et al., 2009; Bauer et al., 2010; Boitor et al., 2015; Braun et al., 2012; Dreyer et al., 2015; Saatsaz et al., 2016; Ucuzal & Kanan, 2014), and six evaluated the

effects of massage on muscle tension (Bauer et al., 2010; Braun et al., 2012; Boitor et al., 2015; Cutshall et al., 2010; Drackley et al., 2012; Dreyer et al., 2015). Other outcomes evaluated included patient satisfaction (Braun et al., 2012; Miller et al., 2015), relaxation (Braun et al., 2012; Dreyer et al., 2015), length of stay (Albert et al., 2009), feasibility (Braun et al., 2009), mood (Albert et al., 2009); rate of atrial fibrillation (Albert et al., 2009); sleep (Bauer et al., 2010), and opiate consumption (Mitchinson et al., 2007).

Only one study (Miller et al., 2015) focused on the effects of a brief massage, while the rest of the studies implemented massages that were a minimum of 10 minutes in length, with a majority being 20 minutes. The duration of the massage could be an intervening variable, but no study in this review examined this potential variable.

This sub-section found adequate evidence for the use of massage as a non-pharmacological method for pain management. All but one of the fourteen studies included in the review found significant benefit of massage for reducing pain and anxiety in post-surgical patients. Furthermore, 11 of the 14 were RCT or Level II studies. The next sub-section will review evidence related to the modality of essential oils and aromatherapy as a non-pharmacologic pain intervention.

### **Aromatherapy**

Searches for aromatherapy included the search terms “aromatherapy” and “essential oils”. Searches for “aromatherapy” and “postoperative pain” resulted in 11 articles. Eight articles focused on something other than postoperative pain and were excluded. One article was a duplicate between the search engines. Thus, two articles related to aromatherapy from these search terms were included in this section of the literature review.

The search terms “essential oils” and “postoperative pain” returned 12 articles. Three articles were duplicates of the “aromatherapy” search. Five articles were excluded because they had a focus on something other than pain, were not a study, or focused on a pediatric population. Three articles from the essential oil search were included in this literature review. All of the studies are a Level II. A synthesis of the five articles related to aromatherapy and essential oils in postoperative pain management follows.

Two articles focused on the use of lavender oil in managing episiotomy pain (Sheikhan, Jahdi, Khoei, Shamsalizadeh, Sheikhan, & Haghani, 2012; Vakilian, Aatarha, Bekhradi, & Chaman, 2011). Both studies evaluated the effects of lavender oil sitz bath versus a povidone-iodine/betadine sitz bath post-episiotomy two times per day and used a VAS to evaluate pain. Both also assessed edema and redness. The studies differed in that the duration of the treatment sitz baths differed and the studies used different assessment methods to collect data.

Sixty women participated in one of the RCTs that examined the effects of a lavender oil essence sitz bath versus the traditional betadine sitz bath and were divided into equal groups (Sheikhan et al., 2012). The intervention group took a 30-minute lavender sitz bath twice a day for five days, while the control group took a 30-minute betadine sitz bath twice a day for five days. Researchers used a VAS to assess pain and REEDA scale to evaluate redness, edema, ecchymosis, discharge, and approximation. Assessments were conducted at 4 and 12 hours and 5 days post-episiotomy. At the 4-hour assessment, the intervention group reported statistically significantly lower pain scores than the control group, but the difference at the 12-hour assessment was not significant. The intervention group reported significantly less pain than the control group by day 5. Researchers noted that the intervention group required significantly less pain medication than the control group. Seventy percent of the intervention group were not



medicated for pain the 4 intervening days compared with only 33.3 percent of the participants in the control group. The REEDA scores were significantly lower in the intervention group.

The second RCT also examined the effects of lavender sitz baths versus providone-iodine sitz baths on episiotomy wound healing (Vakilian et al., 2011). Although, there were twice as many participants (n=120), like the previous study the participants were divided into two equal groups, the control group and the intervention group. The control group took a povidone-iodine sitz bath two times a day for ten days, whereas the intervention group took a lavender oil sitz bath with the same application and duration of the treatment. The groups went to a clinic after the 10 days and were evaluated by midwives blinded to the group assignment. Evaluation included pain level (patient rated using a VAS), edema, redness, dehiscence, number of sutures, and infection. Analysis of this data found that 41.7 percent of the intervention patients reported no pain versus only 28.3 percent of the control patients. The intervention group experienced significantly less redness and wound dehiscence than the control group. No significant difference was noted in the amount of edema.

The three remaining studies investigated the effects of essential oils or aromatherapy on pain in gastric bypass patients (Kim et al., 2007), colorectal surgery patients (Yu & Seol, 2017), and vitrectomy patients (Adachi et al. 2014). Kim et al. (2007) and Yu and Seol (2017) used lavender in their studies, while Adachi et al. (2014) used eucalyptus-lemon essential oil. Adachi et al.'s (2014) study also included two non-pharmacologic interventions: massage and aromatherapy. All three studies used different pain scales, but all noted a significant reduction in pain ratings or amount of opioids required in the intervention groups.

One of the RCT studies examined the effects of lavender aromatherapy on laparoscopic gastric banding patients' opioid requirements in the immediate postoperative setting (Kim et al.,

2007). The study setting was the post-anesthesia care unit (PACU). Fifty-four postoperative patients were equally divided between the intervention and control groups. The intervention group had two drops of lavender oil placed on a cotton swab, which was then placed in the patient's oxygen mask. In an attempt to blind the patients to their group allocation, the control group had non-scented baby oil cotton swabs placed in their oxygen masks. Researchers gathered pain intensity data using a NRS at 5, 30, and 60 minutes after arrival to the PACU. No statistically significant differences were noted between the two groups; however, the researchers did note that 22 control participants required opioids, while only 12 intervention patients required opioids. They also noted that the control group used one and a half times more Morphine than the intervention group.

Researchers in another study combined the nonpharmacological interventions of massage and aromatherapy (Adachi et al., 2014). Researchers conducted a three-armed RCT that examined the effects of aromatherapy and massage on posture-related postoperative pain following a vitrectomy. Sixty-three patients were divided into three groups: (1) aromatherapy massage treatment with essential oil; (2) oil massage without essential oil; and (3) a control group. The intervention was carried out on the first two postoperative days, the days identified by the researchers as being the most painful days for postoperative vitrectomy patients. Both intervention groups received a 10-minute massage of their back, shoulders, waist, and arms. The aromatherapy massage intervention used eucalyptus-lemon essential oil. Grape-seed oil was used in the other massage intervention group. The control group received standard care. Researchers elected to use the Faces Pain Scale (FPS) because participants may have a difficult time reading a VAS or NRS after having eye surgery. Data was gathered one hour before and after the intervention and a final outcome was gathered on the third postoperative day. The

intervention groups experienced a significantly greater reduction in pain versus the control group both in the short-term evaluation and the long-term evaluation. No significant difference was noted in pain ratings between the two intervention groups at any point in the study.

Yu and Seol (2017) focused their study on the effects of *Lavandula angustifolia* Mill. (lavender) oil aromatherapy on pain relief and lower urinary tracts symptoms following urinary catheter removal in postoperative colorectal surgery patients. Sixty-six patients were randomly and equally divided into three groups, two intervention groups and one control group. Researchers implemented the intervention following the urinary catheter removal. One intervention group smelled gauze with lavender oil, while the other intervention group had gauze with linalyl acetate. The control group smelled gauze with almond oil. The groups inhaled the aromas for 20 minutes. Researchers gathered data immediately before and after the intervention using a VAS for pain. Patients in both intervention groups experienced a more significant decrease in their pain ratings than the control group in the post-intervention assessment. The linalyl acetate intervention group experienced a slightly greater reduction in pain scores. Linalyl acetate is one of the main components of lavender oil.

Unlike with the massage review, none of the studies evaluated the effects of aromatherapy or essential oils on anxiety. Four of the five studies used lavender as their aroma (Kim et al., 2007; Sheikhan et al., 2012; Vakilian et al., 2011; Yu & Seol, 2017). Lavender is one of many scents that could be used to help with pain. None of the studies evaluated the effects of aromatherapy on nausea, another common use. Two of the studies had the participants soak their incision in a bath containing the essential oil (Sheikhan et al., 2012; Vakilian et al., 2011), while another used use the essential oils in a massage (Adachi et al., 2014).

This sub-section found adequate evidence for the use of massage as a non-pharmacological method for pain management. All five studies concluded that aromatherapy or essential oils were effective at reducing pain in post-surgical patients. The next sub-section will review evidence related to the modality of cold therapy or cryotherapy as a non-pharmacologic pain intervention.

### **Cold Therapy**

Searches conducted for the effects of heat on postoperative pain produced no relevant results. Search terms for cold therapy included “postoperative pain”, “cold therapy”, and “cryotherapy”. The search resulted 20+ articles, most of which were excluded as they didn’t have a focus on the effects of cold on postoperative pain. Four of the articles are graded at a Level II on the evidence hierarchy. Two were a Level III. Six articles are included in this literature review.

Two of the Level II studies evaluated the effects of cold packs on chest tube discomfort (Demir & Khorshid, 2010; Kol, Erdogan, Karsh, & Erbil, 2013). Both studies used gel cold packs. Demir & Khorshid (2010) evaluated whether or not cold packs helped to reduce the pain experienced during chest tube removal. Kol et al. (2013) were interested in identifying if cold applications helped decrease pain related to general chest tube irritation. Demir & Khorshid (2010) used the strongest design with 2 control groups, including the use of placebo packs in one of the control groups. The studies used different pain scales, but both concluded that cold application was an effective treatment for pain related to chest tubes.

Ninety patients participated in a randomized, double-controlled study evaluating the effects of cold application on pain and anxiety during chest tube removal (Demir & Khorshid, 2010). The participants were divided into three groups, two control and one intervention. One

control group received standard care. The other control group, the placebo group, had a room temperature gel pack was placed around the chest tube site(s) for 20 minutes prior to their removal. The intervention group had cold gel packs placed around their chest tube site(s) for 20 minutes prior to their removal. Participants rated their pain intensity using a VAS and the McGill Melzack Pain Questionnaire (MPQ) to describe the quality of their pain during the chest tube removal. Data was gathered just prior to the gel pack application. Pain scores were recorded immediately after removal and a final pain score 15 minutes after the chest tubes were removed. Pain scores were similar between all of the groups before the chest tube removal. Although all group's pain scores rose dramatically after the chest tube removal, the participants in the placebo group and control group reported a greater increase in their pain scores. The intervention group's pain rating was approximately 75% that of the placebo and control group at the 15-minute post chest tube removal data point. Although the study found no difference in the amount of pain medications required by the participants after the surgery, the intervention group was able to wait 26 minutes longer than the control group and 18 minutes longer than the placebo group before requiring pain medications. This difference was noted to be significant by the researchers.

In the second of the studies involving pain related to chest tube therapy, researchers evaluated the effects cold gel packs had on participant's pain associated with chest tube irritation (Kol et al., 2013). Forty participants were randomly and equally divided between the control group and the intervention group. The control group received standard care. The intervention group received standard care plus had cold gel packs applied to the chest tube insertion site for 20-minute intervals at postoperative hours 24, 28, 36, and 40. After the cold application, participants engaged in activities such as deep breathing, coughing, and walking five to ten steps.

Participants rated their pain using the Verbal Category Scale, which is part of the McGill Pain Questionnaire. Nurses used the Behavioral Pain Scale to rate the participant's pain. Data was gathered prior to and just after the intervention. Sixty-five percent of participants in the control group described the pain as stabbing, while only 10 percent of the participants in the intervention described it that way. Ninety percent of the participants in the control group reported an increase in their pain during activities. Only 55 percent of the participants in the intervention group reported an increase in their pain levels during activity. Significantly less pain medications were required by the intervention group by the second day. Eighteen participants in the intervention group were able to complete the walking and coughing on postoperative day two, while only 11 control participants were able to complete these tasks.

The two other Level II cold therapy studies had different focuses. One study focused on the effects of cryotherapy post facial surgery (Shin, Lim, Yun, & Park, 2009). The other study evaluated the effects of ice packs on incisional pain and narcotic use (Watkins, et al., 2014). Watkins et al. (2014) used ice packs. Shin et al. (2009) used a combination of ice packs and gel packs. Both studies measured pain using a VAS and concluded that cold therapy is an effective pain management tool.

Shin et al. (2009) included 97 participants in their randomized controlled study which evaluated the effects of cryotherapy on pain, eyelid edema, and facial ecchymosis. Forty-nine participants were placed in the control group and 48 were in the intervention group. The control group received standard care. The intervention group had round ice packs applied to their surgical wounds and their head elevated to 30 degrees. They also had cold gel packs taped to the periorbital area. This was left in place for 20 minutes. The intervention was started three hours after surgery and was repeated every hour from 7:00 am until 10:00 pm for the first three

postoperative days. Ice packs were not withheld from the control group for ethical reasons, but they did not receive the gel packs. Participants rated their pain using a VAS. Data was gathered preoperatively, three and nine hours after surgery, and on postoperative days 1, 2, 5, and 7. Researchers noted that the intervention group's pain ratings were lower than the control group on the third postoperative day, but the difference was not significant. Eyelid edema and ecchymosis was significantly less in the intervention group.

Fifty-five people participated in a RCT that evaluated the effects of ice packs on midline abdominal incision pain (Watkins et al., 2014). Twenty-eight participants were in the control group and twenty-seven were in the intervention group. The control group received standard care. The intervention group had reusable ice packs applied to their incision in the operating room. The ice pack was left on for the first 24 hours postop. The after the first 24 hours, participants could decide if they wanted to continue using the ice packs or not. Researchers measured the patient's pain scores one hour postoperatively and then twice a day at 8:00 am and 4:00 pm. Patients rated their pain using a VAS. Pain scores were significantly less in the intervention group during both assessments on postop day 1 and in the afternoon assessment on postop day 3. Participants in the intervention group were also given a voluntary questionnaire on patient satisfaction. The results were overwhelmingly positive. The participants reported that the ice packs helped their pain and that they would request ice packs for pain if they have more surgeries.

Chou and Liu (2008) conducted a quasi-experimental (Level III) study on the differences between moist cryotherapy and dry cryotherapy on patient discomfort after orthognathic, or face and jaw, surgery. Discomfort measures included local heat, pain, and swelling. The researchers divided the participants into group I and group II. Group I (n=27) had cold moist towels applied

to their faces. The towels were re-cooled every 5 minutes. Group II (n=21) had 4 plastic bags filled with ice placed on both sides of the chin and neck. The cold therapies were left in place for 30 minutes and then removed for 10. The process was repeated for the first 48 postoperative hours. Participants used a VAS to rate their pain, heat sensation, and facial swelling. This data was gathered at 24 and 48 hours postop. Researchers used a thermometer to measure the skin temperature at nine points (forehead, ear, mandible angle, center of the zygomatic bone, and mouth angle bilaterally). They took measurements at 60, 90, 120, 150, and 180 minutes and 24 and 48 hours postop. The thermometer reported a greater decrease in skin temperature in group II. Participants in group I, the moist towel group, reported significantly lower levels of heat sensation, facial swelling, and pain. The difference in the groups' mean pain scores at the 24 hour evaluation was 11 percent, which was not statistically significant. By the 48 hour mark, the group I participants' mean pain score was 35 percent lower than the participants in group II, which represented a statistically significant difference.

Zencir and Eser (2016) conducted a randomized crossover study (Level III) to evaluate the effects of cold packs on postoperative sternotomy pain and participants' ability to complete breathing exercises. The thirty-four participants functioned as a simultaneous control. Participants rated their pain using a VAS. The participants underwent four episodes of coughing and deep breathing, two times with a cold gel pack and two times without the gel pack. To avoid any residual effects between the treatments, at least four hours separated the exercises. The gel packs were applied for 20 minutes before performing the coughing and deep breathing. Participants rated their pain using a VAS. Researchers gathered the pain scores just prior to the gel pack being applied and after the coughing and deep breathing exercises. Participants' deep breathing was measured using an incentive spirometer. Data was gathered twice a day at 8:00



am and 2:00 pm for the first two postoperative days. As expected, pain ratings increased with the coughing and deep breathing exercises. On average, scores rose approximately 20 percent when the gel pack was used. Without the gel pack, the average scores rose approximately 60 percent. This was noted to be significant. A significant increase in incentive spirometer values was noted between postop days 1 and 2 when the gel pack was used. Forty out of the 43 patients reported that they would prefer to use the gel packs for pain management.

Only one of the studies also evaluated the effect cold therapy on anxiety (Demir & Korshid, 2010). All of the studies concluded that cold packs had a positive effect on pain. Other outcomes evaluated were analgesic use (Kol et al., 2013; Watkins et al., 2014), length of stay (Watkins et al., 2014), nursing opinions or views on the therapy (Watkins et al., 2014), swelling (Chou & Liu, 2008; Shin et al., 2009), oxygen saturation and incentive spirometry (Zencir & Eser, 2016), and ecchymosis (Shin et al., 2009).

This sub-section found adequate evidence for the use of cold therapy as a non-pharmacological method for pain management. All six studies included in the review found significant benefit of cold therapy for reducing pain in post-surgical patients. The next sub-section will review evidence related to the modality of guided imagery as a non-pharmacologic pain intervention.

### **Guided Imagery**

The search for postoperative pain and guided imagery resulted in a total of 38 articles, six of which were duplicates. Of the 32 remaining articles, 30 were immediately excluded because they had a focus on something other than guided imagery on pain in the postoperative period.

Both studies were a Level III. A description of the two remaining studies follows.

Ninety-three people participated in a pretest/post-test quasi-experimental study evaluating the effects of relaxation therapy on pain and anxiety both before and after undergoing a joint replacement surgery (Lin, 2011). Forty-eight participants were allocated to the control group and 45 were allocated to the intervention group. The groups were assigned by sequential assignment and the control participants were enrolled first. The control subjects received standard care. The intervention group listened to a 10-minute cassette tape recording on guided imagery. During this time, the lights were dimmed, the patient was encouraged to assume a comfortable position, and a sign was placed on the door to minimize interruptions. Researchers asked the intervention participants to listen to the tape two times in a row. The intervention was implemented on the day prior to surgery. Researchers assisted the participants to listen to the tape at 2:00 pm for the first three postop days. The participants could also listen to the tape anytime they wanted. The patients used VASs to rate their pain and anxiety. Researchers also elected to use the State-Trait Anxiety Inventory (STAI) to assess the participants' anxiety. Researchers gathered data before and after the intervention from the day prior to surgery through the third postoperative day. Pain ratings were lower in the intervention group, with significant differences noted on the day prior to surgery and the first postop day. Intervention participants' VAS anxiety scores were also significantly different on the day before surgery and the first two postoperative days. No significant difference was noted on the STAI scores.

Thomas and Sethares (2010) conducted a quasi-experimental study that evaluated the effects of guided imagery on postoperative pain in the total joint arthroplasty patient. One hundred twenty-one participants were divided into the control group (n=52) and the intervention group (n=69). The subjects chose to be in the control group or the experimental group. The control group received standard care. The intervention group listened to CD in addition to

receiving standard care. The CD contained quiet music and white noises, such as waves or crickets, and was narrated by one person, who read a message in a soothing voice. The intervention participants listened to the CD twice a day for five days prior to the surgery. They continued to listen to the CD two times a day throughout their hospital stay. The participants wore headphones while listening to the CD. The participants rated their pain using a NRS. They rated their pain using the Beck Anxiety Inventory. Trained research nurses gathered data once a day for the first three postop days. The timing of data collection differed from subject to subject because of therapy schedules. Researchers noted the intervention group had lower pain ratings than the control group on all of the assessments, but the difference was not found to be significant.

Both studies evaluated the effects of guided imagery on pain and anxiety in postoperative orthopedic patients. The participants in both studies were primarily women. Neither study was a randomized controlled trial. Preliminary results from these studies showed guided imagery as an effective non-pharmacological intervention for the treatment of postoperative pain. The final sub-section will discuss the non-pharmacological intervention of music therapy.

### **Music Therapy**

The search for “music therapy” and “postoperative pain” returned 50 articles. Five of the articles were duplicates between the search engines. Of the remaining 45 articles, 29 were eliminated as they had a focus on something other than how music therapy influences pain in the postoperative period. One of the articles was systematic reviews or meta-analyses (Level I) (Hole, Hirsch, Ball, & Meads, 2015). An analysis of the 16 remaining articles follows.

Hole et al. (2015) conducted a search of three databases from 1898 through 2013. They focused their search on RCTs conducted on adults and written in any language. Their search

resulted in 73 studies with over 6500 participants. Sixty-one percent of the studies found that music reduced patients' postoperative pain. They noted that the timing of the music was not relevant; music could be introduced before, during, or after the procedure and still have an effect on pain. Participants' ability to select the music resulted in a greater reduction in pain, though this reduction was not noted to be significant. The authors stated that one should be allowed to select the type of music. They concluded by stating that music is a safe, non-invasive, and cheap intervention that can be used to reduce pain in the postoperative patient.

Engwall and Dupplis (2009) also conducted a systematic review, but included RCTs and quasi-experimental studies, leading it to be a Level II on the evidence hierarchy. They searched four online databases for the effects of music on postoperative pain. They limited the years of their search to 1998 through 2007. The initial results included 1,631 articles. They limited their review to RCTs and quasi-experimental studies on adult patients that were written in English. In the end, they included eighteen studies. They included 14 RCTs and four quasi-experimental studies that contained a total of 1,604 subjects. Nine of the studies were conducted by two research groups. Five were conducted by the one researcher group and four by the other. A majority, 15 out of 18, of the studies examined revealed the participants in the intervention group reported significantly less pain than the participants in the control group. Four studies also found that the participants in the intervention group required less pain medications.

Three articles evaluated the effects of music on postoperative orthopedic pain (Allred, Byers, & Sole, 2010; Chen, Chen, Huang, Hsieh, & Lai, 2015; Wang, Dong, & Li, 2014). Wang et al.'s (2014) study included both lower limb and gynecological surgery patients. All of the studies were at Level II. The studies had the participants use a VAS to rate their pain. Only Wang et al. (2014) reported that the pain scores in the intervention group were significantly

lower. Allred et al. (2010) did note that the intervention group had a statistically significant reduction in their pain scores, which was not noted in the control.

Allred et al. (2010) conducted a RCT evaluating the effect of music on postoperative pain and anxiety in patients undergoing a total knee arthroscopy. Fifty-six participants were randomly and equally divided between the control and intervention group. The control group received standard care. The intervention group received standard care and listened to music for 20 minutes before and after ambulating for the first time on postop day 1. The control group had a 20 minute rest period before and after walking. Researchers selected the music and picked music with 60 to 80 beats per minute. The participants rated their pain using the MPQ-SF and a VAS. They rated their anxiety using a VAS. Data was gathered four times: just prior and after listening to the music for the first time, immediately after walking (or just before listening to the music for the second time), and immediately after listening to the music for the second time. While the control and intervention groups' pain scores were noted to not be statistically significant, the researchers noted the intervention group's pain score decreased an average of 30 percent while the control group's pain scores dropped an average of 22 percent. No differences were noted in anxiety scores between the groups. At the end of the study, the intervention group completed an experience/satisfaction survey. Eighty-four percent of the intervention participants felt the music helped them to forget about their pain for a while. Ninety-two percent said the music helped improve their mood.

Thirty people participated in a repeated measure RCT that evaluated the effects of music therapy on postoperative pain following total knee replacement surgery (Chen et al., 2015). The thirty participants were equally divided between the control and the intervention groups. The control group received standard care. The intervention group listened to music three different

times during the study. They listened to music for 30 minutes the night before the surgery and again for 30 minutes while in the surgical waiting room the day of surgery. After getting settled in the PACU, music was played for 60 minutes. Researchers selected five compositions, all having around 60 to 80 beats per minute, for the participants to listen to. Researchers gathered data prior to and after the musical intervention. They also gathered data one hour after the participants returned to the ward to examine if there was any long-term effects of the intervention. The participants rated their pain using a VAS. Additionally, researchers recorded the participants' vital signs and opioid usage. Researchers noted a consistent decrease in the intervention group's mean systolic blood pressure through the phases, while the control group's mean systolic blood pressure increased through the phases. No significant differences between the groups were noted in pain ratings and opioid consumption.

Wang et al. (2014) conducted a prospective RCT examining the effects of music on postoperative pain in orthopedic and gynecological surgery patients. The specific types of surgical procedures were not specified. Their study consisted on 40 elderly (ages 65 to 80) participants divided equally between the control and intervention groups. The control group received standard care. The intervention group received standard care and listened to soft music for 30 minutes the night before surgery and during the procedure. The type and beats per minute of the music was not specified. Participants rated their pain using a VAS. They rated their anxiety using the Zung Self-Rating Anxiety Scale (SAS). Validity and reliability of this scale was not noted by the researchers. Participants completed the SAS the night before their surgery and right before surgery. Operating room staff asked the participants about their pain during the procedure, but the frequency of the VAS usage was not specified. SAS scores dropped significantly (approximately 13 percent) in the intervention group, while the SAS scores

increased by approximately one percent in the control group. Mean pain scores six hours after surgery were almost 28 percent lower in the intervention group than in the control group.

Four Level II studies were conducted evaluating the effects of music therapy on cardiovascular or thoracic surgery (Chan, 2007; Cutshall et al., 2011; Liu & Petrini, 2015; Nilsson, 2009). Three of the studies (Chan, 2007; Liu & Petrini, 2015; Nilsson, 2009) selected music with a tempo of 60 to 80 beats per minute. Cutshall et al. (2011) did not define the tempo of music used. Three of the studies also evaluated the effects of music on patient's anxiety, though they all used different measuring scales (Cutshall et al., 2011; Liu & Petrini, 2015; Nilsson, 2009). The findings were mixed. Chan (2007), Cutshall et al. (2011), and Liu and Petrini (2015) noted a statistically significant reduction in the intervention group's pain scores. Two of the studies found lower anxiety scores in the intervention group (Cutshall et al., 2011; Liu & Petrini, 2015), although Cutshall et al. (2011) noted the difference in anxiety scores was not significant.

Chan (2007) conducted an RCT to evaluate the effects of music on postoperative pain in patients undergoing a C-clamp procedure after percutaneous coronary interventions. Sixty-six patients participated in the study. Thirty-five people were in the control group and 31 were in the experimental group. Both groups received standard care (plus rest). The intervention group listened to researcher-selected music via headphones for the 45 minutes the C-clamp was applied. Pain data was gathered before the C-clamp was applied and upon its removal. The researchers selected the University of California at Los Angeles (UCLA) universal pain assessment tool to evaluate pain. The UCLA universal pain assessment tool is an 11 point scale similar to the NRS. The researchers tested the scale and found it to be valid and reliable. Significant differences in pain scores were found between the groups when the C-clamp was

removed. The intervention group's mean pain score was 3.5 points, or 55 percent, lower than the control group's mean pain scores.

One hundred patients participated in an RCT conducted by Cutshall et al. (2011). The purpose of the study was to evaluate the effects of music on pain and anxiety in postoperative cardiac surgical patients. The control group had 51 subjects and the experimental group contained 49. The control group received standard care (plus rest). The intervention group listened to one of four different CDs via a CD player. The music contained music and nature sounds. They listened to the music for 20 minutes twice a day on postop days 2 through 4 with controlled interruption. Participants used VASs to rate their pain, anxiety, satisfaction, and relaxation. Data was gathered before and after the intervention. Researchers noted a significant decrease in the intervention group's mean pain scores after the second session on postop day 2. The intervention group's mean pain scores were consistently lower after the intervention, whereas the control group saw an increase in mean pain scores after one session. The control group had higher mean anxiety scores throughout the study. Relaxation and satisfaction scores were also consistently higher in the intervention group. The anxiety, relaxation, and satisfaction scores were not considered statistically significant.

Chinese researchers conducted a RCT examining the effects of music on postoperative pain and anxiety in thoracic surgery patients (Liu & Petrini, 2015). One hundred twelve participants were equally divided between the control and experimental groups. The control group received standard care. The intervention group also received the standard care and listened to researcher-selected, 60 to 80 beats per minute music via an MP3 player with headphones. They listened to the music for 30 minutes once a day on postoperative days 2 and 3 with controls put into place to minimize interruptions. Participants used the FPS to rate their



pain and the STAI to rate their anxiety. Researchers also monitored the participants' vital signs. Data was gathered before and after the intervention. Researchers noted statistically significant differences in pain and anxiety scores between the groups. Almost 90 percent of the intervention participants liked the music and 68 percent felt it helped control their pain. Over 75 percent of the music group felt the music helped their anxiety. No significant differences were noted in amount of pain medications used by the participants.

Nilsson (2009) conducted a repeated-measures RCT primarily to investigate cortisol levels in postoperative CABG or aortic valve replacement patients. Cortisol is a hormone released in response to stress. Pain, anxiety, and vital signs were also measured. Fifty-eight participants were divided into the control group (n=30) and the intervention group (n=28). The control group received standard care (plus rest). The intervention group received standard care and listened to music for 30 minutes via an MP3 that was connected to a music pillow with controls to minimize interruptions. The researchers selected the type and tempo (60 to 80 beats per minute) of the music. The intervention was carried out once on the first postoperative day. Data was gathered immediately prior to and after the intervention and 30 minutes after the intervention. Participants rated their pain and anxiety on NRSs. Immediately after the intervention or rest period (control group), the intervention group's serum cortisol levels were almost 22 percent lower than the control group's serum cortisol levels. The difference was not seen in the final assessment 30 minutes later. No significant differences were noted in pain or anxiety scores.

The search returned two other Level II studies. Ebnesahidi and Mohseni (2008) evaluated the effects of music therapy in C-section patients. Mondanaro, Homel, Lonner, Shepp, Lichtensztein, and Loewy (2017) conducted a study to determine the effects of music on

postoperative spinal surgery pain. Mondanaro et al. (2017) differed from the rest of the studies in that the researchers used live music instead of recorded. Both of the studies allowed the patients to pick the type of music they wanted to listen to. Both studies used a VAS to measure participants' pain. Both studies also evaluated the effects of music on anxiety, but they used different scales. The studies both reported significant findings in regards to pain scores.

Ebneshahidi and Mohseni (2008) conducted a RCT on the effects of music on post-caesarean pain. The music group contained 38 participants and the control group contained 39. Researchers instructed all of the participants to bring in music from home. After getting settled in the recovery room, the intervention participants were allowed to listen to their music, via headphones, for 30 minutes. The control group also wore headphones, but did not listen to music. The groups rated their pain and anxiety scores using VASs. The participants rated their pain and anxiety upon admission. A blinded nurse gathered the data after the intervention. Pain scores were 41 percent lower in the intervention group. Researchers also noted the intervention group required 36 percent less Morphine. These findings were statistically significant. Significant differences were not noted in the anxiety scores.

Sixty people participated in a mixed-methods RCT conducted by Mondanaro et al. (2017). The participants were undergoing spinal fusion surgery. Assignment to the groups was determined based on a randomized chart created by a blinded statistician. The participants were recruited by the research team (who looked at the daily surgical schedule) or through referrals from the medical team or patient care navigator. Participants were divided equally between the control and intervention groups. The control group received standard care. The intervention participants received one 30 minute music session within the first 72 postop hours. Participants selected the type of music. One difference with this study was the fact that researchers used live

music. Pain, which was measured using a VAS, was the primary outcome measured by researchers. Anxiety and depression were measured using the Hospital Anxiety and Depression Scale (HADS). Blinded researchers gathered the data before and after the intervention. The pain scores in the control group rose by 13 percent, while the pain scores in the intervention group drop by almost 18 percent. This difference was noted to be significant. No statistically significant difference were noted in the anxiety or depression scores.

Three Level III studies (four articles) are included in this literature review (Lin, Lin, Huang, Hsu, & Lin, 2011; Özer, Özlü, Arslan, & Günes, 2013; Vaajoki, Kankkunen, Pietilä, Kokki, & Vehviläinen-Julkenun, 2012; Vaajoki, Pietilä, Kankkunen, & Vehviläinen-Julkenun, 2011). The 2011 and 2012 articles by Vaajoki et al. were on the same study. The studies differed in the site of surgery and Özer et al. (2013) used a different tool to measure pain than the other two studies. Two of the studies had the participants choose from limited variety of research-selected music (Lin et al., 2011; Özer et al., 2013). Vaajoki et al. (2011, 2012) allowed the participants to pick from over 2000 songs. Lin et al. (2011) noted that the music had a tempo of 60 to 72 beats per minute. Özer et al. (2013) and Vaajoki et al. (2011, 2012) didn't specify the tempo of the music. Despite these differences, the studies found music therapy to be beneficial for the patients.

Lin et al. (2011) conducted a pretest, post-test quasi-experimental study with 60 participants. They were evaluating the effects music therapy had on postoperative spinal surgery pain and anxiety. The participants were divided equally between a control and an experimental group. Allocation was decided based on the day of the surgery. The control group received standard care (plus rest), while the intervention group received standard care and listened to researcher-selected music that had a tempo of 60 to 72 beats per minute. Participants selected

the music they preferred and were given an MP3 with which to listen to the music. The intervention was 30 minutes in length with controls in place to minimize interruptions. Participants listened to the music at four designated times throughout the study: (1) the night before the surgery; (2) one hour prior to surgery; and (3) at 3:00 p.m. on the first two postoperative days. The researchers encouraged the participants to listen to the music at any time outside of the designated times. Participants used VASs to rate their pain and anxiety before and after each designated music session. Anxiety was also measured using the STAI the night before the study and on the second postoperative day. Statistically significant differences in VAS pain and anxiety scores were seen between the two groups during all measurements. The lowest differences were noted on the first postop day where the intervention group's mean pain and anxiety scores were 39 and 48 percent, respectively, lower than the control group. The intervention group's three other mean pain scores were over 60 percent lower than the control group's mean pain scores. The intervention group's mean anxiety scores varied from 59 percent lower on the day of the surgery to 75 percent lower on the day before the surgery.

Eighty-seven people participated in a pretest, post-test quasi-experimental study evaluating the effects of music therapy on postoperative cardiac surgery pain (Özer et al., 2013). Forty-four participants were in the intervention group and 43 in the control group. The control group received standard care (plus rest). The intervention group received standard care and listened to music via headphones for 30 minutes. The intervention participants chose from 20 different choices of researcher-selected music. The intervention was only conducted once. Participants rated their pain before and after the intervention using a unidimensional verbal pain intensity scale. With this scale, the participants identify the words (“hurts a little bit”, “hurts a little more”, “hurts even more”, “hurts a whole lot”, and “hurts worse”) that best matches their

pain (Özer et al., 2013, p. 22). The words are paired with numbers (1 to 5), with a higher number indicating more pain. The intervention participants' mean posttest ratings were almost 44 percent lower than their mean pretest scores. By comparison, the control group's mean posttest scores were only 4 percent lower than the pretest.

Vaajoki et al.'s 2011 article discussed the effectiveness of music therapy on pain intensity and distress. The 2012 article explored the effect of music therapy on analgesic use and length of hospital stay. Their prospective, quasi-experimental study included 168 patients undergoing laparoscopic abdominal surgery. Eighty-three people were assigned to the intervention group. Eighty-five were assigned to the control. The week the participant had surgery determined the group placement. Both groups received standard postoperative care. The intervention group listened to music for 30 minutes a total of seven times during the study, once the evening of surgery and three times (morning, afternoon, and evening) on the first two postoperative days. Participants listened to their choice of music via headphones connected to an MP3 from over 2000 songs from a variety of genres. Music was added upon participant request. All but one patient used a VAS to rate their pain. One patient in the control group was blind and used a NRS instead. Statistically significant differences were not noticed on the first postoperative day. On the second postop day, the intervention group's pain intensity during rest, with position changes, and with deep breathing were 33, 24, and 31.5 percent lower, respectively, than the control group's scores (Vaajoki et al., 2011). These were noted to be significant findings. The intervention group used slightly less amounts of analgesic, but the difference was not statistically significant (Vaajoki et al., 2012).

One Level IV study is included in this literature review (Madson & Silverman, 2010).

Fifty-eight patients undergoing a solid organ transplant participated in a pretest, posttest study.

The participants listened to music for anywhere from 15 to 35 minutes. The principal investigator sang and played the guitar. The participants could receive the music therapy once a week, but only one session was included in the study. The participants rated their pain, nausea, anxiety, and relaxation on 10-point Likert scales. With their Likert scale, lower scores were desired. Data was gathered before and after the session. Statistically significant differences were noted across all areas. Participants' mean pain scores dropped by over 18 percent. A 38 percent decrease in mean anxiety score was noted. The most dramatic change was noted in the participants' relaxation scores which changed by 41 percent.

Similar to the massage sub-section, nine of the studies examined the effects of music therapy on anxiety, which, as mentioned earlier, is can influence pain (Allred et al., 2010; Cutshall et al., 2011; Ebnesahidi & Mohseni, 2008; Lin et al., 2011; Liu & Petrini, 2015; Madson & Silverman, 2010; Mondanaro et al., 2017; Nilsson, 2009; Wang et al., 2014). Seven studies examined the effects of music therapy on vital signs (Allred et al., 2015; Chan, 2007; Chen et al., 2015; Ebnesahidi & Mohseni, 2008; Liu & Petrini, 2015; Nilsson, 2009; Özer et al., 2013), while four examined opioid usage (Allred et al., 2015; Chen et al., 2015; Ebnesahidi & Mohseni, 2008; Vaajoki et al., 2012). Two studies examined patient satisfaction (Allred et al., 2015; Cutshall et al., 2011) and two examined relaxation (Madson & Silverman, 2010; Cutshall et al., 2011).

One common theme noted by the researchers was the influence of the participant's music preference. The studies recommended future studies take this into consideration. Ten out of the 13 studies and both systematic reviews concluded that music therapy was beneficial in reducing pain scores in postoperative patients. This sub-section found adequate evidence for the use of music therapy as a non-pharmacological method for pain management.

## Summary

This literature review examined 43 articles consisting of two systematic reviews and 41 studies of the effectiveness of alternative therapies (massage, aromatherapy, cold therapy, guided imagery, and music therapy) for post-surgical pain control. A majority of the studies were of Level II evidence. Eight studies were of Level III evidence. Two were of Level IV evidence and one was of Level VI evidence. No Level V or Level VII evidence studies were included in this review of literature.

The findings from 42 studies found overwhelming evidence of the efficacy of alternative therapies for post-surgical pain control and only five did not find a significant difference in pain scores (Albert et al., 2009; Allred et al., 2010; Chen, 2015; Nilsson, 2009; Thomas & Sethares, 2010).

The strongest evidence of efficacy of alternative interventions for pain control emerged from the studies related to massage therapy. Thirteen out of the 14 massage therapy studies reported significant differences in pain scores between the control and intervention groups. However, there were differences in the way the intervention was delivered, which confounded the evidence to some degree. The site massaged differed in the studies. Six studies examined the effects of extremity massages (Abbaspoor et al., 2014; Boitor et al., 2015; Degirmen et al., 2010; Miller et al., 2015; Saatsaz et al., 2016; Ucuzal & Kanan, 2014), while another six allowed patients to select the massage site (Bauer et al., 2010; Braun et al., 2012; Cutshall et al., 2010; Dion et al., 2011; Drackley et al., 2012; Dreyer et al., 2015). One study focus on the back and neck (Mitchinson et al., 2007) and one study did not specify the site massaged (Albert et al.,

2009). The length of the massage also differed between the studies, with a majority of the massages (n=10) being 20 minutes in length. Miller et al. (2015) examined the effects of a brief massage (five minutes), acknowledging the fact that nursing staff may not have the time to perform longer massages. Drackley et al. (2012) investigated a “fee-for-service” model (p. 121). Insurance did not pay for the massage.

Significant differences were noted in pain scores in all of the aromatherapy and essential oil studies. Of the five studies, four examined the effects of lavender (Kim et al., 2007; Sheikhan et al., 2012; Vakilian et al., 2011; Yu & Seol, 2017). Lavender is a popular essential oil used to treat pain. However, only two studies used aromatherapy alone (Kim et al., 2007; Yu & Seol, 2017), which decreased the strength of the evidence for this therapy alone. The other studies incorporated the oil in either a sitz bath in which the patient soaked (Sheikhan et al., 2012; Vakilian et al., 2011) or into the lotion that was used in a massage (Adachi et al., 2014).

Cold therapy or cryotherapy was found to be effective in reducing pain in all six studies. The studies implemented cold therapy in different ways. Three studies used cold gel packs (Demir & Korshid, 2010; Kol et al., 2013; Zencir & Eser, 2016). One used a combination of cold gel packs and ice packs (Shin et al., 2009), while another used ice packs and cold, wet towels (Chou & Liu, 2008). Only one used just ice packs (Watkins et al., 2014). There were no studies identified that compared the various methods of using cold therapy, therefore, the evidence indicates that cold therapy is effective for pain management, but there is less clarity as to the most effective modality for delivering this therapy.

The evidence for guided imagery was limited to two guided imagery studies, which found different pain reduction results. Lin (2011) found that guided imagery resulted in a significant reduction in pain scores, while Thomas and Sethares (2010) did not find differences in the



scores. Of interest, both studies implemented the intervention prior to surgery and not post-surgical, which is the focus for this literature review. Thus, the decision was made post literature review that the utility of this evidence was limited and therefore would not be used in the project.

The evidence of efficacy of music therapy emerged quite strongly in this review. Of the 15 music therapy studies, ten found the intervention to be helpful in reducing pain scores. Four of the studies allowed the participants to select the type of music (Ebnesahidi & Mohseni, 2008; Madson et al., 2010; Mondanaro et al., 2017; Vaajoki et al., 2011 & 2012). Thus, music preference trended as an important interventional approach for positive effects on pain control.

Twenty-one of the studies also investigated the effects of the non-pharmacological intervention on anxiety. This evidence is included in this review because anxiety is known to influence the perception of pain. No studies using the aromatherapy and essential oils as a variable for the effects on anxiety. The results from the studies that used the other alternative therapies included in this review were mixed. Eleven studies found the intervention significantly decreased anxiety: seven massage therapy (Bauer et al., 2010; Braun et al., 2012; Cutshall et al., 2010; Drackley et al., 2012; Dreyer et al., 2015; Mitchinson et al., 2007; Saatsaz et al., 2016) and four music therapy (Lin et al., 2011; Liu & Petrini, 2015; Madson & Silverman, 2010; Wang et al., 2014). Cutshall et al.'s (2011) music therapy study found a difference in anxiety, but this was not statistically significant.

Regardless of the type of non-pharmacological intervention, researchers repeatedly concluded that they were effective, non-invasive, and inexpensive alternatives to analgesic medications, which carry a higher risk of adverse effects (Hole et al., 2015; Liu & Petrini, 2015; Özer et al., 2013; Watkins, 2014). The use of non-pharmacological interventions is not a new concept for Americans (Abbaspoor et al., 2014; Bauer et al., 2010; Dion et al., 2011; Drackley et

al., 2012; Mitchinson et al., 2007). Evidence from this literature review was used to create a continuing education event for staff nurses to empower them to use non-pharmacological interventions, which can be tailored to the patient's unique needs or requests in the effort to manage pain in the post-operative period. The next section provides details on the synthesis of the literature and creation of the educational plan.

## **Discussion**

### **Interpretation**

Despite there being a better understanding of pain and the development of new treatments, patients do not feel like their pain is being treated adequately (Bernhofer, 2011). Opioids, the common method of treating pain, has come under scrutiny in the wake of the national opioid crisis. The management of pain is an important focus for healthcare providers. Untreated or inadequately treated pain has deleterious effects, both short-term and long-term, on patients. Patient satisfaction with pain management influences hospital reimbursement by government agencies (HCAHPS, 2015).

Treating the whole patient, or holism, is a distinguishing concept that separates the nursing model from the medical model (Mason, 2014). This aligns with the key concepts of Katharine Kolcaba's Comfort Theory. Non-pharmacological interventions – massage, aromatherapy, music therapy, guided imagery, cryotherapy – generally fall into to the category of interventions described by Parker and Smith (2010) as “Comfort Food for the Soul” (p.394). All of the non-pharmacological interventions included in the review of literature demonstrated a positive influence on postoperative pain. Massage therapy and music therapy had very strong evidence supporting their use in the management of postoperative pain. The other topics, while the results were positive, had limited studies included in this review (guided imagery) or had

differing application methods (cryotherapy, aromatherapy/essential oils), which makes it more difficult to state with certainty which method is most effective.

Sidani et al. (2016) found that nurses generally had a positive opinion of the use of non-pharmacological interventions in the management of pain, but are often overlooked for a variety of reasons including, but not limited to, lack of time or comfort with the interventions (Parker & Smith, 2010). Almost everything a nurse does for her patients requires a physician order. Most non-pharmacological interventions can be implemented without a physician's order. Being able to implement cares for the patient without having to get an order from a healthcare provider can be empowering for nurses.

Nursing burnout is an issue in the United States. A recent, nation-wide survey found that 70 percent of the respondents feel burnt out (Masterson, 2017). Nursing burnout impacts patient care and leads to decreased patient satisfaction and a poor quality of care (Masterson, 2017). Busy workloads, sicker patients, and staffing shortages play a role in this problem. Technology can also play a role (Masterson, 2017). Nurses report feeling like they spend more time in front of the computer than in interacting with the patient and their family. Incorporating non-pharmacological interventions, especially massage, could possibly help the nurse to feel more connected to her patient, leading to the "wow" moments described by Parker and Smith (2010) and improving nurse satisfaction.

Professional medical societies and government organizations recognize that a multi-modal approach is a preferred approach in the treatment of postoperative pain (Montgomery & McNamara, 2016). For some, a combination of the methods is necessary to obtain the best pain relief (Gatlin & Schulmeister, 2007). The review of literature revealed strong evidence that non-pharmacological interventions aid in reducing a person's pain in the postoperative period. The

information gathered from this independent study was used to educate staff nurses as to the benefits of non-pharmacological interventions in the treatment of postoperative pain.

### **Outcome/Dissemination**

The information from this independent study was disseminated to the nursing staff at the facility at a continuing education event. The objectives for the event were:

By the end of this event, the learner will be able to:

1. Identify three consequences of untreated or under-treated pain.
2. Identify two provider barriers to pain management.
3. Describe the four contexts of comfort.
4. Identify their beliefs towards the use of non-pharmacological methods in the management of pain.
5. Describe three non-pharmacological interventions available for patients at the facility.

The event was directed primarily at nurses, but was open to employee of the facility.

Nursing staff should have received education on the basics of pain in school. The purpose of the first part of the presentation was to reinforce this information and to educate staff on the facts of pain, barriers to treating pain, and why proper management is important. The second half of the presentation was to introduce Katharine Kolcaba's Comfort Theory and the role of non-pharmacological interventions, the effectiveness of the non-pharmacological interventions reviewed in this independent study, and to explore the non-pharmacological interventions available at the facility.

Lecture was the primary method used for the presentation. Lecture is an effective method of learning when there are time constraints and when information comes from a variety of sources (Billings & Halstead, 2012; Bastable, 2014). Education and experience levels of the

attendees varied. Lecture is an effective method of teaching, especially at lower levels of the cognitive domain of learning (Bastable, 2014). A common criticism of lecture is that it has limited participant involvement (Billings & Halstead, 2012). To combat this and to promote learner engagement, questions were asked throughout the event. Anonymous polling (“clickers”) was used for some of the questions, while the audience was asked to answer other questions out loud. The goal of this was to draw on the staff’s experiences.

A PowerPoint presentation was created for the event (Appendix B.). Learning was evaluated by the questions asked throughout and after the education event. “Clickers” was used to encourage participation. People can feel uneasy when they have to answer questions publically and like the anonymity that clickers provide (Lantz, 2010).

### **Implications for Nursing**

**Practice.** Nurses and other healthcare providers should implement non-pharmacological interventions into their practice. It’s been noted that non-pharmacological interventions are inexpensive and have few adverse effects (Hole et al., 2015; Kim et al., 2007; Liu & Petrini, 2015; Saatsaz et al., 2016; Watkins et al., 2014). The effects of non-pharmacological interventions and opioid consumption was not the focus of this independent study. It was a secondary finding in nine of the 43 studies included in the review of literature. Four of these studies found that the intervention groups required less opioids to manage their pain (Ebnesahidi & Mohseni, 2008; Kim et al., 2007; Kol et al., 2013; Watkins et al., 2014). Two other studies mention that the interventions could potentially be used to reduce the amounts of opioid used to treat postoperative pain (Abbaspoor et al, 2014; Allred et al, 2010)

Parker and Smith (2010) note that non-pharmacological interventions often fall into the “Comfort Food for the Soul” (p. 394) interventions, which are the ones patients are more apt to

remember. Maya Angelou has a quote, which paraphrases a different quote, echoing this sentiment: “I’ve learned that people will forget what you said, people will forget what you did, but people will never forget how you made them feel” (Jagannathan, n.d.). How patients remember their hospital experiences will influence how they rate their stay on the HCAHPS survey.

**Education.** Nurses and nursing students need education about the various types of non-pharmacological interventions (Allred et al., 2015; Vaajoki et al., 2012). Possible education topics could include theories as to how non-pharmacological interventions help control pain, training on the different massage methods, training on how to use guided imagery with patients, and education on the various aromas and their healing attributes and methods of use. This independent study focuses on a general overview of non-pharmacological interventions as an option to aid in postoperative pain control. After trialing on one unit, the facility recently implemented the “Comfort Menu”, which allows patients to identify the types of non-pharmacological intervention they would like to try, throughout the hospital. Education on the “Comfort Menu”, was also included in the continuing education event.

Pain management is just one use for non-pharmacological interventions. Other education could include uses for non-pharmacological interventions, such as anxiety or nausea.

**Policy.** The Joint Commission (2017) is implementing new and revised pain standards on January 1, 2018. One of the elements for pain management is that the hospital “provides nonpharmacological pain treatment modalities” (p. 2). The facility where the continuing education event was held does not currently have an alternative therapy policy. The facility is part of a larger health care organization. Other sites associated with the organization have

alternative therapy policies. The facility could work with the sister sites to form its own alternative therapy policy, or possibly look at creating one policy for the entire organization.

The facility has a policies and procedures committee. A majority of the members are removed from direct patient care, for example managers or administrators. The committee does attempt to reach out to subject matter experts when needed. People who should be included in the development of an alternative therapy policy should include nurses and certified nursing assistants, physical and occupational therapy staff, pharmacists, and physicians. The committee would have to determine which interventions could be performed by the staff members or if any interventions, such as massage, should be performed by trained therapists. In this case, consulting professionals from outside the facility. The committee would need to decide which interventions would be used and who would be implementing them.

**Research.** Further research should be conducted on the length and depth of massage. One massage article found participants in the intervention group complained of increased pain on the day following the massage. Researchers attributed this to working out some of the knots and muscle tension and that the participants may have been more willing to get up and moving, thus leading to increased soreness the next day (Bauer et al., 2010). Length of massage is an important consideration. Only one study examined the effects of a brief massage, which may be more feasible for the staff nurse (Miller et al., 2015).

Of the five aromatherapy/essential oil studies included in the review of literature, only two used aroma alone (Kim et al., 2007; Yu & Seol, 2017). Two of the studies had participants soak their incision in a bath containing the essential oil lavender (Sheikhan et al., 2012; Vakilian et al., 2011). Lavender is known to contain antibacterial and antifungal properties and is

attributed with analgesic and antispasmodic properties (Sheikhan et al., 2012). Further research should examine the effectiveness of the different ways aromatherapy can be used.

One common theme in the music therapy literature was the patient's ability to select the type of music. Music has the ability to elicit strong emotions from people, emotions ranging from joy to sadness, from tension to transcendence (Vuilleumier & Trost, 2015). Future research should evaluate the effect of patient-selected music on pain.

Anxiety is known to increase the amount of pain medications a person needs (Bailey, 2010). Several of the studies examined the effect of the non-pharmacological intervention on anxiety, with mixed results. None of the aromatherapy/essential oils studies examined its effect on anxiety. The correlation between non-pharmacological interventions and anxiety is a potential area for future research.

### **Summary and Conclusions**

According to Kolcaba, humans strive to have their basic comfort needs met. Pain interferes with comfort. When patients' basic comfort needs are not met, they are unable to rise above and reach their full potential. Untreated or under-treated pain can have negative short-term and long-term effects on a person.

In addition to the effects on patients, patients' perception of pain management also affects hospitals. HCAHPS surveys ask questions about pain management. Hospital reimbursement is tied to these results. The scores for the facility are below the state and national average.

The use of non-pharmacological interventions in nursing is not a new concept. Advances in technology, increased reliance on medications, and increased demands on nurses' time has caused non-pharmacological interventions to be overlooked as a pain management option. Strong evidence in the review of literature was found to support nurses' use of non-pharmacological interventions in the treatment of postoperative pain.



Katharine Kolcaba's Comfort Theory was used to design a continuing education event for staff nurses at a mid-size facility in Midwestern North Dakota. One of the goals of the continuing education event was to increase nurse awareness of the type of non-pharmacologic interventions available and their effectiveness. Another goal was dispel myths or misconceptions about pain. By breaking down this barrier, the hope is that nurses will treat the patient holistically. The hope is that the continuing education event helped nurses realize what they can do to help their patients, without having to get an order from an advanced care provider. This will hopefully allow patients to have their comfort needs met and for nurses to feel a sense of fulfillment and satisfaction.

### References

- Abbaspoor, Z., Akbari, M., & Najar, S. (2014). Effect of foot and hand massage in post-cesarean section pain control: A randomized control trial. *Pain Management Nursing, 15*(1), 132-136. <http://dx.doi.org/10.1016/j.pmn.2012.07.008>
- Adachi, N., Munesada, M., Yamada, N., Suzuki, H., Futohashi, A., Shigeeda, T., . . . Nisjigaki, M. (2014). Effects of aromatherapy massage on face-down posture-related pain after vitrectomy: A randomized controlled trial. *Pain Management Nursing, 15*(2), 482-489. <http://dx.doi.org/10.1016/j.pmn.2012.12.004>
- Albert, N.M., Gillinov, A.M., Lytle, B.W., Feng, J., Cwynar, R., & Blackstone, E.H. (2009). A randomized trial of massage therapy after heart surgery. *Heart & Lung, 38*(6), 480-490. doi: 10.1016/j.hrtlng.2009.03.001
- Alligood, M.R. (2014). *Nursing theorists and their work* (8<sup>th</sup> ed.). St. Louis, MO: Elsevier Mosby.
- Allred, K.D., Byers, J.F., & Sole, M.L. (2010). The effect of music on postoperative pain and anxiety. *Pain Management Nursing, 11*(1), 15-25. doi: 10.1016/j.pmn.2008.12.002
- The American Academy of Pain Medicine (AAPM). (n.d.). AAPM facts and figures on pain. Retrieved from [http://www.painmed.org/PatientCenter/Facts\\_on\\_Pain.aspx#refer](http://www.painmed.org/PatientCenter/Facts_on_Pain.aspx#refer)
- American Nurses Association (ANA). (2011). Nursing at its best: Competent and caring. *Online Journal of Issues in Nursing (OJIN), 16*(2). Retrieved from <http://www.nursingworld.org/MainMenuCategories/ANAMarketplace/ANAPeriodicals/OJIN/TableofContents/Vol-16-2011/No2-May-2011/Articles-Previous-Topics/Nursing-at-its-Best.html>

- American Nurses Association (ANA). (2015). *Code of ethics for nurses with interpretive statements*. Retrieved from <http://nursingworld.org/DocumentVault/Ethics-1/Code-of-Ethics-for-Nurses.html>
- Bailey, L., (2010). Strategies for decreasing patient anxiety in the perioperative setting. *AORN Journal* 92(4), 445-458. doi: 10.1016/j.aorn.2010.04.017
- Bastable, S.B. (2014). *Nurse as educator: Principles of teaching and learning or nursing practice* (4<sup>th</sup> ed.). Burlington, MA: Jones & Bartlett Learning.
- Bauer, B., Cutshall, S.M., Wentworth, L.J., Engen, D., Messner P.K., Wood, C.M., . . . Sundt, T.M. (2010). Effect of massage therapy on pain, anxiety, and tension after cardiac surgery: A randomized trial. *Complementary Therapies in Clinical Practice*, 16, 70-75. doi: 10.1016/j.ct cp.2009.06.012
- Bernhofer, E., (2011). Ethics and pain management in hospitalized patients" *OJIN: The Online Journal of Issues in Nursing*, 17(1). Retrieved from <http://nursingworld.org/MainMenuCategories/ANAMarketplace/ANAPeriodicals/OJIN/Columns/Ethics/Ethics-and-Pain-Management-.html>
- Billings, D.M., & Halstead, J.A. (2012). *Teaching in nursing: A guide for faculty* (4<sup>th</sup> ed.). St. Louis, MO: Elsevier Saunders.
- Bockhold, C.R., & Hughes, A.K. (2016). The ethics of opioids for chronic noncancer pain. *Nursing*, 46(10), 63-68. doi: 10.1097/01.NURSE.0000494640.54809.51
- Boitor, M., Martorella, G., Arbour, C., Michaud, C., & Gélinas, C. (2015). Evaluation of the preliminary effectiveness of hand massage therapy on postoperative pain of adults in the intensive care unit after cardiac surgery: A pilot randomized controlled trial. *Pain Management Nursing*, 16(3), 354-366. <http://dx.doi.org/10.1016/j.pmn.2014.07.014>

- Braun, L.A., Stanguts, C., Casanelia, L., Spitzer, O., Paul, E., Vardaxis, N.J., & Rosenfeldt, F. (2012). Massage therapy for cardiac surgery patients – a randomized trial. *The Journal of Thoracic and Cardiovascular Surgery*, 144(6), 1453-1459.  
<http://dx.doi.org/10.1016/j.jtcvs.2012.04.027>
- Chan, M.F. (2007). Effects of music on patients undergoing a C-clamp procedure after percutaneous coronary interventions: A randomized controlled trial. *Heart & Lung*, 36(6), 431-439. doi: 10.1016/j.hrtlng.2007.05.003
- Chen, H.J., Chen, T.Y., Huang, C.Y., Hsieh, Y.M., & Lai, H.L. (2015). Effects of music on psychophysiological responses and opioid dosage in patients undergoing total knee replacement surgery. *Japan Journal of Nursing Science*, 12, 309-319. doi: 10.1111/jjns.12070
- Chou, S.Y., & Liu, H.E. (2008). Comparison of effectiveness between moist and dry cryotherapy in reducing discomfort after orthognathic surgery. *Journal of Clinical Nursing*, 17, 1735-1741. doi: 10.1111/j.1365-2702.2007.02115.x
- Cicolini, G., Comparcini, D., & Simonetti, V. (2014). Workplace empowerment and nurses' job satisfaction: A systematic literature review. *Journal of Nursing Management*, 22, 855-871. doi: 10.1111/jonm.12028
- Cleveland Clinic. (n.d.). Acute vs. chronic pain. Retrieved from <https://my.clevelandclinic.org/health/articles/acute-vs-chronic-pain>
- Cutshall, S.M., Anderson, P.G., Prinsen, S.K., Wentworth, L.J., Olney, T.L., Messner, P.K., . . . Bauer, B. (2011). Effects of the combination of music and nature sounds on pain and anxiety in cardiac surgical patients: A randomized study. *Alternative Therapies in Health and Medicine*, 17(4), 16-23.

Cutshall, S.M., Wentworth, L.J., Engen, D., Sundt, T.M., Kelly, R.F., & Bauer, B.A. (2010).

Effect of massage therapy on pain, anxiety, and tension in cardiac surgical patients: A pilot study. *Complementary Therapies in Clinical Practice*, 16, 92-95. doi:

10.1016/j.ctcp.2009.10.006

Degirmen, N., Ozerdogan, N., Sayiner, D., Kosgeroglu, N., & Ayranci, U. (2010). Effectiveness

of foot and hand massage in postcesarean pain control in a group of Turkish pregnant women. *Applied Nursing Research*, 23, 153-158. doi: 10.1016/j.apnr.2008.08.001

Demir, Y., & Khorshid, L. (2010). The effect of cold application in combination with standard analgesic administration on pain and anxiety during chest tube removal: A single-blinded, randomized, double-controlled study. *Pain Management Nursing*, 11(3), 186-196. doi:

10.1016/j.pmn.2009.09.002

Dion, L., Rodgers, N., Cutshall, S.M., Cordes, M.E., Bauer, B., Cassivi, S., & Cha, S. (2011).

Effect of massage on pain management for thoracic surgery patients. *International Journal of Therapeutic Massage and Bodywork*, 4(2), 2-6.

Drackley, N.L., Degnim, A.C., Jakub, J.W., Cutshall, S.M., Thomley, B.S., Brodt, J.K., . . .

Broughey, J.C. (2012). Effect of massage therapy for postsurgical mastectomy recipients. *Clinical Journal of Oncology Nursing*, 16(2), 121-124. doi: 10.1188/12.CJON.121-124

Dreyer, N.E., Cutshall, S.M., Huebner, M., Foss, D.M., Lovely, J.K., Bauer, B.A., & Cima, R.R.

(2015). Effect of massage therapy on pain, anxiety, relaxation, and tension after colorectal surgery: A randomized study. *Complementary Therapies in Clinical Practice*, 21, 154-159. <http://dx.doi.org/10.1016/j.ctcp.2015.06.004>

Ebneshahidi, A., & Mohseni, M. (2008). The effect of patient-selected music on early

postoperative pain, anxiety, and hemodynamic profile in cesarean section surgery. *The*

- Journal of Alternative and Complementary Medicine*, 14(7), 827-831. doi:  
10.1089/acm.2007.0752
- Engwall, M., & Dupplis, G.S. (2009). Music as a nursing intervention for postoperative pain: A systematic review. *Journal of PeriAnesthesia nursing*, 24(6), 370-383. doi:  
10.1016/j.jopan.2009.10.013
- Ferrell, B.R., & Ferrell, B.A. (1990). Comfort. In D.A. Corr, & C.A. Corr (Eds.), *Nursing Care in an Aging Society* (pp. 67-91). New York, New York: Springer Publishing Company.
- Gatlin, C.G., & Schulmeister, L. (2007). When medication is not enough: Nonpharmacologic management of pain. *Clinical Journal of Oncology Nursing* 11(5), 699-704. doi:  
10.1188/07.CJON.699-704
- Gropelli, T., & Sharer, J. (2013). Nurses' perceptions of pain management in older adults. *MEDSURG Nursing*, 22(6), 375-382.
- Hole, J., Hirsch, M., Ball, E., & Meads, C. (2015). Music as an aid for postoperative recovery in adults: A systematic review and meta-analysis. *The Lancet*, 386, 1659-1671.  
[http://dx.doi.org/10.1016/50140-6736\(15\)60169-6](http://dx.doi.org/10.1016/50140-6736(15)60169-6)
- Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS). (n.d.).  
Background. Retrieved from <http://hcahps.org/home.aspx#background>
- Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS). (2015).  
HCAHPS fact sheet. Retrieved from  
[http://hcahps.org/Files/HCAHPS\\_Fact\\_Sheet\\_June\\_2015.pdf](http://hcahps.org/Files/HCAHPS_Fact_Sheet_June_2015.pdf)
- Institute of Medicine of the National Academies. (2011). *Relieving pain in America: A blueprint for transforming prevention, care, education, and research*. The National Academies Press.

Integrative Pain Center of Arizona. (n.d.). The long-term effects of untreated chronic pain.

Retrieved from <http://www.ipcaz.org/long-term-effects-untreated-chronic-pain/>

International Association for the Study of Pain (IASP) and European Federation of IASP

Chapters (EFIC). (n.d.). Unrelieved pain is a major global healthcare problem. Retrieved

from <https://www.iasp->

[pain.org/files/Content/ContentFolders/GlobalYearAgainstPain2/20042005RighttoPainRelief/factsheet.pdf](https://www.iasp-pain.org/files/Content/ContentFolders/GlobalYearAgainstPain2/20042005RighttoPainRelief/factsheet.pdf)

Jagannathan, M. (n.d.). Maya Angelou at her best: 8 quotable quotes. *Reader's Digest*. Retrieved

from <https://www.rd.com/culture/maya-angelou-quotes/>

Joint Commission. (2017). Joint Commission enhances pain assessment and management

requirements for accredited hospitals. *The Joint Commission Perspectives*, 37(7).

Retrieved from

[https://www.jointcommission.org/assets/1/18/Joint\\_Commission\\_Enhances\\_Pain\\_Assessment\\_and\\_Management\\_Requirements\\_for\\_Accredited\\_Hospitals1.PDF](https://www.jointcommission.org/assets/1/18/Joint_Commission_Enhances_Pain_Assessment_and_Management_Requirements_for_Accredited_Hospitals1.PDF)

Kim, J.T., Ren, C.J., Fielding, G.A., Pitti A., Kasumi, T., Wajda, M., . . . Bekker, A. (2007).

Treatment with lavender aromatherapy in the post-anesthesia care unit reduces opioid

requirement in the morbidly obese patient undergoing laparoscopic adjustable gastric

banding. *Obesity Surgery*, 17, 920-925.

King, N.B., & Fraser, V. (2013). Untreated pain, narcotics regulation, and global health

ideologies. *PLoS Med* 10(4):e1001411. doi: 10.1371/journal.pmed.1001411

Kol, E., Erdogan, A., Karsh, B., & Erbil, N. (2013). Evaluation of the outcomes of ice

application for the control of pain associated with chest tube irritation. *Pain Management*

*Nursing*, 14(1), 29-35. <http://dx.doi.org/10.1016/j.pmn.2010.05.001>

- Kolcaba, K. (n.d.). Frequently asked questions. Retrieved from  
<http://www.thecomfortline.com/home/faq.html#comfort-definition>
- Kolcaba, K. (2001). Evolution of the mid range theory of comfort for outcomes research.  
*Nursing Outlook, 49*(2), 86-92. doi: 10.1067/mno.2001.110268
- Kolcaba, K.Y. (1994). A theory of holistic comfort for nursing. *Journal of Advanced Nursing, 19*(6), 1178-1184. doi: 10.1111/j.1365-2648.1994.tb01202.x
- Kolcaba, K. (2003). *Comfort theory and practice: A vision for holistic health care and research* (1<sup>st</sup> ed.) [E-reader version]
- Lantz, M.E. (2010). The use of 'Clickers' in the classroom: Teaching innovation or merely an amusing novelty. *Computers in Human Behavior, 26*, 556-561. doi:  
10.1016/j.chb.2010.02.014
- Lin, P.C. (2011). An evaluation of the effectiveness of relaxation therapy for patients receiving joint replacement surgery. *Journal of Clinical Nursing, 21*, 601-608. doi: 10.1111/j.1365-2702.2010.03406.x
- Lin, P.C., Lin, M.L., Huang, L.C., Hsu, H.C., & Lin, C.C. (2011). Music therapy for patients receiving spine surgery. *Journal of Clinical Nursing, 20*, 960-968. doi: 10.1111/j.1365-2702.03452.x
- Lin, R.J., Reid, M.C., Liu, L.L., Chused, A.E., & Evans, A.T. (2015). The barriers to high-quality inpatient pain management: A qualitative study. *American Journal of Hospice and Palliative Care, 32*(6), 594-599. doi: 10.1177/1049909114530491
- Liu, Y., & Petrini, M.A. (2015). Effects if music therapy on pain, anxiety, and vital signs in patients after thoracic surgery. *Complementary Therapies in Medicine, 23*, 714-718.  
<http://dx.doi.org/10.1016/j.ctim.2015.08.002>



- Madson, A.T., & Silverman, M.J. (2010). The effect of music therapy on relaxation, anxiety, pain perception, and nausea in adult solid organ transplant patients. *Journal of Music Therapy, 47*(3), 220-232.
- Malec, M., Knoebel, R.W., & Shega, J.W. (2012). Noncancer pain management in seriously ill older adults: Practical considerations with opioid use. *Clinical Geriatrics, 20*(8), 24-31.
- Mason, D.M. (2014). Holism and embodiment in nursing. *Holistic Nursing Practice, 28*(1), 55-64. doi:10.1097/HNP.0000000000000010
- Masterson, L. (2017). Nurses are burnt out. Here's how hospitals can help. *Healthcare Dive*. Retrieved from <https://www.healthcaredive.com/news/nurses-are-burnt-out-heres-how-hospitals-can-help/442640/>
- Medicare.gov. (n.d.). Hospital compare: Survey of patients' experiences. Retrieved from <https://www.medicare.gov/hospitalcompare/compare.html#cmprTab=1&cmprID=350002%2C350015&cmprDist=7.1%2C7.4&dist=100&loc=58501&lat=46.8243438&lng=-100.659753>
- Melnyk, B.M. & Fineout-Overholt, E. (2014). *Evidence-based practice in nursing & healthcare: A guide to best practice* (3<sup>rd</sup> ed.). Philadelphia, PA: Wolters Kluwer Health.
- Miller, J., Dunion, A., Dunn, N., Fitmaurice, C., Gamboa, M., Myers, S., . . . Gilmore, L. (2015). Effect of a brief massage on pain, anxiety, and satisfaction with pain management in postoperative orthopaedic patients. *Orthopaedic Nursing, 34*(4), 227-234. doi: 10.1097/NOR.0000000000000163
- Mitchinson, A.R., Kim, H.M., Rosenberg J.M., Geisser, M., Kirsh, M., Cikrit, D., & Hinshaw, D.B. (2007). Acute postoperative pain management using massage as an adjuvant therapy: A randomized trial. *Archives of Surgery, 142*(12), 1158-1167. doi: 10.1001/archsurg.142.12.1158

- Mondanaro, J.F., Homel, P., Lonner, B., Shepp J., Lichtensztejn, M., & Loewy, J.V. (2017). Music therapy increases comfort and reduces pain in patients recovering from spine surgery. *The American Journal of Orthopedics*, 46(1), E13-E22.
- Montgomery, R., & McNamara, S. A. (2016). Multimodal pain management for enhanced recovery: Reinforcing the shift from traditional pathways through nurse-led interventions. *AORN Journal*, 104S9-S16. doi: 10.1016/j.aorn.2016.10.012
- Nilsson, U. (2009). The effect of music intervention in stress response to cardiac surgery in a randomized clinical trial. *Heart & Lung*, 38(3), 201-207. doi: 10.1016/j.hrtlng.2008.07.008
- Olsen, D.P. (2016). Ethical practice with patients in pain. *American Journal of Nursing* 116(1), 57-60.
- Özer, N., Özlü, Z.K., Arslan, S., & Günes, N. (2013). Effect of music on postoperative pain and physiologic parameters of patients after open heart surgery. *Pain Management Nursing*, 14(1), 20-28. <http://dx.doi.org/10.1016/j.pmn.2010.05.002>
- Parker, M.E., & Smith, M.C. (2010). *Nursing theories & nursing practice* (3<sup>rd</sup> ed.). Philadelphia, PA: D.A. Davis Company.
- Paschkis, Z., & Potter, M. L. (2015). Acute pain management for inpatients with opioid use disorder. *American Journal of Nursing*, 115(9), 24-46. doi: 10.1097/01.NAJ.0000471243.30951.92
- Patterson, C. (n.d.). 7 myths regarding opioid use in pain management. Retrieved from [http://www.michigan.gov/documents/mdch/7\\_Myths\\_Regarding\\_Opioid\\_Use\\_in\\_Pain\\_Management1\\_209258\\_7.pdf](http://www.michigan.gov/documents/mdch/7_Myths_Regarding_Opioid_Use_in_Pain_Management1_209258_7.pdf)

- Rudd, R.A., Aleshire, N., Zibbell, J.E., & Gladden, R.M. (2016). Increases in drug and opioid overdose deaths — United States, 2000–2014. *Centers for Disease Control and Prevention (CDC) Morbidity and Mortality Weekly Report (MMWR) 64(50)*, 1378-82. Retrieved from [http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6450a3.htm?s\\_cid=mm6450a3\\_w](http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6450a3.htm?s_cid=mm6450a3_w)
- Saatsaz, S., Resaei, R., Alipour, A., & Beheshti, Z. (2016). Massage as adjuvant therapy in the management of post-cesarean pain and anxiety: A randomized clinical trial. *Complementary Therapies in Clinical Practice, 24*, 92-98. <http://dx.doi.org/10.1016/j.ctcp.2016.05.01>
- Sheikhan, F., Jahdi, F., Khoei, E.M., Shamsalizadeh, N., Sheikhan, M., Haghani, H. (2012). Episiotomy pain relief: Use of lavender oil essence in primiparous Iranian women. *Complementary Therapies in Clinical Practice, 18*, 66-70. doi: 10.1016/j.ctcp.2011.02.003
- Shin, Y.S., Lim, N.Y., Yun, S.C., & Park, K.O. (2009). A randomised controlled trial of the effects of cryotherapy on pain, eyelid oedema and facial ecchymosis after craniotomy. *Journal of Clinical Nursing, 18*, 3029-3036. doi: 10.1111/j.1365-2702.2008.02652.x
- Sidani S., Manojlovichh, M., Doran, D., Fox, M., Covell, C.L., Kelly, H., . . . McAllister, M. (2016). Nurses' perceptions of interventions for the management of patient-oriented outcomes: A key factor or evidence-based practice. *Worldviews on Evidence-Based Nursing, 13(1)*, 66-74. doi: 10.1111/wvn.12129
- Thomas, K.M., & Seathares, K.A. (2010). Is guided imagery effective in reducing pain and anxiety in the postoperative total joint arthroplasty patient? *Orthopaedic Nursing, 29(6)*, 393-399. doi: 10.1097/NOR.0b013e3181f837f0

Ucuzal, M., & Kanan, N. (2014). Foot massage: Effectiveness on postoperative pain in breast surgery patients. *Pain Management Nursing, 15*(2), 458-465.

<http://dx.doi.org/10.1016/j.pmn.2012.03.001>

U.S. Department of Health and Human Services (HHS). (2016). The opioid epidemic: By the numbers. Retrieved from <http://www.hhs.gov/sites/default/files/Factsheet-opioids-061516.pdf>

Vaajoki, A., Kankkunen, P., Pietilä, A.M., Kokki, H., Vehviläinen-Julkunen, K. (2012). The impact of listening to music on analgesic use and length of hospital stay while recovering from laparotomy. *Gastroenterology Nursing, 35*(4), 279-284. doi:

10.1097/SGA.0b013e3182608fc1

Vaajoki, A., Pietilä, A.M., Kankkinen, P., Vehviläinen-Julkunen, K. (2011). Effects of listening to music on pain intensity and pain distress after surgery: An intervention. *Journal of Clinical Nursing, 21*, 708-717. doi: 10.1111/j.1365-2702.2011.03829.x

Vakilian, K., Atarha, M., Bekhradi R., & Chaman, R. (2011). Healing advantages of lavender essential oil during episiotomy recovery: A clinical trial. *Complementary Therapies in Clinical Practice, 17*, 50-53. doi: 10.1016/j.ctcp.2010.05.006

Vuilleumier, P., & Trost, W. (2015). Music and emotions: From enchantment to entrainment. *Annals of the New York Academy of Sciences, 1337*, 212–222. doi: 10.1111/nyas.12676

Wang, Y., Dong, Y., & Li, Y. (2014). Perioperative psychological and music interventions in elderly patients undergoing spinal anesthesia: Effects on anxiety, heart rate variability, and postoperative pain. *Yonsei Medical Journal, 55*(4), 1101-1105.

<http://dx.doi.org/10.3349/ymj.2014.55.4.1101>

Watkins, A.A., Johnson, T.V., Shrewsbury, A.B., Nourparvar, P., Madni, T., Watkins, C.J., . . .

Master, V.A. (2014). Ice packs reduce postoperative midline incision pain and narcotic use: A randomized controlled trial. *Journal of the American College of Surgeons*, 219(3), 511-517. <http://dx.doi.org/10.1016/j.amcollsurg.2014.03.057>

Yu, S.H., & Seol, G.H. (2017). *Lavandula angustifolia* Mill. oil and its active constituent linalyl

acetate alleviate pain and urinary residual sense after colorectal cancer surgery: A randomized controlled trial. *Evidence-Based Complementary and Alternative Medicine (Ecam)*, 2017, 1-7. doi: 10.1155/2017/3954181

Zencir, G., & Eser, I. (2016). Effects of cold therapy on pain and breathing exercises among

median sternotomy patients. *Pain Management Nursing*, 17(6), 401-410. doi: 10.1016/j.pmn.2016.05.006

Appendix A. MASSAGE ARTICLE MATRIX								
Authors/ Publication Year	Purpose	Design	Sample	Data Collection and Measurement	Findings	Strengths	Limitations	Level of Evidenc e
Abbaspoor, Z., Akbari, M., & Najar, S. (2014). Effect of foot and hand massage in post-cesarean section pain control: A randomized control trial. <i>Pain Management Nursing</i> , 15(1), 132-136. <a href="http://dx.doi.org/10.1016/j.pmn.2012.07.008">http://dx.doi.org/10.1016/j.pmn.2012.07.008</a>	To determine the effect of hand and foot massage on post C-section pain	RCT	N=80 <i>Inclusion:</i> Those who gave consent; had an elective C-section; ages 18-35; gestational age of 37-42; history of prior C-section with a low transverse incision; and an estimated birth weight of 2,500-4,000 g <i>Exclusion:</i> Unable to report pain; general anesthesia; fetal death or discomfort in neonates; abnormal body mass index (BMI) in the first trimester; damage or issues to hands or feet; and when an obstetrician didn't deliver the baby.	Pain scores were obtained using a NRS. Vital signs, including heart rate (HR), blood pressure (BP), and respiratory rate (RR), were measured using an automated machine. Opioid and other analgesic medication usage was monitored. Data was gathered before the intervention and 90 minutes after the intervention.	There was a decrease in the pain scores in both groups, but the drop in the experimental group was greater. The control group also used more analgesics.	Randomization of patients; massage was administered by one trained massage therapist	Findings are limited to the sample population	II

<p>Albert, N.M., Gillinov, A.M., Lytle, B.W., Feng, J., Cwynar, R., &amp; Blackstone, E.H. (2009). A randomized trial of massage therapy after heart surgery. <i>Heart &amp; Lung</i>, 38(6), 480-490. doi: 10.1016/j.hrtnl.2009.03.001</p>	<p>To determine whether massage improves postoperative mood, pain, anxiety, and physiologic measurement (HR, BP, &amp; RR); shortens hospital stay; and decreased occurrence of atrial fibrillation</p>	<p>RCT</p>	<p>N=252 <i>Inclusion:</i> open heart procedures (valve repair/replace ment, CABG, or both) midline sternotomy incision; ages 18-85; alert and oriented to person, place and time (A&amp;Ox3); ability to communicate in English; able to complete pre-op surveys <i>Exclusion:</i> enrollment in another post-op open heart surgery trial; cognitive impairment or mental illness; systolic left ventricular dysfunction (ejection fraction [EF] &lt;35%); additional surgical procedures; minimally</p>	<p>Anxiety was measured using the Beck Anxiety Index (BAI). Depression was measured using the Beck Depression Index – Primary Care (BDI-PC) tool. Pain was measured using a VAS. Vital signs were also checked using an automated machine and patients were being monitored via telemetry monitors. Measurements were taken within 10 minutes of the intervention being performed and 10 minutes after the intervention.</p>	<p>There were no statistically significant differences noted between the intervention and control groups. Researchers did note that the patients with higher scores (indicating more anxiety/depression, etc.) in the beginning had higher scores after surgery.</p>	<p>Massages were performed by licensed massage therapists; sessions were performed twice; large sample size</p>	<p>Limited ability to position patients because of surgical incisions</p>	<p>II</p>
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			invasive or approach other than midline sternotomy					
Bauer, B., Cutshall, S.M., Wentworth, L.J., Engen, D., Messner P.K., Wood, . . . Sundt, T.M. (2010). Effect of massage therapy on pain, anxiety, and tension after cardiac surgery: A randomized trial. <i>Complementary Therapies in Clinical Practice</i> , 16, 70-75. doi: 10.1016/j.ctcp.2009.06.012	Evaluation of the effect of 2 20 min massages on pain, anxiety, and tension after cardiac surgery. Secondary purpose was to examine feasibility	RCT	N= 113 <i>Inclusion:</i> patients undergoing CABG, valve repairs/replace ments, or both; midline sternotomy incision <i>Exclusion:</i> previous cardiac surgery; chronic pain syndromes; history of psychosis; prolonged bleeding or intubation >24 hrs	VASs were used to assess pain, anxiety, tension, and relaxation. Vital signs (HR, BP, & RR) were also monitored. Data was gathered before and after intervention.	Massages were performed on postop days 2 & 4. After the massage on postop day 2, patients in the experimental group reported statistically significant less tension than the control group. Postop day 4 results showed statistically significant lower pain, anxiety, and tension scores in the intervention group.	Massage was administered by a Certified Massage Therapist; positioning was based on patient preference; large sample size; complementary massage was provided to all participants in the control group	Results limited to sample population; inability to blind patients to which group they were in	II
Boitor, M., Martorella, G., Arbour, C., Michaud,	To evaluate the preliminary effects of hand	Pilot RCT	N=40 <i>Inclusion:</i> age 18 years or older; French or English	Pain was assessed using one of three scales: the 0-10 Pain Faces Thermometer (FPT), the Critical-	There were significantly statistical differences noted in pain intensity following	Massage was performed by the same trained research nurse; both the control	Treatment was rarely administered 3 times as per protocol due to	II



C., & Gélinas, C. (2014). Evaluation of the preliminary effectiveness of hand massage therapy on postoperative pain of adults in the intensive care unit after cardiac surgery: A pilot randomized controlled trial. <i>Pain Management Nursing</i> , 16(3), 354-366. <a href="http://dx.doi.org/10.1016/j.pmn.2014.07.014">http://dx.doi.org/10.1016/j.pmn.2014.07.014</a>	massage on pain after cardiac surgery in the adult intensive care unit (ICU)		speaking; elective cardiac surgery requiring sternal incision; EF of 35% or higher; able to answer questions and self-report pain <i>Exclusion:</i> diagnosis of cognitive or psychiatric disorder; pulmonary artery pressure >50 mmHg; right ventricular failure; BMI >30; abnormalities to one or both hands	Care Pain Observation Tool (CPOT), or the Brief Pain Inventory (BPI). Vital signs (BP, HR, RR, & oxygen saturation [SpO <sub>2</sub> ]) were also measured using an automated vitals monitor. Vital signs were taken 1 minute prior to the intervention, 1 minute after the intervention, & 30 minutes after the intervention. Video was taken from a camera installed at the foot of the patient's bed.	the second and third interventions.	and experimental groups had treatments of similar length	short ICU stays; having only one practitioner provide the massage could promote a practitioner effect (presence of therapists helps patients to feel relaxed and calm); anxiety wasn't measured, which can also affect pain; the control group received the touch and presence of the research nurse, which could have lessened the effects seen	
Braun, L.A., Stanguts, C., Casanelia, L., Spitzer, O., Paul, E., Vardaxis, N.J., & Rosenfeldt,	The purpose was to determine if massage reduced patient's reports of pain anxiety, and muscle tension and	RCT	N=152 <i>Inclusion:</i> elective CABG or valve surgery, or both; 18 years or older; mentally alert; English speaking	Data was gathered on pain, anxiety, muscle tension, and relaxation using a VAS. Vital signs (HR, RR, & BP) were also obtained using an automated vitals machine. Data was gathered	Patients receiving massage had a greater reduction of pain scores. Muscle tension and anxiety were saw a greater reduction in those receiving massage versus the control group. No significant	Large sample size; randomization of patients	Blinding of patients was impossible; lack of generalization to other populations	II

F. (2012). Massage therapy for cardiac surgery patients – a randomized trial. <i>The Journal of Thoracic and Cardiovascular Surgery</i> , 144(6), 1453-1459. <a href="http://dx.doi.org/10.1016/j.jtcvs.2012.04.027">http://dx.doi.org/10.1016/j.jtcvs.2012.04.027</a>	increased relaxation.		<i>Exclusion:</i> None mentioned	immediately before and after the intervention.	difference was noted in the vital signs			
Cutshall, S.M., Wentworth, L.J., Engen, D., Sundt, T.M., Kelly, R.F., & Bauer, B.A. (2010). Effect of massage therapy on pain, anxiety, and tension in cardiac surgical patients: A pilot study.	To assess the effect of massage on postoperative cardiac patients.	RCT	N=58 <i>Inclusions:</i> scheduled cardiac surgery requiring cardiopulmonary bypass including CABG or valve surgery via median sternotomy; able to give consent; medically stable on postop days 2-5	VASs were used to assess pain, anxiety and tension. Data was gathered immediately before and after the intervention.	Pain, tension, and anxiety levels were significantly improved in the massage group.	The massage therapist had previously worked as an occupational therapist and was comfortable with the tubes and drains.	Small sample size; lack of generalizability outside of cardiovascular surgical patients; possible sense of disappointment in the control group	II

<p><i>Complementary Therapies in Clinical Practice</i>, 16, 92-95. doi: 10.1016/j.ctcp.2009.10.006</p>			<p><i>Exclusion:</i> previous cardiac surgery; history of chronic pain syndrome or significant psychiatric history; prolonged bleeding; intubation &gt; 24hrs</p>					
<p>Degirmen, N., Ozerdogan, N., Sayiner, D., Kosgeroglu, N., &amp; Ayranci, U. (2010). Effectiveness of foot and hand massage in postcesarean pain control in a group of Turkish pregnant women. <i>Applied Nursing Research</i>, 23, 153-158. doi: 10.1016/j.a</p>	<p>Assess the effectiveness of hand and foot massages on post C-section pain control</p>	<p>RCT</p>	<p>N=75 <i>Inclusion:</i> Able to give consent; scheduled C-section; conscious <i>Exclusion:</i> unable to understand verbal or written instructions; no secondary school degree or higher educational qualifications; general anesthesia; patient controlled analgesic (PCA) use; injury or tissue damage to</p>	<p>Pain was measured using the NRS and a VRS. Measurements were taken before and immediately after the intervention, 60 minutes post, and 90 minutes post intervention.</p>	<p>Both intervention groups had statistically significant changes in their pain ratings versus the control group. The intervention group that received a 20 minute hand &amp; foot massage had better pain relief than the intervention group that received the 10 minute foot massage only.</p>	<p>3 equal groups; massage was performed by 1 person</p>	<p>Limited number of patients; limited time to conduct the study; interruptions during sessions; results limited to this patient population</p>	<p>II</p>

pnr.2008.08 .001			hand or feet, arthritis, phlebitis, burn wound, inflammation, eczema; cardiovascular or respiratory diagnosis; psychological problems including but not limited to major depression or paranoia					
Dion, L., Rodgers, N., Cutshall, S.M., Cordes, M.E., Bauer, B., Cassivi, S., & Cha, S. (2011). Effect of massage on pain management for thoracic surgery patients. <i>International Journal of Therapeutic Massage</i>	The purpose was to study the effectiveness and feasibility of massage in postop thoracic surgery patients	Descriptive	N=160 <i>Inclusion:</i> open or laparoscopic general thoracic surgery patients (including but not limited to lung & esophageal resections, and reconstruction surgery) <i>Exclusion:</i> refusal of consent; inability to verbalize pain ratings	Pain was assessed using the NRS. Pain scores were measured before and after the intervention.	Median pain ratings were lower after massage sessions. Subjective patient and staff comments were positive. Only 1 patient requested to stop the massage.	Positioning could be changed during the massage; patients could select the area they wished to be massaged; sample size	Massage therapists were only available from 9 – 10 am, Monday through Friday; results limited to sample population; lack of randomization	IV

<i>and Bodywork, 4(2), 2-6.</i>								
Drackley, N.L., Degnim, A.C., Jakub, J.W., Cutshall, S.M., Thomley, B.S., Brodt, J.K., . . . Broughey, J.C. (2012). Effect of massage therapy for postsurgical mastectomy recipients. <i>Clinical Journal of Oncology Nursing, 16(2)</i> , 121-124. doi: 10.1188/12.CJON.121-124	To evaluate the effect of massage therapy on pain, anxiety, and overall well-being in women who received mastectomies. A secondary purpose was to examine the feasibility of a fee-for-service model	Quality improvement pilot study	N=46 <i>Inclusion:</i> unilateral or bilateral mastectomy surgery	Pain scores were gathered using the VAS. Relaxation was measured using a 0-10 scale (0 = most relaxed, 10 = not relaxed at all). Patients were given a survey after the massage but prior to discharge assessing satisfaction, stress, relaxation, pain, and over-all well-being	Pain, anxiety, and tension levels were decreased after massage. Insurance declined to pay for the service, so all participants had to pay out of pocket.	Massages were uninterrupted.	Small sample size; lack of randomization; lack of generalizability to other populations; patients were given pamphlets on the benefits of massage leading to possible bias.	VI
Dreyer, N.E., Cutshall, S.M., Huebner, M., Foss, D.M., Lovely, J.K., Bauer,	To examine the effects of massage on colorectal surgery patients.	RCT	N=127 <i>Inclusion:</i> 18 years of age or older; scheduled colorectal surgery between 12/11/2007 –	Vital signs (BP, HR, & RR) were obtained using an automated vitals machine. Pain, anxiety, tension, relaxation, and overall satisfaction scores were measured using a NRS. Data	Patients in both groups reported less pain, tension, and anxiety on subsequent days, but the massage group had more significant changes.	The large study size; massage was provided by a massage therapist with special training and experience with hospital environments	Inability to/lack of participant blinding; patients were often busy or unavailable for the treatment; lack of a massage therapist on the weekends; results	II

B.A., & Cima, R.R. (2015). Effect of massage therapy on pain, anxiety, relaxation, and tension after colorectal surgery: A randomized study. <i>Complementary Therapies in Clinical Practice</i> , 21, 154-159. <a href="http://dx.doi.org/10.1016/j.ctcp.2015.06.004">http://dx.doi.org/10.1016/j.ctcp.2015.06.004</a>			3/24/2009; gave consent <i>Exclusion:</i> new cellulitis, deep vein thrombosis (DVT), active skin infections, systemic infections, lymphoma, and uncontrolled hypo- or hypertension; surgery on Thursday or Friday	was gathered before and after the intervention. Opioid type and amount was tracked.			are limited to colorectal surgical patients	
Miller, J., Dunion, A., Dunn, N., Fitmaurice, C., Gamboa, M., Myers, S., . . . Gilmore, L. (2015). Effect of a brief massage on pain,	To examine the effects of hand/arm massage on postoperative orthopedic patients when used in conjunction with analgesics	Convenience sample RCT	N=50 <i>Inclusion:</i> adult postoperative knee or hip replacement patients less than 85 years; speak English; A&Ox3; order for analgesic medications <i>Exclusion:</i> Anxiolytic	Pain was measured using the NRS. Anxiety was measured using a VAS. Patient satisfaction was measured with the VAS. Data was gathered immediately before medication administration. After medication administration, the intervention was	Patients received both treatments (analgesic medication only and analgesic medication with massage). Patient satisfaction with pain management was higher when they received both pain medication and massage.	Study investigators were trained by licensed massage therapists; study groups were of equal size	Short hand and arm massage; findings are limited to postoperative orthopedic patients; wide variety of pain scores	II

<p>anxiety, and satisfaction with pain management in postoperative orthopaedic patients. <i>Orthopaedic Nursing</i>, 34(4), 227-234. doi: 10.1097/NOR.000000000000163</p>			<p>within the last 24 hours; age &gt;85 years</p>	<p>performed. Pain and anxiety ratings were gathered 5 and 45 minutes after medication administration. Satisfaction with pain management was recorded at the 45 minute mark.</p>				
<p>Mitchinson, A.R., Kim, H.M., Rosenberg J.M., Geisser, M., Kirsh, M., Cikrit, D., &amp; Hinshaw, D.B. (2007). Acute postoperative pain management using massage as an adjuvant therapy: A randomized trial. <i>Archives of Surgery</i>,</p>	<p>Evaluate the effect of back massage on patients' reports of postoperative pain, anxiety, and functional recovery</p>	<p>RCT</p>	<p>N= 605 <i>Inclusion:</i> sternotomy or abdominal incision least 8 cm long <i>Exclusion:</i> blind; deaf; delirious; unable to speak or read English; severe mental illness</p>	<p>Pain and anxiety were measured using VASs. Delirium was assessed using the Bedside Confusion Scale. Patients completed a baseline assessment and then between 9 – 11 am on postop days 1 – 5, or until discharge if earlier. Scores were measured 30 minutes after intervention.</p>	<p>Pain ratings in the three groups (massage, individual attention, control) decreased in the days postop, but the massage group had statistically significant changes in pain ratings.</p>	<p>Intervention was carried out at the same time each day by certified massage therapists; large sample size</p>	<p>Majority of the sample population were elderly men; self-selection bias – those who were uncomfortable with touch refused to participate</p>	<p>II</p>

142(12), 1158-1167. doi: 10.1001/arc hsurg.142.1 2.1158								
Saatsaz, S., Rezaei, R., Alipour, A., & Beheshti, Z. (2016). Massage as adjuvant therapy in the managemen t of post- cesarean pain and anxiety: A randomized clinical trial. <i>Complemen tary Therapies in Clinical Practice</i> , 24, 92-98. <a href="http://dx.doi.org/10.1016/j.ctcp.2016.05.014">http://dx.doi.org/10.1016/j.ctcp.2016.05.014</a>	To determine if massage had an effect on patient's pain and anxiety levels in patients who had a C-section.	RCT	N=156 <i>Inclusion:</i> Primiparous women undergoing an elective C-section; ages 20-35; having a healthy baby; conscious; able to understand the NRS <i>Exclusion:</i> History of cardiovascular, respiratory, or psychological disorders, sensitivity to touch, wounds, phlebitis or traumatic on hands or feet preventing massage, receiving local anesthetic, and longitudinal abdominal incisions	A form was used to gather information on analgesic use. A checklist for monitoring vital signs (HR, RR, & BP). A VAS was used to assess pain, and Spielberger's State Anxiety Inventory was used to assess anxiety. Data was gathered in the afternoon the day of surgery, 4 hours after the last analgesic administration. Data was gathered again 90 minutes after the intervention.	There were 3 groups, 1 control and 2 intervention (foot massage only and a hand and foot massage group). There were statistically significant results in reports of pain and anxiety between the control and intervention groups. There was less of a difference between the two intervention groups.	The groups were equally divided (52 participants in each group) and the groups had similar backgrounds due to the study's inclusion criteria. Single blinding was in place to help reduce bias.	The sample size was small and included only females, making it harder to apply the results to the general population. The participants only received one session.	II
Ucuzal, M. & Kanan, N. (2012).	To determine the effectiveness	Quasi-experi	N=70 <i>Inclusion:</i> 18 years or older;	Data was gathered using a patient information form, the	Patients reported less pain in both groups after receiving pain	Control and experimental group were equal	Findings are limited to patients similar to those in	III



<p>Foot massage: Effectiveness on postoperative pain in breast surgery patients. <i>Pain Management Nursing</i>, 15(2), 458-465. <a href="http://dx.doi.org/10.1016/j.pmn.2012.03.001">http://dx.doi.org/10.1016/j.pmn.2012.03.001</a></p>	<p>of foot massage in patients after breast surgery</p>	<p>mental RCT</p>	<p>no hearing, speech, or sight impairments; no mental disabilities interfering with understanding; underwent: E-SLNB, E-ALND, BM, or MRM with general anesthesia; expressed "medium" or "severe pain";; had at least 1 drain in the surgical area <i>Exclusion:</i> breast prostheses placed during surgery; hypertension; need BP to be taken on the foot; postoperative complications (e.g. bleeding, nausea/vomiting; use of a PCA; infectious disease; open wounds/sores; scar tissue;</p>	<p>Short-Form McGill Pain Questionnaire (SF-MPQ), and a calibrated sphygmomanometer and stethoscope</p>	<p>medications, but there was a greater reduction in pain scores in the experimental group that also received a foot massage. This difference was found to have a high level of statistical significance.</p>	<p>in size; all data and massages were performed by the principal researcher</p>	<p>the trial; pain levels were determined by asking the patient to rate their pain and pain is subjective</p>	
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			clotting problems; osteoporosis; osteomyelitis; hepatitis; neuropathy r/t diabetes; DVT					
AROMATHERAPY & ESSENTIAL OILS ARTICLE MATRIX								
Authors/ Publication Year	Purpose	Design	Sample	Data Collection and Measurement	Findings	Strengths	Limitations	Level of Evidenc e
Adachi, N., Munesada, M., Yamada, N., Suzuki, H., Futohashi, A., Shigeeda, T., . . . Nisjigaki, M. (2014). Effects of aromatherapy massage on face-down posture-related pain after vitrectomy: A randomized controlled trial. <i>Pain Management Nursing</i> , 15(2), 482-489. doi:	Evaluate the effects of aromatherapy massage on face down posturing (FDP) pain after a vitrectomy	RCT	N= 63 <i>Inclusion:</i> received vitrectomy with intraocular gas tamponade; ordered to maintain postoperative FDP; 20 years of age or older <i>Exclusion:</i> acute or chronic neck, shoulder, back waist, or arm pain; non-strict FDP that tolerates lateral positioning; positive allergy tests to essential base oils	The study using the Faces Pain Scale (FPS) to assess patients' pain. Pain ratings on 5 regions (shoulder, neck, back, waist, and arms) was gathered. Data was gathered before and after the intervention on postop days 1 & 2 and a final assessment was done on postop day 3.	Both the essential oil massage and the plain massage showed a significantly greater reduction in pain over the control group. The pain ratings in the plain massage group increased on the second postop day, but decreased by postop day 3.	Three groups – 1 control, 2 intervention (1 massage alone & 1 essential oil massage); took into consideration that the patients would have vision difficulties when picking a pain scale to use	Non-blind design possibly lead to biases; groups were not gender balanced; unclear whether essential oil benefits were because of inhalation or topical absorption; patients were of a single race; findings are limited to the population described in this study	II

http://dx.doi.org/10.1016/j.pmn.2012.12.004								
Kim, J.T., Ren, C.J., Fielding, G.A., Pitti A., Kasumi, T., Wajda, M., . . . Bekker, A. (2007). Treatment with lavender aromatherapy in the post-anesthesia care unit reduces opioid requirement in the morbidly obese patient undergoing laparoscopic adjustable gastric banding. <i>Obesity Surgery</i> , 17, 920-925.	To assess whether lavender oil would improve pain control in the Post-anesthesia care unit (PACU) setting for patients undergoing laparoscopic gastric banding	RCT	N=53 <i>Inclusion:</i> age >18 years; undergoing lap gastric band surgery <i>Exclusion:</i> history of asthma, bronchitis, chronic obstructive pulmonary disorder (COPD), contact dermatitis to cosmetic fragrances; pregnancy	Pain was measured using a NRS at 5, 30, and 60 minutes after implementation. Patient sedation was monitored using the Observer's Assessment of Alertness/Sedation scale (OAA/S)	There wasn't a significant difference in the pain or sedation levels of both groups of patients. A statistically significant difference in the amount of Morphine given to the patients was noted between the two groups, with the experimental group requiring less.	Control group had non-scented baby oil coated oxygen in an attempt to blind the groups to their allocation	Small sample size; Limited setting – PACU environment; findings are limited to the population described in this study; possible placebo effect; anxiety wasn't assessed	II
Sheikhan, F., Jahdi, F., Khoei,	Compare the effectiveness of lavender	RCT	N= 60 <i>Inclusion:</i> delivery	Pain was assessed using a VAS and discomfort using the	Significant differences were noted at the 4 hour	Control group received standard treatment	Small sample size; findings are limited to the	II

<p>E.M., Shamsalizadeh, N., Sheikhan, M., &amp; Haghani, H. (2012). Episiotomy pain relief: Use of lavender oil essence in primiparous Iranian women. <i>Complementary Therapies in Clinical Practice</i>, 18, 66-70. doi: 10.1016/j.ctcp.2011.02.003</p>	<p>oil to the standard episiotomy treatment of a betadine sitz bath</p>		<p>between 37-42 weeks gestation; cephalic vaginal delivery; had received an episiotomy without tearing; single tone delivery <i>Exclusion:</i> chronic systemic diseases; psychological problems; allergies; eclampsia/preeclampsia; PROM &gt;24 hrs; prolonged and precipitate labor; addiction; Vulvo vaginitis or perineal hematoma with 12 hours of delivery;</p>	<p>REEDA scales. Ratings were taken prior to the intervention, 4 hours after, 12 hours after, and 5 days post-episiotomy</p>	<p>check, but not at the 12 hour check. At the 5 day follow-up, 70% of the experimental group had not taken analgesia compared with 33.3% in the control group. This difference was noted to be significant.</p>	<p>population described in this study</p>		
<p>Vakilian, K., Atarha, M., Bekhradi R., &amp; Chaman, R./2011</p>	<p>Assess the effects of Lavandula on episiotomy healing</p>	<p>RCT</p>	<p>N=120 <i>Inclusion:</i> singleton pregnancy; no acute or chronic diseases; normal spontaneous</p>	<p>Pain was assessed using a VAS. Edema was measured in centimeters and redness in millimeters.</p>	<p>Redness was significantly less and inflammation was less in the lavender group. No significant differences in pain were reported.</p>	<p>Good sample size</p>	<p>Findings are limited to the population described in this study</p>	<p>II</p>

			vaginal delivery with medio-lateral episiotomy <i>Exclusion:</i> those who did not attend the examination; presented to exam with signs of an allergy					
Yu, S.H., & Seol, G.H. (2017). <i>Lavandula angustifolia</i> Mill. oil and its active constituent linalyl acetate alleviate pain and urinary residual sense after colorectal cancer surgery: A randomized controlled trial. <i>Evidence-Based Complementary and Alternative Medicine</i>	Assess aromatherapy with lavender or linalyl acetate effect on pain relief and urinary satisfaction after urinary catheter removal in colorectal surgery patients	RCT	N=66 <i>Inclusion:</i> colorectal surgery patients	Pain was measured using the VAS scale. BP& HR were also assessed. BP was measured after the patient had been resting for 30 minutes. HR was measured before and after the aromatherapy treatment. Patients were given a self-questionnaire assessing their lower urinary tract symptoms (LUTS)	Patients in the experimental group (lavender and linalyl acetate) experienced less pain than the patients in the control group. No statistically significant changes in BP or HR were noted. LUTS scores varied slightly, but not significantly.	Equally divided groups; double blind study	Small sample size; findings are limited to the population described in this study	II

( <i>Ecam</i> ), 2017, 1-7. doi: 10.1155/20 17/3954181								
COLD ARTICLE MATRIX								
Authors/ Publication Year	Purpose	Design	Sample	Data Collection and Measurement	Findings	Strengths	Limitations	Level of Evidenc e
Chou, S.Y., & Liu, H.E. (2008). Comparison of effectivenes s between moist and dry cryotherapy in reducing discomfort after orthognathi c surgery. <i>Journal of Clinical Nursing</i> , 17, 1735- 1741. doi: 10.1111/j.1 365- 2702.2007. 02115.x	To compare the effect of moist (ice towel) versus dry (ice pack/bag) cryotherapy in postop discomfort	Quasi- experi mental	N= 48 <i>Inclusion:</i> undergoing scheduled orthognathic surgery; females $\geq 16$ & men $\geq 18$ years of age; not allergic to cold therapy; no signs or symptoms of infection; fully conscious; able to communicate in Mandarin Chinese; caregivers at bedside postop <i>Exclusion:</i> those complaining of discomfort or vomiting during data collection	Temperature at nine points on the head (forehead and bilaterally to ear, mandible angle, center of the zygoma, and mouth angle) were measured 60, 90, 120, 150, 180 minutes, 24 and 48 hours after surgery. Pain was measured using a VAS. Heat sensation and facial swelling were measured using VASs.	Dry cryotherapy (ice pack) patients had a greater reduction in temperature in most sites, but moist cryotherapy was more effective at reducing pain and heat sensations.	Measuring two interventions – both are effective depending on the outcome desired	Posture of the patient, amount of adipose tissues can affect the degree or closeness of the cooling effect; small sample size; results limited to sample population; ice towels required more supervision (heated up faster thus required being re-cooled more often) leading to possible biases; patients were on different wards which may have altered their baseline temps; no randomization	III
Demir, Y., & Khorshid,	To evaluate the effect of cold	RCT	N= 90 <i>Inclusion:</i> admitted to the	Pain intensity was measured using a VAS. Pain quality	Pain ratings were similar before the procedure. Ratings	All chest tubes were removed by the same	Results limited to sample population;	II

<p>L. (2010). The effect of cold application in combination with standard analgesic administration on pain and anxiety during chest tube removal: A single-blinded, randomized, double-controlled study. <i>Pain Management Nursing</i>, 11(3), 186-196. doi:10.1016/j.pmn.2009.09.002</p>	<p>application on pain and anxiety during chest tube removal.</p>	<p>cardiovascular and thoracic surgical intensive care unit (ICU) between 8/15/2007 – 6/1/2008; chest tube in for a minimum of 24 hours; age 18-74; ability to communicate in Turkish; oriented to place and time; able to report pain; had not received mechanical ventilation support; two mediastinal chest tubes OR 1 pleural and two mediastinal chest tubes <i>Exclusion:</i> history of psychiatric disease; allergy to paracetamol drugs; visual or hearing impairments; inability to</p>	<p>was measured using the McGill Melzack Pain Questionnaire (MPQ). Anxiety was measured using the Spielberger Situational Anxiety Level Inventory (STAI-I). Data was gathered 10 minutes prior to and immediately after, and 15 minutes after chest tube removal.</p>	<p>went up after removal, which was expected. The intervention group reported pain levels lower than the other two groups at the 15 minute post removal mark. No differences were noted between the groups when it came down to description of the type of pain or anxiety levels.</p>	<p>physician; 3 groups (1 interventional [cold pack 4°C, 39.2°F]; 1 warm application group [placebo, 18-22°C, 64.4-71.6°F]; and one group [control] with no pack application.</p>	<p>possible influence of environmental factors on pain perceptions</p>	
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			communicate in Turkish					
Kol, E., Erdogan, A., Karsh, B., & Erbil, N. (2013). Evaluation of the outcomes of ice application for the control of pain associated with chest tube irritation. <i>Pain Management Nursing</i> , 14(1), 29-35. <a href="http://dx.doi.org/10.1016/j.pmn.2010.05.001">http://dx.doi.org/10.1016/j.pmn.2010.05.001</a>	To evaluate the effectiveness of ice on chest tube irritation	Randomized, single-blind	N= 40 <i>Inclusion:</i> 18-65 years of age; undergone thoracotomy and wedge resection procedure; two chest tubes inserted <i>Exclusion:</i> not extubated within 2 hours after surgery; inability to communicate; procedures that would influence pain threshold including decortication and thoracic wall resection	Pain was measured using the simple descriptive scale from the MPQ & a modified version of the Behavior Pain Scale. Since patients who were intubated were excluded from the study, the scale measured patients' facial expressions and position of the upper limbs. Both measures were scored on a 1-4 scale. The lowest score possible, indicating no/little pain, was a 2. The highest score was an 8. During the intervention period, patients were instructed to perform activities such as coughing, deep breathing, and walking. Data was gathered before and during the application.	Pain ratings and analgesic consumption in the intervention groups were found to be statistically significantly lower than in the control group.	Surgical procedure was performed by the same surgical team.	Small sample size; results limited to sample population	II
Shin, Y.S., Lim, N.Y., Yun, S.C., & Park, K.O. (2009). A randomised	To assess the effect of cryotherapy on patient discomfort after a craniotomy	RCT	N= 97 <i>Inclusion:</i> planned elective supratentorial craniotomy between	Pain was measured using a VAS. Eyelid edema was measured using a 0-4 rating scale described or rhinoplasty patients (0= no edema, 4=	No significant differences were noted in pain ratings between the two groups. Cryotherapy did have a significant effect on eyelid	Data was gathered by a single observer; didn't withhold ice packs for control groups if needed	Diagnostic testing interrupted the intervention periods; no blinding; VAS might not be a sufficient scale to	II



controlled trial of the effects of cryotherapy on pain, eyelid oedema and facial ecchymosis after craniotomy. <i>Journal of Clinical Nursing</i> , 18, 3029-3036. doi: 10.1111/j.1365-2702.2008.02652.x			11/1/2005-9/8/2006 at a medical center in Korea; ability to communicate verbally and nonverbally; giving informed consent <i>Exclusion:</i> Glasgow Coma Scale <15; neurological deterioration or changes; hemodynamically unstable; cold allergy	massive edema with swollen shut eyes). Facial bruising was also measured on a 0-4 rating scale (0= no ecchymosis [bruising], 4= ecchymosis $\geq 6$ cm <sup>2</sup> . Data was gathered preoperatively (baseline), 3 & 9 hours after surgery, and on postop days 1, 2, 5, & 7.	edema and ecchymosis.		measure all aspects of pain	
Watkins, A.A., Johnson, T.V., Shrewsberry, A.B., Nourparvar, P., Madni, T., Watkins, C.J., . . . Master, V.A. (2014). Ice packs reduce postoperative midline incision	The purpose of the study was to evaluate the effectiveness of ice packs on midline incisional pain.	RCT	N= 55 <i>Inclusion:</i> any open transperitoneal abdominal surgery with a classic midline incision <i>Exclusion:</i> minimally invasive operative; reoperation during hospital stay	Pain was measured using a VAS. Data was gathered 1 hour postoperatively. After that, the assessment were completed twice a day (0800 & 1600) for 3 days. Narcotic use and length of hospital stay were also monitored.	No difference in pain scores was noted at the 1 hour postop check. Patients in the intervention group reported lower pain scores throughout the study. Statistically significant results were noted on postoperative days 1 (both assessments) and the afternoon assessment on postop day 3. A significant difference in narcotic usage was noted on the first postop day,	Randomization; constant ice application for the first 24 hours postop	Small sample size; results limited to the sample population; inability to blind researchers and patients	II

<p>pain and narcotic use: A randomized controlled trial. <i>Journal of the American College of Surgeons</i>, 219(3), 511-517. <a href="http://dx.doi.org/10.1016/j.amcollsurg.2014.03.057">http://dx.doi.org/10.1016/j.amcollsurg.2014.03.057</a></p>					<p>but not on the other days. The researchers believe this may be because the ice packs were sporadically used after the first 24 hours.</p>			
<p>Zencir, G. &amp; Eser, I. (2016). Effects of cold therapy on pain and breathing exercises among median sternotomy patients. <i>Pain Management Nursing</i>, 17(6), 401-410. <a href="http://dx.doi.org/10.1016/j.pmn.2016.05.006">http://dx.doi.org/10.1016/j.pmn.2016.05.006</a></p>	<p>The purpose of the study was to evaluate the effects of cold therapy on pain in postoperative median sternotomy patients.</p>	<p>Randomized crossover clinical trial</p>	<p>N=34 <i>Inclusion:</i> median sternotomy undergoing CABG surgery with or without a valve replacement; &gt;20 years old; no respiratory dysfunction; able to use VAS; able to give consent <i>Exclusion:</i> sensitivity to cold; Reynaud's disease, cryoglobulinemia; cold</p>	<p>The intervention was performed twice a day for the first two postoperative days. Participants' pain was assessed before and after cold pack application using a VAS. Researchers also measured depth of breathing using an incentive spirometer.</p>	<p>Pain with deep breathing rose by 20% when cold packs were used, and by 60% when they weren't used.</p>	<p>Crossover design may limit bias</p>	<p>Small sample population; findings limited to sample population; not evaluating other nursing interventions that may affect pain; the exclusion of many diabetic patients who underwent CABG surgery</p>	<p>III</p>

			hemoglobinuria; diabetes mellitus; unconsciousness; bilateral internal mammary artery grafts; minimally invasive CABG; emergency surgery; postop complications; cognitive impairment					
GUIDED IMAGERY ARTICLE MATRIX								
Authors/ Publication Year	Purpose	Design	Sample	Data Collection and Measurement	Findings	Strengths	Limitations	Level of Evidence
Lin, P. (2011). An evaluation of the effectiveness of relaxation therapy for patients receiving joint replacement surgery. <i>Journal of Clinical Nursing</i> , 21, 601- 608. doi: 10.1111/j.1	Assess the effects of guided imagery on pain and anxiety in postoperative joint replacement patients	Pretest post- test quasi- experi- mental	N=93 <i>Inclusion:</i> ability to speak Mandarin; scheduled total joint replacement	Pain and anxiety data were measured using a VAS. Researchers also used the State- Trait Anxiety Inventory to assess participant's pain. Data was gathered the evening prior to surgery and daily for the first three days postop.	The intervention group's pain was lower than the control group throughout the study. It was significantly lower on the preop and postop day 1 assessment. Anxiety measured via the VAS was significantly lower on the preop assessment and on postop days 1 & 2. No significant difference was noted on the State-Trait Anxiety Inventory.	Every effort was made to reduce interruptions. Data was gathered prior to surgery.	Almost two thirds of the participants were women; results limited to sample population.	III

365-2702.2010.03406.x								
Thomas, K.M., & Sethares, K.A. (2010). Is guided imagery effective in reducing pain and anxiety in the postoperative total joint arthroplasty patient? <i>Orthopaedic Nursing</i> , 29(6), 393-399. doi: 10.1097/OR.0b013e3181f837f0	Evaluate the effects of guided imagery on postoperative pain and anxiety in the total joint arthroplasty patient	Prospective quasi-experimental	N=121 <i>Inclusion:</i> scheduled total joint arthroplasty due to degenerative joint disease; cognitively alert; spoke English	Pain was measured using a NRS. The Beck Anxiety Inventory (BAI) was used to rate anxiety. Data was gathered daily for the first 3 postop days.	The intervention groups' pain and anxiety scores were lower during all the measurements, but the difference was not noted to be significant.	Large sample size	Results limited to sample population; women made up 69% of participants; blinding was impossible; data gathered at different times; participants could select to be in the intervention group – no randomization; no baseline or preop data; unable to verify if participants used the CD twice a day before surgery	III

## MUSIC THERAPY ARTICLE MATRIX

Authors/ Publication Year	Purpose	Design	Sample	Data Collection and Measurement	Findings	Strengths	Limitations	Level of Evidence
Allred, K.D., Byers, J.F., & Sole, M.L. (2010). The effect of music on postoperative	To determine if a rest period and listening to music prior to and immediately after the first walk on	RCT	N=56 <i>Inclusion:</i> ages 45-84; scheduled for a total knee arthroplasty (TKA); American Society of	Pain rating information was gathered using the McGill Pain Questionnaire Short Form (MPQ-SF) and a VAS. A VAS was also used to assess patient anxiety. Vital	There were no statistically significant differences noted in pain or anxiety ratings or vital signs between the two groups. A difference in pain and anxiety	Intervention was performed before and after walking	There were interruptions, although limited, during the intervention times; control group also had the rest variable; variable of	II

<p>ve pain and anxiety. <i>Pain Management Nursing</i>, 11(1), 15-25. doi:10.1016/j.pmn.2008.12.002</p>	<p>postop day 1 can reduce pain and/or anxiety, reduce mean arterial pressure (MAP), HR, RR, &amp; SpO<sub>2</sub>.</p>	<p>Anesthesiologists (ASA) physical exam class 1, 2, or 3; no appreciable hearing or vision deficits; able to communicate in English; admit to the orthopedic floor postoperatively; alert and oriented to person, place, time, and situation (A&amp;Ox4); Patient controlled analgesia (PCA) prescribed postoperatively <i>Exclusion:</i> inability to see the VAS well enough to mark a rating; current antipsychotic medication use; allergy to traditional opioid use; ICU admission postoperatively</p>	<p>signs (BP, HR, RR, &amp; SpO<sub>2</sub>) were measured using an automated machine. Data was gathered 20 minutes prior to walking, immediately before walking; immediately after walking, and 20 minutes after walking. Opioid usage data was gathered 6 hours after walking.</p>	<p>ratings was noted in the intervention group between when data was first gathered and immediately before the walk, though it was not statistically significant.</p>		<p>administration of “as needed” pain medications by nursing staff; small sample size; results limited to sample population</p>	
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			y and/or hemodynamically unstable					
Chan, M.F. (2007). Effects of music on patients undergoing a C-clamp procedure after percutaneous coronary intervention: A randomized controlled trial. <i>Heart &amp; Lung</i> , 36(6), 431-439. doi: 10.1016/j.hrting.2007.05.003	To assess the effect of music on vital signs (BP, HR SpO <sub>2</sub> , RR) and pain ratings in patients who underwent a C-clamp procedure after percutaneous coronary intervention	RCT	N=66 <i>Inclusion:</i> Diagnosis of myocardial infarction (MI), acute coronary syndrome (ACS), and/or coronary artery disease (CAD); Conscious and alert with a Glasgow Coma Scale (GCS) rating of 15; able to communicate in Cantonese <i>Exclusion:</i> hearing deficit; history of psychiatric illness; neurologic disorder; dying; unable to give informed consent	Vital signs were monitored using an automated machine. Pain scores were measured using a NRS. The data was collected at the baseline (before application of the C-clamp), 15, 30, and 45 minutes after application of the C-clamp.	There were statistically significant changes noted in HR, RR, SpO <sub>2</sub> , and pain ratings in the experimental group.	Data collection was carried out by the same researcher	Limited music choices (15 songs, 5 of which were Chinese); small sample size; results limited to sample population	II
Chen, H.J., Chen, T.Y., Huang, C.Y., Hsieh, Y.M., &	Determine if listening to music preop and postop had any effect on	RCT	N= 30 <i>Inclusion:</i> waiting for TKR without premedication; ages 45-85;	Vital signs were monitored using an automated machine. Pain scores were assessed using a VAS. Measurements	No differences in BP were noted in the first 2 phases, but a significant difference was noted in the systolic blood	No significant differences between control and intervention groups; experiment was	Small sample size; results limited to sample population; possibility that patients didn't	II

<p>Lai, H.L. (2015). Effects of music on psychological responses and opioid dosage in patients undergoing total knee replacement surgery. <i>Japan Journal of Nursing Science</i>, 12, 309-319. doi: 10.1111.jjns.12070</p>	<p>patients psychological parameters (BP, HR, &amp; RR) and opioid usage in total knee replacement (TKR) patients</p>		<p>ability to communicate in Mandarin or Taiwanese <i>Exclusion:</i> hearing impairment; pregnancy; spinal anesthesia; alcoholism; infectious disease</p>	<p>were taken before and immediately after the intervention in the first 2 phases, in 15 minute intervals for the 3 phase, and 4 hours after the intervention. Opioid usage was also monitored.</p>	<p>pressure (SBP) in the intervention group over time. HR didn't differ and the RR only differed in the second phase. Pain ratings and opioid usage didn't differ between the groups.</p>	<p>conducted in multiple phases (preop, intraop, and postop)</p>	<p>like the music choices.</p>	
<p>Cutshall, S.M., Anderson, P.G., Prinsen, S.K., Wentworth, L.J., Olney, T.L., Messner, P.K., . . . Bauer, B.A. (2011). Effect of the combination of music and nature sounds on</p>	<p>To study the efficacy and feasibility of special music, which included nature sounds, for pain and anxiety in postop cardiac surgery patients</p>	<p>Randomized experimental design</p>	<p>N= 100 <i>Inclusion:</i> first time CABG or valve surgery (or both); 18 years or older; consented to participate <i>Exclusion:</i> non-English speaking; intubated on postop day 2; diagnosis of chronic pain, chronic psychiatric disorder, or</p>	<p>VASs were used to measure pain, anxiety, relaxation, and overall satisfaction on postop days 2-4.</p>	<p>The experimental group reported significantly less pain and anxiety and increased relaxation and satisfaction compared to the control group.</p>	<p>Patients were able to select the type of music they preferred</p>	<p>Sessions were interrupted for cares; control may have had exposure to the intervention; results limited to the sample population</p>	<p>II</p>

pain and anxiety in cardiac surgical patients: A randomized study. <i>Alternative Therapies, 17(4), 16-23.</i>			hearing impairment					
Ebneshahidi, A., & Mohseni, M. (2008). The effect of patient-selected music on postoperative pain, anxiety, opioid requirements, and hemodynamic profile in cesarean section surgery. <i>The Journal of Alternative and Complementary Medicine, 14(7), 827-831.</i> doi: 10.1089/acm.2007.0752	To assess the effects of patient selected music on postoperative pain, anxiety, opioid requirements, and hemodynamic profile	RCT	N= 80 <i>Inclusion:</i> age 18-36; ASA 1 or 2, scheduled C-section with general anesthesia <i>Exclusion:</i> hearing impairment; chronic pain problems; history of drug or alcohol abuse; known psychiatric or memory disorders; known allergies to planned perioperative medications; past complications during anesthesia or surgery; anxiety	Pain and anxiety were measured using VASs. Opioid use in the recovery room and via PCA usage were recorded. Heart rate and blood pressure were measured twice, 5 minutes apart, 30 minutes after the intervention by a nurse blinded to the group assignment. The two readings were then averaged.	Pain scores were statistically significantly lower in the intervention group. Opioid consumption was also significantly lower in the intervention group. There were no differences noted in anxiety levels, pulse, or blood pressure between the two groups.	RN checking the vital signs was blinded as to group assignment; patients brought in the music they preferred	Pain scores were only evaluated in the immediate postop period; intervention was only implemented once; objective measures (HR, BP) may not reflect how the patient actually feels	II



			disorder; history of hypertension; primary language other than Persian					
Engwall, M., & Dupplis, G.S. (2009). Music as a nursing intervention for postoperative pain: A systematic review. <i>Journal of PeriAnesthesia Nursing</i> , 24(6), 370-383. doi: 10.1016/j.jopan.2009.10.013	The purpose was to examine the effects of music on postoperative pain	Systematic Review	N= 18 studies, 1,604 patients <i>Inclusion:</i> studies evaluating the effect of music on postop pain conducted between 1998-2007; quantitative studies with RCT or quasiexperimental design; adult patients <i>Exclusion:</i> review articles, qualitative design studies; studies that didn't include music or used sounds instead of music	N/A	All but 3 studies showed significant differences in pain scores between the intervention group(s) and control group. Despite 3 studies not showing differences, participants in these studies were satisfied and felt the music had helped in some way. Differences in opioid consumption varied between studies.	Large number of studies and participants	9 of the studies were performed by 2 research groups; inclusion of quasi-experimental studies excludes it from being Level I evidence	II
Hole, J., Hirsch, M., Ball, E., & Meads, C. (2015). Music as an aid for postoperative recovery	To assess whether music improves recovery after surgical procedures	Systematic Review/Meta-analysis	N= 73 RCTs <i>Inclusion:</i> RCTs, any language; adult population; any form of surgical procedure	N/A	The results show music reduced postop pain, anxiety, and analgesia use, and improved patient satisfaction. It didn't shorten hospital length of stay. The type of music and	Inclusion of more studies than other systematic reviews	Very heterogeneous review	I

in adults: A systematic review and meta-analysis. <i>The Lancet</i> , 386, 1659-1671. <a href="http://dx.doi.org/10.1016/S0140-6736(15)60169-6">http://dx.doi.org/10.1016/S0140-6736(15)60169-6</a>			(with or without sedation or anesthesia) <i>Exclusion:</i> central nervous system, head or neck surgery		timing didn't make a difference.			
Lin, P.C., Lin, M.L., Huang, L.C., Hsu, H.C., & Lin, C.C. (2011). Music therapy for patients receiving spine surgery. <i>Journal of Clinical Nursing</i> , 20, 960-968. doi: 10.1111/j.1365-2702.2010.03452.x	Assess the effects of music therapy on anxiety, pain, and physiological reactions of patients with spondylopathy	Quasi-experimental	N= 60 <i>Inclusion:</i> elective spinal surgery; >18 years old; no mental or cognitive impairment; ability to communicate; willing to participate	Anxiety was measured using the State-Trait Anxiety Inventory (STAI) and a VAS. Pain was measured using a VAS. HR, BP, and an 84 hour urine cortisol, norepinephrine, and epinephrine test was also completed.	The patients in the intervention group had lower anxiety scores than the control group, but no significant changes were noted. There was a statistically significant difference noted in the pain scores, with the intervention group reporting lower pain scores. Blood pressure and heart rate were significantly lower in the intervention group. No difference was noted in the urine cortisol, norepinephrine, and epinephrine results.	Subjective and objective data was collected	Small sample size; results limited to sample population	III
Liu, Y., & Petrini, M.A. (2015).	Evaluate the effects of listening to music on	RCT	N=112 <i>Inclusion:</i> inpatient thoracic	Pain was measured using the Faces pain scale. Anxiety was measured using the	There were significant decreases in pain, anxiety, SBP, and HR over time.	Other distractions (cellphones, visitors, etc.) were minimized	No blinding; limited music choices that were chosen by the	II

Effects of music therapy on pain, anxiety, and vital signs in patients after thoracic surgery. <i>Complementary Therapies in Medicine</i> , 23, 714-718. <a href="http://dx.doi.org/10.1016/j.ctim.2015.08.002">http://dx.doi.org/10.1016/j.ctim.2015.08.002</a>	pain, anxiety, and vital signs in postoperative thoracic surgery patients		surgery patients; 18 years of age or older; able to understand Chinese (thus able to follow instructions and sign consents), conscious, A&Ox4 <i>Exclusion:</i> emergency surgery; unwilling to participate; unable to understand instructions; vision or hearing impairments	STAI. Vital signs were measured using automated machines. Opioid and other medication consumption was monitored.	There were no changes noted in diastolic blood pressure (DBP), RR, PCA or med usage.		researchers; possible bias by the intervention group because they received special attention	
Madison, A.T., & Silverman, M.J. (2010). The effect of music therapy on relaxation, anxiety, pain perception, and nausea in solid organ transplant patients.	To evaluate the immediate effects of music therapy on self-reported measures of relaxation, pain, anxiety, and nausea during early solid organ transplant intervention	Pre-test/post-test design	N=58 <i>Inclusion:</i> Completion of both pre- and post- tests	Four 10 point Likert scales were used to measure pain, nausea, anxiety, and relaxation. 1 was the lowest score, indicating the pain wasn't experiencing pain, nausea, anxiety, and was relaxed. 10 was the highest indicating discomfort or lack of relaxation.	Statistically significant results were seen in all areas. A separate comparison was done on patients who reported a pain rating of 8 or higher on the Likert scale. These patients didn't have a significant difference in their post-test scores. All 58 patients reported that they would like to receive music therapy in the future.	Investigator played patient preferred music	No randomization; music offered on a weekly basis; small sample size; results limited to sample population	IV

<i>Journal of Music Therapy</i> , (3), 220-232.								
Mondanaro, J.F., Homel, P., Looner, B., Shepp, J., Lichtensztein, M., & Lowey, J.V. (2017). Music therapy increased comfort and reduces pain in patients recovering from spine surgery. <i>The American Journal of Orthopedics</i> , 46(1), E13-E22.	The purpose was to assess the effects of music therapy on the recovery of spinal surgery patients.	Mixed methods study	N= 60 <i>Inclusion:</i> Undergoing anterior, posterior, or anterior-posterior spinal fusion; willing to sign consent <i>Exclusion:</i> diagnosis of psychosis or depression; prior spinal injury	Pain was measured using a VAS. Depression and anxiety were measured using a Hospital Anxiety and Depression Scale (HADS). Fear-related movement was measured using the Tampa Scale for Kinesiophobia (TSK).	There were significant differences noted in pain ratings, but no differences noted in any other measurement.	The statistician was blinded; team had 2 board-certified music therapists	Small sample size; resulted limited to sample population; variable interests of the patients	II
Nilsson, U. (2009). The effect of music intervention in stress response to cardiac surgery in a randomized	To evaluate the effect of bedrest and music on postop day 1 stress levels	Prospective RCT	N=58 <i>Inclusion:</i> Postop day 1 after CABG or aortic valve replacement (AVR) <i>Exclusion:</i> emergency surgery;	Vital signs (MAP, HR, & RR), pain, anxiety, and serum cortisol levels were checked at 12:00 noon on the first day postop (immediately prior to the intervention). They were repeated at	There was a significant difference in the serum cortisol levels in the intervention group at the 12:30 pm check. The difference was not noted at the 1:00 pm check. There were no differences	Interruptions were minimized during the study times. Objective and subjective data.	The intervention was only done once; researcher remained in the room leading to possible Hawthorne effect (aka observer effect); no blinding of	II

clinical trial. <i>Heart &amp; Lung</i> , 38(3), 201-207. doi: 10.1016/j.hrthl.2008.07.008			surgery start time after 12:00 pm; previous cardiac surgery; corticosteroid treatment; need for an intra-aortic balloon pump or temporary pacemaker; participation in other studies; hearing impairment; difficulty cooperating during the study	12:30 (immediately after the intervention) and at 1:00. PaO <sub>2</sub> and SaO <sub>2</sub> were also checked at 1:00 pm. Pain and anxiety were assessed using the NRS. Vitals were checked using an automatic vital machine. Labs were drawn off a radial artery catheter placed the day of surgery.	noted in the vital signs, pain rating, or anxiety ratings between the two groups.		researchers or participants	
Özer, N., Özlü, Z.K., Arslan, S., & Günes, N. (2013). Effect of music on postoperative pain and physiologic parameters of patients after open heart surgery. <i>Pain Management Nursing</i> , 14(1), 20-	To evaluate the effect of music on self-reports of pain and physiologic parameters in patients who had undergone open heart surgery	Quasi-experimental	N= 87 <i>Inclusion:</i> 18 years of age or older; ability to speak Turkish; first postop day CABG or valve replacement; <i>Exclusion:</i> emergency operation; chronic pain problems; hearing impairment; cognitive impairment;	Physiologic parameters included SBP, DBP, HR, SpO <sub>2</sub> , & RR and were obtained using an electronic vital sign monitoring device. Pain intensity was measured using a unidimensional verbal pain intensity scale where the patient picks the word that best describes their pain. The words corresponded with	Statistically significant differences in pain ratings and oxygen saturations were noted in the intervention group.	Patients were able to choose the type of music they wanted to listen to out of 20 different choices; the control group was allowed to listen to music after data collection was complete in an attempt to avoid potential bias	Results are unable to be generalized; inability to blind the patients as to their groups; subjects were picked via random sampling	III

28). <a href="http://dx.doi.org/10.1016/j.jpmp.2010.05.002">http://dx.doi.org/10.1016/j.jpmp.2010.05.002</a>			issues cooperating during measurement; hemodynamically unstable	numbers on a 5 point Likert scale.				
Vaajoki, A., Kankkunen, P., Pietilä, A.M., Krokki, H., & Vehviläinen-Julkunen, K. (2012). The impact of listening to music on analgesic use and length of hospital stay while recovering from laparotomy. <i>Society of Gastroenterology Nurses and Associates</i> , 35(4), 279-284. doi: 10.1097/SGA.0b013e3182608fc1	To assess the effect of music therapy on analgesic use, length of hospital stay, and adverse effects	Prospective design	N= 168 <i>Inclusion:</i> Adult population; undergoing elective major abdominal operations with an upper midline abdominal incision; epidural anesthesia after surgery; anticipated hospital stay of at least 4 days; ASA status between 1 and 3 <i>Exclusion:</i> drug abuse; psychiatric disorders; hearing impairment; dementia; chronic pain conditions; admission to ICU or high dependency	Researchers compared the amount of medications each patient received and the length of their hospital stay. Patients completed a questionnaire developed by the researchers on postop day 3.	No differences were noted between the two groups with regards to length of time the epidural was in place, use of breakthrough pain medication, occurrence of adverse effects, or length of hospital stay.	Music therapy was repeated a total of 7 times in the first 2 days postop.	Lack of randomization; Researcher was not blinded leading to possible biases; results limited to sample population	IV

			unit after surgery					
Vaajoki, A., Pietilä, A.M., Kankkunen, P., & Vehviläinen-Julkunen, K. (2011). Effects of listening to music on pain intensity and pain distress after surgery: An intervention. <i>Journal of Clinical Nursing</i> , 21, 708-717. doi: 10.1111/j.1365-2702.2011.03829.x	Evaluate the effects of listening to music on pain intensity and pain distress after abdominal surgery	Prospective clinical	N= 168 <i>Inclusion:</i> major abdominal surgery	Pain was assessed when breathing deeply and changing position using a VAS	Not significant differences were noted after the intervention on the first postop day. Differences were more significant in the experimental group on the second postop day. The intervention group didn't listen to music on the third postop day, but pain measures were still assessed. No significant differences were noted between the groups, seeming to indicate there are no long term effects of music therapy.	One researcher collected all the data; type of music was selected by the patient	Patients were disrupted occasionally; patient confusion between pain intensity and pain distress; results limited to the sample population	IV

## Appendix B.

12/1/2017

## Non-Pharmacological Interventions and Postoperative Pain

Marie Aamodt, BSN, RN

### 1. I am a(n):

- A - RN/LPN
- B - APRN
- C - Therapist (RT, PT, OT, ST)
- D - Physician or Physician Assistant
- E - Other

### 2. I have worked in my field:

- A - 0-5 years
- B - 6-10 years
- C - 11-15 years
- D - 16-20 years
- E - More than 20 years

### Objectives

By the end of this event, the learner will be able to:

- Identify three consequences of untreated or under-treated pain.
- Identify two provider barriers to pain management.
- Describe the four contexts of comfort.
- Identify their beliefs towards the use of non-pharmacological methods in the management of pain.
- Describe three non-pharmacological interventions available for patients at Sanford Health.

### 3. Pain is one of the most common reasons people seek medical care.

- A - True
- B - False

### What is pain?

- ▶ Whatever the experiencing person says it is, existing whenever the experiencing person says it does" (McCaffery as cited by Bernhofer, 2011)
- ▶ Highly unpleasant physical sensation caused by illness or injury (Pain [def. 1], n.d.)
- ▶ Something everyone will experience at some point in their life.



12/1/2017

**Pain can be:**

- ▶ Acute
- ▶ Chronic
- ▶ Physical
- ▶ Emotional
- ▶ Mental
- ▶ Spiritual



**Why is it important to properly treat pain?**

- ▶ It is a nurse's moral and professional obligation
- ▶ ANA Code of Ethics (2015) states "Nursing encompasses . . . the alleviating of suffering" (p. vii)
  - ▶ Beneficence - desire to do good, compassion
  - ▶ Non-maleficence - do no harm
- ▶ American Society for Pain Management Nursing position: "Every patient with pain, including those with substance use disorders, has the right to be treated with dignity, respect, and high-quality pain assessment and management" (Oliver et al., 2012, p. 16-9).
- ▶ Failure to provide adequate pain relief could be seen as negligence (Berne, Carr, & Cousins, 2007)



**Why is it important to properly treat pain?**

- ▶ It is in Sanford's Patient's Rights and Responsibilities:
  - ▶ "As a Sanford patient, you can expect:
    - ▶ Information about pain and pain relief measures.
    - ▶ Staff commitment to pain prevention and pain management.
    - ▶ Staff who will listen and respond to your reports of pain." (Sanford Health, n.d.)
- ▶ It affects hospital reimbursement
  - ▶ HCAP5 Patient Survey question: "Patients who reported that their pain was 'always' well controlled"
    - ▶ Sanford's results: 66%
    - ▶ North Dakota average: 73%
    - ▶ National average: 71% (Mediana.org, n.d.)

**4. Past experiences and beliefs can influence the way one treats pain.**

A - True  
B - False

**What keeps pain from being adequately treated?**

- ▶ Patient reasons:
  - ▶ Fear of pain medications
  - ▶ Don't want to be labeled a drug addict
- ▶ Provider reasons:
  - ▶ Fear of causing addiction or overdose
  - ▶ Prejudices, prior experiences
  - ▶ Lack of knowledge
  - ▶ Time constraints
  - ▶ Media - "The Opioid Epidemic"
  - ▶ Government regulations



(Evans, 2017; Fackler & Potter, 2015)

**5. What percentage of acute pain is under-treated?**

A - 20%  
B - 40%  
C - 60%  
D - 80%

12/1/2017

6. Untreated or under-treated acute pain can lead to chronic pain.

A - True  
B - False

The effects of untreated or under-treated pain

- Physical:
  - Reduced mobility
    - Pressure sores
    - Pneumonia
    - DVT/PE
  - Poor sleep
  - Poor appetite and dehydration
  - Impaired immunity



(Patterson, n.d.)

The effects of untreated or under-treated pain

- Mental/Emotional:
  - Irritability
  - Difficulty concentrating
  - Increased confusion/delirium
- Social/Economic:
  - Missed school/work
  - Longer hospital stays
  - Strained relationships
  - Increased dependence on caregivers

(King B. Frazer, 2013; Patterson, n.d.; Rajeh B. Valimeradi, 2009)

How do we treat pain

- Drugs:
  - Opioids
  - Non-opioids
  - Adjuvant medications
- Non-drugs:
  - Massage
  - Guided imagery
  - Aromatherapy
  - Music
  - Positioning
  - Heat/cold packs
  - Environmental (dimming lights, temperature, smells)




7. Human beings strive to have their basic comfort needs met.

A - True  
B - False

Theory of Comfort

- Developed in the 1990s by Katherine Kolcaba
- Beliefs:
  - Health care situations are stressful for patients
  - Comfort is a basic human need
- Comfort exists in 4 contexts:
  - Physical
  - Psychospiritual
  - Environmental
  - Social
- Comfort exists in 3 states:
  - Relief
  - Ease
  - Transcendence



(Kolcaba, 1994; Kolcaba, 2006)

12/1/2017

	Relief	Ease	Transcendence
Physical			
Psychospiritual			
Environmental			
Sociocultural			

	Relief	Ease	Transcendence
Physical	Abdominal pain, diarrhea, N/V, lack of mobility	Comfortable resting position (deep and relaxation), PCA	PI resumes his ADLs with side effects controlled
Psychospiritual	Anxiety, depression, social stigma	Deep breathing, coaching/tic model, reassurance	PI feels spiritually and emotionally at ease
Environmental	Double-patient rooms, female screen, temperature, bright lights	Male nurse, single room, low lighting, quiet, privacy provided	PI feels comfortable changing colostomy bag
Sociocultural	Family not present, financial concerns	Visitors, phone calls, learns more about financial implications	PI has a supportive network in place, financial issues have been addressed

### Theory of Comfort

- ▶ Parker and Smith (2010) divide nursing cares are divided into 3 main categories:
  - ▶ Technical Interventions
    - ▶ Taking vitals, performing assessments, administering medications
  - ▶ Coaching
    - ▶ Listening to the patient, education, referrals to other departments
  - ▶ "Comfort Food for the Soul" (p. 394)
    - ▶ Massage, music therapy, art therapy
- ▶ Which of these do you think gets the most attention?

### 8. I currently use non-pharmacological interventions, such as massage, in my practice.

A - Yes  
B - No

### Take a moment:

- ▶ How do you feel about using non-pharmacological interventions to treat post-operative pain?
- ▶ Are there barriers to using non-pharmacological interventions? If so, what are they?

**Sanford Comfort Menu**



## Did you know about Sanford's Comfort Menu?

12/1/2017

### Non-Pharmacological Interventions

**MUSIC THERAPY**

### Massage Therapy

- Studied reviewed: 14
  - 13/14 (almost 93%) found that massage was effective at reducing postoperative pain
  - 9 evaluated the effects of massage in anxiety
    - 7 of which found that massage decreased patient anxiety
- The site of the massage varied - hand, back, or patient selected
  - Hand/feet: 6
  - Patient selected: 5
  - Back/shoulders: 1
  - Not specified: 1
- Length
  - A majority of massages in the studies were 20 minutes in length
  - Only 1 investigated the effects of a short (5 minute) massage

### Aromatherapy/Essential Oils

- Studies reviewed: 5
  - 2 evaluated the effects of the aroma alone
  - 2 involved soaking the incision site in a sitz bath
  - 1 combined aromatherapy with massage
- Lavender was the most common aroma studied
  - Has antibacterial and antifungal properties
  - Analgesic, anti-spasmodic, and relaxing properties attributed to lavender (Jhean et al. 2012)
- Spearmint, lavender, and "nausea relief" are available for use here
- Aromatherapy is commonly used to treat nausea
- Other aromas can be used depending on the condition being treated
  - A symptom grid is available by searching the SharePoint site

#### Essential Oil Reference Grid for Single EO

Essential Oil (EO)	Site	Assess/Effect	Assess/Effect	Assess/Effect	Assess/Effect	Assess/Effect	Assess/Effect	Assess/Effect
Lavender (Monarda spicata)	Foot	Assess/Effect	Assess/Effect	Assess/Effect	Assess/Effect	Assess/Effect	Assess/Effect	Assess/Effect
Spearmint (Mentha spicata)	Hand	Assess/Effect	Assess/Effect	Assess/Effect	Assess/Effect	Assess/Effect	Assess/Effect	Assess/Effect
Peppermint (Mentha piperita)	Hand	Assess/Effect	Assess/Effect	Assess/Effect	Assess/Effect	Assess/Effect	Assess/Effect	Assess/Effect
Other								

### Cold Therapy

- Studies reviewed: 6
- 100% of the studies found cold therapy helpful in reducing pain
- Different methods were used
  - Alot towels, gel packs, ice bags
- We have ice bags on the floor or you can order a heating/cooling pump from Central Supply.
- The effect of heat on pain was not examined, but can be useful for certain types of pain (ex. shoulder pain after a laparoscopic surgery)



### Music Therapy

- Studies reviewed: 15
  - 12 found that music therapy was effective at reducing postoperative pain
  - 9 studies examined the effects of music therapy on anxiety
    - 5 of which found that music therapy had a positive effect on anxiety
- Common theme: Patients should be allowed to pick the type of music they prefer
- C.A.R.E. channel, music channels (channels 28, 29), encourage patients to bring music (iPod, etc.) from home

12/1/2017

**Points to Ponder**

- ▶ **Massage:**
  - ▶ If considering hand massage, keep IV lines in mind
  - ▶ Some people may not like to be touched
- ▶ **Aroma therapy:**
  - ▶ Some people may have sensitivities to scents
- ▶ Non-pharmacological interventions are cheap and have fewer side effects than opioids
- ▶ Can be personalized to meet the patient's specific needs
- ▶ Can be implemented without a physician order

**Musings on Comfort**

Comfort may be a blanket or breeze,  
 Some ointment here to soothe my knees;  
 A listening ear to hear my woes,  
 A pair of footies to warm my toes;  
 A PRN medication to ease my pain,  
 Someone to reassure me once again;  
 A call from my doctor, or even a friend,  
 A rabbi or priest as my life nears the end.  
 Comfort is whatever I perceive it to be,  
 A necessary thing defined only by me.

B.D. Levenson (under nurse)  
 Scabies, 1995, p. 208

1. Pain is one of the most common reasons people seek medical care.

A - True  
 B - False

2. Past experiences and beliefs can influence the way one treats pain.

A - True  
 B - False

3. What percentage of acute pain is under-treated?

A - 20%  
 B - 40%  
 C - 60%  
 D - 80%

4. Untreated or under-treated acute pain can lead to chronic pain.

A - True  
 B - False

12/1/2017

5. Human beings strive to have their basic comfort needs met.

- A - True  
B - False

6. I plan on using non-pharmacological interventions, such as massage, in my practice.

- A - Yes  
B - No

## References

- American Nurses Association. (2015). Code of ethics for nurses with interpretive statements. Retrieved from <http://nursingworld.org/DocumentVault/Ethics-1/CODE-OF-ETHICS-for-Nurses.html>
- Bermer, F., Carr, D.B., & Cousins, M. (2007). Pain management: A fundamental human right. *Anesthesia and Analgesia*, 105(1), 205-221. doi: 10.1213/01.ane.0000268145.52345.55
- Bernhofec, E., (2011). Ethics and pain management in hospitalized patients' OJN: The Online Journal of Issues in Nursing, 17(1). Retrieved from <http://nursingworld.org/WaivMenuCategories/ANANWorkplace/ANANPeriodicals/OJN/CColumns/Ethics/Ethics-and-Pain-Management-.html>
- Evans, M. (2017). Christie set to impose pain pill limits despite N.J. doctors' objections. *The Inquirer Daily News*. Retrieved from [http://www.philly.com/philly/news/politics/20170120\\_Christie\\_set\\_to\\_impose\\_pain\\_pill\\_limits\\_despite\\_N\\_J\\_doctors\\_objections.html](http://www.philly.com/philly/news/politics/20170120_Christie_set_to_impose_pain_pill_limits_despite_N_J_doctors_objections.html)
- King, N.B., & Fraser, V. (2013). Untreated pain, narcotics regulation, and global health ideologies. *PLOS Med* 10(4):e1001411. doi: 10.1371/journal.pmed.1001411
- Kolcaba, K.Y. (1994). A theory of holistic comfort for nursing. *Journal of Advanced Nursing*, 19(6), 1178-1184. doi: 10.1111/j.1365-2648.1994.tb01202.x

## References

- Kolcaba, K.Y. (1995). The art of comfort care. *Image: Journal Of Nursing Scholarship*, 27(4), 287-289.
- Kolcaba, K., Tilton, C., & Drouin, C. (2004). Comfort theory: A unifying framework to enhance the practice environment. *Journal of Nursing Administration*, 36(11), 538-544.
- Medicare.gov. (n.d.). Hospital compare: Survey of patients' experiences. Retrieved from [https://www.medicare.gov/hospitalcompare/compare.html#mprTab=18&mprID=350002003390015&mprDist=7\\_1&C7\\_A&dist=100&loc=55501&lat=45.824343&long=100.459753](https://www.medicare.gov/hospitalcompare/compare.html#mprTab=18&mprID=350002003390015&mprDist=7_1&C7_A&dist=100&loc=55501&lat=45.824343&long=100.459753)
- Oliver, J., Coggins, C., Compton, P., Hagen, S., Mattellano, D., Stanton, M., . . . Turner, H.N. (2012). American Society for Pain Management Nursing position statement: Pain management in patients with substance use disorders. *Pain Management Nursing*, 13(3), 169-183. <http://dx.doi.org/10.1016/j.pmn.2012.07.001>
- Pain [def. 1]. (n.d.). In *Oxford OnLine*. Retrieved from <https://en.oxforddictionaries.com/definition/pain>
- Parker, M.E., & Smith, M.C. (2010). *Nursing theories & nursing practice* (3<sup>rd</sup> ed.). Philadelphia, PA: D.A. Davis Company.

## References

- Paschakis, Z., & Pottar, M. L. (2015). Acute pain management for inpatients with opioid use disorder. *American Journal of Nursing*, 115(9), 24-46. doi: 10.1097/01.NAJ.0000471243.309191.92
- Patterson, C. (n.d.). 7 myths regarding opioid use in pain management. Retrieved from [http://www.michigan.gov/documents/mch/7\\_Myths\\_Regarding\\_Opioid\\_Use\\_in\\_Pain\\_Management1\\_201928\\_7.pdf](http://www.michigan.gov/documents/mch/7_Myths_Regarding_Opioid_Use_in_Pain_Management1_201928_7.pdf)
- Rajek, N., & Valmoradi, M. (2009). Perspectives and experiences of elective surgery patients regarding pain management. *Nursing and Health Sciences* 12, 67-73. doi: 10.1111/j.1442-2018.2009.00488.x
- Sanford Health. (n.d.). Welcome to Sanford Health. Retrieved from <https://www.sanfordhealth.org/patients-visitors/patient-information/patient-bill-of-rights/#en-english>
- Sheikhen, F., Jahdi, F., Khoji, E.M., Shamsalzadeh, N., Sheikhen, M., Hageit, H. (2012). Epididymal pain relief: Use of lavender oil essence in primiparous Iranian women. *Complementary Therapies in Clinical Practice*, 18, 66-70. doi: 10.1016/j.ctcp.2011.02.003

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