MUSIC THERAPY FOR PAIN MANAGEMENT AMONG ADULT PATIENTS AFTER ABDOMINAL SURGERY: EVIDENCE - BASED NURSING

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ABSTRACT

Acute pain after surgery is a significant problem. The number of patients undergoing surgery has increased worldwide, and abdominal surgery is a major surgery where patient experience severe pain after surgery.

The aim of this study was to summarize current evidence on music therapy for pain management among adult patients after abdominal surgery. The researcher investigated and selected a collection of music therapy studies through PICO (Population Intervention Comparison Outcome) framework. The database used for searching included Cochrane Database, Cumulative Index to Nursing and Allied Health (CINAHL), Ovid Full Text, ProQuest Nursing & Allied Health Source, PubMed and ScienceDirect.

The total number of samples consisted of 30 relevant studies. After final appraisal, 9 studies were selected to be used in this study. The studies of comprised five RCTs (Randomized Controlled Trials), three quasi-experimental studies, and one systematic review which were published in English between the year 1999 and 2012.

After analyzing and synthesizing the evidences, it can be concluded that music therapy was an effective intervention on postoperative pain management. In order to utilize music therapy for patients after abdominal surgery, it was recommended that: 1) prior to the surgery, patients should be clearly inform about the effectiveness and music therapy intervention procedures; 2) type of music should be varied according to the culture, religion, personal choices; 3) duration of music therapy in each session last for 60 minutes; 4) the selected music should be played in a quiet environment; 5) music therapy should be given at least one time a day, and 6) prepared the equipments should include earphones, headphones, and CD players.

It is recommended that a clinical practice guideline on music therapy for postoperative pain management should be developed and implemented among patients after abdominal surgery. Strategies to distribute this knowledge among nurses in the clinical settings should be taken into consideration. A clinical research should be performed to evaluate its effectiveness is also recommended.

KEY WORDS: PATIENTS AFTER ABDOMINAL SURGERY/MUSIC THERAPY /POSTOPERATIVE PAIN/EVIDENCE BASED NURSING

50 pages

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CHAPTER I
INTRODUCTION

1.1 Background and significance of the clinical problem

Pain is a serious problem of each individual. Right now millions of people in the world are suffering any kinds of pain, which is either a direct or indirect consequence of several diseases. Pain is a common problem of hospitalized patients in general and surgical wards. People normally experience pain in various degrees. If pain is above their pain threshold, it might interrupt their normal lives. Pain severity can be divided into severe, moderate, and mild pain. The type of pain can be divided into acute and chronic. Acute pain mainly occurs after injury or surgery. According to World Health Organization (WHO, 2007, p. 7), “There is a need to look at the problem of pain in a comprehensive manner.” Pain is not well managed everywhere. For instance, every year 7 millions of patients pay a visit to emergency departments in Australia and 78% – 86% of them suffer from pain. Also, management of patients’ pain within this department is generally poor (National Institute of Clinical Studies [NICS], 2011). In addition, American Cancer Society has reported that many people in Bangladesh suffer from pain (American Cancer Society [ACS], 2013). If pain is not well managed, patients and their family experience psychological, physiological, and financial sufferings. Unrelieved pain stimulates the pituitary-adrenal axis, and it inhibits the immune system, so infection occurs and delays wound healing. Moreover, persistent pain among hospitalized patients, in particular those who receive abdominal or any major surgery, will decrease patients’ movement and lead to some complications such as deep vein thrombosis, pulmonary embolus, and pneumonia. These increase hospital burden, family burden, length of hospital stay, cost of care, and readmission rate, and decrease patients’ satisfactions (Wells, Pasero, & McCaffery, 2008).

1.1.1 Pain among patients after abdominal surgeries

1) Definition of acute pain

Pain is a physical suffering or distress due to injuries. The International Association of the Study of Pain (IASP) has defined pain as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage” (en.wikipedia.org). There are various definitions of acute pain. American Society of Anesthesiologists (ASA, 2012), has defined acute pain as pain that is present in a surgical patient after a procedure. Among patients undergoing surgeries, acute postoperative pain is defined as a clinical condition that should be treated accurately and completely (Beyaz, Bayar, & Erdem, 2011). Acute pain is also described by its severity. According to NICS (2011), severe acute pain is defined as a pain score of 7 or more or significant distress. It can be concluded that acute postoperative pain refers to the feeling of pain perception by patients after the surgical procedure.

2) Pain among patients after surgeries

From the hospital records of the United States of America (USA) in 2004, the total number of discharged patients was 35 million and 46% of them underwent surgery. Of these, 16% received more than one procedure, and after surgery 80% of the patients suffered postoperative pain and 11% to 20% experienced severe pain (Wells et al., 2008). According to Rowlingson (2006), surgical procedure in the USA is increasing day by day. In one year 75 million patients undergo surgery, so postoperative pain management is essential for them. It has also been found that 80% of patients reported that they had moderate to severe pain after operation. Similar to the study of Apfelbaum, Chen, Mehta, and Gan (2003), about 82% of patients undergoing surgery experienced postoperative pain, 47% of them had moderate pain and 39% had severe pain. Most of the patients (75%) complained about pain after hospital discharge, while more than half, or 58%, had pain before discharge from the hospital. Patients with surgical procedures always expect pain, particularly if the surgery is abdominal surgery; patients experience severe acute pain after a procedure.

3) Pain among patients after abdominal surgeries

Abdominal surgery is a major surgery which damages extended part of tissues; therefore, acute severe pain is expected after the surgery

(ASA, 2012; Wells et al., 2008). The study conducted by Gupta, Gandhi, and Viscusi (2011), found that 7.4 million abdominal surgical procedures were completed in the year 2010 among seven largest countries around the world. This figure reflects that a very high number of patients experience pain. In the same study, it is also stated that persistent pain varies between 15% and 30% after minor and major abdominal or pelvic procedures. Furthermore, type of surgery also plays an important role on characteristics of pain. Abdominal and thoracic surgical procedures are always expected to cause severe pain after surgery. Gerbershagen et al. (2013), have pointed out that many patients experience postoperative pain within the moderate level. On the first postoperative day, patients with obstetrics, hysterectomy, caesarean section, and after abdominal surgery reported highest pain score using the Numerical Rating Scale (NRS), ranging from 7 to 8 points. Likewise, Vallano, Aguilera, Arnau, Ban, and Laporte (1999), conducted a study on management of postoperative pain in patients undergoing abdominal surgery in Spain. The results showed that 38% of the patients' complained of severe to unbearable pain on the first day after the surgery. Furthermore, this study has shown that patients at different centers reported surgical pain differently. For example, the percentages of patients suffering from severe to unbearable pain varied from 22% to 67%.

Another study done by Jawaid, Muhammad, Shafiq, and Malik in the year 2009 found that almost half of the surgical patients received abdominal surgeries (46.67%), and they always experienced postoperative pain (Jawaid, Muhammad, Shafiq, & Malik, 2009).

It can be summarized that acute pain is a common symptom among patients after abdominal surgery. Its severity depends on type of surgical incision and patients' conditions. Improper management of postoperative pain brings serious impact on patient's health conditions. Proper postoperative pain management is therefore very important.

1.1.2 Mechanisms of acute postoperative pain

In order to understand the mechanisms of acute pain after surgery, the author will consequently present pathophysiology of acute pain, pain pathways, and theories related to pain as follows:

1) Pathophysiology of acute postoperative pain

The incision or cutting of tissues stimulates free nerve endings and specific nociceptors (Azari, Santoso, & Osborne, 2013; Rowlingson, 2006). These nociceptors release inflammatory cytokines/mediators (Azari et al., 2013; Rowlingson, 2006) and sympathetic amines including the substances such as bradykinin, serotonin, and histamine, both sensitize and stimulate the receptors and pain impulses, which move to the dorsal horn of the spinal cord, make contact with second order neurons that cross to the opposite side of the cord, and ascend via the spinothalamic tract to the reticular activating system and thalami (Azari et al., 2013). Pain sensation occurs in the somatosensory cortex and the nociceptive stimulus perceives it as acute pain (Azari et al., 2013; Voscopoulos & Lema, 2010).

2) Pain Pathways

Every tissue has pain receptors which are called nociceptors that respond to thermal, mechanical, and chemical stimuli with A-delta, C, and A-beta fibers. Mechanical receptors are responsible for acute pain through A-delta fibers; these receptors are activated by strong stimuli, resulting in sharp pain that usually happens in cases of acute injuries or tissue damages. Thermal receptors activated by burn and responsible factor are A-delta fibers. Chemoreceptor is activated by chemicals and it causes chronic pain, with the responsible factor being C fibers (Marmo & D'Arcy, 2013).

Peripheral and central nervous systems are involved with pain perception. Peripheral nerve fibers convey the pain stimuli to the grey matter of the spinal cord, which then transmits them, ascending the pathway to the brain in the anterolateral column of the white matter of the spinal cord. When tissues are damaged from noxious stimuli, pain-producing substances are released into the extracellular fluid surrounding the pain fibers. These substances include bradykinin, cholecystokinin, serotonin, histamine, potassium ions, norepinephrine, prostaglandins, leukotrienes, and substance P (SP). The Neuropeptide is a substance that functions as a neurotransmitter and as a neuromodulator. To be specific, SP is a hendecapeptide—a peptide composed of a chain of 11 amino acid residues. It belongs to the tachykinin and is released from the terminals of specific sensory nerves. It is found in the brain

and spinal cord, and is associated with inflammatory processes and pain (Marmo & D'Arcy, 2013).

The brain and spinal cord also produce pain-relieving substances, which are endorphins and enkephalin. These chemicals attach to endogenous receptors in the brain, spinal cord, and peripheral tissues, activating the descending inhibitory system (Marmo & D'Arcy, 2013). Pain pathways explain both acute and chronic pain; patients who are undergoing surgical procedures experience acute pain as described in various articles. In fact, there are many theories all over the world that attempt to explain pain differently as exemplified below.

3) Theories of Pain

Pain is experienced by every one of all ages, genders, and economic statuses. Pain is an unfavorable experience, and feeling of pain is different in each individual as it varies from person to person. Different theorists explain pain in their own way; sometimes it comes up with debate. In ancient period of time, if somebody suffered from pain, it was thought that she/he was receiving a form of punishment. The Greeks believed that pain was a pleasure as when pain reduced it was pleasurable. Pain was also emotional. After a period of time, Aristotle said pain was related with the soul and the heart. However, the contemporary theories of pain describe pain in different etiologies and responses. Each theory provides health care professionals with different approaches to pain management. The following are the theories of pain.

a) Specificity Theory: In the 17th century, Descarles stated that pain was physical phenomena by injury or damage of body tissue or nerve that sent message directly through the specific pain receptors to the pain center and free nerve endings in the skin which acted as pain receptors. The feelings of pain depended on the severity of injury. This theory explained the mechanisms of pain, and it was widely accepted in the 19th century (Marmo & D'Arcy, 2013).

b) Pattern Theory: This theory was established in the early 1900s. It described two fibers which were responsible for pain; one was A-delta fibers which worked rapidly and the other one was C fibers it worked slowly. This type of pattern of pain was called the pattern theory. This theory explained central summation. Peripheral pain impulses sent message to the brain for interpretation through the spinal

cord; thus, according to this theory, pain depended on the amount of tissue injury. Individual perception or emotional factors were not described in this theory (Marmo & D'Arcy, 2013).

c) Neuromatrix Theory: This theory was discovered in 1990s. It mainly described individuals' own intrinsic network of neurons. This theory was not widely accepted as it was limited and not a very popular theory (Marmo & D'Arcy, 2013).

d) Gate control Theory: It is a hypothetical thought about the emotion of a person and it is a mechanism of the brain. A-beta fiber is usually interpreted in terms of the gate control theory. The spinal cord acts as the gate, so when pain impulses increase, they relatively open the gate more and comparatively more pain impulses are sent from the peripheral to the central nervous systems. Then, pain perception occurs. When it is closed, the brain is unable to describe pain, and that means no pain. The gate control theory is the unique theory that describes the relationship of pain among psychological factors and it is related to beliefs, previous experience, motivation, emotional aspects, anxiety, and depression of individuals, all of which are responsible factors of pain to affect the brain. This theory was developed in 1962, and at present, it is a very popular and widely accepted theory (Marmo & D'Arcy, 2013).

1.1.3 Impacts of acute postoperative pain

Several researchers have revealed that improper postoperative pain management can have many impacts on the patients' life. Wells et al. (2008), for instance, have described that if pain is not well managed, patients and families suffer from a lot, both physically and mentally. Unrelieved pain stimulates the pituitary-adrenal axis, and it inhibits the immune system, so infection occurs and delays wound healing. Severe acute pain activates the sympathetic nervous system which causes harmful effects on the cardiovascular, gastrointestinal, and renal systems. As a result, patients suffer from cardiac ischemia and ileus. Continuous pain decreases patients' movement and leads to some complications such as deep vein thrombosis, pulmonary embolus, and pneumonia, which, in turn, brings about an increase in hospital burden,

family burden, length of hospital stay, cost of care, readmission and a decrease in patient satisfactions. Furthermore, hospital loses their reputation and profits.

According to Sinatra (2010), ineffectively treated and persistent postoperative pain may lead to anxiety, sleep disorders, demoralization, and disturbances in mental activities and social relations. When pain remains unrelieved, patients may develop the feeling of hopelessness or helplessness and this may be subsequently develop into chronic depression (Wells et al., 2008). Gupta et al. (2011), have pointed out that improper management of pain will lead to chronic pain and some serious problems can arise as a result such as 1) psychological distress; 2) delayed activities of daily living; 3) delayed return to previous work; 4) sleep disturbance; and 5) abdominal tissue adhesions which may lead to intestinal obstruction.

Moreover, some postoperative complications that have occurred due to analgesia within 24-hours are nausea/vomiting, pruritus (Nimmaanrat & YunusWanjsa, 2014; Vaajoki, Kankkunen, Pietilä, Kokki, & Vehviläinen-Julkunen, 2012). Vaajoki et al. (2012), have stated in their study that after giving intrathetical analgesia to patients, more adverse effects occurred such as fatigue and paralytic ileus. Some patients stayed for ten days longer at the hospital because of complications.

The aforementioned negative impacts of pain happen due to improper management of postoperative pain. Adverse effects of pain occur after using analgesia during a surgical procedure. Pain has a significant influence on quality of life of patients, so proper management of postoperative pain is very important immediately after surgery.

1.1.4 Management of postoperative pain

Postoperative pain management starts from the perioperative period (ASA, 2012). Following are the main methods for management of pain after surgery: a) Pharmacological management and b) Non- pharmacological management.

1) Pharmacological management of postoperative pain

Pharmacological management of postoperative pain refers to the management of pain by using medications to inhibit pain sensation (McGuire, 2010). There are various groups of medications that have been widely used for postoperative pain control. Those include the following:

a) Non-narcotic analgesics including nonsteroidal anti-inflammatory drugs (NSAIDs): these drugs include aspirin, acetaminophen, ibuprofen, ketoprofen, and naproxen, which are used for pain control by relieving inflammation. They also help block pain at the peripheral nervous system level, so pain sensation cannot be transmitted (Dewit & Kumagai, 2013).

b) Narcotics (opioids): Morphine, meperidine, hydromorphone, codeine, and fentanyl belong to the narcotics groups of drugs. These drugs are prescribed for management of pain. They act to impede pain at the central nervous system level (Dewit & Kumagai, 2013).

c) Medications with non-analgesic primary actions are used as adjuncts to pain control. Examples of these drugs are following:

(i) Antidepressants including amitriptyline, imipramine, and trazodone hydrochloride

(ii) Anticonvulsants such as phenytoin, carbamazepine, gabapentin, and pregabalin

(iii) Stimulants including caffeine and dextroamphetamine

(iv) Muscle relaxants such as carisoprodol and baclofen

(v) Chemotherapeutic agent which is methotrexate (Dewit & Kumagai, 2013).

2) Non-pharmacological management of postoperative pain

Pharmacological methods are a usual form of management of postoperative pain, but for better management outcomes, a combination of pharmacologic and non-pharmacologic managements is very effective. Following are some non-pharmacologic methods which are commonly used for postoperative pain management (Dewit & Kumagai, 2013; McGuire, 2010):

a) Distraction: The activities that distract patients' mind away from pain such as watching television, talking with friends, using computer, and playing a game (Dewit & Kumagai, 2013; McGuire, 2010).

b) Relaxation: Relaxation means release of tension by doing some activities such as movement of the body, head, neck, face, or feet (Dewit & Kumagai, 2013; McGuire, 2010).

c) Guided imagery: This method helps the patients to imagine the happy moments in their life and it is effective to break the mind away from pain (Dewit & Kumagai, 2013; McGuire, 2010).

d) Meditation: This method involves prayers according to individual patients' preferences such as sound, repeated phrase, or visual images (Dewit & Kumagai, 2013; McGuire, 2010).

e) Binders: Binders refer to the utilization of abdominal bandage to support patients abdominal. This process of intervention is helpful for surgical patients during movement to reduce pain (Dewit & Kumagai, 2013; McGuire, 2010).

f) Music: This method is also helpful for the patients as it offers distraction of their mind away from pain by listening to music (Comeaux & Steele-Moses, 2013; Vaajoki, Pietilä, Kankkunen, & Vehviläinen-Julkunen, 2013). It may be natural sounds such as ocean, running streams, breezes, rain, and birds singing as well as different types of songs including classic, religious, pop songs and sounds of music instruments according to patients' personal preference. Music is one of the most effective non-pharmacological therapies for management of postoperative pain (Dewit & Kumagai, 2013; McGuire, 2010).

3) Postoperative pain management in Bangladesh

Lots of patients are admitted into the hospitals everyday at surgical units all over the world including Bangladesh. The author has work experience at different levels of hospitals in Bangladesh such as primary, secondary, and tertiary level hospitals where major and minor surgeries are performed. In Bangladesh, there is no statistical data regarding abdominal surgery available. According to the author's work experience as a registered nurse, most of the patients suffer severe pain after surgery. Their pain levels have never been assessed with any form of instrument, and information about their pain level has never been formally recorded. The nurses in Bangladesh have no special training on postoperative pain management and have less opportunity to become experts in specific departments such

as surgery specialists or pain management nurses. Moreover, there is no standard guideline on pain management in any group of patients, particularly those who have major surgery such as abdominal surgery. Nurses just follow the doctor's prescription. After a surgery, patients always receive only pain medication by intravenous, intramuscular, or oral administration for management of postoperative pain. Evidence has shown that when patients perform self-assessment of their pain using a numerical rating scale, it improves chances of early recovery and enhances postoperative outcomes (Eriksson, Wikstrom, Lindblad-Fridh, & Brostrom, 2012). For these reasons, if nurses have enough knowledge of postoperative pain management, they can teach the patients how to utilize the scale and the patient will reap the benefits.

Effective pain management is not just a matter of giving the right medicine to the patients at the right time. It is a combination of pharmacologic and non-pharmacologic approaches that together give the individual patients the greatest possible degree of comfort for the longest possible time. Music has found to be one of the most effective non-pharmacological methods for management of postoperative pain (Dewit & Kumagai, 2013; McGuire, 2010). The limbic system processes the emotions and the hypothalamus releases stress hormones. During acute pain, the limbic system tells the spinal cord to hold back on the pain signals, and when patient listen music emotional stress reduced and then pain perception also reduce.

1.1.5 Music therapy as a non-pharmacological intervention of postoperative pain

Several theorists have stated that after injuries patients suffer acute pain and feelings of pain depends on severity of the injury. The gate control theory is proposed to describe individual patients' emotional state which can be controlled by music therapy because music could distract patients' emotions away from pain to make them feel relaxed.

The processing of pain is a phenomenon involving both the periperal and central nervous systems. As the ascending nociceptive information passes through the brainstem to reach the brain, it activates a network of brainstem structures and pathways. The classical pain pathways ascending via the thala-mus to cortical regions are supplemented by more medial ancient pathways that directly impact the midline

emotional systems concentrated in the supraspinal structures of the lower brainstem and diencephalon, including the medullary reticular formation, periaqueductal gray, parabrachial region, hypothalamus, thalamus, as well as various limbic structures and the forebrain, that mediate the perception of pain. These various brain regions are associated with autonomic, motor, discriminative, affective, cognitive, and motivational aspects of pain behaviours and by listening music patient's perception divert as well as pain away and emotionally patient feel less pain (Bernatzky, Presch, Anderson, & Panksepp, 2011).

Music is a non-pharmacological method, and this therapy can be used for management of pain. Research has shown that the combination of non-pharmacologic and pharmacologic interventions provides better pain control (Morton & Fontaine, 2009). Listening to music for control of pain after surgery has received increasing attention day by day (Vaajoki et al., 2013). Florence Nightingale, the founder of modern nursing, acknowledged the power of music during the period of Crimean War. During that time, the injured soldiers were treated with music which helped the healing process (Nilsson, 2008). Music can reduce postoperative pain by at least 50% (Azari et al., 2013) and can quickly reduce pain concentration and pain suffering (Vaajoki et al., 2013). Also, patients feel less pain during deep breathing and in a shifting position (Vaajoki, Pietila, Kankkunen, & Vehvila¨inen-Julkunen, 2011). Their pain tolerance power increases as well (Comeaux & Steele-Moses, 2013). Music therapy also helps reduce anxiety level up to 19% (Chen, Seth, Rao, Huang, & Adelman, 2012), thus significantly decreasing anxiety levels of patients (Comeaux & Steele-Moses, 2013; The Joanna Briggs Institute, 2011).

Listening to music is also helpful for many other reasons. For instance, it enhances early recovery (Comeaux & Steele-Moses, 2013; Vaajoki et al., 2011; Vaajoki et al., 2013); lowers blood pressure, heart rate, and respiratory rate (The Joanna Briggs Institute, 2011; Vaajoki et al., 2011); decreases the amount of analgesic or opioid use (The Joanna Briggs Institute, 2011; Vaajoki et al., 2012; Vaajoki et al., 2013); promotes environmental noise satisfactions (Comeaux & Steele-Moses, 2013); and enhances patients' satisfaction (Vaajoki et al., 2011; Vaajoki et al., 2013). Music therapy is easy to use, safe, and simple and does not require any musical skill in particular (Vaajoki et al., 2011; Vaajoki et al., 2013). Finally, music therapy reduces

undesirable analgesic side effects including pruritus and nausea/vomiting (Nimmaanrat & YunusWanjses, 2011; Vaajoki et al., 2013).

According to the study of Nimmaanrat and YunusWanjses (2011), it was found that after listening to music patients with abdominal surgery gave positive comments. For example, 51% said it was lovely, 36% thought listening to music made them sleepy, 31% thought it was excellent, 29% believed music helped them achieve relaxation, 29% said music therapy distracted their mind from pain and made them feel as if they were staying outside the hospital, and 18% commented that their time passed very quickly when listening to music. It is clear that as a non-pharmacological method, music therapy is very effective for management of postoperative pain.

In Bangladesh, there is no practice in regard to non-pharmacological pain management methods such as music therapy for pain management among adult patients after abdominal surgery. From the above evidence found in this study, music therapy is very effective for management of pain after surgery. Some studies have found that music therapy can lower heart rate, blood pressure, and breathing rate, and it can also reduce depression and sleeplessness, which, in turn, results in early recovery of patients. Therefore, nurses in Bangladesh can select music as a non-pharmacologic method for management of postoperative pain after major surgery such as abdominal surgery as it will be very useful for patients. In addition to benefits for patients, nurses' work load, hospital burden, and family burden will be reduced.

1.2 Clinical problem of the study

After undergoing abdominal surgery, patients always experience severe pain. Inadequate postoperative pain management brings about many impacts such as physiological, psychological, and financial impacts on the patients. Thus, better management of postoperative pain is very important among this group of patients.

In Bangladesh, when patients suffer postoperative pain, nurses provide care by giving them oral, intramuscular, or intravenous pain medications. Unfortunately, standard pain assessment utilizing a pain scale is not available. Nurses use only patients' complaint as the tool for recognition of pain symptoms before informing physicians in charge to prescribe pain medications. Some patients who

receive opioid injection develop complications such as abdominal distension which leads to delayed recovery. Other pain management strategies do not exist. In particular, non-pharmacological therapy for management of pain among patients with postoperative pain is not available. In sum, postoperative pain management in Bangladesh stills demonstrates some limitations and needs to be improved to ensure high quality of care for patients.

Several research studies have investigated the use of music as a non-pharmacological method of pain management. These studies have revealed that as a complementary therapy music therapy is very helpful for pain management after abdominal surgery. The author, therefore, would like to review the best available evidence and summarize the contents of such evidence in regard to pain management with music therapy among patients after abdominal surgery.

1.3 Purpose of the study

The purpose of this study is to summarize current evidence on music therapy for pain management among adult patients after abdominal surgery.

1.4 Expected benefits of the study

1. After completion of the study, the contents synthesized from existing evidence can be utilized as recommendations on music therapy for pain management among patients after abdominal surgery in Bangladesh.

2. The guidelines on music therapy for pain management among patients after abdominal surgery can be developed and implemented to enhance quality of nursing care in Bangladesh.

CHAPTER II
METHODOLOGY

The study is conducted with the objectives of synthesizing research evidences on music therapy for pain management after abdominal surgery. This chapter consists with search strategy, appraisal method and levels of evidence as follows:

2.1 Search Strategy

2.1.1 Search framework

The author searched and selected evidences for music therapy to management of pain in adult patients after abdominal surgery by using following PICO framework (Melnyk & Fineout-Overholt, 2005).

P (Population)	=	Adult patients after abdominal surgery
I (Intervention)	=	Music therapy
C (Comparison)	=	Standard care or usual care
O (Outcome)	=	Postoperative pain

2.1.2 Scope of searching

The music intervention for management of pain in adult patients after abdominal surgery was searched from the following scope:

1) Keywords used in the search according to the PICO framework

P (Population) = Adult patients with abdominal surgery /Gynecologic surgery/Upper abdominal surgery/Lower abdominal surgery/Major abdominal surgery

I (Intervention) = Music therapy/ music intervention

C (Comparison) = Standard care/ usual care/ routine care

O (Outcome) = Pain/ Postoperative pain/pain after surgery /pain after abdominal surgery/pain control.

The author used a Boolean operator for searching. For each PICO element, the author used synonyms by connecting terms with “OR”, then located citations that are relevant to all the PICO elements by linking with “AND”.

2) The databases used for the search

The author used electronic databases of Mahidol University library system and searched for systematic reviews from The Cochrane Library. Cumulative Index to Nursing and Allied Health (CINAHL), Ovid Full Text, ProQuest Nursing & Allied Health Source, PubMed, and ScienceDirect were used to search for single research studies. The author further searched from libraries and electronic databases and also searched thesis of master program from the library of Faculty of Nursing, Mahidol University.

3) Type of evidence

The author searched for systematic reviews of randomized controlled trials (RCTs), high quality single RCTs, and quasi experimental study acquired from full text studies published in English from 1999 to 2014.

2.2 Appraisal method and levels of evidence

2.2.1 Evidence appraisal method

The authors used the method and criteria as proposed by Melnyk and Fineout-Overholt (2011), to appraise the quality, reliability and applicability of the evidences. The collected evidences were apprising on the basis of the following three questionnaires:

1) Are the results of the study valid? (Validity)

The validity of a research or evidence means whether the evidence was conducted through scientific procedure and able to scientifically answer the raising questions and it is an important measurement tool of any evidence-based nursing practice. Randomization is a vital step for the validity of an experimental research. The selected evidences were consisted with, randomization for selection of

the groups, the studies conducted with follow-up assessments of the effects of intervention, the subjects in the group were analyzed who were assigned randomly and the control groups were appropriate, the instruments which were used to measure the outcomes were valid and reliable, the subjects in each of the groups were similar on demographic and baseline clinical variables and the subjects and intervention providers were kept blind to the study groups. During selection of evidences all above criteria were followed.

2) What are the results? (Reliability)

The reliability means depended on as for accuracy, honesty, consistency, achievement and repeatability in order to; anyone can perform same experiment with using similar equipment, condition and achieve exactly the same outcome. To test the validity of study findings needs the examination and evaluation the results of the research. The reliability can be assessing by intervention effect both statistical significance and clinical significance. Reliability consists by internal and external reliability. The evidences were measured the effect size, level of significance and precise the intervention by using confidence intervals.

3) Will the results help me in caring for my patients? (Applicability)

The ultimate goal of any research is applying the results to the patient individually or in a group. Applicability means the usefulness of the results in a given situation. Validity, reliability and usefulness for clinical decision making are considered during applying the results in clinical setting. Applicability measured by matching with setting conditions, resources availability, abilities of the health care providers, benefits of patients and families, support by the authority. All of the evidences were provided music therapy, all results were significant, and were applicable in the author's setting.

The author selected all evidences by following above all three criteria. All of the selected evidences that meet the above criteria will be selected to use in the study.

2.2.2 Appraisal the level of evidence

The following selected evidence appraised by the author and used the level of quality mentioned by Melnyk and Fineout-Overholt, (Melnyk & Fineout- Overholt, 2011).

Table: 2.1 Level of research and empirical evidence (Melnyk & Fineout- Overholt, 2011)

Level of evidence	Source of empirical evidence
Level I	Evidence from a systematic review or a meta-analysis of all studies that are RCT, or evidence from guidelines developed from a systematic review of research evidence from randomized control trials.
Level II	Evidence obtained from at least one RCT/well designed RCTs.
Level III	Evidence obtained from at least one well-designed controlled trials without randomized assignment.
Level IV	Evidence from well-designed case controlled and cohort studies.
Level V	Evidence from a systematic review of descriptive and qualitative study.
Level VI	Evidence from a descriptive or qualitative study.
Level VII	Evidence from the opinions, attitudes of experts on the issues or and/or a report written by expert committee.

CHAPTER III
FINDINGS

This chapter describes the search findings and summary of evidence in order to evaluate the intervention on the effects of music therapy for pain management among adult patients after abdominal surgery as follows:

3.1 Search results

The author searched, screened, appraised and finally selected the best evidence based on criteria relevant to this study.

3.1.1 Searching process and results

The author used the electronic database and websites of Mahidol University library system to collect the best research evidence on postoperative pain management among adult patients after abdominal surgery. The search yielded 30 relevant studies by searching databases from 1999 to 2014. Well-recognized databases with a number of relevant studies included PubMed (6 studies), ProQuest Nursing and Allied Health Source (2 studies), Cochrane Library (4 studies), ScienceDirect (2 studies), Cumulative Index to Nursing and Allied Health (CINAHL) (13 studies), and Ovid full-text (3 studies). The author carefully read the abstracts, methodology, measurement instruments and findings of the evidence. Then 9 samples of evidence-based practice including five RCTs, three quasi-experimental studies and one systematic review which were selected based on criteria. These findings are summarized in this chapter. All of the selected studies with evidence-based practice were focused on music therapy after abdominal surgery for pain management. Twenty one samples of evidence-based practice were excluded from the study because they did not meet the above criteria.

3.1.2 The following 9 studies included in the study are listed in the table presented below:

Table: 3.1 - Evidence-based practice table categorized by type and level

No	Author/year	Title of evidence	Type	Level
1	Good, M., Stanton-Hicks, M., Grass, J. A., Anderson, G. C., Choi, C., Schoolmeesters, L. J., & Salman, A./1999	Relief of Postoperative Pain with Jaw Relaxation, Music and Their Combination.	RCTs	II
2	Good, M., Stanton-Hicks, M., Grass, J. A., Anderson, G. C., Lai, H-L., Roykulcharoen, V., & Adler, P. A./2001	Relaxation and Music to Reduce Postsurgical Pain.	RCTs	II
3	Good, M., Anderson, G. C., Stanton-Hicks, M., Grass, J. A., & Makii, M./2002	Relaxation and Music Reduce Pain after Gynecologic Surgery.	RCTs	II
4	Good, M., Anderson, G. C., Ahn, S., Cong, X., Stanton-Hicks, M./2005	Relaxation and Music to Reduce Pain Following Intestinal Surgery.	RCTs.	II
5	Good, M., & Ahn, S./2008	Korean and American Music Reduces Pain in Korean Women after Gynecologic Surgery.	Quasi-Experimental Research	III
6	Engwall, M., & Duppils, G. S./2009	Music as a Nursing Intervention for Postoperative Pain: A Systematic Review.	Systematic Review	II
7	Good, M., Albert, J. M., Anderson, G. C., Wotman, S., Cong, X., Lane, D., & Ahn, S./2010	Supplementing Relaxation and Music for Pain After Surgery.	RCTs.	II
8	Vaajoki, A., Pietila, A-M., Kankkunen, P., & Vehvila¨inen-Julkunen K./2011	Effects of Listening to Music on Pain Intensity and Pain Distress after Surgery: An Intervention	Quasi-Experimental Research.	III
9	Motahedian, E., Movahedirad, S., Hajizadeh, E., & Lak, M./2012	The Effects of Music Therapy on Postoperative Pain Intensity in Patients under Spinal Anesthesia.	Quasi-Experimental Research	III

The selected 9 studies are briefly described below:

Evidence number: 1

Title: Relief of postoperative pain with jaw relaxation, music and their combination

Author/Year: Good, M., Stanton-Hicks, M., Grass, J. A., Anderson, G. C., Choi, C., Schoolmeesters, L. J., & Salman, A./1999

Publication source: Journal of Pain.

Type of evidence: RCTs.

Objectives: To determine the effects of jaw relaxation, music and the combination of relaxation and music on postoperative pain after major abdominal surgery during ambulation and rest on postoperative days one and two.

Methodology

A total of three non-pharmacological groups and one control group, namely, relaxation (26%), music (26%), combination (24%), and control groups (24%). The music offered was selected by patients. Instructions were provided before surgery. Different groups were kept in different rooms. Music was played 60 minutes on the first and second postoperative days at once a day during three phases of ambulation. Before and after intervention, pain levels were measured and recorded by using VAS.

Details about music therapy for pain management

Type of music: Music was selected by the participants from five music categories. Most of the patients chose orchestral music 29%, then the same number of subjects (24%) decided on piano and jazz, while synthesizer music was preferred by 13% and very few participants (10%) selected harp music.

Duration and time of music interventions: Sixty minutes once a day.

Equipment used: Tape recorder, earphones.

Procedures for music interventions

Instructions were given to the participants for their understanding. During ambulation, the treatment groups listened to music at all three phases such as five minutes for preparation in bed; during ambulation while getting out of bed, walking, and then returning to bed. Afterward, the patients were given ten minutes to rest in bed

for recovery. After intervention, the data collector measured pain sensation and pain distress by using 0-100mm VAS and recording the findings.

Outcomes and scale: Pain was measured and documented by the VAS in which a zero indicated no pain and 100 indicated the highest level of pain experienced by the participants.

Results

1. Pain was reduced significantly in the relaxation group at six of the eight post-tests; on the first postoperative day after ambulation, pain distress was significantly lower (p=0.035).

2. For the music group pain was significantly lower for seven post-tests; on the second postoperative day after ambulation, pain sensation was significantly decreased (p=0.013).

3. The combination group had significantly less pain at all of the tests; pain sensation and pain distress were significantly reduced (p=0.027) and (p=0.026), respectively.

4. The additional outcomes were measured on the second postoperative day in which radial pulse rate and respiration rate were significantly lower while resting (P=0.004), and (P=0.001 to 0.004), respectively.

Evidence number: 2

Title: Relaxation and music to reduce postsurgical pain.

Author/Year: Good, M., Stanton-Hicks, M., Grass, J. A., Anderson, G. C., Lai, H-L., Roykulcharoen, V., & Adler, P. A./2001

Publication source: Journal of Advanced Nursing.

Type of evidence: RCTs

Objectives: To investigate the effects of relaxation, music and the combination of relaxation and music on postoperative pain across and between two days and two activities (ambulation and rest) and across ambulation each day.

Methodology

The total number of participants was 468 patients in five hospitals in the USA who had undergone abdominal surgery and had been randomly assigned to four groups, namely, the relaxation, music, combination and control groups. All of the

treatment groups were instructed about the intervention before admission. Music was played on the first and second postoperative days during all three phases of ambulation. The VAS was used for measuring pain sensation and pain distress before and after the intervention.

Details about music therapy for pain management.

Type of music: Participants selected the music from the following five types: synthesizer, harp, piano, orchestra or slow modern jazz music.

Duration and time of music interventions: Sixty minutes once per day.

Equipment used: Audiotapes and earphones.

Procedures for music interventions

Before admission, the treatment groups received preadmission testing and instruction about intervention and written consent was given. The intervention groups practiced the technique for two minutes before surgery with the help of the data collector. The ambulation consisted of three steps: Step 1 - 5 minutes of preparation in bed; Step 2 - ambulation getting out of bed, walking and returning to bed and Step 3 - a 10-minute recovery period in bed after returning from ambulation. Music was played continuously throughout the process. Before and after the intervention, pain scores were measured by using the VAS.

Outcomes and scale: Pain sensation and distress was measured by the VAS on a line from 0 to 100 mm with verbal anchors.

Results

1. Pain was decreased significantly after the intervention from the first to the second postoperative day ($P < 0.001$).

2. Mean pain sensation and distress were reduced among all treatment groups at 17% and 22%, respectively.

3. While resting on the first and second postoperative day, pain sensation and distress were measured at 15% and 26% after ambulation, respectively.

4. On the second postoperative day, pain sensation was mostly reduced at rest (25%) with relief pain distress (31%), while ambulation pain sensation and pain distress were decreased at 15% and 16%, respectively.

5. On the second postoperative day, the treatment groups who received music or both music and relaxation commented about music, whereby 65% of the

participants said the music they used both relaxed and distracted them, while 22% of the participants used music only for relaxation and 13% listened to music to distract their minds from the pain.

Evidence number: 3

Title: Relaxation and music reduce pain after gynecologic surgery (GYN)

Author/Year: Good, M., Anderson, G. C., Stanton-Hicks, M., Grass, J. A., & Makii, M./2002

Publication source: Journal of Pain Management Nursing

Type of evidence: RCTs.

Objectives: To investigate the effects of three non-pharmacologic nursing interventions: relaxation, music and the combination of relaxation and music on pain following GYN surgery.

Methodology

This was a randomized control trail study with a total of three non-pharmacological groups and one control group, namely, the relaxation (26%), music (24%), combination (24%) and control group (26%). The relaxation group performed the activity according to the instructions they received from the investigator. The participants in the groups were offered a selection of music and listened to the music for 60 minutes during three steps of ambulation: Step 1 - 5 minutes of preparation in bed; Step 2 - ambulation getting out of bed, walking and returning to bed and Step 3 - a 10-minute recovery period in bed after returning from ambulation. Music was played continuously throughout the process and pain levels were measured by the VAS.

Details about music therapy for pain management

Type of music: Many participants (27%) selected slow jazz music; 26% selected classical orchestral music; 24% preferred piano, a low number of subjects (14%) selected synthesizer music and only 9% chose harp music.

Duration and time of music interventions: Sixty minutes, once a day.

Equipment used: Earphones and tape recorder.

Procedures for music interventions

The treatment groups were instructed about the techniques via tape recorder. Music groups were selected in which the participants were allowed to select one type of music from the five types of soothing music offered. The combination group listened to a tape providing both relaxation teaching and music intervention. Ambulation had three phases: Phase 1, A-5 minutes during the preparatory phase in bed; Phase 2,-an ambulation phase involving getting out of bed, walking a comfortable distance and returning to bed and Phase 3 - a 10-minute recovery phase in bed. Music and combination groups listened to the tapes throughout all the three phases. Before and after the intervention, the VAS was used to measure pain levels.

Outcomes and scale: The VAS was used to measure pain sensation and distress.

Results

1. Pain was significantly reduced after the intervention among all three of the treatment groups, namely, the relaxation, music and combination groups. On the second postoperative day during ambulation, however, more pain was reduced in the combination group than in the other groups.

2. On the first postoperative day after the intervention, pain sensation was decreased at 9% to 18% and pain distress was reduced at 19% to 27%. After ambulation, pain distress was significantly decreased ($p < .001$).

3. On the second postoperative day pain sensation and distress were reduced at 13% to 23% and 11% to 29%, respectively.

4. Additional outcomes such as radial pulse rates were significantly lower on the first postoperative day during rest ($p=.038$) and respiratory rates were also significantly lower after every test ($p = .002$ to $.032$) in the treatment groups.

Evidence number: 4

Title: Relaxation and music reduce pain following intestinal surgery (INT)

Author/year: Good, M., Anderson, G. C., Ahn, S., Cong, X., Stanton-Hicks, M./2005

Publication source: Journal of Research in Nursing & Health

Type of evidence: RCTs

Objectives: To examine the effects of relaxation, music and the combination of both on pain after INT surgery. In addition, the effects of the intervention on heart and respiratory rates and postoperative recovery outcomes (sleep, recovery rate and complications) were explored.

Methodology: This was a randomized control trial study with 167 participants. The study was conducted with the following four groups: the relaxation (26%), music (29%), combination (22%) and control groups (23%). Patients ranged in age from 20 to 70 years, had undergone abdominal incisions, used PCA and agreed to postoperative ambulation. All of the treatment groups were given preoperative instructions by an introductory tape. The research nurse accompanied all of the participants during ambulation and the participants listened to music during all of the ambulation periods (60 minutes). Pain sensation and distress were measured on a dual 100 mm VAS six times per day.

Details of music therapy for pain management

Type of music: Participants selected music from the following five types of soothing music: synthesizer, harp, piano, orchestra or slow modern jazz music.

Duration and time of music intervention: Sixty minutes once per day between 9:30 am and 3:45 pm.

Equipment used: Lightweight foam earphones and a small tape recorder.

Procedures for the music intervention

Music was played by the patients after intestinal surgery during the following three phases of ambulation: Phase 1 - 5 minutes of preparation in bed; Phase 2 - during ambulation and Phase 3 - a 10-minute recovery phase in bed. The treatment groups listened to music during all three phases. After finishing all interventions, the participants offered their opinions for the data collector. Pain levels were measured with the VAS.

Outcomes and scale: Pain sensation and emotional distress were measured with the VAS by using a dual 0 to100-mm scale.

Results

1. Postoperative pain was significantly reduced among the three treatment groups during the preparatory, recovery and rest periods on both the first and second

postoperative days. The differences ranged of the significance point were from 7 to 14 mm or reduced pain from 16 to 40%.

2. All of the treatment groups experienced decreased pain sensation (45%) and pain distress (61%) after ambulation ($p < .006$) with pain sensation (23%) and pain distress (37%) ($p < .02$). During the post recovery period, the highs in reduction of pain sensation and distress were 53% and 76%, respectively, ($p < .045$), while the lows were 24% and 38%, respectively ($p < .048$).

3. Additional findings were also obtained from the participants. For example, 96% reported the interventions were helpful for pain relief, and 64% informed the data collector that pain was reduced to a moderate degree; 62% reported increased feelings of pain control. The treatment groups also noticed that reduced pain sensation, distress and both at 7%, 47% and 38%, respectively after the interventions.

4. Other reports also included in this study in relation to pain management regarding music therapy included the fact that the participants used the music for relaxation, sedative and both at 27%, 21% and 52%; and 71% reported music as a sedative while 70% were asleep after the interventions.

Evidence number: 5

Title: Korean and American music reduces pain in Korean women after gynecologic surgery (GYN).

Author/Year: Good, M., & Ahn, S./2008

Publication source: Journal of Pain Management Nursing.

Type of evidence: Quasi-experimental research.

Objective: To determine if the positive effects of music on pain found in postoperative GYN patients in the USA were also found in Korean women and to compare the effects of American and Korean music.

Methodology: This was a quasi-experimental research with two groups, an experimental (47%) and control (53%) group using a pretest and post test design. After giving written consent, the participants were selected as a music group or a control group. The treatment group selected from the music offered such as American music (38%) and Korean music (62%). The research assistant provided instructions to the participants and motivated them to practice music listening in a relaxing manner.

Music was played two times a day for 15 minutes each time. The control group rested in bed for the same 15-minute period. After completing the two days of interventions, the research assistant gave questionnaires to the music group; pain sensation and distress were measured with a 0 to 100-mm VAS.

Details about music therapy for pain management:

Type of music: Many participants selected Korean music (22); among these, 38% chose ballads, 21% preferred religious (Buddhist and Protestant) music and 3% selected popular Korean music. One third of the respondents selected American music (13); among these, 24% preferred orchestra and 15% chose piano music.

Duration and time of music interventions: Fifteen minutes and music was played twice a day at 10 am and 2 pm**.**

Equipment used: Tape recorder, earphones.

Procedures for music interventions

The patients were allowed to select from the music Korean or American offered and received instructions from the research assistant. Music was played in a quiet environment and the experimental group listened music in a relaxing manner for 15 minutes twice a day. The control group did not listen to music but received routine care only and rested in bed during the aforementioned 15 minutes. Pain scores were measured by using the VAS to record the pain levels.

Outcomes and scale: Pain sensation and distress were measured with a 100-mm VAS.

Results

1. The patients who listened to the music reported their pain to be reduced on the first day after surgery at 17% in the morning and 23% in the afternoon.
2. In the morning of the second postoperative day, pain was decreased at 15%.
3. Pain sensation and distress were significantly reduced ($p < .001$).
4. American music and Korean music were no different in pain; both were effective.
5. Most of the participants in the experimental group explained that they used music for both relaxation and distraction, and 80% said that music was very calming, while 53% described music as making them feel sleepy and 62% said music

could reduce pain to a moderate degree. The entire music group (67%) liked music, 29% loved it and 91% would like to recommend music to other people undergoing surgery.

Evidence number: 6

Title: Music as a Nursing intervention for postoperative pain: A systematic review.

Author/year: Engwall, M., & Duppils, G. S./2009

Publication source: Journal of Peri-Anesthesia Nursing

Type of evidence: Systematic review.

Objective: To measure the effectiveness of music intervention on postoperative pain management among adult patients after surgery.

Methodology

The authors of this systematic review searched for scientific articles by using online databases such as Blackwell Synergy, Cumulative Index to Nursing and Allied Health (CINAHL), PubMed, Elsevier, and ScienceDirect. They used keywords related to the topic and set exclusion criteria for selecting the evidence-based practice. Forty-three studies were found in relation to the title. After reading the objectives, methods and research questions 19 studies were excluded. The researcher then reviewed the randomizing process, statistical analysis, validity, reliability, ethics and generalization of the results before finally selecting 18 articles published from 1998 to 2007. Among the selected samples of evidence-based practice, 14 were RCTs and 4 were quasi-experimental studies; in all, fifteen samples of evidence-based practice revealed that music therapy was effective for managing postoperative pain.

Details about music therapy for pain management:

Type of music: The research team selected the music in seven studies; the participants choose music in nine studies, one study showed music selected by both participants and researcher, and another study's performed live bedside music by a harpist. The following are the types of music used in this systematic review:

Five studies = Piano, harp, synthesizer, orchestral, slow jazz without lyrics.

One study = Soft classical music.

One study = Relaxing and calming accompanied by the sound of sea waves.

Two studies = Soft instrumental, new-age synthesizer.

One study = Peaceful pan flute music.

One study = Piano music.

One study = Classical, jazz, light rock, country, rock and roll, easy listening, gospel, country and rock and roll.

One study = Western classical music, Gagaku, Noh songs, (Japanese traditional music), Enka (Japanese popular songs).

One study = Easy listening, classical and jazz.

One study = Synthesizer, harp, piano, orchestra, slow jazz and flute.

One study = Chinese and Western music.

One study = Mozart classical and ocean music.

One study = Slow, soft melodies played on a harp.

Duration and time of music interventions: Most of the studies showed the duration of music therapy to be 15 to 60 minutes; 5 papers provided music intervention once a day; three articles three times a day, another three evidence-based practice played music two times a day and one study performed music intervention 15 minutes per time. Two papers showed that music intervention was performed throughout the PACU period. Four articles indicated that participants listened to music during surgery, which was started from the end of anesthesia and finished to the end of the surgery.

Equipment used: Earphones, headphones, cassette player, and tape recorder.

Procedures for music interventions

Most of the evidence-based practice explained that the patients received music therapy on the first and second postoperative days. The selected music was played in a quiet environment.

The ambulation condition consisted of three phases each day: the first phase was preparation while the patients were in bed for five minutes and the second phase was getting out of bed, walking a comfortable distance and returning to bed. The third phase was recovery in bed for ten minutes.

Four articles found that they started music during surgery from the end of the anesthesia to the end of the surgery.

Live music was also used in one study with slow, soft and melodious music performed by a harpist.

Outcomes and scale: Different measuring scales were used to measure the effectiveness of music intervention. The measuring scales included the VAS, NRS, VRS, and FS. Among all of the studies, the VAS used in 10 of the articles, the NRS in 4 articles, the VRS in 3 articles and the VAS with a facial scale (FS) in one article as an outcome measuring technique.

Results

The results of this systematic review showed that most of the papers indicated that the outcome was more effective than the group receiving only routine care when music therapy was used with routine treatment. Moreover these differences were significant on the first and second post operative days. The findings from three of the studies were not significant; there were no differences in pain level or outcome after the intervention. In this paper, additional outcomes were measured, including opiate intake, effects of medication, acceptance of music, vital signs, anxiety and satisfaction level, as well as side effect such as nausea, headache and urinary problems, oxygen saturation, heart rate, fatigue, well-being, respiratory rate, sleep, length of hospital stay and analgesics used.

Evidence number: 7

Title: Supplementing relaxation and music for pain after surgery.

Author/Year: Good, M., Albert, J. M., Anderson, G. C., Wotman, S., Cong, X., Lane, D., & Ahn, S./2010.

Publication source: Journal of Nursing Research.

Type of evidence: RCTs.

Objectives: To test an intervention of patient teaching (PT) for pain management and compare the intervention with relaxation and music (RM) for immediate and general effects on postoperative pain.

Methodology: This was a randomized control trail study with a total of four groups, namely, the PT, RM, combination (PTRM), and control group. The ages

of the participants ranged from 18 to 75 years and the total number of patients was 517. The patients received instructions about patient-controlled analgesia (PCA). Music was played four times on each of the first and second postoperative days and each intervention lasted for 15 minutes. Pain sensation and distress were measured by the VAS.

Details of music therapy for pain management

Type of music: Music was selected by the participants in the RM and PTRM groups. For example, 33% selected jazz, 26% preferred orchestra, 17% chose inspirational music, 13% liked piano, 7% selected the harp and only 4% loved synthesizer music. Inspirational music was as follows: Catholic, Protestant, Jewish, and nondenominational music. In addition, participants' suggestions should be included in the selection of music. On the second postoperative day one-third of the RM and PTRM groups changed their selected music at 34% for the RM group and 35% for the PTRM group.

Duration and time of music intervention: The duration of the music intervention was 20 minutes and four times a day at 8 am, 12 noon, 4 pm and 8 pm on the first and second postoperative days.

Equipment used: Tape, tape recorder, and remote control.

Procedures for music interventions

Introductory audiotapes were recorded at 5 to 10 minutes before surgery. One room was provided for one participant and the research nurse stayed in front of room. The environment was silent; television and telephone were turned off and people were not permitted to enter the room. Music was started from the evening of the first operative day for 20 minutes at a time and four times per day. Before and after the intervention the investigator used the VAS to measure pain sensation and distress. Nurses noted whether or not the participants were asleep after the interventions; if someone was asleep or quietly awake, posttest measurements were taken and recorded.

Outcomes and scale: Pain sensation and distress were measured by the VAS from a 0 to 100-mm horizontal line.

Results

1. A total of five tests were done in this study to examine immediate RM effects and RM effects were discovered in three tests.

2. In the morning of the first postoperative day, the RM effects measured 6 mm less pain ($p < .001$) with 3 mm less pain in the afternoon ($p = .04$).

3. In the morning of the second postoperative day, pain was significantly decreased at 3 mm ($p = .04$).

4. Both RM and PTRM were effective for management of postoperative pain after abdominal surgery.

5. Additional outcomes were measured whereby pulse and respirations rate were found to be significantly lower in the RM and PTRM groups.

6. Participants' opinions about music therapy were as follows: 56% used music as a relaxation and distraction from pain; 24% used music only to relax; 16% used music only to distract; 96% liked their preferred music and 82% explained that the selected music helped the participants sleep. Moreover, it was observed that 37% of the participants slept within 20 minutes after the interventions.

Evidence number: 8

Title: Effects of listening to music on pain intensity and pain distress after surgery: An intervention.

Author/year: Vaajoki, A., Pietila, A-M., Kankkunen, P., & Vehvila¨inen-Julkunen K./201.

Publication source: Journal of Clinical Nursing

Type of evidence: Quasi experimental study

Objectives: To evaluate the effects of music listening on pain intensity and pain distress on the first and second postoperative days in abdominal surgery patients and the long-term effects of music on the third postoperative day.

Methodology: This was a quasi-experimental research design. The study was conducted with adult patients after major abdominal surgery. The subjects were aged between 21 and 85 years. Two groups were involved in this study: one was a music group (83) and another was a control group (85). The total number of respondents was 168. The participants' pain intensity and pain distress were measured at three different situations such as when patients were resting in their beds, during

deep breathing and while shifting position. In this study, the total intervention was performed seven times: the first started in the evening of the operation day and on the first and second postoperative days for three times each day such as in the morning, at noon and in the evening. On the third postoperative day, no music was played, but the long term effects of music therapy were measured. The VAS was used for measuring the pain levels of the participants.

Details of music therapy for pain management

Type of music: Different kinds of music were selected by the participants according to the most popular and classic music in Finland. The researcher gave the opportunity to the participants to choose their favorite music from 2,000 songs. The music offered was either domestic or foreign hit songs with dance music, pop, rock, soul, blues, spiritual or classical music.

Duration and time of music intervention: Thirty minutes was required for every intervention for a total of seven times. On the operation day, the music was played one time in evening from 6 to 8 pm, as well as on the first and second postoperative days for a total of three times each day in the morning from 8 to 9 am, in afternoon from 1 to 3 pm and in the evening, from 6 to 8 pm.

Equipment used: Headphones and an MP3 player.

Procedures for music interventions: Participants were instructed about the intervention on the day before surgery. After surgery, the patients were sent to the postoperative room. The research nurse assessed and recorded the participants' pain during three different conditions, namely, during the rest period in bed, deep breathing and position changing. Next, the selected music was played in a quite environment for 30 minutes. For a total of seven times, the intervention was performed, including the evening of the operative day with three times daily on the first and second postoperative days. After finishing the music intervention, the level of pain and recorded was measured, including patients' comments about their experiences with music listening. On the third postoperative day, the researcher developed a questionnaire for participants to complete.

Outcomes and scale

Pain intensity and pain distress were measured with the VAS in different positions. One participant was blind and assessed pain scores by using an 11-point numerical rating scale (NRS).

Results

1. On the second postoperative day after music therapy, pain intensity and pain distress were significantly reduced under three different circumstances such as during bed rest, deep breathing and changing position.
2. Pain intensity during bed rest was 1.0 in the music group and 1.5 in the control group ($p = 0.02$).
3. Pain distress during bed rest was measured among the intervention group at 0.9 with a measurement of 1.5 in the control group ($p = 0.01$).
4. During deep breathing, pain intensity was measured at 1.3 in the music group and 1.9 in the control group ($p = 0.03$).
5. Pain distress was measured during deep breathing at 1.3 in the treatment group and 1.8 in the control group ($p = 0.04$).
6. While shifting position, pain intensity was 2.5 for the music group and 3.3 for the control group ($p = 0.02$).
7. While changing position, pain distress was measured and recorded after music intervention at approximately 2.5 for the music group and 3.2 for the control group ($p= 0.04$).
8. An additional outcome was measured on fear about postoperative pain with significant differences between the music and control groups at 50 and 37, respectively.

Evidence number: 9

Title: The effects of music therapy on postoperative pain intensity in patients under spinal anesthesia.

Author/year: Motahedian, E., Movahedirad, S., Hajizadeh, E., & Lak, M./2012.

Publication source: Iran Journal of Critical Care Nursing.

Type of evidence: Quasi-experimental research.

Objective: To investigate the effects of music therapy on postoperative pain intensity in patients under spinal anesthesia.

Methodology: This was a quasi-experimental study with two groups where one was an experimental group with 30 participants and the other was a control group with another 30 participants. The age of the participants ranged from 18 to 44 and all of the participants were males undergoing urological and abdominal surgery. The procedures for the music intervention were explained to every patient before surgery. Music was selected by the therapist. The selected music was played during surgery at six minutes after giving spinal anesthesia until one minute before finishing by closing the surgical wound. Musical instruments were tape recorded with headphones and remote control handling by the participant. Pain was measured by the VAS at 0-10.

Details about music therapy for pain management

Type of music: Huan Sepastian Bakh's music and soft music.

Duration and time of music interventions: Music was played during surgery for 30 to 60 minutes (six minutes after giving spinal anesthesia until one minute before surgical wound closure).

Equipment used: Headphones and MP3 player.

Procedures for music interventions

The treatment group was instructed about music intervention before the operation. Music was started from six minutes after spinal anesthesia until one minute before surgical wound closure. The patients listened to the music continuously throughout the operations. Music and volume were controlled by the participants. Pain level was measured after the operation by using the VAS.

Outcomes and scale: Pain was measured by the VAS with a 0-10 mm scale. According to the scale, pain intensity of 0 to1 indicated no pain; 2 to 3 indicated mild pain; 4-5 indicated moderate pain; 6-7 indicated severe pain and 8-10 indicated intolerable pain.

Results

1. After the intervention, postoperative pain intensity was reduced significantly (p=0/005).

2. In the treatment group, the amount of pethedine used was significantly reduced (p=0/041).

3. In terms of suffering from intensive and intolerable pain, the music group suffered 23% less than the control group.

Appraisal of the evidence-based practice

The method and criteria of Melnyk and Fineout-Overholt (2011), were employed to appraise the validity, reliability and applicability of all 9 samples of evidence-based practice. The author read each sample of evidence-based practice thoroughly then asked questions to analyze the validity, reliability and applicability of each sample. A checklist table was developed to facilitate the appraisal process. The final results of the appraisal were confirmed with the author's advisor. It was revealed that all of the evidence-based practice used in this study comprised high quality research or systematic reviews. The results were reliable with scientific merit and are feasible for application in clinical practice.

3.2 Conclusion

3.2.1 Brief summary

The selected evidence-based practice comprised one systematic review, five RCTs, and three quasi-experimental studies. Seven studies started music therapy from the 1st post operative day and one evidence used music therapy during the surgery. Among systematic review, 13 studies provided music therapy postoperatively, 4 studies applied music during and after surgery, and participants of another evidence listened music during whole surgery period. Most of the evidence-based practice used music therapy for 60 minutes and gave priority to the patient's preferences for selection of music. The Visual Analog Scale (VAS) was used for measuring pain before and after the interventions among eight articles and for the systematic review of 18 studies. Among these, 10 samples of evidence-based practice used the VAS as a pain measuring instrument and the others used the NRS, verbal rating scales, facial scales and graphic numerical pain intensity scales. All of the evidence-based practice

stated that pain level was significantly decreased after music intervention. Finally, it can be concluded that music therapy is very effective as a non-pharmacological method for the management of postoperative pain among adult patients after abdominal surgery.

3.2.2 Recommendations

Of the nine samples of evidence-based practice, eight were interventional researches and one was an integrative review published from 1999 to 2012. Of the aforementioned eight interventional studies, five were RCTs and another three were quasi-experimental research. For the systematic review 14 were RCTs and 4 were quasi-experimental studies. The following recommendations are suggested by the findings:

1) Music therapy is an effective measure of pain management among patients after abdominal surgery because it can reduce postoperative pain on the first day when patients begin ambulation (Engwall & Duppils, 2009/Level II; Good et al., 2001/Level II; Good at el., 2002/Level II; Good el al., 2005/Level II) and two articles found music therapy to be effective perioperatively (Engwall & Duppils, 2009/Level II; Motahedian et al., 2012/Level III). On the second postoperative day after music therapy, pain intensity and pain distress were significantly reduced during bed rest, deep breathing and shifting position (Vaajoki, 2011/Level III). Both RM and PTRM were measured with significantly less posttest pain (Good et al., 2010/Level II).

2) All of the studies showed that patients were instructed about music listening before surgery to make them understand the benefits of listening to music and the process of the interventions. Furthermore, the results of these studies were significant (Engwall & Duppils, 2009/Level II; Good & Ahn, 2008/Level III; Good et al., 1999/Level II; Good et al., 2001/Level II; Good at el., 2002/Level II; Good el al., 2005/Level II; Good et al., 2010/Level II; Motahedian et al., 2012/Level III; Vaajoki, 2011/Level III).

3) The types of music were varied according to culture, religion and personal preferences. For example, the inspirational music selected by the music therapist was Catholic, Protestant, Jewish and nondenominational (Good et al., 2010). Furthermore, the participants were allowed to select music from the following five

types of soothing music: synthesizer, harp, piano, orchestra or slow modern jazz music (Engwall & Duppils, 2009/Level II; Good et al., 1999/Level II; Good et al., 2001/Level II; Good et al., 2002/Level II; Good et al., 2005/Level II). Moreover, the music alternatives were domestic or foreign hit songs, dance, pop, rock and soul with blues, spiritual or classical music (Engwall & Duppils, 2009/Level II; Vaajoki et al. 2011/Level III) and Korean ballads with Korean religious music (Buddhist and Protestant) and popular music in Korea and America. Orchestra and piano music were also selected (Good & Ahn, 2008/Level III). In addition, peaceful pan flute music, piano music, easy listening, gospel, soft classical music, relaxing and calming accompanied by sound of sea waves (Engwall & Duppils, 2009/Level II) were selected with soft instrumental, western and Chinese classical music, Gagaku, Noh songs, (Japanese traditional music), Enka (Japanese popular songs), Mozart classical and ocean music. Live music comprised slow, soft melodies played by a harp as relaxing music (Engwall & Duppils, 2009/Level II).

4) Patients should be encouraged to select the music based on personal preferences (Engwall & Duppils, 2009/Level II; Vaajoki et al. 2011/Level III).

5) The duration of the music therapy in each session was varied and should be lasted for 60 minutes (Good et al., 1999/Level II; Good et al., 2001/Level II; Good et al., 2002/Level II; Good et al., 2005/Level II).

6) The selected music should be played in a quiet environment (Engwall & Duppils, 2009/Level II; Good & Ahn, 2008/Level III; Good et al., 2010/Level II).

7) Music therapy should be given at least once a day (Good & Ahn, 2008/Level III; Good et al., 2010/Level II) and on the first and second postoperative days (Engwall & Duppils, 2009/Level II; Vaajoki et al. 2011/Level III). Furthermore, it can be started during surgery if there are no contraindications (Engwall & Duppils, 2009/Level II; Motahedian et al., 2012/Level III).

8) The equipment that should be prepared includes earphones, headphones, and CD players (Engwall & Duppils, 2009/Level II; Good & Ahn, 2008/Level III; Good et al., 1999/Level II; Good et al., 2001/Level II; Good at el., 2002/Level II; Good el al., 2005/Level II; Good et al., 2010/Level II; Motahedian et al., 2012/Level III; Vaajoki, 2011/Level III).

9) The process of music therapy during ambulation should be as follows: (Engwall & Duppils, 2009/Level II; Good et al., 2001/Level II; Good at el., 2002/Level II; Good el al., 2005/Level II);

(a) A 5-minute preparatory period in bed;

(b) An ambulation period including getting out of bed, walking a comfortable distance and returning to bed.

(c) A 10-minute recovery period in bed and listening to music continuously throughout the process.

10) The scales should be used for measuring postoperative pain. Although many scales were used for measuring pain level, the VAS is the most frequently used instrument (Engwall & Duppils, 2009/Level II; Good & Ahn, 2008/Level III; Good et al., 1999/Level II; Good et al., 2001/Level II; Good at el., 2002/Level II; Good el al., 2005/Level II; Good et al., 2010/Level II; Motahedian et al., 2012/Level III; Vaajoki, 2011/Level III). However, it was found that numerical rating scales are more applicable among patients who have difficulty using their hands to mark the scales (Engwall & Duppils, 2009/Level II; Vaajoki, 2011/Level III).

11) Additional outcomes that should be additional measured including the following:

(a) Fear of postoperative pain (Good at el., 2011/II).

(b) Blood pressure, heart rate, respiration rate (Good et al., 1999/Level II; Good at el., 2002/Level II; Good et al., 2010/Level II).

(c) Effects of different music such as American and Korean music (Good & Ahn, 2008/Level III).

(d) Amount of analgesic use (Motahedian et al., 2012/Level III).

CHAPTER IV
CONCLUSION AND SUGGESTIONS

4.1 Conclusion

The aim of this study was to search, select, analyze, and summarize current evidence on music therapy for pain management among adult patients after abdominal surgery. This topic was selected according to its significance on patient care. Nowadays, the number of surgical procedures is increasing worldwide and most of these patients experience severe pain after surgery, particularly patients receiving major surgeries including abdominal surgery. Pain is not only an unpleasant experience but it also inhibits the optimum surgical outcomes. Postoperative patients with severe pain frequently develop postoperative complications, have delayed wound healing, and have longer length of hospital stay. Evidence has shown that appropriate management of postoperative pain after abdominal surgery is possible by using both pharmacological and non-pharmacological management. Music therapy is one of the most effective non-pharmacological methods for management of post surgical pain.

Relief from pain is a patient's right as well as responsibility of nurses. In Bangladesh, patients have to suffer a lot after undergoing surgery because nurses are not well trained and they lack necessary knowledge of pain management including measuring scales, pain assessment methods, record keeping, evaluation, and supervision. In addition, there is no standard guideline on pain management for postoperative patients. Nurses just follow the doctor's prescription and manage postoperative pain only by medicines, which can be oral, intramuscular, or intravenous medication regardless of some possible adverse effects that may occur due to pain medications. Accordingly, non-pharmacological methods for pain management in clinical settings in Bangladesh are in need because it is an activity that nurses can perform according to the laws and regulations of nursing practice. Music therapy can be used as a complementary therapy for pain management along with pharmacological

pain management methods. Moreover, music therapy can enhance nurse-patient relationship and promote the caring practice of nurses.

For better management of postoperative pain, understanding of current scientific evidence is considered crucial because such evidence provides updated information, proper management of pain after surgery, detailed description of the procedures of intervention, and also highlights the significance and benefits of the interventions. Findings have shown the effectiveness and generalizability of the interventions, so evidence is seen as very helpful for adequate management of postoperative pain after abdominal surgery.

Based on these aforementioned purposes, the author searched available current evidence using Mahidol databases and websites in the search for related evidence. Cumulative Index to Nursing and Allied Health (CINAHL), Ovid Full Text, ProQuest Nursing and Allied Health Source, PubMed, and ScienceDirect were used to search for single research studies. The PICO framework was employed to guide the search terms. The keywords used in the search were “Adult patients with abdominal surgery,” “Gynecologic surgery,” “Upper abdominal surgery,” “Lower abdominal surgery,” “Major abdominal surgery,” “Music therapy,” “Music intervention,” “Usual care or routine care,” “Pain,” “Postoperative pain,” “Pain after surgery,” “pain after abdominal surgery,” and “Pain control.” The author used a Boolean operator in the search. For each of the PICO elements, the author collected any synonyms by connecting terms with “OR,” then located citations that were relevant to all the PICO elements by linking them with “AND.” Evidence included systematic reviews of randomized controlled trials (RCTs), high quality single randomized controlled trials, and quasi-experimental studies published in English from 1999 to 2014.

The author appraised the evidence by using the method and criteria focusing on validity, reliability, and applicability. After the search, the author found 30 relevant studies and then read the whole full text of the evidence retrieved before finally selecting nine pieces of evidence that were relevant to the objective of the study. The other 21 pieces of evidence were excluded, because these evidences were not match with author’s title. Of these chosen nine studies, one was a systematic review and eight were interventional studies; among them five were RCTs and three were quasi-experimental studies.

The evidence revealed the following: 1) a combination of pharmacologic and non-pharmacologic method is very effective for postoperative pain management; 2) music is the best non-pharmacologic method which could reduce surgical pain at a significant level for patients after abdominal surgery; 3) the additional outcomes should be measured including the amount of pain medication, fear of postoperative pain, lower blood pressure, heart rate, and respiration rate, when measuring the effects of American and Korean music; 4) adverse effect of music was not found in the studies; 5) relaxation is a technique that should be added to music therapy because it would improve the effectiveness of music therapy; 6) music therapy is cost-effective, is easy to use, and requires no musical skill; 7) patients recover early and hospital burden and family burden are reduced; 8) music increases patients' satisfaction and leads to a good reputation of the hospital, and 9) patients could resume their previous work early. All nine selected studies clearly described the procedures, measuring scales, durations, times, and types of music used.

Based on the review of selected studies, it can be concluded that music is an effective non-pharmacological method for postoperative pain management for adult patients after abdominal surgery, when it is used with routine therapy.

4.2 Suggestions

It is recommended that after abdominal surgery, patients should receive music therapy. The implementation of music therapy should be applied in the following criteria.

4.2.1 Implications for practice

1. The recommendations derived from the selected and reviewed evidence should be utilized to develop clinical practice guidelines on music therapy for postoperative pain management among adult patients after abdominal surgery.

2. The guidelines should be modified according to the context of Bangladesh clinical settings. The resources used for providing music therapy to the

patients as well as the method to arrange the relaxing environment should be adapted to suit the clinical practice context.

3. The guidelines should be made simple and easy for nurses to practice in a real situation.

4. Acute pain management algorithm should be developed among adult patients and nurses should follow the system because if pain is not well managed, patients' suffering will increase, length of hospital stay will be extended, chronic pain may be developed, and various complications may occur such as infection sand venous thrombosis. Adverse outcomes occur due to errors in choice of medications and/or calculation, lack of education and/or mentoring, insufficient monitoring, and poor communication. Algorithm is an educational tool that is helpful for nurses to overcome the problems mentioned above. By using successful algorithms, safety and efficacy can be enhance, money can be saved, and satisfaction can be promoted.

5. The guidelines and the algorithm should be presented to the authority of the clinical setting to get acceptance and support. The feasibility of the guidelines and algorithm should be tested and confirmed by performing a pilot study.

6. Communication with all stakeholders should be conducted regularly though monthly meetings to establish rapport with all stakeholders.

7. The core team members of the program include the project leader chief head nurse, chief superintendent nurse, one head nurse of the surgery unit, one nursing teacher. The team should also include the authority of the hospital, head of the surgery department and anesthesia department, head nurse of the operation theatre, and head nurse of the gynaecological department.

8. A training program should be organized for nurses to equip them with necessary knowledge and skills on postoperative pain management as well as to raise their awareness of an effective post operative pain management. After the training program, nurses' performance should be evaluated to make sure that all standard nursing procedures to control pain by music therapy are implemented.

4.2.2 Implications for research

1. A music intervention for Bangladeshi patients after abdominal surgery should be developed; an experimental study should be conducted to evaluate the effectiveness of music therapy on patients after abdominal surgery.

2. The health expenditure should be used as a variable to reflect the outcomes of music therapy.

3. A study should be performed to evaluate the effects of the training program on nurses' pain knowledge, attitudes, and practices.

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