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Music Therapy and Conscious Sedation

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Music Therapy and Conscious Sedation

Abstract
Objectives: To determine the effect of being exposed to music during a colonoscopy on fentanyl and versed requirements in adult patients at an outpatient gastrointestinal clinic when compared to standardized care.

Design: A triple blind randomized controlled trial.

Setting: The study took place at a large medical center in Upstate New York.

Interventions: Comparing the amounts of sedative medications administered in those who were exposed to music therapy and those who were not during a routine colonoscopy.

Main Outcome Measures: The amounts of fentanyl and versed that were administered during a colonoscopy.

Results: The total number of patients was 101; 54.4% listened to music and 45.5% did not. There was a significant difference in the amount of fentanyl administered between those who were exposed to music compared to those who did not (t(99) = -2.85, p(99) = -2.97, p<0.005).

Conclusions: The amounts of both fentanyl and versed were reduced in those who had music playing during their colonoscopy when compared to those who did not. Music therapy is a safe and cost effective intervention that can be used as adjunct therapy during conscious sedation procedures such as colonoscopies.

Document Type
Thesis

Degree Name
M.S. in Advanced Practice Nursing

First Supervisor
Nancy Wilk

Second Supervisor
McGrane Winton

Subject Categories
Nursing

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Subject Categories
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Music Therapy and Conscious Sedation

By

Steffanie Vavra, RN, BSN

Submitted in partial fulfillment of the requirements for the degree
Master’s in Advanced Practice Nursing

Supervised by

Nancy Wilk

&

Heather McGrane Minton

Wegmans School of Nursing

St. John Fisher College

April 2018
Introduction

- In 2014 only 65.7% of adults in US were up to date with colorectal screenings
  -85% reported anxiety, fear of pain, and constipation
  -Fear of pain and anxiety were higher in those with GI symptoms
  -American Cancer Society
  -9,116,492 new colorectal cases in 2014
  -Introduction of conscious sedation
    -Risk on cardiovascular system
  -Music Therapy
    -Improve positive thoughts, induce relaxation, distract from pain & fear

Purpose

- To determine the effect of music therapy on fentanyl and sedative
  requirements in adult patients receiving a colonoscopy at an outpatient
  gastroenterology clinic when compared to standardized care.

Methodology

- Sample: Adult patients on ASA GI scheduled for routine colonoscopy
- August 2015 – December 2017
- Double blind study:
  -Physicians, nursing staff, patients
- Exclusion criteria:
  -4 Emergency Procedures
- General Anesthesia
- Advanced Endoscopist assigned
- Patient selected music during IB
- Reduction in sedative medications, both fentanyl and propofol

Methodology

- Before the Procedure
  -Patient identified and room assignment
  -Pre-interview revealed
- During the Procedure
  -Identify if exposure to music
- After the Procedure
  -Chart review to gather data
  -SPSS: Independent t test assess
Results

- By prior agreement with the collaborating institution, the results are
  protected as institutional property and cannot be disseminated in a public
  venue. The faculty of the course has had access to the non-protected data in
  the manuscript and presentation and has verified the successful completion of
  course requirements.

Plans for Dissemination

- Poster presentation at use.
- Identify staff meetings with nurses, techs, and physicians.
- Complementary Therapies in Medicine

References

Music Therapy and Conscious Sedation
1 message

Qualls, Brandon <Brandon_Qualls@urmc.rochester.edu>  
To: "Vavra, Steffanie" <scv08535@sjfc.edu>

Mon, Jul 24, 2017 at 11:06 AM

Steffanie,

Your project "Music Therapy and Conscious Sedation" has been approved and you are able to begin your project. Once you have completed your project, please be sure to submit a copy of your final report/paper for inclusion in our records.

Thank you,

Brandon

Brandon Qualls, MPA
Coordinator, Clinical Nursing Research Center
University of Rochester Medical Center
Strong Memorial Hospital
601 Elmwood Avenue, Box 619-7
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Conclusions: The amounts of both fentanyl and versed were reduced in those who had music playing during their colonoscopy when compared to those who did not. Music therapy is a safe and cost effective intervention that can be used as adjunct therapy during conscious sedation procedures such as colonoscopies.
1. Background

In 2014, only 65.7% of adults in the United States were up to date with colorectal cancer screening.¹ Studies have shown that patients are not compliant with screening due to fear of pain and anxiety during the procedure.² This may be attributed to having conscious sedation compared to general anesthesia. These fears are associated with feeling pain during the procedure and the environment in which the procedure is done. Hearing various alarms, being able to see and hear the instruments, the narrowness of the table, and a cold environment are reasons patients do not want procedures done under conscious sedation.³ Similarly, these fears apply to colonoscopies. Patients have reported not having colonoscopy completed because of fear of pain and embarrassment. The American Cancer Society estimated that a total of 134,490 new cases of colon and rectal cancer were diagnosed in the United States in 2016.⁴ By helping to decrease these perceived fears, it is hopeful that the number of new cancer cases that are diagnosed yearly will decrease.

By providing sedation, most patients have been more accepting of having the procedure completed.⁵ The use of sedative medications has been found to improve the performance of the procedure as well as enhancing the completion of the procedure. However, the process of administering intravenous sedation has its consequences. The cardiorespiratory system is affected by the use of sedation. Unfortunately, about 50% of potentially serious complications that are experienced during endoscopies occur within the cardiorespiratory system.⁵ Some of the complications include hypo/hypertension, cardiac arrhythmias, myocardial ischemia/infarction, respiratory depression, hypoxia, airway obstruction, and pulmonary aspiration. The risk of complications increases with the administration of sedative medications; therefore, to decrease the risk of complications, the amount of sedation needs to be decreased.
Music therapy is one possible solution to addressing patient fears in conjunction with a decrease in sedative medication. Music therapy has been shown to induce relaxation, inspire positive thoughts, and to create a diversion from pain or fear. It is for these reasons that medical professionals are incorporating music therapy into their everyday practice and procedures. It is a safe, cost-effective intervention that has been utilized as an adjunct to analgesics in pain management. It has also been shown to decrease procedural pain intensity and overall distress and anxiety in patients. Additionally, it has been demonstrated to decrease the amount of sedative medications required to complete a procedure. The purpose of this study was to determine the effect of music therapy on fentanyl and midazolam (Versed) requirements in adult patients receiving a colonoscopy at an outpatient gastrointestinal clinic when compared to standardized care.

2. Methods

This was a triple blind randomized controlled study where the nurse and physician performing the procedure were blinded, as well as, the patient.

2.1 Inclusion and Exclusion Criteria

All patients that were scheduled for an outpatient colonoscopy with conscious sedation were included in the study, which was conducted at a gastrointestinal clinic in Western New York during August 2017 and December 2017. The following exclusion criteria applied:

- Patients undergoing emergency procedures
- Patients undergoing general anesthesia
- Patients assigned to an advanced endoscopist
- Patients who had a gastrointestinal fellow performing their procedure
• Patients receiving meperidine or the brand name Demerol instead of fentanyl

2.2 Before the Procedure

The researcher identified the appropriate patients based on the inclusion and exclusion criteria. The researcher then acknowledged what procedural room was assigned to that patient. Since the study was completed by means of a chart review, no consents were needed from the patients.

2.3 During the Procedure

As an observer, the researcher entered the assigned room to verify whether or not music was being played during the procedure. Music was played either by speakers attached to the computer utilized by the nurse or from the imbedded speakers in the laptop. It was the choice of the physician performing the procedure if music was played or not.

2.4 After the Procedure

After the procedure, the researcher conducted a chart review of the identified patients. Collected data included the amount of fentanyl and versed that were administered during the procedure and whether or not music was played. There were no patient identifiers on the spreadsheet that were used to collect data.

2.5 Statistical Analysis

Independent samples t-tests were conducted to determine the differences between the two groups: (1) patients exposed to music and amount of fentanyl and versed administered, and (2) patients not exposed to music and the amount of fentanyl and versed administered. All statistical analyses were performed using SPSS 24.13
2.6 Ethics

The study was approved by the affiliated college and the medical center where the data was collected.

3. Results

A total of 101 patients were eligible to be part of the study. A little over half of the patients (55, 54.5%) were found to have been exposed to music during their colonoscopy, while the remaining patients were not exposed to music. Independent sample t-tests revealed a significant difference in the amount of fentanyl administered between the patients who were exposed to music during their colonoscopy (M=84.2mcg, SD=32.3) compared to the patients who were not exposed to music (M=105.9mcg, SD=42.4) ($t_{(99)}=-2.85, p<0.005$). Similarly, the independent samples t-tests revealed a significant difference in the amount of versed that was administered. Those who were exposed to music had lower amounts of versed (M=4.7mg, SD=2.0) compared to those who were not exposed (M=6.1mg, SD=2.9) ($t_{(99)}=-2.97, p<0.005$).

4. Discussion

The purpose of this study was to compare the amounts of fentanyl and versed administered to patients who were exposed to music to those who were not. The results showed a significant decrease in the amounts of both fentanyl and versed in the patients who were exposed to music therapy during their colonoscopy when compared to the patients who were not exposed. It is interesting to note that the difference in fentanyl was considered clinically significant as administration is given in increments of 25mcg. On average, those who were not exposed to music had an additional dosage of fentanyl, which increased the patients risk for sedation related complications. It has been found that the risk of sedation related complications is associated with
the increased sedation levels of the patient\textsuperscript{12}. In this study, being exposed to music during a colonoscopy significantly reduced the amount of Fentanyl administered; therefore, this decreased the risk of sedation complications. Furthermore, not only did it increase the safety to the patients, it was cost effective; it reduced the overall cost in this study by $962.50\textsuperscript{14}.

While there was a statistically significant decrease in the amount of versed administered in patients who were exposed to music compared to those not exposed to music, this finding was not of clinical importance. This is because the average administration increment of versed is 2mg, and the difference in this study was less than 1.5mg. Therefore, those who were not exposed to music had less than one administration of versed compared to those exposed to music. Although it was not found to be of clinical importance, it is still significant to note that those exposed to music had less versed than those who were not exposed. Versed is utilized during conscious sedation for its amnesia properties, allowing patients to not remember the procedure. However, with increased doses, these amnesia periods last longer than patients desire.

One strength of the study was that some endoscopists at the medical center already incorporated music as part of their routine care. This allowed for a convenient approach to gather the applicable data. It also prevented bias by allowing the study to be triple blinded since the patients, unit staff, and the physicians performing the procedure were not aware that the study was taking place.

One limitation to the study was the selection of music and the way that the music was played during the procedure. The patient did not have a choice in the selection of the music being played. The music selection was usually up to the doctor performing the procedure. This may have affected the results because if the patient was exposed to music of their choice, they may have relaxed more and not required as much medication. Also, the manner that the music was
presented was a limitation. The music was played through the speakers on the computer in the procedure room. The individual may have been able to hear other sounds such as the staff talking to one another and the use of the equipment during the procedure ultimately affecting medication requirements.

5. Relevance for Clinical Practice

The results of the study can be used to improve clinical care areas where conscious sedation procedures are performed. Music therapy can be offered as part of routine care during the pre-operative process in order to decrease the amount of sedation administered. It has also been illustrated to improve overall patient satisfaction and willingness to repeat the procedure in the future. One outcome measure that can be used for future research would be to determine if being exposed to music during a colonoscopy increases patient’s satisfaction with the procedure.

6. Conclusion

Music therapy is a cost effective intervention that has been shown to decrease the amount of sedative medications during non-invasive procedures such as colonoscopies. It is because of this that it can be implemented into everyday care as a safe adjunct to sedative medications. The decreased amount of sedative medications decreases the patients risk for adverse reactions to the cardiopulmonary system. Based on the results of the study, it is recommended that physicians should offer music therapy to their patients during colonoscopies in addition to sedative medications.
References


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<tr>
<td>Purpose</td>
<td>The purpose of this study was to discover what environmental factors patients found to cause anxiety while receiving local/regional anesthesia. A large amount of surgeries are now done with local anesthesia and this author wanted to find the specific areas which bring anxiety to the patient. With the findings of the study, the author hoped to decrease the amount of anxiety the patients would endure during the day of the surgical procedure. Some common concerns regarding local/regional anesthesia were being awake while the procedure took place, the time between administration of medication and the start of the procedure, and the overall sounds and environment of the procedure room.</td>
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<tr>
<td>Subjects</td>
<td>214 patients participated in this study. The study took place at three outpatient surgical units within a large city in England over a two-year period (2005-2007). All surgical staff (nurses, surgeons, and anesthetists) and patients consented to the study. The inclusion criteria for the patients included: non-life-threatening immediate surgery, no history of chronic or physical health, English speaking, 18 years and older, and not undergoing ophthalmic or dental surgery. Patients were not chosen to participate if having ophthalmic or dental procedures because they were thought to possibly experience additional anxieties related to vision loss and/or change to physical appearance. The patients were chosen by convenience because they were already scheduled to have their surgeries during that time period that those specific units.</td>
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| Study Design | After the procedure, the patients that fit the inclusion criteria took home a questionnaire. They were asked to complete the survey within 24-48 hours and return in a pre-paid envelope. The questionnaire was generated using literature previously written on anxiety and evidence gained from previous studies. An original survey was created that was used during a greater study which observed more areas of anxiety. The form that was utilized during this specific study only contained questions related to the effect of the environment (theatre) on the level of patient anxiety. A pilot study was also completed prior to the actual study. The pilot study used the first 10% of the patients and with those results, adjustments were made to the questionnaire prior to obtaining further data. All questions on the survey were arranged using a
| Results                                                                 | 214 patients completed the survey. The patients underwent a variety of procedures; general surgery (37%) and orthopedic surgery (35%) being the most common. 101 patients (77%) stated that they experienced some form of anxiety the day of the procedure. The most common aspect of anxiety was fear of being awake during the procedure (60%) and possibility of feeling the doctor perform the surgery (47%). Other areas of anxiety were the thought of feeling their body being cut open, having the local/regional anesthesia wearing off too quickly or becoming painful. By the use of factor analysis, the author was able to compile the results into two categories: ‘Anaesthetic Information Provision’ and “Intraoperative Apprehension”. Factor analysis was used to decide whether or not the shared variables could be assembled together to form themes to describe their association; which is how ‘anaesthetic information provision’ and ‘intraoperative apprehension’ were generated. Also, multiple regression analysis was used to conclude if a level of anxiety could be anticipated by the two new categories created. Anxiety related to lack of information about the procedure and/or the anaesthetic would fall into the category of ‘anaesthetic information provision’. Anxiety related to being awake during the procedure, feeling the body part being cut open, or being able to hear throughout the procedure would be placed into ‘intraoperative apprehension’. |
| Conclusion                                                             | It is evident that an increase in patient anxiety during the day of the medical procedure is directly related to concerns that fall within ‘anaesthetic information provision’ and/or ‘intraoperative apprehension’. Out of the 214 participants, 173 patients experienced some form of anxiety on the day of the procedure. With the increase in anxiety, patients are less likely to elect to have conscious sedation procedure when compared to general anesthesia. |
| Implications                                                           | By defining areas of patient anxiety prior to having local/regional anesthesia will help staff better care for their patients. It is important to have these procedures done and if medical personnel can help patients alleviate anxiety prior to the procedure, it will result in a better patient outcome. One overall concern that the patients experienced during the study was the lack of communication between the patient and staff. Staff should continuously ask if the patients have any questions about the medication or the procedure itself. This will help eliminate any ‘intraoperative apprehension’ or misconceptions the patient may be experiencing. An example would be worrying about anesthesia wearing off before the commencement of the procedure. By receiving information about the procedure and medications that |
will be administered prior to the day of surgery will help rid of misapprehensions. It will also help patients think of questions to ask the day of the surgery. Furthermore, the study discusses distraction techniques that can help decrease a patient’s anxiety. Listening to music or talking to the nurse before the procedure has been suggested to decrease levels of anxiety. During this interaction, the staff can attend to the physical and comfort needs of the patient.

| Weaknesses | The questionnaire that was used during the study only utilized questions pertaining to the environment on the patient’s anxiety. There are many more areas that could have been addressed that cause anxiety to patients. Also, the questionnaire was never validated as an appropriate tool prior to the study. Thus, questions included could have not to be relevant and other important questions may have been omitted. Finally, only 41% of the patients responded to the survey which could have narrowed the data collected. |
## Citation

## Purpose
Although a colonoscopy is a fairly safe procedure, many people are not having them done due to anxiety. People are afraid of pain and discomfort they may experience during the procedure; while some are just too embarrassed to have one done. This study was completed to see if listening to music during the procedure will help ease the pain/discomfort and anxiety that the patient may experience. Also, the authors wanted to see if colonoscopies would be more socially accepted if a patient were able to listen to music while having their procedure done. Recent studies have found that music therapy has been illustrated to promote relaxation, induce positive thoughts, and distract attention from fear of pain. This study hoped to increase patient satisfaction in regards to colonoscopies.

## Subjects
The study took place at an institution in Palermo, Italy. All patients that were scheduled for an outpatient colonoscopy between September and November 2006 were offered to participate if between the ages of 18 and 75. The exclusion criteria included: non-Italian speaking, abnormal hearing, and previous colon resection surgeries. All participants had to sign an informed consent that explained the risks and benefits of the procedure. All patients performed the same bowel preparation that consisted of a low-residue food and clear liquids for three days prior to the date of the procedure. The patients then had to drink 4L of polyethylene glycol, which was ingested over four hours the evening before the procedure. There were 109 patients total that fit the criteria; 56 in the music group and 53 to the control group. All of the colonoscopies were performed by endoscopists who had performed more than 500 colonoscopies.

## Study design
This was a quantitative single blind randomized controlled study; all medical personnel (physicians and nurses) and all patients were blinded to the trial treatment. After the patients signed the informed consent, they were then randomized to colonoscopy with or without music. This randomization was generated by a computer software system. The patients then were asked to complete a 20 question questionnaire to obtain a baseline anxiety level. The answers to the questions were combined in a score from 1 (absent or very low anxiety) to 6 (maximal anxiety). All patients had to wear headphones
through the entire procedure regardless of being randomized to the music group or not. This was done to ensure blindness of the physicians and nurses that were assigned to the procedure. Also, an independent observer was present through all cases to ensure that the physician nor nurse could hear the music being played in the patient’s headphones. Patients that were in the music group could then pick their own genre of music which included blues, classic, country, and many other varieties. Both the control group and the music group could receive conscious sedation by patient request. If a patient wished to have sedation, the physician would then order the drug and dosage. Midazolam and pethidine were the two drugs given during the procedures. A similar flexible videocolonoscope was used for all procedures. Heart rate, oxygen saturation, and arterial blood pressure were frequently monitored during the procedures. Some outcome measures included: the patient’s perceptions of pain throughout the procedure, patient satisfaction, and willingness to repeat the procedure in the future. Physicians were asked the degree of difficulty in performing the procedure. All questions were rated on a linear analogue scale from 0 to 10. Some other outcome measures included: systolic and diastolic blood pressure, heart rate, oxygen saturation— all recorded 3 minutes after starting the music, before inserting the scope, 5 minutes after the scope was inserted, and 3 minutes after completing the procedure. The study also observed how much medication was administered throughout the procedure and the actual length needed to complete the colonoscopy.

Results

The average length of the procedure was 23 minutes; ranging from the shortest of 8 minutes to the longest of 60 minutes. Within the music group, a variety of genre was chosen: new age, rock, swing, classical and pop being the most common. The cecum was reached in 84.9% in the control group and 83.9% in the music group. The mean pain score for all genders in the music group was 3.8 with a standard deviation of 1.9 compared to the control group with a mean of 5.9 with a standard deviation of 2.2. The p-value was <0.00001 meaning that this outcome is statistically significant. This means that there was a significant amount of less pain in the music group when compared to the control group. The mean pain score in females failed to be statistically significant. The researchers found this to probably be because of a type II error. More patients agreed to repeat the procedure and were overall more satisfied in the music group than the control group; both p-values <0.05 meaning statistically significant. Physicians felt the procedure to be less difficult in the music group. There was also a significant reduction of the proportion of participants requiring sedation (midazolam) in the music group (11% vs 34%). However, the mean dose of midazolam
| **Conclusion** | This study illustrates a statistically significant benefit of music therapy in relation to patient’s receiving colonoscopies. There are benefits demonstrated in both the subjective and objective outcomes. Music therapy improves patient satisfaction, pain scores, and willingness to repeat the procedure in the future. Musical therapy also decreased vital signs associated with pain. The relative reduction of pain was found to be lower in females than males. |
| **Implications** | If music therapy, which is cost effective, can help patients have better outcomes with procedures such as colonoscopies, then music should be routinely utilized. If staff can help ease patient anxiety with music in order to have the procedure done, then the amount of deaths associated with colon cancer will hopefully decrease. When patients listened to music, their vital signs (heart rate and blood pressures) significantly lowered after the completion of the procedure. Patient satisfaction and willingness to repeat the procedure in the future was also increased in the music group. This is important because people will be more compliant with their care if they are satisfied with the outcome the first time around. The patients will also be more likely to recommend to friends and relatives if they are satisfied with their care. Not only were the patient’s satisfied, the doctors found that the difficulty of the procedure to be less with the patients listening to music. This is important because the physicians were also blinded to the study as well and did not know what patients were in the music group. With the procedures being less difficult, the doctors would be able to complete more procedures with more patients within a given time period. |
| **Weaknesses** | There were considerably less females in the music group when compared to males. This may skew some of the results when looking at directly gender outcomes. More studies may have to be done to see if there is a gender difference. Another weakness to this study is the silence in the headphones being worn by the control group. This may have caused an increase in anxiety to the patients because they were expecting to hear music and instead just hear silence. |

Purpose | The objective of this study was to investigate the effectiveness of musical therapy on levels of intraoperative anxiety. The study looked directly at patients undergoing vascular surgery with localized analgesia. The purpose was to assess the efficacy, safety, and feasibility of musical therapy. It has been proven that intraoperative anxiety has been associated with higher incidences of post-surgery pain, an increase in the need for analgesics and anesthetics, and an increase in recovery period and discharge from a hospital. According to the National Association for Music Therapy, music therapy has been utilized to achieve therapeutic objectives: restoration, maintenance, and increase in health (including physical and mental). It also has been proven to be effective to the cardiovascular system to induce relaxation. The sympathetic nervous system has also been seen to be affected; leading to a decrease in adrenergic activity, producing an altered state of consciousness, and a decrease in neuromuscular arousal. The relaxation in the cardiovascular system includes a decrease in heart rate, blood pressure, respiratory rate, metabolic rate, oxygen consumption, skeleton muscle tension, epinephrine levels, gastric acidity and motility, and sweat gland levels.

Subjects | The study included all patients who underwent elective varicose vein crossectomy with GSV stripping during December 2010 and March 2011 at Getafe University Hospital in Madrid, Spain. Overall, there were 40 patients that were included in the study; 20 patients in the control group and 20 patients in the experimental group. The patients' ages ranged from 27 to 70 years old. Only 30% of the patients in the study were male. The patients were recruited from the Angiology and Vascular Surgery Department at the hospital. The exclusion criteria for the study included: sensory disability (particularly auditory impaired), psychiatric acute or deteriorating disorder, altered mental status, and cognitive impairment. All subjects underwent stripping in a single lower limb with spinal anesthesia without sedation.

Study Design | This was a quantitative controlled randomized study. All subjects that were included in the study were picked due to convince of being at that particular surgical center during that specific time period. All patients received the same spinal anesthesia without sedation meaning they were all conscious and awake throughout the procedure. All patients were randomized to either the control group (standard care) or experimental group (music therapy or MT). Patients in the control group listened to the background noise of the procedural room and received the standard care. The same piece of music was played for all patients in the MT group. The piece selected had previously shown to induce relaxation on the
cardiovascular system. The piece was *Slow Cantabile Semplice*, by Henry Gorecki. A previous study illustrated that this musical piece also improved endothelial function, reduced system inflammatory markers, and improved arterial vasoreactivity; which is why this particular piece was selected for all in the MT group. All patients in the MT group listen to the symphony through headphones attached to an MP3 player. This was done to reduce external noise from the surgical room during the procedure and to have the patient concentrate solely on the music. The volume of the music was pre-adjusted prior to the procedure so all patients' headphones were set to the same level. All patients had baseline heart rate, systolic and diastolic blood pressures, and anxiety levels prior to the start of the procedure. An investigator who was blinded to the study was obtaining all baseline and post procedure levels. A restrictive 4-person block randomization matched by genre was done to minimize the probability of imbalance and temporal biases between both groups and homogeneity in genre distribution. A computer then randomized all subjects to either the control or experimental group. All subjects had to complete a verbal interview 20 minutes prior to the procedure. The interview was assessed using the State Anxiety and the Trait Anxiety with the STAI scale in the surgical waiting room. In addition to the interview, the participants also had to complete a 27 closed question questionnaire with dichotomous and multiple choice answers. This questionnaire was created specifically for this study. It also included a visual analogue scale of anxiety the patient had to select. The survey included questions pertaining to patient musical habits and training, demographic features, and preoperative anxiety levels. After the procedure, the patients had to complete another personal interview with the interviewer no more than 10 minutes out of surgery. The same questionnaire was utilized post-procedure. However, the questions varied in number based on what group the participant was in. This was because patients in the control group were not asked questions about satisfaction with MT. During the procedure, the patients' vital signs were measured every 5 minutes (heart rate, blood pressure, breathing rate, and oxygen saturation). Plasma levels of catecholamines (adrenaline and noreadrenaline) were measured before and after the procedure. The levels were drawn while the patients were listening to either music (MT) or ambient noise in the procedure room (control). All patients had to sign the same informed consent regardless of being in either group. The sample size was estimated to show a 2-tailed null hypothesis. The sample size of 40 patients resulted from assuming a statistical power of 80% and an alpha error of 5%. Demographic features, comorbidities, and basal anxiety levels did not differ significantly between the two groups (see table 1). This was determined because all of the p values were 0.55 or higher determining that it is not statically significant.

**Results**

95% in the MT group and 90% in the control group completed the study. 94.7% of the patients in the MT group stated that MT helped control their intraoperative anxiety when compared to the standard care received in the control group. This was found to be statistically significant because the p value was <0.03. Patients in the MT group were asked "Do you think that music has helped you relax?" post procedure and 94.7% stated that it did. This was found to be statistically significant. Also, the levels of catecholamines that were drawn both before and after the procedure were
| Conclusion | The results of the study illustrated that listening to music during varicose vein surgery helped eliminate intraoperative anxiety a patient may experience. Musical therapy does not affect a patients' vital signs during procedures based on this study. MT was illustrated to prevent stressed-induced changes in physiologic measures; which was demonstrated by considerably lower catecholamine levels at the start and end of the procedure. |
| Implications | The main benefit of musical therapy is that there are no adverse reactions that could arise. MT is feasible, cost effective, and a profitable treatment that helps ease a patient’s anxiety and should be implemented into routine care. MT could be offered to the patient at any time during the visit to help alleviate the anxiety. Musical therapy could also be a good alternative to patients that have an allergy to benzodiazepines, which are medications usually administered during moderate sedative procedures. |
| Weaknesses | The study could not be performed double blinded; because is not plausible to blind the patient to the intervention (MT). The patients had to listen to the same symphony during the procedure. Patients may not enjoy to listen to that particular symphony thus resulting in some level of anxiety. Also, all of the headphones connected to the MP3 players were preset prior to patient use. Patients could have been hard of hearing and could not adequately hear the music. |
| Purpose | The purpose of this study was to identify correlations between anxiety levels, previous pain experience, non-drug interventions, and pain intensity during a colonoscopy. The objective of the study was to provide information that can be utilized to improve the overall treatment of pain during colonoscopy procedures. The following research questions were identified: How does anxiety before colonoscopy affect pain experience during the procedure? How do previous colonoscopy and pain experience affect pain during the procedure? How effective are non-pharmacological methods in colonoscopy pain management? The study was looking specifically at trait anxiety and state anxiety. State anxiety is a transitory emotion that is illustrated by feelings of strain, fright, and tension. Trait anxiety is described as an individual’s disposition to respond. Trait anxiety level is suggested to be a useful predictor of a patient’s predisposition to procedural anxiety. |
| Subjects | An original sample included 208 outpatients at one Finnish hospital during May and October of 2006. The authors looked at outpatients specifically obtaining a colonoscopy during that time period at that specific hospital. In order to have patients of a variety of ages, the authors looked at the first patient in the morning, which was generally an older person, and looked at the first person scheduled in the afternoon, which was generally a younger person. Inclusion criteria included: over 20 years old, adequate eyesight and hearing, capability for completing questionnaires, ability to use a visual analogue scale (VAS), and voluntary participation. The exclusion criteria included: dementia, psychiatric illness and mental deficiency, prisoners, pregnant, and breast feeding women. Of the 208 eligible participants, 78 were excluded for various reasons. An information letter along with an informed consent to participate in the study was sent to the patients two weeks before their scheduled procedure. The patients were asked to send the signed consent back and to arrive a half hour early the day of their procedure. 130 participants total completed the study; 67 men and 63 women ranging from 23-85 years of age. The most common indications for needing a colonoscopy was screening for colorectal cancer and inflammatory bowel disease. |
| Study Design | This was a descriptive cross-sectional study design and had voluntary participants. This was a quantitative study. The patients had to arrive to the hospital a half hour before their allotted time spot in order to complete |
the State Trait Anxiety Inventory (STAI). The Spielberger State Trait Anxiety Inventory was the instrument used to measure trait and state anxiety through a two-part 40 question self-report. It is a widely used scale for evaluation of anxiety. The report is also very simple to use and easy to score. The trait portion measures the person’s general disposition while the state measures how anxious the patient is right now. The instrument is rated on a four-point Likert-scale ranging from 1 (not at all) to 4 (very much so). A weighted score was then given to each question. The higher the score indicating higher levels of anxiety; maximum score of 80 with a minimum score of 20. The internal consistency of the report was evaluated by using Cronbach’s Alpha; resulting in a good score of 0.72. Before the patients could be discharged, they had to complete another questionnaire. This questionnaire was developed specifically for this study. It included 12 closed questions focusing on previous colonoscopy and pain experience, effect of non-drug interventions, and the degree of pain of the procedure. To increase the reliability of the questionnaire, the same variable was assessed by both the Verbal Rating and the VAS with a 100mm horizontal line. Both scales are considered reliable, valid, and appropriate for use in clinical research as well as assessing patient’s pain during a colonoscopy. Spearman’s rho correlation coefficients for the results were $p=0.602$ and 0.846, indicating statistical correlation between scales. The authors also included an expert panel and pilot testing to improve questionnaire content and construct validity. The nurses also used non-drug interventions before and during the procedure. These interventions included: emotional support such as peaceful talk, explanation of the reason for the pain, distracting of patient’s thoughts, and forewarning patients about upcoming pain during the examination.

**Results**

70% of the patients had a previous colonoscopy performed earlier. Woman’s state and trait anxiety were higher when compared to men. This was found to be statistically significant ($r=0.550$). State anxiety had a significant impact on the difficulty of the colonoscopy and pain during the procedure. 58% of the patients stated that the colonoscopy was painful to some extent, while only 17% found the procedure to not be painful at all. Woman found the procedure to be more painful than men. 62% of the respondents found the procedure to be easy, 15% found it very easy, and 23% found it to be difficult. 34% of the patients admitted that their previous colonoscopy was more difficult. 30% stated that the examinations were nearly the same and 7% stated at this one was more difficult than the last one. There was no difference in men nor woman in previous experience in colonoscopy. 39% of the patients stated that nurses’ peaceful talk helped them very much and 38% stated that it also helped greatly in pain management. None of the effects of the nurses’ non-drug interventions results were deemed statistically significant. Also, there were no differences between the men’s and the women’s responses to the non-drug interventions.
<table>
<thead>
<tr>
<th>Conclusion</th>
<th>Awareness and understanding of previous pain experiences and patient anxiety levels in patients are essential and must be taken into account. The level of state anxiety before a colonoscopy has a significant effect on how difficult and painful the procedure will be. It was found that women had higher levels of state and trait anxiety when compared to the opposite sex. A previous colonoscopy did not have any impact on the patient's levels of anxiety. Most of the participants found the procedure to be considerably easy, but women found the procedure to be more difficult. Over 1/5 of the patients compared the pain experienced during the colonoscopy to be compared to muscle cramping.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implications</td>
<td>It is important for nurses to assess patients level of anxiety prior to procedure and identify those with higher levels of anxiety. Nursing can help ease patients' anxiety levels with discussion of the procedure of what to expect and reasons for pain. The participants in this specific study stated that nurses' peaceful talk and explanations helped them very much and helped control their pain better. The non-drug interventions were effective in both anxious and non-anxious patients as well as both somatic and visceral pain. Nurses should implement non-drug interventions as part of colonoscopy pain management. This study found that women are more anxious and experience more pain and discomfort during the procedure. Nurses should be aware of this and explain this to women prior to the start of the procedure. Staff should bring more attention to individual education and counselling of patients at the start and during the colonoscopy. It is essential to bring attention to patient's previous pain, anxiety levels, and gender differences when preparing them for a procedure. Helping reduce a patients' anxiety level and pain during a colonoscopy could help them being more willing to attend future appointments and recommend to friends and family.</td>
</tr>
<tr>
<td>Weaknesses</td>
<td>Patients were not anonymous when submitting their responses to the researchers. This may have impacted the patients to describe their true feelings and responses to the procedure. 22% of the patients refused to be part of the study. This may be because the patients may have felt like the study would have been a burden to them. The inclusion and exclusion criteria were very specific, resulting in a loss of patients. Also, the researchers never completed a statistical analysis which would determine how big their sample size would have to be.</td>
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</table>

Purpose | The purpose of this study was to evaluate the effect of music therapy (MI) on stress hormones, physiological parameters, acute procedural pain and anxiety in patients undergoing port catheter placement procedure (PCPP).

Subjects | All patients included were newly diagnosed oncology patients who were scheduled for elected outpatient port catheter placement between March 1 and September 2012. There were 100 patients total. All patients included had to be undergoing port catheter placement for the first time to exclude any previous experiences of the procedure. The inclusion criteria included: 18-75 years of age, were Turkish-speaking, able to read at the fifth grade level and were mentally competent. Exclusion criteria included: auditory problems, hormonal dysfunction, steroid use, anxiolytic and sedative use, cocaine abuse, diagnosis of severe anxiety disorder, active psychosis or dementia, and uncontrolled hypertension.

Study Design | This is a prospective, randomized controlled study that was performed in the Emergency Department of the Gaziantep University in Turkey. All patients were randomly assigned to either the control group or the MI group. The patients were randomly allocated using a computer-generated system. All procedures were done within the surgical intervention room of the ED. The patients in the MI group listened to Turkish classical music from the time they were taken into the surgical room until the time the procedure was complete. The patients in the control group listened to the usual background noise of the surgical intervention room. The state-trait anxiety inventory (STAI) form was completed to determine the baseline anxiety level of the participants. The patients also completed the same form after the commencement of the procedure. The STAI form has two parts: one evaluates a transitory emotional state characterized by subjective feelings of attention and apprehension and the second part (trait anxiety) demonstrates a relatively stable tendency to anxiety. All participants were taken into the surgical room at exactly 0830, laid on a stretcher with monitors, and had an IV with NaCl. After being in the room for 30 minutes, two doctors and one nurse began the procedure which lasted for 30 minutes. All patients received the same exact surgical treatment which lasted for the same amount of time. Post procedure, the patients had to complete a visual analogue scale (VAS) to rate their pain level on a scale of 0 (no pain) to 10 (maximal possible pain). All patients also had their cortisol and adrenocorticotropic hormone levels drawn on arrival to the surgical room, immediately before and immediately after the procedure. Also, all patients had their HR, RR, systolic
| Results       | Both the MI group and the control group were demographically similar prior to the procedure. See Table 1. The mean HR, RR, SBP, and DBP were all similar between the two groups. 30 minutes after the participants were taken into the surgical room, the mean HR, RR, SBP, DBP, ACTH and cortisol were all significantly lower in the MI group than the control group (p<0.05 for all data). Immediately after the procedure, the mean HR, RR, SBP, DBP, ACTH, and cortisol again were significantly lower in the MI group than the control group. There was also a significant lower reduction in the STAI scores within the MI group post procedure than the control group. In the MI group, the patients HR lowered as the three occasions progressed. In the control group, the HR actually went up right before the procedure and right after the procedure. This finding also reflects the RR of the both the MI group and the control group. The patients in the MI group had lower SBP and DBP within the second and third checks of the procedure. The control groups’ cortisol and ACTH levels stayed pretty much the same throughout the three checks. The patients in the MI group saw a decrease in both levels in the three checks. |
| Conclusion    | During the port catheter placement procedure, MI significantly decreased stress hormone levels, physiological parameters, acute procedural pain, and anxiety compared to the control group. MI is noninvasive, inexpensive, effective, safe, and easy to implement for patients. It should be utilized during standard level of care for noninvasive procedures. |
| Implications  | Most patients that undergo diagnostic and/or invasive procedures are often frightened and anxious and if we can help eliminate those feelings with minimal expenses, it should be utilized. Physiologic and psychological instability may increase the length of the procedure and the amount of sedation required. This could result in more respiratory distress for the patient. Also, a tense patient may find it problematic to cooperate with the health care team, adding more difficulties to the procedure. Therefore, it is important to address both anxiety and fright in the patient prior to a procedure. |
| Limitations   | This procedure used a quasi-experimental design with random assignment and blinding was not an option. The participants were chosen from a single hospital and only consisted of patients undergoing port catheter placement procedure. Therefore, the results cannot be generalized to other patients. Also, only one type of music was selected for the patients to hear. The patients may have had better results if they were listening to music of their liking. |

Purpose | The purpose of this study was to assess the effects of playing patient-selected music during interventional procedures on the doses of sedation and analgesia and anxiety levels.

Subjects | All patients were included in the study who were scheduled to have an interventional radiology procedure in a specific center. The exclusion criteria included: patients undergoing emergent procedures, procedures requiring general anesthesia, patients unable to sign consent, and those who had hearing difficulties. Patients who were hospitalized signed the consent form at least 24 hours before the procedure. Outpatients were contacted before their scheduled procedure and were asked to bring a compact disc with their selected music piece the day of the procedure. Patients were then randomized to either the control group of the intervention group (music therapy).

Study Design | This was a randomized controlled quantitative study. Patients were randomized in blocks to either the control group or the music group. The block size was randomly chosen to be four or six with equal probability. On arrival to the IR suite, patient and procedure were identified according to policy. Patient’s consent and music compact disc was then checked. If a patient was unable to provide own CD or forgot, a CD of their choice was offered from hospital inventory. If patient did not find a music selection that they enjoyed, they were asked to leave the study. Patient’s baseline demographics, preexisting medical conditions, and patient medications were recorded. Patients were also asked to complete the State Anxiety Inventory (SAI) which measured their baseline anxiety level. Lastly, baseline pulse rate and mean blood pressure were recorded. After this, patients then opened their randomized envelope which revealed what group they were assigned to; control group or music therapy. If patients were in the music therapy group, headphones were then applied to all patients. All patients had their pulse rate and mean blood pressure recorded at 10 minute intervals throughout the procedure. The length of the procedure was also recorded. Analgesia and sedation were administered as required following the departmental protocol and also recorded. When the procedures finished, the patient’s pulse rate and mean blood pressure were recorded again. If it was an inpatient, the vitals were taken 24 hours after the procedure while outpatients had their vital signs taken just prior to discharge. At this time, the patients had to complete the same SAI questionnaire which measured their anxiety level.
| Results | There were 100 patients total that conducted the study; 50 patients in each group. All patients baseline characteristics were similar in both groups however, the pulse rate in the music group was higher and found to be statistically significant; p value <0.012. However, the pulse rate is not clinically significant since the mean value was only 6 points higher. Sedation (midazolam) was required in 60% of the cases in the control group versus only 42% in the music therapy group. Pain medication (fentanyl) was required in 52% of the cases in the control group and only 36% in the music therapy group. Both of these statistics were deemed statistically significant because both p values were <0.05. The amount of medication administered was also significantly lower in the music group than the control group. Music group received a mean dose of 1.3mg of midazolam while the control group received 2.1mg. The mean amount of fentanyl administered to the music group was 18mg while the control group’s average was 29mg. There was no significant difference between the two groups in the change from baseline pulse rate or blood pressure. |
| Conclusion | Sedation requirements were significantly reduced by playing self-selected music to the patient during interventional radiology procedures. By lowering sedation during interventional radiology, music makes the procedure safer. It also contributes favorably to the overall patient experience. |
| Implications | Although it is not common for patients to go into respiratory depression after conscious sedation, it still can happen. If providers can make this statistic even smaller by the use of music therapy, it should be routinely used in procedures. Not only is it cost effective, it increases patient satisfaction. Patients then would be more willing to recommend the procedure to friends and family. |
| Limitations | This study took place at a small, single-center place, which the whereabouts was not identified in the article. Due to the small numbers, it limits the study to be able to draw meaningful conclusions from any subset analysis. Also, the participants in the study all had various procedures that were not identified. It is hard to generalize the findings when the patients all had different procedures done. Also, if patients did not have a compact disc of their own, they had to choose from the hospital inventory. This choice could have been limited to genre and limited the patient’s selection. |
Steffanie Vavra  
March 28, 2016  
Dr. Boev  

**Literature Matrix 7**

| Purpose | The aim of this study was to see whether music could help decrease the need for midazolam during colonoscopy and improve the acceptability of this procedure by patients. Some studies suggest that music alleviates anxiety and improves patient tolerance during gastrointestinal endoscopy. |
| Subjects | Patients undergoing elective colonoscopy during October 2003 and February 2004 were elected to participate in the study. Exclusion criteria included: under 15 years of age or over 60, hard of hearing due to any cause, patients with overt or borderline psychiatric illness, and those with considerable cardiopulmonary morbidity. All patients were randomized using a computer generated system to either the control group or the music group. All patients received the same drug (midazolam) at the same bolus dosage (increments of 2mg). The dose of midazolam, duration of the procedure, recovery time, pain, and discomfort scores, and willingness to repeat the procedure using the same sedation protocol were recorded. |
| Study Design | This was a quantitative randomized controlled trial. All the participants had an equal chance of being in either the control group or music group. The patients in the music group had to choose from six different music choices: popular film songs based on carnatic classical ragas, classical music, devotional songs, folk songs, soft instrumental music, and bioacoustics. All music was played using a Walkman and headphones. Patients in the control group also wore headphones to place over their ears but no music was played. Randomization and placement of headphones were done by a trainee physician who was not involved in further evaluation. All procedures were performed by endoscopists who had performed at least 200 previous colonoscopies. During the procedure the pulse rate and systolic and diastolic blood pressures were monitored and recorded via an electronic wristwatch blood pressure recorder. After the procedure, all patients were monitored in the recovery room. Also, the occurrence of hypertension (SBP >140 or DBP >90), hypotension (SBP <90), tachycardia (heart rate >100/min) and bradycardia (<60/min) were recorded. Recovery time was defined as the time until the patient was oriented in time, place, and person and able to seriously subtract 6 from 100 which was assessed by the recovery room nurse who was unaware of the group allocation. Pain and discomfort were assessed using 0-10 visual analog scales (0 is zero pain and 10 is extreme pain or discomfort). All patients were provided written consent. The same size was estimated based on a previous pilot study that included 20 patients. It was calculated |
that at least 40 patients were needed in each group of the study to detect a 25% reduction in the dose of sedative medication with p value of 0.05 and study power of 80%.

**Results**

Patients in the two groups were comparable in age, gender, educational, and social status. The endoscope was advanced to cecum in 69 cases- 3 cases had malignant strictures that precluded a full examination. Three cases had to be abandoned midway due to extreme non-cooperation from three patients; all three patients had irritable bowel syndrome with recent change in pattern of symptoms. Three patients had a previous colonoscopy prior the study. The more popular type of music selected was film songs followed by bioacoustics, soft instrumentals, folk songs, classical music, and devotional songs. The mean pain score between the two groups were similar however the mean discomfort score was higher in the control group and found to be statistically significant. There was no difference in duration of procedure between the two groups. Recovery time was found to be longer in the patients in the control group (20 minutes) versus the music group (10 minutes).

**Conclusion**

This study showed that music can decrease the dose requirement of sedative medication for colonoscopy and reduce patient discomfort. Since it is readily available, noninvasive, and without any side effects, music may be recommended as adjunct to sedatives for patients undergoing elective colonoscopy.

**Implications**

 Colonoscopies can be uncomfortable and a painful procedure. Sedatives and analgesics administered during colonoscopies carry a risk of arterial hypotension and respiratory depression. Music therapy can act as an adjunct therapy that does not pose any risks or side effects and may actually help reduce the amount of sedation needed for the procedure. Music has a positive psychological and physiological effect, which is why it has been used to relieve stress associated with medical procedures and interventions.

**Limitations**

There was a limited selection in which the participants could choose the music of their liking. A patient may not have enjoyed listening to any of the selected styles of music and therefore their findings may have been skewed. There were three patients that had previous colonoscopies so their previous experience may have made an impact on this study.
Steffanie Vavra  
April 3, 2016  
Lit Matrix 8  
Dr. Boev

| Citation | Bae, I., Man Lim, H., Hur, M.H., Lee, M. (2014). Intra-operative music listening for anxiety, the BIS index, and vital signs of patients undergoing regional analgesia. *Complementary Therapies in Medicine, (22)*, 251-257. |
| Purpose | The purpose of this study was to assess the effect of music listening on the levels of anxiety and sedation of patients during surgery with regional anesthesia but without the use of sedatives. In addition to the subjective assessments provided by the patients, the researchers objectively assessed the effects of music on patients’ anxiety level, sedation level, and vital signs. |
| Sample | The patients were at an unnamed hospital in an unnamed city in Korea during June through August 2010. The inclusion criteria included: healthy patients who did not have sever systemic disease (were Grade 1 and Grade 2 according to the American Society of Anesthesiologists physical status classification), between the ages of 20 and 60, undergoing surgery planned with local spinal, peridural, or brachial plexus anesthesia, surgery was administered in the supine position, did not receive medication or sedatives that would affect the measurement of vital signs or the bispectral (BIS) index during the study, and able to communicate, able to understand the purpose and objectives of the study while able to sign consent. The participants were chosen by being scheduled in two operating rooms, 4 and 5. The researchers visited the patients prior to the day of their scheduled procedure. They explained the purpose of the study and then asked them to join. If the patients elected to be in the study, the researchers placed them into either the control group or experimental group based on scheduled room for procedure; patients scheduled in room 4 were allocated into the experimental group while patients in room 5 were allocated into the control group. The participants were given a $5 reward to participate in the study. The patients in the experimental group were able to choose the music of their choice. |
| Study Design | This was a nonequivalent control group pretest-posttest design quasi-experiment intended to assess the effect of music listening on patient’s anxiety level, vital signs, and BIS index during surgery with regional anesthesia. The personnel in the operating rooms did not know if the patients were in the control or experimental group. The sample size was estimated using a G-Power 3.0 with a significance level of 0.05, statistical power of 0.8 and an effect size of 0.7. The necessary sample size was found to be 34 for both groups. The final group size was 80, after the researchers factored in a 15% failure rate. 42 participants were interviewed for the experimental group with 2 refusing to participate. 41 participants were interviewed for the control group with 1 patient receiving |
intraoperative warming, ultimately resulting in exclusion from the study. Most patients were diagnosed with femur fracture, tibia fracture, right hand 5th metacarpal fracture, talus fracture, knee later meniscus tear, and degenerative arthritis. The study assessed the patient’s anxiety level using the State-Trait Anxiety Inventory and the visual analogue scale (VAS). An electrocardiograph device was connected to a monitor that measured pulse rate, and blood pressure every 5 minutes during the procedure. Patient vital signs were measured in their hospital rooms one day before the surgery as well as in the surgical waiting room and operating room. The BIS index measures the level of patient sedation with a local anesthesia using a BIS monitor and sensor. These scores range from 0 to 100. A score of 90 to 100 indicates awake, memory intact. A score between 65 and 85 indicates sedation. A score between 45 and 65 indicates general anesthesia, deep hypnosis, memory function lost. Lastly, a score less than 40 indicates suppression and cortical silence. All patients were identified upon entering into the operating room, moved to a surgery bed, and asked to maintain the supine position throughout the procedure. To measure the BIS index, the patient’s skin was cleansed with alcohol before attaching the device. Then, an electrode was placed to the forehead, bridge of the nose, parallel to the eyebrows, and temple area. Soft pressure was applied to decrease resistance in the electrodes that registered high resistance and baseline measurements were taken. BIS levels were take a total of 6 times: when the patient entered the room, immediately after the local anesthesia was administered, prior to surgery, and every 5 minutes after the start of the surgery until it ended. Patients in the experimental group listened to music during the surgery. There were a total of 10 selections participants could choose from: 1 from each of the classical, pop, religious, Korean pop, and relaxation music genres. Considering that each song was approximately 3-4 minutes long and that surgery generally lasts approximately 30-40 minutes, 10 songs were selected for each genre. Prior to surgery, researchers determined the volume level with each patient was comfortable, and the music was played at that volume. Participant were told that they could stop listening to the music at any point in the procedure.

Results

The results were analyzed using PASW statistics 18.0. Patient’s baseline characteristics were analyzed as frequencies and percentages, and homogeneity tests were conducted using the x2 and the t-test. There were no significant differences between the two groups in anxiety, state anxiety, BIS index, BP, heart rate, and oxygen saturation at baseline. The anxiety levels in the recovery room after surgery were significantly lower in the music group compared to the control group (2.3 vs 5.3). This was found to be statistically significant with a p value of p<0.001. the average systolic BP dropped throughout the procedure in the music group while increased throughout the procedure in the control group. This also occurred with the diastolic blood pressure as well. Vital signs were similar in both before and
after the procedure. The BIS index decreased during the procedure as well in the music group and remained the same in the control group.

<table>
<thead>
<tr>
<th>Conclusion</th>
<th>Music may reduce anxiety and has an immediate and sustained effect on sedation. However, the researchers cannot elucidate the possibility that a placebo effect during the intervention was responsible for the improvements produced by music therapy.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implications</td>
<td>The state anxiety level decreased in the experimental group after the treatment. This finding supports the theory that music helps decrease anxiety during stressful situations including surgery and has anti-anxiety effects in general. Music therapy also helps induce a deeper sedation without the use of medications. This was illustrated in the study by the reduction of the BIS index during the procedure in the experimental group. This would help to improve patient outcomes in patients undergoing both regional anesthesia and conscious sedation.</td>
</tr>
<tr>
<td>Limitations</td>
<td>The researchers did not use randomization methods in the allocation and blinding patients because of music listening by headphones. The researchers did not name the hospital or city in which this study took place in.</td>
</tr>
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</table>
Steffanie Vavra  
January 14, 2017  
Literature Matrix 9

| Purpose | 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. |
| Subjects | Patients undergoing elective abdominal surgery were divided into either a music group or a control group. The subjects were adult patients (21-85 years old) at Kuopio University Hospital in Finland with a total of 280 patients. Patients were randomized into either the music or control group. Their estimated hospital stay was at least 4 days. The exclusion criteria were drug abuse, psychiatric disorders, hearing impairment, dementia and chronic pain problems. |
| Study Design | Prospective clinical study with 2 parallel groups; patients assessed pain intensity and pain distress in bed rest, during deep breathing, and in shifting position once in the evening of the operation day and on the first and second postoperative days in the morning, at noon, and in the evening. On the third postoperative day, the patients assessed their pain intensity and pain distress only once. Patients in the music group listened to music 7 times between the operation day and the second postoperative day. One researcher collected all of the data. |
| Results | The mean time of anesthesia was almost the same in both groups. There were no statistical differences between the music group and the control group for duration of surgery. There was significant difference between the two groups regarding fear about postoperative pain 50/83 in music group and 37/85 in the control group. There were no significant differences between the two groups in regard to age, sex, education, occupation, marital status, diagnosis, type of surgery, ASA classification, duration of anesthesia, and surgery, duration in the PACU, duration of epidural analgesia, or doses of analgesia. There were no differences between the two groups in pain intensity and pain distress in bed rest, during deep breathing, or shifting position on the first postoperative day. On the second postoperative day, pain intensity and pain distress were significantly higher in the control group during bed rest, position changes, and during deep breathing when compared to the music group. There were no significant differences between the two groups on day 3 postoperatively. |
| Conclusion | Listening to music can alleviate pain intensity and pain distress after abdominal surgery. Music should be offered to patients as a non-pharmacological method adjuvant to pharmacological methods in pain management after surgery because of its potential benefit. Music may be useful in the distraction of attention away from pain, influencing better |
| Implications | The results of this study can be used to improve postoperative pain management after abdominal surgery. Music intervention should be offered as an adjunct alternative to pharmacological pain relief after abdominal surgery in nursing practice. Nursing professionals should be motivated by using non-pharmacological methods in postoperative pain management. |
| Limitations | One limitation to this study was the fact that music intervention took place in the patients’ room during the daily routines of normal nursing practice. This meant that the patients were occasionally disrupted during the intervention by the doctor’s rounds, nursing actions, telephone calls, or visits by relatives. These interruptions occasionally disturbed and irritated patients. Some patients felt confused when assessing pain intensity and pain distress as they found it difficult to distinguish one from the other. All of the data were collected in one hospital and the results cannot be generalized. |