**MINI-CAT**

**Scenario:**

28 year old female presents to the PACU s/p an operation (did not specify which operation purposefully). While evaluating her pain management course, a nurse proposes that music therapy has been found to be beneficial as a non-pharmacologic, adjunct therapy for patients who are recovering post-operatively in addition to pharmacologic interventions.

**Search Question**: Clearly state the question (including outcomes or criteria to be tracked)

Is music therapy beneficial as a non-pharmacological adjunct to pain management for patients in the PACU as compared to only pharmacologic intervention?

**Identify the PICO Elements:**

**P =** postoperative patients

**I =** music therapy

**C** **=** pharmacologic standard care

**O** = improved pain management

**PICO search terms:**

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| **P** | **I** | **C** | **O** |
| Patients in PACU | Music therapy | Strictly pharmacologic intervention | Improved pain management |
| Post-operative patients | Music benefits | Analgesics alone | Better patient outcomes |
| Surgical patient | Music | Lack of music therapy | Patient’s pain/discomfort |

**Search tools and strategy used:**

**Databases**: Science Direct, PubMed, Google Scholar

Terms used: music benefits on postoperative pain, music therapy adjunct to pain management in PACU, music therapy reduces pain in PACU patients

Articles returned:

* Science Direct: +last 10 years
  + music benefits on postoperative pain – 870 results
  + music therapy adjunct to pain management in PACU – 22 results
  + music therapy reduces pain in PACU patients – 83 results
* PubMed: +last 10 tears
  + music benefits on postoperative pain – 593 results
  + music therapy adjunct to pain management in PACU – 17 results
  + music therapy reduces pain in PACU patients – 32 results
* Google Scholar: +last 10 years
  + music benefits on postoperative pain – 9,860 results
  + music therapy adjunct to pain management in PACU – 402 results
  + music therapy reduces pain in PACU patients – 1,910 results

**How I narrowed down my chosen articles:**

I narrowed my choices to a few selected articles based on the type of study done in that article (I tried to find systematic review, meta-analysis and randomized controlled trials mainly), articles focusing specifically on music therapy as an adjunct therapy to pain management in patients post-operation. I didn’t specify a patient population or specific operation done and I even chose articles with research on 3 different types of procedures in different patient populations to show that music therapy proved to be beneficial for various types of operations and populations and is not limited to one. Rather I focused on articles which compared music therapy as a non-pharmacologic adjunct treatment to only pharmacologic treatment in pain management post-operation.

**Chosen articles:**

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| **Article 1:**  Effect of Music Therapy on Postoperative Pain Management in Gynecological Patients: A Literature Review  Wai Man Sin, MN, RN, and Ka Ming Chow, DN, RN, RM |
| Link: <https://www-sciencedirect-com.york.ezproxy.cuny.edu/science/article/pii/S1524904215001010> |
| Abstract:  Unrelieved postoperative pain may have a negative impact on the physiological and psychological well-being of patients. Pharmacological methods are currently used to relieve such pain in gynecological patients; however, inadequate pain control is still reported, and the use of nonpharmacological pain-relieving methods is increasingly being advocated, one of which is music therapy. The purpose of this literature review was to identify, summarize, and critically appraise current evidence on music therapy and postoperative pain management among gynecological patients. A systematic search of MEDLINE, CINAHL, PsycINFO, British Nursing Index, and Allied and Complementary Medicine was conducted using the search terms music, gynecological, pain, surgery, operative, and post-operative to identify relevant articles in English from 1995 to the present. All identified articles were assessed independently for inclusion into review. A total of 7 articles were included after removal of duplicates and exclusion of irrelevant studies. All the included studies assessed the effects of music therapy on postoperative pain intensity, and three of them measured pain-related physiological symptoms. The findings indicated that music therapy, in general, was effective in reducing pain intensity, fatigue, anxiety, and analgesic consumption in gynecological patients during the postoperative period. It is recommended as an adjunct to pharmacological pain-relieving methods in reducing postoperative pain. Future researches on music therapy to identify the most effective application and evaluate its effect by qualitative study are recommended. |
| Type of study:  Systemic review |
| Main Points:  Systematic review for music therapy on postoperative pain in gynecological patients. Criteria for included studies include patients older than 18 years old undergoing gynecological operations, music therapy, a comparison group who didn’t receive music therapy and only received pharmacological intervention and the outcomes which included pain intensity.  5/7 articles showed significant reduction in pain intensity when employing music therapy for postoperative pain.  Psychological effects due to pain was also evaluated and music was found to reduce levels of anxiety in patients undergoing an operation.  Music therapy was also found to minimize fatigue in patients and the use of analgesics. |
| Why I chose it:  I chose this article as it was a systematic review of articles all containing high levels of evidence. This article focused on gynecological operations whereas my other articles focused on other types of operations to show that the benefits of music therapy are not limited to one type of operation or specialty. Music was shown to not only reduce pain but the psychological effects of pain on a patient as well. |

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| **Article 2:**  Music as an aid for postoperative recovery in adults: a systematic review and meta-analysis  Hole, Jenny, MBBS ; Hirsch, Martin, MBBS ; Ball, Elizabeth, PhD ; Meads, Catherine, PhD |
| Link:  <https://cuny-yc.primo.exlibrisgroup.com/discovery/fulldisplay?docid=cdi_proquest_miscellaneous_1736415791&context=PC&vid=01CUNY_YC:CUNY_YC&lang=en&search_scope=MyInst_and_CI&adaptor=Primo%20Central&tab=Everything&query=any,contains,music%20therapy%20on%20postoperative%20pain%20a%20meta%20analysis&mode=advanced> |
| Abstract:  Background Music is a non-invasive, safe, and inexpensive intervention that can be delivered easily and successfully. We did a systematic review and meta-analysis to assess whether music improves recovery after surgical procedures.  Methods We included tandardiz controlled trials (RCTs) of adult patients undergoing surgical procedures, excluding those involving the central nervous system or head and neck, published in any language. We included RCTs in which any form of music initiated before, during, or after surgery was compared with standard care or other non-drug interventions. We searched MEDLINE, Embase, CINAHL, and Cochrane Central. We did meta-analysis with RevMan (version 5.2), with tandardized mean differences (SMD) and random-effects models, and used Stata (version 12) for meta-regression. This study is registered with PROSPERO, number CRD42013005220.  Findings We identified 4261 titles and abstracts, and included 73 RCTs in the systematic review, with size varying between 20 and 458 participants. Choice of music, timing, and duration varied. Comparators included routine care, headphones with no music, white noise, and undisturbed bed rest. Music reduced postoperative pain (SMD –0·77 [95% CI –0·99 to –0·56]), anxiety (–0·68 [–0·95 to –0·41]), and analgesia use (–0·37 [–0·54 to –0·20]), and increased patient satisfaction (1·09 [0·51 to 1·68]), but length of stay did not differ (SMD –0·11 [–0·35 to 0·12]). Subgroup analyses showed that choice of music and timing of delivery made little difference to outcomes. Meta-regression identified no causes of heterogeneity in eight variables assessed. Music was effective even when patients were under general anaesthetic.  Interpretation Music could be offered as a way to help patients reduce pain and anxiety during the postoperative period. Timing and delivery can be adapted to individual clinical settings and medical teams. |
| Type of study:  Systemic review and meta analysis |
| Main points:  Systematic review and meta analysis of randomized controlled trials studying adult patients undergoing surgical operations  4216 abstracts identified including 73 randomized controlled trials with trials varying from 20-458 participants  Music therapy was compared not only to routine care such as pharmacologic agents but also to headphones with no music, white noise and quiet bed rest.  Music was shown to reduce postoperative pain, anxiety levels, use of analgesia and increased patient satisfaction.  Length of stay was not reduced with the introduction of music, one variable which was not affected by the adjunctive therapy. |
| Why I chose this article:  This article is a systematic review and meta analysis of randomized controlled trials yielding high levels of reliable evidence. This article compared music not only to routine care but to other comparators as well and adjunct music therapy was still found to minimize the pain scores and anxiety levels the most. |

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| **Article 3:**  Effects of music therapy on pain, anxiety, and vital signs in patients after thoracic surgery, [YangLiuMarcia A.Petrini](https://www.sciencedirect.com/science/article/abs/pii/S0965229915001260#!) |
| Link: <https://www.sciencedirect.com/science/article/abs/pii/S0965229915001260> |
| Abstract:  Objective: To examine the effectiveness of music listening on pain, anxiety, and vital signs among patients after thoracic surgery in China. Design and setting: A randomized controlled clinical trial was conducted in the thoracic surgery department of two tertiary hospitals in Wuhan, China. 112 patients were recruited and randomly assigned to either experimental (n = 56) or control (n = 56) group respectively.  Intervention: The experimental group received standard care and a 30-min soft music intervention for 3 days, while the control group received only standard care. Measures include pain, anxiety, vital signs (blood pressure, heart rate and respiratory rate), patient controlled analgesia, and diclofenac sodium suppository use.  Results: The experimental group showed statistically significant decrease in pain, anxiety, systolic blood pressure and heart rate over time compared to the control group, but no significant difference were identified in diastolic blood pressure, respiratory rate, patient controlled analgesia and diclofenac sodium suppository use.  Conclusion: The findings provide further evidence to support the practice of music therapy to reduce postoperative pain and anxiety, and lower systolic blood pressure and heart rate in patients after thoracic surgery in China. |
| Type of study:  Randomized controlled trial |
| Main points:  postoperative pain is an acute kind of pain which is commonly accompanied by anxiety which can cause further adverse effects such as fatigue, loss of appetite and weight, tachycardia and depression.  Research shows that listening to music can increase comfort and relaxation, relieve pain, decrease anxiety levels and other psychological symptoms.  Randomized controlled trial – experimental group received 30 minutes of music intervention for 3 days post-operation plus pharmacologic standard care and pain management and the control group only received standard, pharmacologic treatment.  Music therapy as an adjunct therapy to standard care was found to decrease pain, anxiety and improve vital signs. |
| Why I chose this article: This article relayed research from a randomized control trial in which music was played for 3 days post-operation in addition to pharmacologic standard care. I liked that it clearly depicted the relationship between music as a non-pharmacologic therapy and pharmacologic treatment in post-operative pain. |

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| **Article 4:**  The Impact of Music on the PACU Patient’s Perception of Discomfort  Betty Easter, RN, CPAN, Laura DeBoer, RN, CAPA, Gail Settlemyre, BSN, RN, CPAN, Carolyn Starnes, MSN, RN, CNM, CPAN, Vickie Marlowe, BSN, RN, CPAN, Rebecca Creech Tart, PhD |
| Link: <https://www.sciencedirect.com/science/article/pii/S1089947210000572?casa_token=o7D0XTDUXPUAAAAA:91_e-7yM6JWZynTIyVgTXGBmEyvsRCqDR51gZiaUqvPzsbw4LnnDK3cwfKzKpAo0VNhfenU0vvyFYg> |
| Abstract:  Pain is a normal finding in the postoperative patient, and noise can accentuate one’s perception of discomfort. In this study, physiological measurements, intravenous (IV) opioid administration, length of stay, and satisfaction for postoperative patients who listened to music were com- pared with patients not provided music during their PACU stay. Of the 213 subjects enrolled, 163 experienced postoperative pain. The mean change in experimental subjects’ respiratory rate was significantly lower than the controls. Decreases in heart rate and blood pressure from admission to discharge were similar between the two groups. On average, peripheral oxygen saturation and opioid pain control were not significantly different between control and experimental subjects. Subjects provided with music reported acceptable noise levels and increased satisfaction with their PACU experience. Music intervention is therefore a viable, minimal cost, and alternative therapy that PACU nurses can use to assist patients coping with postoperative pain. |
| Type of study:  Randomized controlled trial |
| Main points:  Stable post-operative patients in the PACU who were 18+ of either gender and any ethnic background were able to participate in the study.  All subjects received standard care including opioids for pain control. Experimental group listened to music of their preference and the control group were not allowed to listen to music.  Subjects who listened to music were found to have a significantly lower respiratory rate than the subjects who did not listen to music, implying that music therapy relaxes and soothes the post-operative patient, thereby lessening their pain.  While not all vitals were effected by the music therapy, such as blood pressure and heart rate, the patients who listened to music were calmer with a lower respiratory rate and had a higher satisfaction with their overall PACU experience and so these results showed that music therapy is in fact a good tool for coping with post-operative pain. |
| Why I chose this article:  This article is a prospective randomized controlled trial. It didn’t specify a patient population so it shows how music therapy is not limited in its potential benefits. I like that its research found that music lowered the respiratory rate in patients who had it which shows its calming and soothing effects. |

**Summary of the Evidence**:

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| Author (Date) | Level of Evidence | Sample/Setting  (# of subjects/ studies, cohort definition etc. ) | Outcome(s) studied | Key Findings | Limitations and Biases |
| Wai Man Sin, MN, RN, and Ka Ming Chow, DN, RN, RM  2015 | Systematic review | Systematic search of MEDLINE, CINAHL, PsycINFO, British Nursing Index and Allied and Complementary Medicine, total of 7 articles included | Studied nonpharmacological pain-relieving methods, namely music therapy, on postoperative gynecological patients. | Findings indicate that music therapy was effective in reducing pain severity, fatigue, anxiety – psychological effects due to pain, and use of analgesics during the postoperative period. | Future research aims at identifying the most effective application of music as opposed to general music therapy. Limited evidence and not all studies included were of highly reliable evidence. |
| Hole, Jenny, MBBS ; Hirsch, Martin, MBBS ; Ball, Elizabeth, PhD ; Meads, Catherine, PhD  2015 | Systematic review and meta analysis | Identified 4261 titles and abstracts, included 73 randomized controlled trials with trial size varying from 20-458 participants. Searched MEDLINE, EMbase, CINAHI and Cochrane Central. | Included randomized controlled trials studying any form of music therapy initiation for postoperative patients compared with the routine care or other non-pharmacologic interventions. Assessed whether music improves the recovery of postoperative patients. | Music therapy as an non-pharmacologic management for postoperative patients was found to be more beneficial in reducing pain levels, anxiety, analgesia use and patient satisfaction than routine care using pharmacologic agents and other comparators including headphones with no music, white noise and quiet bed rest. | Further investigation regarding copyright issues in the clinical setting. |
| Yang Liu, Marcia A Petrini  2015 | Randomized controlled trial | Randomized controlled trial conduced in thoracic surgery department in Wuhan, China. 112 patients recruited and randomly assigned to either experimental (n = 56) or control (n = 56) group respectively. | Effectiveness of music therapy on pain severity, anxiety levels and vital signs in postoperative thoracic patients. | Experimental group (n=56) who received the music therapy postoperatively showed a statistically significant decrease in pain severity, anxiety levels, systolic blood pressure and heart rate compared to the control group. Variables which were not effected by music therapy include diastolic blood pressure, respiratory rate or patient controlled analgesia (PCA). | Choice of music was limited and chosen by the researcher as opposed to the patients which could have affected the outcomes. Another main limitation is that the experimental group did not only receive music therapy but they also received special and extra attention from the researcher compared to the control group which could contribute to the positive results in the experimental group. |
| Betty Easter, RN, CPAN, Laura DeBoer, RN, CAPA, Gail Settlemyre, BSN, RN, CPAN, Carolyn Starnes, MSN, RN, CNM, CPAN, Vickie Marlowe, BSN, RN, CPAN, Rebecca Creech Tart, PhD  2011 | Randomized controlled trial | Randomized controlled trial conducted in a community hospital with 258 beds and inpatient/outpatient PACU. Over 5 months, 4,226 patients were admitted, 233 of those patients were enrolled and randomized into either experimental or control group. | Measured how music therapy affects various factors including physiological measures, length of hospital stay, IV opioid administration, patient satisfaction and postoperative pain. | Music therapy was found to be beneficial and effective in diminishing pain scores, increasing patient satisfaction and even lowering respiratory rate which indicated a relaxed nature to the experimental group. | The study included subjects who had been scheduled for any procedure and didn’t exclude patients who were receiving nerve/spinal blocks or subjects using oral opioids for chronic pain or have a history of drug abuse. |

**Conclusions:**

1. For patients over 18 years old who were postoperative for a gynecological procedure and had music therapy as an adjunct management for postoperative pain were shown to have reduced pain scores, lower levels of anxiety, less fatigue and decreased use of analgesics.
2. Music therapy was shown to be beneficial when compared not only to standard of care which is typically only pharmacologic agents but also when compared to other non-drug measures such as headphones with no music, white noise or quiet bed rest. Again, music therapy was shown to improve pain, anxiety, use of analgesics and now, patient satisfaction.
3. In this randomized controlled trial, for 3 days postoperation the experimental group received 30 minutes of music intervention along with the pharmacologic standard care compared with the control group who received only pharmacologic care. Results showed that music therapy was shown to not only decrease pain and anxiety but even improve vital signs including systolic blood pressure.
4. Stable postoperative patients in the PACU who were 18 years or older of either gender and any ethnic background were allowed to participate in this randomized controlled trial which showed that music therapy lessened pain and helped relax and soothe the patients as seen through its effects on a decreased respiratory rate.

**Overall Conclusion:**

Music therapy, as an adjunct to pharmacologic standard of care, has been shown to not only decrease pain scores and severity in the postoperative patient which was my original research question, but it has also shown to reduce anxiety levels, lessen fatigue, increase patient satisfaction and even improve vital signs. This conclusion is not limited to a specific gender, ethnicity, age, operation or specialty rather the results are widespread and can benefit many different patients in the PACU postoperation.

**Weight of Evidence:**

1. Article #1 is a systematic review published in the last 10 years and searched articles with high levels of evidence including MEDLINE, CINAHL and Allied and Complementary Medicine and so I weigh this article second highest. Only 7 articles were included in the systematic review which was narrowed down from a total of 1,352 studies. These 7 articles were high quality according to the SIGN checklist for RCTs. These chosen studies also included double blind studies and random assignment of participants to experimental and control groups to minimize biases.
2. Article #2 is a systematic review and meta-analysis also published in the last 10 years consisting of all randomized controlled trials and so I weigh this article the highest. MEDLINE, Embase and Cochrane Central were included which all consist of articles with high levels of evidence. The meta-analysis was conducted with standardized mean differences, random-effects models and used Stata for meta-regression. 4,261 titles and abstracts were identified including 73 RCTs included in the systematic review. Sizes of the articles varied from 20-458 participants. This systematic review/meta analysis included more studies than have previous systematic reviews and this one reported all relevant clinical outcomes as opposed to only one. It is also highly comprehensive, including 6,902 patents with a large effect size. Due to their doing of a Cochrane review, no side-effects were reported in any of the studies.
3. Article #3 is a randomized controlled trial done in the past 10 years, supported by two thoracic surgery departments. While it was not conducted in the US, it was done using a high level of evidence aiming at minimizing biases as much as possible, although I still weigh this article the lowest/fourth. It is also very clear about its limitations and implications including the fact that the music was chosen by the researcher and not the patient, the experimental group received not only music but more attention than the control group by the researcher and the intervention with music was only done for 3 days. Though there are limitations, the study is still an RCT in the last 10 years and the fact that it’s transparent about what is limited makes the other findings more credible.
4. Article #4 is a randomized controlled trial done in the past 10 years and is weighed third. The research conducted in this article was actually done by a team of PACU staff nurses guided by an experienced research mentor, forming the facility’s first nurse research team, to evaluate the effect of music therapy on postoperative pain. a power analysis was done at the outset of the study to determine sample size. This RCT focused on quantitative measures as it recognized that self-reported pain scores in a patient who is coming out of anesthesia is difficult to get and even unreliable.

**Magnitude of Effects:**

1. “Results showed that participants in both intervention groups experienced significantly less postoperative pain (p < .001) when compared with the control group. Participants in the two intervention groups listened to relaxing music only or music combined with therapeutic suggestions to achieve a feeling of relaxation and reduction in discomfort reported significantly less fatigue (p < .001), but without significant difference in the incidence of postoperative nausea and vomiting when compared with the control group.” (Wai Man Sin et al, 2015)
2. “Music reduced postoperative pain (45 RCTS, SMD –0·77 [95% CI –0·99 to –0·56]), anxiety (43 RCTS, –0·68 [–0·95 to –0·41]), and analgesia use (34 RCTS, –0·37 [–0·54 to –0·20]), and increased patient satisfaction (16 RCTS, 1·09 [0·51 to 1·68]), but did not affect length of stay (seven RCTs, –0·11 [–0·35 to 0·12]; figure 3). SMDs for the pain and anxiety outcomes were back calculated into specific measurements most used in the RCTs. Pain results (measured by 100 mm VAS) suggested that music reduced pain scores by 23 mm (95% CI 16·9–29·9) on average, compared with placebo. Anxiety results (measured by STAI on a scale of 20–80) were reduced by 6·4 units (3·86–8·94; on average, compared with placebo).” (Hole et al, 2015)
3. “After the intervention, a significant difference between groups regarding pain (Wald 2 = 5.498, p = 0.019), anxiety, SBP, and HR was noted. No significant difference existed in respect to DBP, RR, DSS use, and PCA use ( 2 = 0.29, p = 0.59) ().

89.4% (n=42) of participants like the music, 68.1% (n=32) thought the music alleviated their pain, and 76.6% (n = 36) thought the music decreased their anxiety.” (Liu et al, 2015)

1. “Comparison of the mean change in discharge and admission blood pressure (BP), heart rate (HR), respiratory rate (RR), and peripheral oxygen saturation (SpO2) values of experimental and control subjects showed no mathematically significant differences (data not shown). Conversely, the mean length of PACU stay was 64 minutes for subjects who listened to music and 57 minutes for the control subjects. This seven-minute time differential was found to be significant (P 5 .04; t-test). Self-reported pain scores varied widely among subjects, and the mean change in pain scores between PACU admission and dis- charge showed no significance (data not shown) between the experimental and control groups.” (Easter et al, 2011)

**Clinical Bottom Line and significance:**

The clinical “bottom line” is that there is proven benefit to employing music therapy, a non-pharmacologic therapy, as an adjunct therapy to pharmacologic treatment in post-operative pain. Not only does it reduce pain but it may also reduce anxiety, fatigue, use of analgesics, increase patient satisfaction and improve vital signs. Therefore, I would tell my patients who are undergoing an operation to request music therapy in the PACU or I would have the nurses instructed to use music therapy for patients recovering from an operation to help manage their pain, reduce anxiety, decrease amount of opioids necessary and improve overall satisfaction. I think it’s important to take into account the preference of music, especially in patients who come from various ethnic and religious backgrounds, and so I would aim for the music of choice to be played for these patients which would likely improve pain more than if the patient was unable to choose what they’re listening to. These results are clinically significant in that whenever we’re able to minimize the use of analgesics, especially opioids when postoperation, it is ideal to for various reasons including avoiding addiction to the medication and possible adverse side effects that all pharmacologic agents pose risks for, especially controlled substances. We would like to employ the use of non-pharmacologic agents when appropriate and proven successful and based on these results, the use of music therapy is beneficial for the reduction of pain, anxiety, fatigue, use of analgesics and increased patient satisfaction.