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## Music Therapy and Post-Operative Pain

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### Abstract

**Purpose:** The purpose of this project was to investigate music as an adjunct therapy to pain management in the post-operative setting. More specifically, the study was intended to explore the impact of self-selected music on individual pain level as well as patient satisfaction during the recovery period.

**Methods:** Participants in this study underwent elective outpatient surgery. Subjects were selected using a convenience sampling technique. Participants listened to pre-recorded music of their choice on a personal music device in the post-operative period. Data was gathered using the Numerical Rating Scale for pain (0-10), a post-intervention discharge survey, and a demographical questionnaire.

**Results:** A p value of 0.001 demonstrated a statistically significant reduction in patient's pain levels after listening to music. In addition, 50% of the patients expressed satisfaction with overall pain control and 59% felt that listening to music was extremely effective in decreasing their pain. Of the 12 eligible participants in the study, 11 said they would recommend music as an adjunct therapy.

**Discussion:** The results of the study showed that music can indeed be beneficial in the post-operative period for the reduction of patient pain. Furthermore, music can enhance patient satisfaction.

**Conclusions:** The incorporation of music into the post-operative recovery area is a viable option. Music can be considered as an adjunctive therapy to traditional nursing care.

Keywords: music therapy, pain relief, adjunct therapy

Poorly managed post-operative pain has been identified as having a significant negative impact on the physiological and psychological status of a surgical patient when left unchecked (Sin & Chow, 2015). Acute post-operative pain that is not addressed can result in complications and extended rehabilitation and is also closely associated with the advancement to chronic pain (Garimella & Cellini, 2013). Research suggests that prompt management of acute pain can reduce the risk for pain progression (Sinatra, 2010). Pain is now recognized as having more than just physiological and psychological effects but has significant monetary effects in the healthcare system. Pain is one of the highest reported reasons for postsurgical hospital readmission and has been shown to significantly increase the cost of hospital care (Sinatra, 2010). The monitoring of post-surgical pain has become so important in the medical world that it has now become a national measurement of quality of patient care (Garimella & Cellini, 2013). The Hospital Consumer Assessment of Health Providers and Systems (HCAHPS) scores measure patient satisfaction related to pain management and, if found to be unsatisfactory, may have negative consequences in regard to reimbursements (Garimella & Cellini, 2013).

Traditionally, clinicians have used pharmacological approaches when treating pain. Opioid-based medications are the first line pharmaceutical intervention after surgery to reduce discomfort. However, these medications have the potential to cause adverse reactions ranging from minor opioid induced nausea to life-threatening respiratory arrest. The consequences of overtreatment of opioids are often overlooked but can cause serious health related issues (Argoff, 2013). For some patients, opioids may even be contraindicated due to their current physiological state. The opioid class of medications has the potential to cause dangerous drug and alcohol interactions, which also limits their use in many situations. The most worrisome side effect of

opioid medications is respiratory depression, which can cause hypoxia and resultant respiratory arrest (Garimella & Cellini, 2013).

Special populations are more sensitive to the side effects of opioids and prove to be an even bigger challenge when it comes to pain control. This includes patients who suffer from obesity, comorbidities, and chronic pain. These patients pose unique issues for clinicians. Post-operative pain management in obese patients is challenging in that many of these individuals are prone to respiratory compromise in the form of sleep apnea and respiratory depression (Poulain, 2006). The use of opioids in obese patients increases these risks of respiratory compromise (Garimella & Cellini, 2013). Patients who suffer from chronic pain often take a daily regimen of opioid medications. For this reason, the requirement of analgesia needed to control their post-operative pain is considerably higher than the typical patient because of their tolerance (Garimella & Cellini, 2013). While medications provide patients with comfort and alleviate anxiety, they also have the potential to produce adverse side effects, prolong patient recovery time, and compound post-surgical complications. In addition, opioids have a high potential for abuse (Bae, Lim, Hur, & Lee, 2014). These facts highlight the importance of research for possible adjunctive pain management techniques.

Other methods and adjunctive therapies have been investigated in hopes of decreasing patients' perceptions of pain, anxiety, or both. Music in particular has undergone extensive research as to its potential benefits to the patient undergoing a surgical procedure. Nurses have long used alternative approaches to comfort patients in their practice such as massage, verbal reinforcement, and aromatherapy. In addition to these treatments, nurses are investigating the effectiveness of music. This type of intervention would be highly beneficial to not only patients but practitioners alike. The delivery of music is relatively inexpensive, easily applied, and

produces no adverse side effects (Economidou, Klimi, Vivilaki, & Lykeridou, 2012). Findings from multiple studies suggest that music may mitigate the pain experience in the post-operative patient and therefore be a useful tool for health professionals (Schneider, 2016). The Advance Practice Nurse (APN) can utilize the results of the proposed study to provide another option for patients undergoing surgical procedures to help decrease feelings of pain and anxiety.

### **Problem Statement**

Insufficient pain control has shown to be a precursor to patient dissatisfaction and interfere with surgical recovery (Schneider, 2016). Untreated or undermanaged post-surgical pain has the potential to cause health complications such as unstable vital signs, emotional anxiety, and even myocardial infarctions (Sin & Chow, 2015). Current treatment of pain in the post-operative period includes the use of medications through intravenous, oral, or rectal administration. These medications are often opioid based and inherently have the potential to cause harm. Because of this, further research is needed to discover other, non-pharmacologic methods of pain alleviation for post-surgical patients. Music therapy, for example, is being explored as an alternate therapy for the treatment of post-operative pain. Music has long-since been used as a healing adjunct to treat anxiety, distress, and illness (Economidou et al., 2012). Research is now aimed at the incorporation of music in pain management.

### **Purpose and Aims**

The purpose of this project was to investigate music as an adjunct therapy to pain management in the post-operative setting. To accomplish this objective, a quasi-experimental study was developed, implemented, and findings were evaluated for validity and applicability to practice.

The related clinical question is as follows: Do patients of same day surgery that use their own selection of music during the post-operative recovery period experience different levels of pain and satisfaction rating of the experience?

The aims of this project were focused on the following:

1. Does the use of a self-selection of music played during the post-operative recovery period affect the individual's pain level?
2. Does the use of a self-selection of music played during the post-operative recovery period affect the individual's satisfaction with the recovery experience regarding pain control measures?
3. Are there any demographic factors that influence pain level and satisfaction in pain control measures in patients that were able to use self-selection music played during the post-operative recovery period?

### **Review of Literature**

A systematic literature review was conducted based on the following question: In post-operative patients, does the inclusion of music therapy in addressing post-operative pain contribute to a reduction in the experience of pain? Thorough search conducted using the following terms interchangeably: music, pain, perception, operation, recovery, surgery, and measures of pain. Inclusion criteria focused on studies published within the last 15 years that assessed the use of music in the post-operative period with the aim of decreasing pain. The following main themes for the music therapy exploration included the effects of music and measurement of pain.

### **Effects of Music**

The review of research produced varying results with the majority reporting that music can be utilized as a promising non-pharmacological intervention in pain management of post-surgical patients. Studies examined not only the effects of music on pain but also the effects of music on anxiety levels of patients (Allred, Byers, & Sole, 2010; Liu & Petrini, 2015; Macdonald, R. A., Mitchell, L. A., Dillon, T., Serpell, M. G., Davies, J. B., & Ashley, E. A., 2003). Results stated that music can increase comfort and relaxation, decrease pain perceptions, reduce feelings of anxiety, and uplift mood (Liu & Petrini, 2015; Macdonald et al., 2003). Music was also found to significantly lower the respiratory rate of experimental subjects as compared with the control subjects (Easter, B., DeBoer, L., Settlemeyre, G., Starnes, C., Marlowe, V., & Tart, R. C., 2010). Similarly, in a prospective clinical study exploring the effects of music listening on pain intensity and pain distress, researchers found promising results. It was reported that on the second postoperative day, patients who listened to music experienced less pain intensity and pain distress during time of bed rest, during deep breathing, and in shifting position (Vaajoki, Pietilä, Kankkunen, & Vehviläinen-Julkunen, 2011). Economidou et al (2012) stated that music significantly decreased postoperative pain in three of four studies that were conducted.

Some studies were not able to provide evidentiary support for the use of music as a pain intervention. In the Finlay and colleague (2015) study, which aimed to identify the therapeutically active properties found within music for post-operative pain management. They looked at cortisol levels of post-operative patients. Cortisol is a hormone that has receptors in most of the body's cells and can indicate a response to stress or danger as well as, increases glucose metabolism, help control blood pressure and reduce inflammation. Cortisol levels were



not statistically significant therefore a definitive result in using music therapy could not be drawn. In another study, Allred, byers, Sole (2010) explored the effect of music on postoperative pain and anxiety. Fifty-six patients who had total knee arthroplasty were randomly selected to either listen to music or have a quiet rest period. Comparisons between the two groups did not show any statistical difference. However, both groups did have a decrease in pain and anxiety. The lack of statistical significance in using music therapy further supports the need for more research on the mental and physiological effects of music on post-operative pain.

### **Measures of Pain**

It has been noted that the validity of tools used in the measure of pain are critical in determining the significance of the findings. Self-reported pain scores in the post-operative recovery period, for example, are inherently troublesome given the patient's level of consciousness (Easter et al., 2010). Pain is also difficult to measure objectively due to its subjective nature. Tools used for measurements and collection of evidence vary from study to study. There is no real valid and reliable method of objectively quantifying pain at this time and measurements are mainly based on self-reported tools (Younger, McCue & Mackey, 2009).

Many of the studies considered in this review utilized either a 0 to 10 descriptive ordinal scale or a faces pain scale to provide subjective units of measurement. In the Schneider (2016) study, which explored if listening to music had a positive effect on pain scores in adult orthopedic patients. The researcher recorded pre and post pain scores as reported by patients on a 0 to 10 pain scale after implementing a musical intervention. It was determined that listening to music was beneficial as an adjunct pain medication. All the participants in this study recommended using music therapy post orthopedic surgery.

In a randomized control clinical trial conducted in China (Liu & Petrini, 2015), 112 thoracic surgical patients were randomly assigned either to experimental or control group. The experimental group received standard of care and a 30 minute of soft music session for 3 day. The control group received the standard of care. Faces pain scale was used to determine pain levels. The experimental group showed a statically significant decrease in pain, anxiety, systolic blood pressure and heart rate compared to the control group.

Another method of measurement used to report pain levels in this review was the Visual Analog Scale for Pain and Anxiety (VAS). This tool was used in studies by Allred et al. (2010) and Vaajoki et al. (2011) to measure various subjective clinical phenomena. The VAS is a 10-cm line with “word anchors” on each end that describe the extremes of the characteristic being measured (Allred et al., 2010). This tool is useful in that it provides ratio-level data, is easy to use and score, and produces results that can be compared to other like research (Allred et al., 2010).

Salivary cortisol is a known biological marker for stress and anxiety and is considered to be an indicator of psychobiological changes (Finlay et al., 2015) as mentioned previously. This variable has been demonstrated to be a reliable gauge of psychobiological change and was used by Finlay et al. (2015) as a physiological measure of pain. Other physiological parameters such as blood pressure, heart rate, and oxygen saturation levels were also used to measure pain (Allred et al., 2010; Easter et al., 2010; Liu & Petrini, 2015). Though these types of measurements are widely used in pain research, it should be noted that pain can indeed exist without any changes in these physiological variables (Younger et al., 2009). Blood pressure, heart rate, and respiratory rate are easily influenced by many factors and such changes and variations in any of them cannot solely be attributed to the presence of pain or lack thereof. Despite these facts, there are several

accepted tools for measuring the construct of pain that can be considered reliable and highly useful in such research. The proper use of these tools allows researchers to measure pain in statistically and clinically sound ways (Younger et al., 2009).

### **Summary of Literature Findings**

Strengths and limitations noted through this literature review range from small sample sizes and faults in study design to the acknowledgement of novel methods of research. Most often, researchers stated that there were limitations with limited music choice. Researchers emphasized the importance regarding personal music choice to enhance the listening experience and possibly influence pain levels (Finlay et al., 2015; Lui & Petrini, 2015). It may be important to provide more music choices based on the personal preferences of the research participants (Liu & Petrini, 2015). The positive effects found in music research could be synergized using music from the personal collection of the participant (Finlay et al., 2015). This is not only based on the fact that personal preference may enhance the listening experience of the participant, but it may also provide a feeling of self-efficacy.

Another noteworthy design limitation was the fact that comorbidities were not taken into account when choosing the subjects for the study (Easter et al., 2010). Clearly, depending on the type of comorbidity, results that focus on physiological parameters such as blood pressure, heart rate, and oxygen saturation may be skewed due to the very nature of the particular disease (Easter et al., 2010).

In many articles reviewed, authors agreed that research in the area of music therapy has proven to be positive but further investigations are required to produce more conclusive evidence (Easter et al., 2010; Finlay et. al., 2016; Lui & Petrini, 2015; Schneider, 2016). In addition, the recommendation was made that future research focus on different influential factors such as

length of intervention time (Allred et al., 2008). Such factors may pose a definite impact on results. As discussed in the review, the selection of pain measures is critical-and should be supplemented with physiological and data (Finlay et al., 2015).

The results of this review concluded that music does have the potential to have a positive effect on the management of pain. Pain treatment modalities are evolving toward heavier reliance on multifaceted analgesic regimens for management of post-surgical pain rather than opioid only treatments (Gan, Habib, Miller, White, & Apfelbaum, 2013). It is highly recommended that future research focus on the application of music in patients undergoing a variety of surgical procedures. It is apparent that more research is necessary to provide concrete evidence. The future of pain management relies on such research to provide sound evidence supporting the use of alternative therapies such as music.

### **Conceptual and theoretical framework**

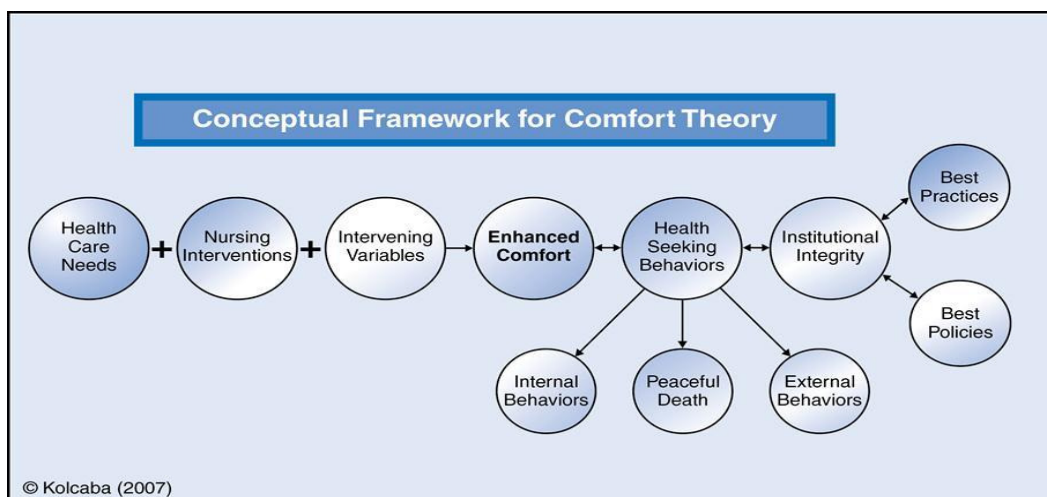
The conceptual framework guiding this study was Kolcaba's Theory of Comfort (Kolcaba, 2010) (see Figure 1). This theory is a middle-range theory for health practice, education, and research. The theory itself emphasizes comfort as an immediate desirable outcome of nursing care ("Kolcaba's Theory of Comfort - Nursing Theory"). The nursing care of post-surgical patients also emphasizes this concept. Kolcaba described comfort existing in three forms: relief, ease, and transcendence ("Kolcaba's Theory of Comfort - Nursing Theory"). When comfort needs of a patient are successfully fulfilled, the patient experiences comfort in the sense of relief.

- Relief can be demonstrated by a patient who receives pain medication in post-operative care.

- Ease is considered comfort in a state of contentment such as when a patient's anxieties are calmed.
- Transcendence is described as a state of comfort in which patients are able to rise above their pain.

Music can provide relief, ease, and transcendence as an adjunctive therapy.

Figure 1. Conceptual framework for the Theory of Comfort (Kolcaba, 2010)



## Methodology

### Subjects:

A total of 12 participants were successfully enrolled in the project using a convenience sampling technique. Participants were provided with traditional nursing care post-surgery per facility protocol with the addition of the music research element. Analgesic medication was provided as needed and per anesthesia protocol. Inclusion criteria included subjects ranging in age from 18 – 90 years of age and included both males and females of all ethnicities. To be able to participate in the study patients were required to be able to proficiently read and write in

English and be cognitively intact. Exclusion criteria included non-English communicating patients, those outside of the aforementioned age range, and those cognitively impaired.

Participant recruitment was completed in the pre-operative screening process. During this time the potential participants were informed about the music study by the pre-operative nurse that was trained by the primary investigator. Patients were recruited on a volunteer basis. Patients were advised of the intended study during their pre-operative phone call conducted 2-3 days prior to surgery. During the phone patients decided if they are willing to be involved in the study after being read a scripted presentation.

After acceptance, the volunteers were immediately given further instructions regarding the specific requirements of the study. Formal consent occurred on the day of surgery in the pre-operative area by the primary investigator. Participant confidentiality and privacy were protected as soon as they entered into the research project. Patients were de-identified and data was saved in a secure folder on the PIs personal computer that was password locked.

**Setting:**

The research project was conducted in an outpatient surgery center in an urban area. The surgery center was equipped with two operating suites and 1 procedure room, along with 3 pre-operative and 5 post-operative beds for patients. The facility offered outpatient, same-day surgical procedures that were elective in nature.

**Tools:**

Tools used to evaluate the variable of interest included the following:

1. Personal music device – a personal music device of the participant's choosing was to be brought by the participants to be used in the post-operative period.

2. Numerical Rating Scale for pain (0-10), 0 being no pain and 10 being the worst pain imaginable.
3. Post intervention discharge satisfaction questionnaire (See Figure 2).
4. Demographical questionnaire (See Figure 3).

Figure 2: Patient Satisfaction Survey

<b>Patient Satisfaction Survey</b>							
1.	How satisfied were you with your overall pain control during the post-operative period? (Please rate your response 5 to 1, 5 being extremely satisfied and 1 being extremely dissatisfied)						
	Extremely satisfied	5	4	3	2	1	Extremely dissatisfied
2.	How effective do you feel listening to music was with decreasing your pain? (Please rate your response 5 to 1, 5 being extremely effective and 1 being not effective at all)						
	Extremely effective	5	4	3	2	1	Not effective at all
3.	Would you recommend music as an adjunctive pain therapy to future patients?						
	Yes			No			
Please feel free to leave additional comments below. Thank you for your participation.							

Figure 3. Demographical Questionnaire

<b>Demographic information</b>	
1.	What is your gender? <input type="checkbox"/> M <input type="checkbox"/> F
2.	What is your ethnicity? <input type="checkbox"/> Caucasian <input type="checkbox"/> African American <input type="checkbox"/> Latino/Hispanic <input type="checkbox"/> Asian <input type="checkbox"/> Native American <input type="checkbox"/> Other, please specify _____
3.	What is your age? <input type="checkbox"/> 18 - 25 <input type="checkbox"/> 26-35 <input type="checkbox"/> 36-45 <input type="checkbox"/> 46-55 <input type="checkbox"/> 56-65 <input type="checkbox"/> 66-75 <input type="checkbox"/> 76-85 <input type="checkbox"/> 86-90
4.	What is the highest level of education that you have completed? <input type="checkbox"/> High School <input type="checkbox"/> Associate Degree <input type="checkbox"/> Bachelor Degree <input type="checkbox"/> Master's <input type="checkbox"/> PhD <input type="checkbox"/> Other, please specify _____
5.	What type of work do you do? <input type="checkbox"/> please specify _____
6.	On a good day how do you rate your pain?  <input type="checkbox"/> no pain; <input type="checkbox"/> mild; <input type="checkbox"/> moderate; <input type="checkbox"/> severe
7.	What do you do that helps minimize your pain?

### **The intervention and/or data collection:**

After obtaining approval from the Institutional Review Board as well as the participating surgery center, the first step involved recruitment of subjects. As described above, patients were recruited during the pre-operative period. The volunteers were provided the following verbal instructions during the pre-operative phone call:

*“Thank you for volunteering to participate in this research project. In order to effectively participate you will need to bring a personal music device on your day of surgery. The personal music device should be pre-loaded with music of your choice that you feel would be relaxing and beneficial to your immediate post-operative recovery period. The music will be given to you in the post anesthesia care unit and will be played the duration of your stay at the surgery center. For the purpose of this research project, I will be gathering data regarding your pain level before and after you listen to the music. You will be provided pain medication as needed. At the end of your post-operative stay you will be asked to fill out a short questionnaire that is intended to determine your overall satisfaction with the intervention and pain control measures. You will also be asked to fill out a short questionnaire to gather demographical information. Your participation in this project is entirely voluntary and you may choose*



to opt out at any time. Please feel free to contact the primary *investigator at any time with questions or concerns.*”

As discussed above, patients in the study were asked to bring their own personal music devices pre-loaded with their choice of music. In the event a participant was unable to provide their own music device they were discharged from the study. On arrival to the recovery room the music intervention was presented to the patient when the recovery room nurse deemed the patient conscious enough to use the music device. The participant used the music intervention during the post-operative period. Pain levels were recorded directly before and 15 minutes after the introduction of the music intervention was presented to the patient. The data was collected based on traditional pain indicators. More specifically, the numerical rating scale (NRS) ranging from 0-10 was utilized to provide a numerical value that was attributed to the patient’s pain level, 0 denoting “no pain” and 10 denoting “worst pain imaginable.” In addition to this, any medication administered for pain was recorded and taken into account for the purpose of results and discussion.

The implementation involved team members of the surgery center. More specifically, 3 bachelors-trained registered nurses proficient in care of post-anesthesia patients. These full-time nurses were involved in the collection of data and management of patient care. Training of these nurses began 2 weeks prior to the arrival of the first subject. Training consisted of:

1. Presenting the nurses with a copy of the project proposal
2. Verbal explanation of the proposed research project
3. Designated opportunity for the nurse to ask questions to clarify any uncertainties

Collection of data was done by the researcher on a weekly basis. This data was retrospectively collected by an administrative assistant in the outpatient surgery center from the charts of consented participants and presented to the primary investigator, de-identified.

### **Data Analysis**

After the completion of data collection statistical analysis was completed with the aid of Microsoft Excel (2010 Version). A paired sample t-test was utilized to compare the difference in the reported pain level before and after the music intervention. The t-test was also conducted to report whether the mean of the differences was statistically significant. In addition, a variety of descriptive statistics were formulated to better describe the results of the project.

## **Results/Findings**

### **Participant Demographics**

A total of 12 participants were eligible and successfully completed the research project (see Table 1). Of the 12 participants, 7 were male and 5 were female. The majority of the participants were between 46 and 65 years of age (41%) with the remaining participants being between 56 and 75 years of age. Seventy-five percent of the participants reported their ethnicity as Caucasian, 17% (n = 2) reported themselves as Latino/Hispanic, and 8% (n = 1) of the participants reported themselves as African American. When asked about level of education 50% (n= 6) of the participants reported having a Bachelor's degree, 25% (n = 3) reported having an Associate's Degree, 17% (n = 2) reported having a High School Diploma, and 8% (n = 1) reported having a Master's Degree.

Participants were asked "on a good day how would you rate your pain." The majority of the group (67%) reported that their pain was "moderate" on a good day. Twenty-five percent

(n = 3) reported their pain as “mild” and 8% (n = 1) reported their pain as “severe” on a good day.

Table 1. Participant Demographics

<b>Participant Demographics</b>		
<b>GENDER</b>	<b>N</b>	<b>%</b>
Male	7	58%
Female	5	42%
<b>ETHNICITY</b>	<b>N</b>	<b>%</b>
Caucasian	9	75%
African American	1	8%
Latino/Hispanic	2	17%
Asian	0	0%
Native American	0	0%
Other	0	0%
<b>AGE</b>	<b>N</b>	<b>%</b>
18-25	0	0%
26-35	0	0%
36-45	0	0%
46-55	5	41%
56-65	3	25%
66-75	4	34%
76-85	0	0%
86-90	0	0%
<b>HIGHEST LEVEL OF EDUCATION</b>	<b>N</b>	<b>%</b>
High School	2	17%
Associate Degree	3	25%
Bachelor's Degree	6	50%
Master's Degree	1	8%
PhD	0	0%
Other	0	0%
<b>ON A GOOD DAY HOW WOULD YOU RATE YOUR PAIN</b>	<b>N</b>	<b>%</b>
No pain	0	0%
Mild	3	25%
Moderate	8	67%
Severe	1	8%

### Patient Satisfaction Survey

Participants reported high levels of satisfaction with their overall pain control during the post-operative period (see Table 2). Response ratings were reported on a scale of 1 – 5, 1 being

extremely dissatisfied and 5 being extremely satisfied. Of the 12 participants 33% (n = 4) rated their satisfaction with their overall pain control during the post-operative period as a “5,” 50% (n = 6) reported a “4,” and 17% (n = 2) reported a “3.” Patients were also asked the question “how effective do you feel listening to music was with decreasing your pain?” Responses were reported on a scale of 1-5, 1 being not effective at all and 5 being extremely effective. Over 50% of the participants expressed that they felt listening to music was extremely effective in decreasing their pain. Not surprisingly, 93% of the participants reported that they would recommend music as an adjunctive therapy.

**Table 2: Patient Satisfaction Survey Scores**

<b>Patient Satisfaction Survey Scores</b>		
(Response rated from 5-1, 5 = extremely satisfied, 1 = extremely dissatisfied)		
<b>HOW SATISFIED WERE YOU WITH YOUR OVERALL PAIN CONTROL DURING THE POST-OPERATIVE PERIOD</b>	<b>N</b>	<b>%</b>
5	4	33%
4	6	50%
3	2	17%
2	0	0%
1	0	0%

(Response rate from 5-1, 5 = extremely effective, 1 = not effective at all)		
<b>HOW EFFECTIVE DO YOU FEEL LISTENING TO MUSIC WAS WITH DECREASING YOUR PAIN?</b>	<b>N</b>	<b>%</b>
5	7	59%
4	4	33%
3	1	8%
2	0	0%
1	0	0%

<b>WOULD YOU RECOMMEND MUSIC AS AN ADJUNCTIVE THERAPY?</b>	<b>N</b>	<b>%</b>
YES	11	92%
NO	1	8%

### Statistical Analysis

Data was analyzed using Microsoft Excel (2010 Version). A paired sample t test was conducted to compare the difference in the reported pain level before and after the music

intervention. A p value of 0.001 demonstrated a statistically significant reduction in patient's pain levels after listening to music. In comparing data from the project, it was found that the average pain scores decreased from 5.75 to 4.33 after the music intervention was introduced to patients. This data was based on the 0-10 pain scale.

### **Discussion**

This study aimed to investigate the use of music as an adjunctive therapy in the post-operative period. A total of 15 participants volunteered to participate. Only 12 were deemed eligible, however, due to the fact that 3 participants forgot to bring their music devices on the day of surgery and were therefore dismissed from the study. Demographical data was somewhat skewed with 75% of the participants reporting their ethnicity as Caucasian. Despite this fact, data and results demonstrate a significant decrease in pain after the introduction of self-selected music regardless of demographical differences. Although sample size was small, it is possible to argue that music was beneficial to patients in the reduction of pain. Additionally, it was determined that the overwhelming majority of patients would indeed recommend music as an adjunct therapy to pain control in the future. That being said, half of the participants did indeed request IV pain medication in addition to listening to their self-chosen music. Despite this fact, results from the study show that music can enhance patient satisfaction in regards to their pain control after surgery. Nurses involved in this study reported that in addition to written responses, patients verbally expressed their excitement and enjoyment in being able to listen to their pre-selected music choices during their recovery after surgery. The administrator of the surgery center where the study was conducted was made aware of the results of this study and has made plans to encourage future patients to bring music to listen to in the post anesthesia care unit.

### **Implications for Practice**

The findings in this research project are consistent with those of similar studies presented in the literature review. The majority of research supports the use of music as an adjunctive therapy to post-operative pain. Nurses are taught a holistic approach to care and therefore all options of pain control should be explored. Music is a non-invasive and cost-effective intervention for pain control. It has been shown to increase patient satisfaction and reduce pain with the absence of adverse side effects. Using music could potentially reduce the use of opioid medications in the recovery period and in turn improve patient outcomes. The evidence presented through this study can be used to support the use of music with confidence in the treatment of pain after surgery.

### **Limitations and Suggestions for Improvement**

Several limitations regarding this study should be noted. Generalizability of results of this project is limited due to the small sample size obtained. Stronger research support would be backed by a larger participatory group. Although a well-constructed research design, the project itself may recruit more participants if it were carried out in a larger surgical facility. Another notable limitation of this project is the fact that participants were given special privilege in the post-operative period when they were given their personal music devices. Although patient privacy is observed in the post-anesthesia care unit, patient bays are separated by only a thin curtain. Patients involved in the study were inevitably able to hear, and possibly see, that not all post-operative patients were listening to music. This factor may have created bias in patient self-reporting of pain levels and satisfaction outcomes. Lastly, the type of surgery that the patient underwent may have impacted their pain levels. More invasive or longer surgeries are more likely to cause more pain and produce pain that is more difficult to treat. These factors were not

taken into consideration in this study. In the future it may be beneficial to focus on patients undergoing one specific type of surgery to provide stronger evidence.

### **Suggestions for Future Research**

As mentioned above, the results provided from this study are congruent with previously published research supporting the physiological benefits of music in the treatment of pain. Knowing the strong correlation of music and patient satisfaction, future projects may aim to investigate auditory analgesia in other aspects of the perioperative period for patients. Music is clearly beneficial in post-operative care but could possibly be used to ease anxiety pre-operatively as well. Focus has traditionally been on the administration of medication to ease pain in the recovery period. Future research should be conducted on continued promotion and collection of evidence in support of using music as an adjunctive therapeutic measure.

### **Conclusion**

The results of the study showed that music can indeed be beneficial in the post-operative period for the reduction of patient pain. Furthermore, music can be used to enhance patient satisfaction. The incorporation of music into the post-operative recovery area is a viable option. It is a powerful and non-pharmacological intervention that is currently underutilized. The findings of this research project and many others support the idea that music should be strongly considered as an adjunctive therapy to traditional nursing care.

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