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Music has potential as an adjunctive occupational therapy intervention for adults in hospitals to relieve pain, anxiety, and potentially reduce the use of analgesics

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Music has potential as an adjunctive occupational therapy intervention for adults in hospitals to relieve pain, anxiety, and potentially reduce the use of analgesics

Disciplines

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Music has potential as an adjunctive occupational therapy intervention for adults in hospitals to relieve pain, anxiety, and potentially reduce the use of analgesics.

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CLINICAL SCENARIO:

There is emerging evidence that the use of self-chosen music as an intervention may be useful for a wide range of patients experiencing invasive or surgical procedures. Among the outcomes expected are the decrease in perceived pain, anxiety, and analgesics use which may speed the client's recovery and increase overall satisfaction.

It is documented that all phases of invasive medical procedures have the potential to increase pain and anxiety levels in patients (Ebnesahidi & Moheeni, 2008). This overall increase requires the use of analgesics and invasive sedative interventions that can quite often delay the recovery process (Ebnesahidi & Moheeni, 2008). Can the use of less invasive sensory stimulation through self-chosen or relaxation focused music help reduce the perceived pain and overall analgesic use for people undergoing invasive medical procedures?

FOCUSSED CLINICAL QUESTION:

Will the addition of Self-chosen/or relaxation music (between 60 – 80 beats per minute) as an intervention for people experiencing invasive/ uncomfortable medical

procedure reduce the patients perceived pain and anxiety levels as well as lead to a decrease in analgesic use which can help speed recovery.

SUMMARY of Search, 'Best' Evidence' appraised, and Key Findings:

- 40 citations were located that met the inclusion/exclusion criteria.
- 4 Quantitative studies and one systematic review were analyzed with critical appraisal forms.
- 3 systematic reviews were located and their abstracts reviewed to determine quality of intervention. Only one systematic review was analyzed due to its specific focus on the use of music for people in the hospital.
- 1 Random control trial RCT by Ebnesahidi & Moheeni (2008) judged to be the highest level of evidence was more thoroughly appraised.
- This RCT concluded that "Postoperative use of patient-selected music in cesarean section surgery would alleviate the pain and reduce the need for other analgesics, thus improving the recovery and early contact of mothers with their children." (Ebnesahidi & Moheeni, 2008)

The original focus of the review was to discern the efficacy of the inclusion of music as an intervention in the hospital setting with hopes of proving it could reduce pain and stress. After reviewing the literature many conflicting studies were found which may have been due to the extremely broad interpretation of type of music used and outcomes measured. Many studies were easy to exclude due to poor design and lack of clear eligibility and exclusion criteria.

Upon finding the five articles used within the critically appraised topic though the populations differed the studies were strong and all covered the use of music as opposed to TAU.

CLINICAL BOTTOM LINE:

There is evidence to support the use of music as an intervention is emerging from the need for less invasive sensory interventions that can reduce the perceived pain, anxiety, and analgesic use for people undergoing invasive medical procedures. No adverse affects related to the intervention of music were found in the articles reviewed. This combined with ease of administration and its low-cost demonstrate the benefit of incorporating the intervention into typical hospital procedure.

Limitation of this CAT: This critically appraised paper (or topic) has /has not been peer-reviewed by one other independent person/a lecturer. The time limit imposed by the semester restricted the amount of evidence that was able to be reviewed. The student building this review has limited clinical experience and this also should be taken into consideration. The studies chosen represent many different populations which may at first make it hard to generalize the findings.

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SEARCH STRATEGY:

Terms used to guide Search Strategy:

- Patient/Client Group: Surgical patients, hospital patients, people dealing with increased pain due to medical condition
- Intervention (or Assessment): The use of music as a therapeutic intervention
- Comparison: The comparison within this analysis is to treatment as usual TAU.

- **Outcome(s):** The outcomes found ranged from reduced perceived pain, anxiety, reductions in respiratory rate, heart rate, differing use of analgesics, as well as faster recovery and patient satisfaction.

Databases and sites searched	Search Terms	Limits used
Cinhal Ebscohost data bases through pacific universities online research engines.	The key words used were, music, pain, anxiety, intervention, surgery, hospital, occupational therapy. The terms are listed in order of importance. The results were limited to peer-reviewed articles and studies that included music and sought to reduce pain, anxiety, and analgesic use.	The results were limited to peer-reviewed articles and studies that included music and sought to reduce pain, anxiety, and analgesic use.

INCLUSION and EXCLUSION CRITERIA

- **Inclusion:**
 Studies that were peer reviewed
 Published in English
 Related to music as an intervention
- **Exclusion:**
 Articles lacking adequate description or explanations of study design, sample size and make-up, as well as outcomes

RESULTS OF SEARCH

Five relevant studies were located and categorised as shown in Table 1 (based on Levels of Evidence, Centre for Evidence Based Medicine, 1998)

Table 1: Summary of Study Designs of Articles retrieved

Study Design/ Methodology of Articles Retrieved	Level	Number Located	Author (Year)
Systematic review of RCT exploring the use of music for hospital patients	1a	1	Evans (2002) Retrieved September 5, 2009, from CINAHL database
	2a		
Random controlled trials	1b	2	McCaffrey, Freeman (2003) Nilsson (2009)
	2b	1	Ebneshahid, & Mohseni, (2008)
Repeated measure design	3b	1	Chan (2007)
	4		

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BEST EVIDENCE: The following study/paper was identified as the 'best' evidence and selected for critical appraisal.

Ebneshahidi, A., & Mohseni, M. (2008). The effect of patient-selected music on early postoperative pain, anxiety, and hemodynamic profile in Caesarean section surgery. *Journal of Alternative & Complementary Medicine, 14*(7), 827-831.

Reasons for selecting this study were:

- Best correlation between self- report and physiological markers in relation to the musical intervention

- This study highlights the significance of allowing the patients to select their own music
- The addition of tracking analgesic use, which can slow recovery, helps reinforce the clinical importance of finding less invasive musical intervention

SUMMARY OF BEST EVIDENCE

Table 2: Description and appraisal of: The effect of patient-selected music on early postoperative pain, anxiety, and hemodynamic profile in Caesarean section surgery by Ebnesahidi, A., & Mohseni, M. (2008)

Aim/Objective of the Study/Systematic Review: The main objective of this controlled trial was to evaluate the efficacy of the use of self-selected music on perceived pain, anxiety, analgesic needs, as well as hemodynamic outcomes for women in the early postoperative phase of caesarean section surgery.

Study Design: (Eg, systematic review, cohort, randomised controlled trial, qualitative study, grounded theory. Includes information about study characteristics such as blinding and allocation concealment. When were outcomes measured, if relevant)

This study was designed by two doctors who used statistical methods relating to perceived pain scale readings to determine the optimal sample size to prove statistical significance and they included four additional participants to each group in order to control for any possible drop outs or complicating factors. This helped them come up with a total of eighty participants; forty would receive self-chosen music fifteen minutes after being brought in to the postoperative recovery room. The control group was also encouraged to bring in their favorite music and received only silence in their head phones during the same time frame. The inability to blind selection of study participants caused the study designers to keep the clinicians blinded to the groups chosen during the trial. This included the nurses collecting the hemodynamic data as well as the anesthesiologists.

The night before the cesarean each woman was contacted and asked to bring in their favorite music. At this time they were cautioned that they may or may not be able to listen to their choice the next day. Upon arrival the participants were asked to fill out two

VAS, one for pain and, one for anxiety to record a baseline reading. All participants were given education on the routine time of surgery, anesthesia, and all aspects of recovery including physical and psychological aspects. The women were then randomly assigned to either the music or no music group.

There is a detailed description of the drugs used to anesthetize each participant during the surgery and reference is made again to the anesthesiologist being blind to the group selection.

The clinicians also recorded the amount of patient controlled analgesia (PCA) was administered for each participant for the first hour postoperatively. After the thirty minutes of music was administered the attending nurse who again was unaware of study groups took HR and BP two times in a five minute interval and averaged the two in order to discern data for analysis.

Setting: This study was undertaken in a hospital in Iran. Little description is given of the hospital or the environmental in which the study was undertaken.

Participants: (N, diagnosis, eligibility criteria, how recruited, type of sample (eg purposive, random), key demographics such as mean age, gender, duration of illness/disease, and if groups in an RCT were comparable at baseline on key demographic variables; number of dropouts if relevant, number available for follow-up)

N=80

TABLE 1. COMPARISON OF BASELINE CHARACTERISTICS IN TWO GROUPS

<i>Music group</i>	<i>Control group</i>
<i>Variable</i>	<i>(n _ 38) (n _ 39)</i>
Age (yr)	25.6+/- 4.3 24.8 +/-4.4
Weight (kg)	66.7 +/-8.7 67.1 +/- 9.4
Height (cm)	161.4 +/-9.3 162.6 +/-10.5
Anesthesia (min)	41.2 +/- 3.2 41.9 +/- 3.6
Surgery (min)	32.1 +/- 2.7 32.7 +/-2.9

The study chosen had eighty participants all women between the ages of 18-36 who had planned a non-emergency caesarean surgery. The women in the study had no hearing deficits, chronic pain problems, alcohol or drug abuse, psychiatric or memory problems, known allergies to the planned peri-operative medications, previous complications with anaesthesia or surgery, hypertension, and had Persian as their first language. The groups were found to lack any differences as to demographics, use of anaesthesia, or types of surgeries that were of statistical significance.

Intervention Investigated (provide details of methods, who provided treatment, when and where, how many hours of treatment provided)

The study investigated the use of music by playing the self-chosen selection for a half hour fifteen minutes after the participant completed their caesarean and were transferred into a recovery suite. Two patients were excluded due to technical difficulties and one woman was excluded because of her extreme anxiety.

Control: The treatment as usual in this study was identified as silence.

Experimental: The type of intervention investigated was self-chosen music lasting for thirty minutes.

Outcome Measures (Primary and Secondary) Give details of each measure, maximum score for each measure and range, administered by whom, where

On the day of surgery each woman was asked to rate their pain and anxiety on a VAS. This self report was repeated immediately after the thirty minute musical intervention. Within the first hour after surgery the amount of post-operative morphine administered was recorded. The hemodynamic measures were collected thirty minutes after intervention. Two measures were taken with five minutes between measures then the average was used for analysis.

Other than the monitoring of analgesic use, the physiological outcome measures were similar among most studies seeking to assess the effectiveness of reducing pain and anxiety. One study which used music as an intervention after open heart surgery (Nilsson, 2009) measured the levels of oxytocins in the body in order to monitor the

causal effect of music. As a result of this study they were able to infer the effect of relaxing music on the first day post-operatively in decreasing pain and anxiety which is directly correlated with higher oxytocins levels. The congruence among outcome measures between studies seeking to reduce stress and anxiety point to their overall accepted reliability.

Main Findings: (inset table of mean scores/ mean differences/ treatment effect, 95% confidence intervals and p-values etc where provided – if you need to calculate these data yourself put calculations here and add interpretation later, under ‘critical appraisal’ on next page).

TABLE 2. POSTOPERATIVE PAIN, ANXIETY, MORPHINE REQUIREMENT AND HEMODYNAMIC PARAMETERS

<i>Variable</i>	<i>Music group</i> (n _ 38)	<i>Control group</i> (n _ 39)
Pain score	27 +/-21	46 +/- 23*
Anxiety score	11 +/- 14	13 +/-12
Morphine (mg)	1.6 +/- 1.7	2.5 +/-1.9*
SBP (mm Hg)	116 +/- 17	119 +/-16
DBP (mm Hg)	69 +/- 12	71 +/-13
HR	87 +/- 14	83 +/-15

Systolic blood pressure (SBP), diastolic blood pressure (DBP),
Heart rate (HR).

**p* _ 0.05.

The mean and standard deviation results were given between the two groups for pain score, anxiety score, morphine use, systolic blood pressure, diastolic blood pressure, and heart rate. The results between the music and non-music group showed a *p*<.05 for greater reduction of perceived pain and the use of analgesics. The study also provides a very clear comparison between the groups to show that little varied in relation to their demographics, length of surgery, and time taken from the time the patient was inducted in the recovery room to when they opened their eyes.

Original Authors' Conclusions (*paraphrase as required. If providing a direct quote, add page number*)

The designers of this study found that though they reported positive effect in reducing perceived pain and analgesic use. They report the possible benefit of inclusion of self chosen music in peri-anesthetic care. They also stated that more study needs to be done in relation to discerning the significance of self-chosen music as compared to live or pre-chosen musical choices, as well as to further assess the optimal amount of time that music could be used and if this would increase the effect.

After the statistical analysis the pain score and post-operative cumulative opioid use were significantly lower in the music group. Data for anxiety, HR, and BP showed no statistical difference between groups.

Critical Appraisal:

Validity (*Methodology, rigour, selection, bias, provide PEDro score/ PEDro partitioned score and sub-test items 1-10 for RCTs; other study designs, follow headings used in critical appraisal checklist forms. Comment in missing information in original paper*)

This study did not include a PEDro/score and was only able to blind the health professionals collecting data though they did randomly assign the women to either the experimental or control group. The length of music administration is short though effective which suggests further study should be undertaken to inspect the use of more extended administration. The fact that the music was introduced only fifteen minutes after arriving in the recovery room might also have affected the patient's ability to realistically judge their own pain and anxiety.

For each item justify scoring for either yes or no and at least mention page and paragraph numbers

Modified single rater PEDro chart

1.eligibility criteria were specified

YES: There eligibility criteria were clearly defined on p. 827 under the heading of methods in the fourth paragraph on the first page.

<p>2. subjects were randomly allocated to interventions (in a crossover study, subjects were randomly allocated an order in which treatments were received)</p>	<p>YES: The paper is not clear about the process but all participants were contacted the day before surgery and asked to bring their favourite calming music and were informed they may or may not hear the music the next day after surgery. The study is strong and relates that the participants were blinded but key lapses in reporting specific protocols are present and can lead to confusion about rigor in design.</p>
<p>3. allocation was concealed</p>	<p>YES: The participants were all asked to bring in their own music and were informed they may or may not hear their music after their surgery the following day. This was outlined by the authors of the study on p. 828 in the second paragraph.</p>
<p>4. the intervention groups were similar at baseline regarding the most important prognostic indicators</p>	<p>YES: The study showed no statistically significant differences at baseline for the two groups as shown on p. 828 in table I.</p>
<p>5. there was blinding of all subjects</p>	<p>NO: With this type of intervention and including the specific design of the study; the control group received silence in their headphones at the predetermined time so they would know they were not in the experimental group. Future studies could use white noise or perhaps try and discern the difference between relaxation music and self-chosen music in effectiveness.</p>
<p>6. there was blinding of all therapists who administered the therapy</p>	<p>YES: the anaesthetists and nurses taking VAS ratings during the study were blinded to the intervention and control group. This</p>

	is discussed in the paper on P. 828 in paragraphs 3 and 5 respectively.
7. here was blinding of all assessors who measured at least one key outcome	YES: Observer bias was avoided by blinding the anaesthetists and nurses collecting the data to be analysed as stated on page 829
8. measures of at least one key outcome were obtained from more than 85% of the subjects initially allocated to groups	YES: Only three out of the 80 participants were excluded from the study two due to technical difficulties with cassette players and one due to abnormally high anxiety as reported on p. 828 under the results heading.
9. all subjects for whom outcome measures were available received the treatment or control condition as allocated or, where this was not the case, data for at least one key outcome was analyzed by "intention to treat"	Yes: The three people with difficulties engaging with the study were excluded from final analysis.
10. the results of between- intervention group statistical comparisons are reported for at least one key outcome	YES: All outcomes are presented in an easy to read table.
11. the study provides both point measures and measures of variability for at least one key outcome	YES: The study used the VAS and on p. 828 below the heading measures the validity of the tool was ascertained previous to its use.

Interpretation of Results (*Favourable or unfavourable, specific outcomes of interest, size of treatment effect, statistical and clinical significance; minimal clinically important difference – some of which you may have calculated yourself. Email original authors for information needed such as additional data needed to calculate confidence intervals.*)

The designers of this study found that though they reported positive effect more study needs to be done in relation to discerning the significance of self-chosen music as compared to live or pre-chosen musical choices, as well as to further assess the optimal amount of time that music could be used and if this would increase the effect. The reduction of self rated pain and analgesic use was shown to be statistically significant though there was no difference in heart rate or anxiety. The research designers used a sample of 80 women which was predetermined to have a power of 80% at a level of 0.05.

Summary/Conclusion:

This study helps reinforce the need for more research of the efficacy of self-chosen music to help reducing perceived pain after surgical procedures as well as possibly reduce analgesic use. The studies chosen for final analysis dealt with many different populations though all participants were dealing with painful or invasive conditions or procedures. The use of less invasive pain relief interventions may help reduce the need for analgesics which can greatly facilitate the healing process leading to faster recovery times. The evidence presented here though not able to be held to the highest level of rigor due to the issues of blinding the participants and all staff to the intervention.

	Study 1 (Chan, 2007) n(101)	Study 2 (Evans, 2002)	Study 3 (McCaffrey, Freeman, 2003)n(66)	Study4 (Nilsson, 2009) n(40)
Intervention investigated	This study collected specific demographic data from patients receiving care in the ICU to determine differences of effect of the short duration musical intervention between different populations	This systematic review sought to collect and report the most valid studies up to 2002 relating to the use of music in the hospital setting and also as it related to adults undergoing invasive or uncomfortable procedures. In order for a study to be included it must have been carried out on adults in a hospital	The study focused on two main questions as quoted from p.519 <ol style="list-style-type: none"> 1. Do community dwelling elders with chronic osteoarthritis pain who listen to music for 14 days have less post test pain as measured on the 1, 7, and 14th day as opposed to those not 	This study sought to compare the use of music along with the normally prescribed bed rest after heart surgery such as coronary artery bypass grafting CABG or Aortic valve replacements AVR.

		setting, Music was the intervention used.	receiving music. 2. Do community dwelling elders with chronic osteoarthritis pain who listen to music have less pain across time period of 14 days than those that do not listen to music?	
Comparison intervention	All participants within this study received music as an intervention.	The studies analysed used no music or TAU as the comparison/control group.	The music group was compared to a group receiving no music.	The comparison group received TAU with bed rest and no music.
Outcomes used	Physiological markers: blood pressure, heart rate, respiration rate were collected at three different intervals. The final results were analysed to discern a low effect and high effect group as it related to response to musical intervention in the ICU.	Outcomes included: anxiety, vital signs (HR, BP, and RR), pain, sedation level, tolerance, satisfaction, mood, and length of stay LOS.	As stated on p. 520 the pain descriptor scale from the Short Form McGill Pain Questionnaire (Melzac 1975) was used along with a visual analogue scale to rate the participants pain after they had completed their morning toileting routine and had received thirty minutes of relaxation music.	Oxytocin levels, mean arterial pressure MAP, heart rate HR, arterial oxygen tension, arterial oxygen saturation and relaxation as outlined on p. 2155 were the outcomes measured.
Findings	The low effect group tended to be younger and better educated and may have been less affected by the musical intervention due to the limited selection of music offered. The high effect group tended to be older and less educated and experienced a statistically significant reduction in all	As paraphrased and quoted from p. 16 of Evans, 2002 the implications for clinical practice are as follows: <ul style="list-style-type: none"> • Music can reduce anxiety in regular hospital patients RHP with no reduction 	This study found that music can reduce pain in community dwelling elders who have chronic osteoarthritis pain. The study also showed that over the 14 day time line the pain continued to reduce.	This study found that in lieu of pre-test discrepancies music along with bed rest improved oxytocin levels (signifying higher relaxation) as opposed to bed rest only which lowered oxytocin levels. The study designers state the pre-test differences could be

<p>physiological markers.</p>	<p>shown amongst people undergoing invasive procedures IP.</p> <ul style="list-style-type: none"> • Music has no impact on HR specifically systolic blood pressure during IP • In RHP a minor decrease in RR was seen but no change was registered in pts undergoing IP. • Music improves the mood of RHP, though its effect on mood during IP has not been evaluated • Music has no impact on post-operative LOS <p>Limited evidence is found relating to :</p> <ul style="list-style-type: none"> • Possibility to reduce sedation during procedures • Possibility to reduce the need for analgesia during procedures • Does not seem to effect the pts perception of pain • May improve pts tolerance during 		<p>caused by different types of surgeries and length of procedure even though groups were allocated randomly.</p>
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		uncomfortable procedures	
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IMPLICATIONS FOR PRACTICE, EDUCATION and FUTURE RESEARCH

- **Reducing the pain response with simple environmental changes such as adding self- chosen music could help improve engagement and outcomes during painful rehabilitation sessions**
- **There is a relatively low cost of adding music as an intervention with the intention of easing pain and anxiety**
- **The studies reviewed show no harm that is caused by the addition of self- chosen music to intervention plans**
- **There is need to study more prolonged use of self-chosen music to discover the impact of benefits**
- **Greater research needs to be placed on the quality and design of hospital and clinic environments**
- **A study by McCaffrey and Freeman in 2003 examined the use of music for community living elders in order to reduce chronic perceived pain as a result of osteoarthritis showed a marked decrease in pain as rated on a VAS over a fourteen day period.**
- **The study by Nilsson in 2009 used music as an intervention for adults undergoing cardiac surgery one day post operatively. Though the music was used for a short thirty minute period there was a marked increase in self-rated relaxation and increased oxytocin (a hormone that correlates with the relaxation response)**
- **More study needs to be done in order to determine the effectiveness of music in reducing length of stay and improving overall patient satisfaction as was inferred from the systematic review by Evan, 2002.**
- **The systematic review by Evans in 2002 helped show the difference of effect for music within adult groups either receiving routine care where music seemed more effective in reducing stress and improving mood.**

- This same review by Evans in 2002 also hints at the possibility of using music to increase tolerance to uncomfortable therapy sessions or procedures.
- A study undertaken in Japan by Chan, 2007 helps illuminate demographic differences in preference and effectiveness of music as an intervention and hints at the need for self-chosen music to reach the greatest range of people possible.
- In the study by McCaffrey and Freeman in 2002 music was used for fourteen consecutive days thirty minutes a day and showed good reductions in pain over the entire time.

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