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Original Research Article

Music as an adjunct for postoperative pain relief after cesarean section: A prospective quasi experimental study

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Abstract

Background: The alleviation of pain post-surgical birth is very crucial. Pain and anxiety may diminish a mother's ability to ambulate early, take better care of her newborn and may hamper the mother child bonding. The use of heterogenous non-pharmacological adjuncts to the standard post-surgery analgesics, especially in caesarean section, may improve the recovery of patients. Music is one such non-invasive method.
Objective: To assess the effectiveness of music as an adjunct for postoperative pain relief following caesarean section and its effect on maternal satisfaction.
Materials and Methods: This prospective quasi experimental study was conducted on 94 antenatal patients scheduled to undergo caesarean section under spinal anaesthesia. They were assigned on every alternate week to either Music Group (1) or Silence Group (2). Group-1 consisted of patients receiving standard care along with music while Group 2 included patients receiving only standard care. The visual analog scale and Maternal satisfaction questionnaire was used to record maternal pain perception, anxiety and any additional analgesia requirement.
Results: Among both the groups the pain score according to the VAS Scale shows that 61% of patients had moderate pain and 48% in Group 1 had VAS <4/10 which was significant($P<0.05$). The music was delivered by Bluetooth speakers and 93.6% were satisfied with it. Many patients (55%) found it to be effective in reducing the postoperative pain. Around, 85% of patients opted for music in their postoperative management if undergoing any other operative procedure in future.
Conclusion: Music as an adjunct to postoperative analgesia can be used to alleviate the patient from their pain, stress and anxiety following caesarean section and take better care of their newborn. The patients were satisfied at different levels with the music provided with minimum use of analgesics postoperatively. We believe research in this field at various levels in obstetrics and gynaecology should be encouraged.

Keywords: Caesarean, Music, Postpartum.

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1. Introduction

Inadequate analgesia significantly increases postoperative stress and anxiety among patients. Effective analgesia is required postoperatively for any obstetric or gynaecological procedures. As a therapeutic use, music has been used for treatment of various diseases including preoperative, intraoperative and postoperatively in surgical procedures as a supplement to pharmacologic analgesia.[1]

Music therapy has been used as a non-pharmacologic therapy in reducing pain during postoperative period in many studies due to its advantages such economically efficient, highly feasible and associated with minimal risk of adverse effects, but there is very limited evidence regarding its effectiveness. The therapeutic benefits of music has been known since 4000B. C reflecting its deep seated link to health and wellbeing. Yet it remains as the most underutilized resource on our planet.[2] Postoperatively patients very commonly experience anxiety and stress for which opioids and anxiolytics are used. This may prolong the recovery of the patients due to their sedative and emetic properties.[3] The use of music therapy in immediate post-operative period

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along with other modalities may be very beneficial for these patients.

Other than pharmacological, several other medicinal therapy have been tried to reduce postoperative pain, one of which includes music therapy. Music should be offered as an integral part of pain management especially in surgical patients and it has a potential to become an adjunct standard of care in postoperative pain.[4]

There are very few studies that analyze the effect of music on pain and anxiety in the post-operative period in our population. There is insufficient evidence to determine whether music is effective for pain relief in these patients. Therefore, this study will help us ascertain the effect of music listening during postoperative period as a means of reducing pain, anxiety, distress and analgesic requirement in patients undergoing cesarean section.

2. Materials and Methods

This Prospective Quasi experimental study was conducted on antenatal patients admitted in department of OBG of Father Muller medical college from 2020-2021. Institutional ethical clearance was obtained for this study (FMIEC/CCM/657/2020), and informed consent was secured from all participating patients.

2.1. Inclusion criteria

Antenatal patients over 18 years of age who underwent caesarean section under Spinal anaesthesia.

2.2. Exclusion criteria

All patients with hypertensive disorders of pregnancy, maternal cardiovascular disorder, chronic pain problem, hearing or speech disorder, and maternal psychiatric or memory disorder, patients who do not consent were excluded from the study.

The study included 94 antenatal patients, carefully selected based on precise inclusion and exclusion criteria, who consented to participate and were scheduled for a caesarean section under spinal anaesthesia. Epidemiological characteristics were noted, and routine examination was done. Participants were assigned on every alternate week to either Music Group (1) or Silence Group (2). Group-1 consisted of patients receiving standard care along with music while Group 2 consisted of patients only receiving standard care. The music provided to Group 1 was for 30 minutes duration every 8 hours over a 24 hour post-operative period with low volume Bluetooth speakers and which consisted of prechosen playlist of soft, relaxing, regular rhythmic patterns without lyrics (sounds of birds, ocean, piano etc.) without extreme changes in dynamics. The visual analog scale[5] and scale for measuring maternal satisfaction in caesarean section was detailed to the patient and was used to record maternal pain perception, maternal satisfaction and any additional analgesia requirement. The parameters were recorded in the master chart. The primary objective of the study was to assess the effectiveness of music as an adjunct to standard treatment for post-operative pain relief following caesarean section and its effect on maternal satisfaction.

2.3. Statistical analysis

Data was entered and analysed using SPSS v.21.0 (IBM Chicago). Descriptive statistics: Nominal and interval data was presented as tables and proportions. Continuous data was presented as mean ± SD, Median and interquartile range. Inferential statistics: Categorical data was analysed using Chi Square test and z test for proportions, continuous data was analysed using one way anova and post hoc tuckey test. Summary statistics was presented as odds ratio with 95% CI. P value <0.05 was considered statistically significant.

3. Results

A total of 94 patients participated in the study, divided into Music and Control groups. The demographic and clinical profiles of both groups were closely comparable. There was a notable trend regarding multigravida and primigravida status in the music group (P=0.07). Among patients with a history of previous caesarean sections, 53% had undergone a lower segment caesarean section.(**Table 1**)

Both groups received the same postoperative pain management regimen, with no significant differences in additional analgesia requirements between them. Pain levels were assessed using the Visual analog scale (VAS). Results indicated that 61% of patients in both groups reported experiencing moderate pain postoperatively (**Table 2**). However, a noteworthy finding emerged in the Music group, where 48% of patients recorded a VAS score of less than 4 out of 10, which was statistically significant. This suggests that the music intervention may have had a positive impact on pain perception in this group.

An overview of maternal satisfaction among patients in the Music group is provided in **Table 3**. A significant 72.3% of these patients listened to music on two separate occasions during their postoperative care. The remaining patients either chose to sleep or were unwilling to listen to music a second time, indicating varying levels of engagement with the intervention. It is important to note that all participants in the Music group had not previously experienced music as part of their postoperative management. When assessing the effectiveness of the music intervention, 55% of the patients indicated that they found it effective in reducing their postoperative pain. This response demonstrates the potential for music therapy as a beneficial adjunct to standard pain management practices.

Satisfaction with the genre of music played was remarkably high, with 93.6% of patients expressing contentment with their musical selection. Additionally, 66% of patients felt satisfied with the duration of music playback. Among those who expressed dissatisfaction, the common

desire was for a longer duration of music, suggesting that an extended music intervention might enhance patient satisfaction further.

The music was delivered through Bluetooth speakers, and an impressive 93.6% of patients were satisfied with this method of delivery, highlighting the feasibility and acceptability of using technology in postoperative care settings. Moreover, many patients perceived music as a significant adjunct to their regular pain management regimen. A striking 85% of patients indicated that they would opt for music in their postoperative management if they were to undergo another caesarean section or any other surgical procedure in the future.

Table 1: Demographic details

		Group			
		With Music		Without Music	
		n	%	n	%
Age	25 and below	12	25.5%	12	25.5%
	26 - 30	17	36.2%	23	48.9%
	Above 30	18	38.3%	12	25.5%
Parity	Multigravida	33	70.2%	20	42.6%
	Primigravida	14	29.8%	27	57.4%
Caesarean Section	No	22	46.8%	31	66.0%
	Yes	25	53.2%	16	34.0%
No. of caesarean section	>1 LSCS	7	28.0%	3	18.8%
	1 LSCS	18	72.0%	13	81.3%

Table 2: Assessment of pain using VAS scale

VAS Scale	Group		Total
	With music	Without music	
5-44mm	23	4	27
% within Group	48.9%	8.5%	28.7%
45-74mm	21	37	58
% within Group	44.7%	78.7%	61.7%
75-100mm	3	6	9
% within Group	6.4%	12.8%	9.6%

P=0.000 (<0.05)

Table 3: Maternal satisfaction with the music

Dose of music	Once	13	27.7%
	Twice	34	72.3%
Effectiveness	No	7	14.9%
	Neutral	14	29.8%
	Yes	26	55.3%
Genre satisfaction	No	1	2.1%
	Neutral	2	4.3%
	Yes	44	93.6%
Duration satisfaction	No	16	34.0%
	Yes	31	66.0%
Freq satisfaction	No	9	19.1%
	Yes	38	80.9%
Mode satisfaction	No	3	6.4%
	Yes	44	93.6%
Disturbance	No	45	95.7%
	Yes	2	4.3%
Effect on pain	No	15	31.9%
	Yes	32	68.1%
Music next cesarean section	No	7	14.9%
	Yes	40	85.1%

4. Discussion

Music has been shown to benefit human existence at various levels and a person can enjoy music depending on their mental status at any given point in time. Various studies have been done to assess the effect of preoperative, intraoperative and postoperative music intervention along with other pharmacological analgesia. During the immediate postpartum period, the mother goes through a lot of physical, emotional and mental stress which can affect ability to take care of the newborn and her postpartum recovery. In our study we found that music as an adjunct was beneficial in bringing down the anxiety with improving the maternal satisfaction regarding the surgical birth process. Music leverages the central nervous system's capacity to process a limited number of stimuli at once. By focusing attention on pleasant stimuli like music, the perception of pain can be reduced. Music activates auditory pathways and the limbic system, which communicate with the hypothalamus and other brain regions to lower excitatory neurotransmitters, promoting relaxation. Additionally, music distracts the brain and stimulates the parasympathetic nervous system, further easing anxiety and pain.[6]

In this study, music was introduced at two specific times, based on previous research indicating that postoperative pain tends to peak around these intervals, even with analgesics. By offering the music intervention at these targeted moments, we can complement the scheduled post-operative pain medications. The music in this study was offered twice and at specific times, as the previous studies had shown that postoperative pain is highest at about these same times, despite the use of analgesics.[7] Providing music intervention at these specific times complemented the post-operative pain medications prescribed at fixed doses and times. The genre of music used in our study was regular rhythmic patterns without lyrics. Most of the patients were satisfied with this. However, Ebneshahidi A et al in their study concluded that patient selected music in the postoperative period could reduce the pain, need of additional analgesics, improve the patient recovery and also help in early mother to child contact.[8] Siedliecki SL et al. concluded that the key factor in increasing relaxation was the patient's preference for the music, rather than any specific style of music being more effective.[9] A. Y. R. Kühlmann et al in their meta analysis mentioned that, specific features of the music intervention such as rhythm and harmony, and the use of specific instruments like string instruments, also seem important features in anxiety and pain reduction.[10] The duration for which the patients listened to music each time was 30 minutes which was decided based on previous interventional studies. Henry et al. states that while the optimal duration for listening to music is not yet established, they recommend a listening period of 25 to 90 minutes.[11] Many of our patients (68%) found it shorter duration and wanted to listen for a longer time. The duration and intervals at which the music was provided was at distinct times as it was determined by previous studies that the pain in postoperative period peaks at these definitive times.[8] Saifon Chawanpaiboon et al in their study concluded that listening to music repeatedly also plays an important role in achieving a successful rate of exclusive breastfeeding.[12]

Chao Ji et al in their systemic review highlighted that mothers of premature infants face greater risks of anxiety, depression, and post-traumatic stress disorder. The unforeseen challenges of premature birth and the extended separation in the neonatal intensive care unit often disrupt the maternal bond. Music offers a promising solution, alleviating maternal distress while enhancing the physiological stability and neurodevelopmental outcomes of premature infants.[13] Music has been exhibited to reduce fatigue in the postoperative period and also divert the patient from the commotion in the in the post anaesthesia care unit (PACU).[14] Although several patients were satisfied with the mode in which music was provided, 3 of our patients wanted headphone/earphones to listen to the music. It has been shown in previous studies that headphones could curtain the PACU noises from equipment and sound which would increase patient satisfaction.[15] However few systemic reviews have shown that music might impede the communication of the medical team with the patients specially when headphones are used to deliver the music.[16] Our patients did not report any much disturbance due to the music in terms of sleep and breast feeding. In fact, it is known to act as a diversion from negative stimuli and alleviate postpartum stress. It can help the patient to feel more relaxed and away from all the pain and anxiety refocus more on the postpartum recovery and care of their newborn. Chang et al. meticulously assessed a range of primary outcomes, including SpO2, respiration rate, pulse rate, systolic and diastolic blood pressure, and VASA score, with birth satisfaction as a secondary outcome. Their analysis revealed no statistically significant differences between the intervention and control groups for most of these measures. However, in a notable parallel to our study, they did uncover significant differences in both VAS scores and maternal satisfaction between the groups, highlighting the impact of the intervention on these key aspects.[17] Mauree H. Whitaker in a review article concluded that music should be offered as an integral part of pain management especially in surgical patients and it has a potential to become an adjunct standard of care in postoperative pain.[4] Among our patients 68% felt that the music was very beneficial in reducing their postoperative pain and requirement of additional analgesia and 85% of them wanted music to be used as an adjunct to pharmacological analgesia if they had a possible repeat caesarean section.

5. Limitation

While this study provides valuable insights into the beneficial aspects of music in postoperative care, there a few limitations of the study that must be acknowledged. Firstly, the selection

of type of music was determined by the investigators with no input or preference from the patients themselves. It has been noted in a meta-analysis that patient preferred music, specific features like rhythm and harmony of the music play an important role to reduce the pain and anxiety.[8] Secondly, our study did not measure any potential side effect due to music as it had been reported in earlier studies that music can sometimes evoke a few negative memories or emotions.[18] Though, it has been seen that introduction to music may prevent severe pain and anxiety if introduced early. Nevertheless, it requires thorough scientific testing. Thirdly, the preoperative anxiety levels were not taken into consideration. A few earlier studies have stated that there might not be significant change in anxiety levels before or after any surgical procedure.[8] However, future studies should be done on a larger sample size in our population to determine the effect of music on postoperative anxiety in patients with various types of surgery.

6. Conclusion

Numerous hospitals around the world give support to the labouring women, to have their choice of music, aromatherapy, while giving birth so as to reduce their stress and anxiety during labour. Similar technique like using music as an adjunct to pharmacological management in postoperative women after surgical birth can be helpful to reduce and divert their attention from the pain, stress including postpartum anxiety and to take care of their new-born. Most of our patients were happy and satisfied at various levels with the music provided. The acceptance and the positive attitude of the patients towards the dulcet music is so gratifying that music should be encouraged as a part of management in obstetric and gynaecological patients.

7. Source of Funding

None.

8. Conflict of Interest

The authors declare no conflict of interest.

9. Ethical Approval

The ethical approval was provided by Father Muller Institutional Ethical Committee.

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