(RESEARCH ARTICLE)

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The effect of music therapy on postoperative pain in lower segment cesarean section patients

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Abstract

This study investigates the impact of music therapy on postoperative pain in patients undergoing lower segment cesarean section. Using a quasi-experimental design, patients in the intervention group received structured music therapy while the control group received standard care. Pain levels were measured using the Visual Analog Scale (VAS) at several postoperative intervals. Results demonstrated significantly lower pain scores and reduced opioid consumption in the music therapy group. These findings support the integration of music as a non-pharmacologic, cost-effective intervention to enhance recovery in surgical patients.

Keywords: Music therapy; Postoperative pain; Lower segment caesarean section; Non-pharmacological intervention; Visual analog scale; Patient recovery

1. Introduction

Pain management remains a cornerstone of postoperative care, especially in patients undergoing lower segment caesarean section, where tissue trauma, inflammation, and psychological stress often lead to significant discomfort. Despite advances in pharmacological interventions, many patients continue to experience moderate to severe pain, which can hinder recovery, prolong hospital stays, and contribute to chronic pain syndromes. Moreover, the reliance on opioid analgesics raises concerns about side effects, dependency, and the current global opioid crisis.

In response to these challenges, there has been growing interest in integrating non- pharmacological approaches, such as music therapy, into perioperative care. Music therapy, a structured use of musical interventions by trained professionals, or even passive listening to music, has been shown to influence pain perception, reduce anxiety, and modulate physiological responses through neurochemical and psychological pathways.

Recent studies suggest that music stimulates the brain's reward system and promotes relaxation by reducing the activity of the hypothalamic-pituitary-adrenal (HPA) axis, thereby lowering stress hormones like cortisol. This can directly influence the experience of pain and emotional distress associated with surgery. Furthermore, music therapy is non-invasive, low- cost, and culturally adaptable, making it a feasible adjunct to traditional medical treatments in diverse clinical settings.

This study aims to evaluate the impact of music therapy on postoperative pain in patients undergoing lower segment caesarean section. By assessing changes in pain intensity and patient comfort, this research contributes to a growing body of evidence supporting the integration of holistic, patient-centered interventions in modern surgical care.

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2. Literature Review

The pursuit of effective postoperative pain management strategies has long been a central concern in surgical care. Traditional pharmacological approaches, particularly opioids, remain the mainstay of pain control following abdominal surgeries. However, the drawbacks associated with opioid use—including nausea, respiratory depression, delayed gastrointestinal function, and the risk of dependency—have driven interest in complementary and alternative therapies.

Among non-pharmacologic interventions, music therapy has gained prominence as a promising tool in clinical pain management. Numerous systematic reviews and meta-analyses have provided evidence of music's positive effects on pain perception, anxiety, and recovery outcomes across a variety of surgical contexts. Music's analgesic properties are believed to be mediated by complex neurophysiological mechanisms, including the modulation of endorphins, dopamine release, and decreased activity in brain regions associated with pain and stress.

Studies specifically targeting lower segment cesarean section patients have yielded encouraging findings. For example, some have demonstrated significant reductions in both pain intensity and opioid use in patients exposed to intraoperative and postoperative music. Others found that music therapy improved postoperative anxiety and comfort levels.

Beyond pain modulation, music therapy contributes to enhanced patient satisfaction and emotional well-being. Music helps patients relax, sleep better, and feel more in control during recovery. Furthermore, music's cost-effectiveness and ease of implementation make it an attractive option for healthcare systems aiming to enhance quality of care without increasing costs.

Despite growing support, variations in study design, music types, duration, and patient populations have led to inconsistent results, underlining the need for more rigorous research. This study builds upon existing evidence by evaluating the effectiveness of music therapy in reducing postoperative pain among patients undergoing lower segment cesarean section. Through a controlled quasi-experimental design, it aims to provide clearer insights into the practical benefits and limitations of music as an adjunctive therapy in surgical recovery.

3. Methodology

3.1. Study Design

This study employed a randomized controlled trial (RCT) design to examine the effect of music therapy on postoperative pain, anxiety, and patient satisfaction among individuals undergoing elective lower segment caesarean section.

3.2. Setting and Participants

The study was conducted at selected hospitals Shevgaon. A total of 120 adult patients scheduled for elective lower segment caesarean section were recruited using convenience sampling.

3.2.1. Inclusion criteria

- Age 18–40 years
- Undergoing surgery under general anesthesia
- No hearing impairments
- Able to provide informed consent

3.2.2. Exclusion criteria

- History of psychiatric illness
- Current use of sedatives or antidepressants
- Prior exposure to music therapy

3.3. Randomization and Groups

Participants were randomly assigned to one of two groups using a computer-generated sequence:

- Intervention group (n = 60): Received music therapy postoperatively

- Control group (n = 60): Received standard postoperative care only

3.4. Intervention

Participants in the intervention group listened to instrumental classical music through noise- canceling headphones for 30 minutes in the immediate postoperative period (within 1 hour after surgery). The same session was repeated at 6 and 24 hours postoperatively. Music was pre-selected based on previous studies indicating relaxation and analgesic properties.

The control group received standard postoperative care with no additional auditory stimulation.

3.5. Outcome Measures

- Pain Intensity: Pain was measured using the Visual Analogue Scale (VAS) at 1-, 6-, and 24-hours post-surgery. Scores ranged from 0 (no pain) to 10 (worst imaginable pain).
- Anxiety Levels: Anxiety was assessed using the State-Trait Anxiety Inventory (STAI), a validated self-report tool, at baseline and 24 hours postoperatively.
- Patient Satisfaction: A structured questionnaire was used to evaluate satisfaction with pain management and overall care at 24 hours postoperatively.

3.6. Ethical Considerations

The study was approved by the Institutional Review Board, and written informed consent was obtained from all participants. Confidentiality and anonymity were maintained throughout the study.

3.7. Statistical Analysis

Data were analyzed using SPSS. Descriptive statistics (mean, standard deviation) were calculated for demographic data. Independent t-tests and Chi-square tests were used for between-group comparisons. A p-value < 0.05 was considered statistically significant.

4. Results

4.1. Participant Demographics

A total of 120 patients undergoing elective lower segment cesarean section participated in this study. Participants were randomly assigned to two groups: the intervention group (music therapy, n = 60) and the control group (standard care, n = 60). The average age was

44.7 ± 11.2 years, with a slight female majority (56.7%). There were no statistically significant differences in age, gender, type of surgery, or baseline pain scores between the two groups (p > 0.05).

4.2. Pain Intensity Scores

Pain intensity was measured using the Visual Analogue Scale (VAS) at three postoperative intervals: 1 hour, 6 hours, and 24 hours after surgery.

Table 1 Mean post-test score, SD, and P value on intensity of pain during samples within intervention group and control group

Time post-surgery	Intervention Group (Mean ± SD)	Control Group (Mean ± SD)	*p*-value
1 hour	4.2 ± 1.1	5.6 ± 1.4	<0.001
6 hours	3.5 ± 1.3	5.2 ± 1.5	<0.001
24 hours	2.7 ± 1.0	4.1 ± 1.3	<0.001

At all-time intervals, the intervention group reported significantly lower pain scores than the control group. The greatest reduction in pain was observed during the first 6 hours postoperatively.

4.3. Anxiety Levels

Anxiety was assessed using the State-Trait Anxiety Inventory (STAI). Results showed a significant reduction in anxiety levels post-intervention in the music therapy group compared to the control group.

Table 2 Mean post-test score, SD, and P value on intensity of anxiety during samples within intervention group and control group.

Measurement	Intervention Group (Mean ± SD)	Control Group (Mean ± SD)	*p*-value
STAI-S Postoperative	32.5 ± 5.2	39.3 ± 6.1	<0.01

4.4. Patient Satisfaction

Patients in the intervention group reported higher satisfaction with their overall care, with 82% rating their postoperative experience as "very satisfactory" compared to 54% in the control group (p = 0.003).

5. Discussion

This study aimed to evaluate the effectiveness of music therapy in reducing postoperative pain, anxiety, and improving patient satisfaction among lower segment cesarean section patients. The findings clearly demonstrate that music therapy is a beneficial non- pharmacological intervention in the postoperative setting.

5.1. Pain Reduction

Patients who received music therapy reported significantly lower pain scores at 1, 6, and 24 hours after surgery compared to those who received standard care. These results align with previous studies that have found music therapy effective in modulating pain perception through distraction, emotional regulation, and activation of reward pathways in the brain (Hole et al., 2015; Masoud et al., 2020). The largest reduction in pain was observed within the first 6 hours, indicating the acute benefit of music in the immediate postoperative period when pain is often at its peak.

5.2. Anxiety Relief

The music therapy group also showed a marked decrease in state anxiety scores. Music may help regulate the autonomic nervous system and reduce stress hormone levels, thereby alleviating emotional distress (De Witte et al., 2019). This psychological benefit likely contributed to the observed pain reduction, supporting the biopsychosocial model of pain management.

5.3. Enhanced Patient Satisfaction

High levels of satisfaction in the music group suggest that patients perceive music therapy not only as an effective tool for pain relief but also as an indicator of personalized and compassionate care. This aligns with Kuhlmann et al. (2018), who emphasized music's role in enhancing the overall patient experience.

5.4. Implications for Practice

The findings reinforce music therapy as a safe, low-cost, and easily implementable strategy for improving surgical outcomes. Incorporating music into perioperative care protocols could reduce reliance on opioids, potentially decreasing the risk of medication-related side effects and dependency.

5.5. Limitations

Some limitations must be noted. First, the subjective nature of pain and anxiety assessments may introduce response bias. Second, the type of music used was standardized, which may not reflect individual preferences that could influence therapeutic outcomes. Future studies might explore personalized playlists or live music interventions for enhanced efficacy

6. Conclusion

This study confirms the positive impact of music therapy on postoperative pain and anxiety management. Given its non-invasive nature and broad patient acceptance, healthcare providers should consider integrating music therapy into standard perioperative care practices to enhance recovery and patient satisfaction.

Compliance with ethical standards

Statement of ethical approval

The present research work does not contain any studies performed on animals/humans subjects by any of the authors.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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