	VOLUME - 11, ISSUE - 09, SEPTEMBER - 2022 • PRINT ISSN No. 2277 - 8160 • DOI : 10.36106/gjrα			
of the for Reserves	Original Research Paper	Anaesthesiology		
	RANDOMISED CONTROLLED STUDY OF EFFEC RELIEVING PAIN AND ANXIETY IN PATIENTS U CAESAREAN SECTION	TS OF MUSIC THERAPY IN JNDERGOING ELECTIVE S		
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ABSTRACT Background: Cesarean section and anesthesia provoke anxiety and stress, causing increased				

sympathetic activity, leading to increase in heart rate (HR) and blood pressure. Music therapy medicine has been found to relieve anxiety and stress besides decreasing pain and stable cardiorespiratory parameters. The aim of present study was to assess the effect of music therapy on anxiety, hemodynamic profile and postoperative pain in patient undergoing for elective caesarean sections. **Method:** A total 58 females of age 18 to 36 years, ASA grade 1 & 2, undergoing elective caesarean section under regional anesthesia were included and divided equally into music-given and music-notgiven group. **Results:** The most common music played was Hindi (55%), followed by Marathi (31%) in music-given group. Hamilton Anxiety Score of patients in music-given group was significantly lower (6.7 ± 2.8) than music-not-given group (10.8 ± 3.4), (p = <0.001). Maternal Satisfaction Score of patients in music-given group was significantly higher (grade 2-59%) than the music-not-given group (grade 1-71%). The pre-operative VAS of patients was comparable between two groups, while the post-operative VAS of patients in music-given group was significantly lower (5.2 ± 1.1) than music-not-given group, (6 ± 1.2), (p=0.007). The music therapy was effective to maintain HR in normal range while it has no effect in maintaining respiratory rate. **Conclusion:** The music therapy can be used as interventional method for women undergoing cesarean section or labor delivery. It is cheap, easily applicable therapy which has positive effects to reduce pain, discomfort, anxiety and gives ease to deal with surgical or psychological pressure and thereby enhances mother satisfaction after section.

KEYWORDS : Cesarean section; Anesthesia; Music therapy; Hamilton Anxiety Score; Maternal Satisfaction Score; VAS

INTRODUCTION

Pain and anxiety are the most common effects after any surgery. Anxiety can increase the risk of psychological and physiological complications which leads to delay postoperative recovery [1]. Anxiety leads to the activation of the sympathetic nervous system which is manifested in the form of changes in the respiratory rate, heart rate (HR), and blood pressure (BP) [2-4]. However, anxiety in the preoperative period may cause an elevation in the level of endogenous catecholamines, cortisol, and natural killer lymphocytes, which may lead to delayed wound healing and recovery. Many studies have shown that anxiety before the surgical procedure requires more anesthetic dosages [5]. Various antianxiety drugs are being used to alleviate surgical anxiety, but their dose has to be kept low to avoid untoward side effects such as respiratory depression and excessive sleepiness. Therefore, these days non-pharmacological interventions such as music therapy, which is also called as "Music Medicine," are being focussed upon in addition to drugs for better anxiety allaying effects.

Music therapy has been shown to have therapeutic effects on body and mind. It is safe, cheap, and effective in reducing anxiety, thus reducing pharmacological sedative dosage [1]. Music relieves pain, anxiety, and stress by acting as distracter which focuses patients' attention away from negative stimuli to something pleasant and encouraging [6]. However, the music therapy can be defined as clinical use of musical intervention to achieve individual goals and meet the physical, emotional, and social need of individual [7].

The mechanism of music therapy is the impulse triggered by musical auditory stimulus overrides the pain signal carried by smaller nerve fibers. Music perceived by right brain may stimulate pituitary gland to release endorphins which decreases pain. Music can reduce catecholamines level and thus can also decrease heart rate and blood pressure [8]. Thus, music can be used as medicine in elective caesarean sections to relieve patient's anxiety, to stabilize hemodynamics during surgeries and to decrease post operative pain and anxiety. There are very few studies which has studied the effect of music therapy on hemodynamics in women undergoing for caesarean section. Thus, present study was an attempt to assess the effect of music therapy on anxiety, hemodynamic profile, and postoperative pain in elective caesarean sections.

MATERIALS AND METHODS

This single center, prospective, interventional study was conducted in the OBGY OT of Teaching institute in a metropolitan city during a period of 18 months starting from the date of ethics committee approval. All the consenting women of age 18 to 36 years, ASA grade 1 & 2, undergoing lower segment caesarean section surgery under regional Anesthesia were include in the study. A total 58 patients were enrolled and divided into two groups of 29 patients in each group. Patients with hearing impairment, established diagnosis of anxiety disorder and patient refusing to give informed consent were excluded from the study.

A predesigned, pretested questionnaire were prepared in accordance with study objectives. The questionnaire was prepared in English. Permission to conduct study and ethical clearance was obtained from Institutional Ethics Committee. Participants were fully informed about the purpose, procedures, and benefits of participation in the study through informed consent form. Participation in this study was voluntary. Participants were informed that all record pertaining to the study would be confidential, and data used for academic purpose only.

VOLUME - 11, ISSUE - 09, SEPTEMBER - 2022 • PRINT ISSN No. 2277 - 8160 • DOI : 10.36106/gjra

The study population was divided into two groups: study and control group. Patients had been asked to pick one concealed paper on which there was written on either study group or control group. Music was provided to study group by headphones/speaker while control group did not receive music.

The types of music provided to patients was Hindi, Marathi, and devotional music. Participants were asked to choose their favorite music from the provided list which they want to listen and that was played on radio or mobile and headphones according to patient's comfort. Preoperative heart rate, respiratory rate and blood pressure were noted.

The music was played pre-operatively for 15 minutes and pain score was measured by Visual Analog Scale for pain (VAS-P). Then again after induction of anesthesia by regional anesthesia technique, the music was played throughout the surgery. Anxiety score was measured by Hamilton Anxiety Rating Scale (HAM-A).

Intra-operatively music was played after induction with regional anesthesia and changes in heart rate, respiratory rate, SpO2 and blood pressure was monitored every 30 minutes. Postoperatively patient was asked about her pain and anxiety score and was noted according to VAS. Postoperatively patients were also asked about their perioperative experience and maternal satisfaction score was noted. If patient was having any discomfort with music or complaining any symptoms at any point of time, music was stopped immediately.

Data analysis

All responses were tabulated by the investigator using Microsoft-Excel 2016 Software. Graphical representations were made wherever necessary. Data was analyzed by using SPSS software version 25.0. Statistical tools used were Mean, Standard deviation, proportions, and percentages. The differences of means of different variables were tested with either Paired t test, Unpaired test, and Chi-square test whenever applicable. P value less than 0.05 was considered to be statistically significant.

RESULTS

A total of 58 females undergoing elective caesarean section under regional anesthesia were included and divided into music given and music not given group of 29 patients in each group. The mean age of patients in music given group was 25.8 ± 2.8 years whereas in music not given group was 27.8 ± 3.8 years, (Table 1). 51.72% and 37.93% patients had previous history of LSCS in music given group and music not given group respectively, which was not statistically significant (p=0.294). The most common music played was Hindi (16; 55.17%), followed by Marathi (12; 41.37%) and least common music played was devotional music (1; 3.44%).

Table 1: Age distribution of patients in music given and music not given group

Age groups (Years)	Music given	Music not given
21-25	08 (27.58%)	12 (41.37%)
26-30	15 (51.72%)	15 (51.72%)
31-36	06 (20.68%)	02 (6.89%)
Total	29 (100%)	29 (100%)
Ranged (Years)	22 to 36	21 to 32
Mean ± SD	25.8±2.8	27.8±3.8

Figure 1 show the comparison of Hamilton Anxiety Score in music given group and music not given group. The mean Hamilton Anxiety Score of patients in music given group was significantly lower (6.7 ± 2.8) than the music not given group (10.8 ± 3.4) and difference was statistically significant with p value of <0.001.



Figure 1: Comparison of Hamilton Anxiety Score of patients between two groups

Figure 2 shows comparison of Maternal Satisfaction Score in music given group and music not given group. The Maternal Satisfaction Score of patients in music given group was significantly higher (Grade 2- 59%) than the music not given group (Grade 1- 71%). The difference was statistically significant as p value 0.0083.



Figure 2: Comparison of Maternal Satisfaction Score of patients between two groups

The pre-operative VAS of patients was comparable between two groups, (p=0.5642), while the post-operative VAS of patients in music-given group was significantly lower (5.2 ± 1.1) than music-not-given group, (6 ± 1.2), (p=0.007) as shown in table 2.

VAS scale		Music given	Music not given
Preoperative	4	01 (3.44%)	00 (0.0%)
	5	01 (3.44%)	03 (10.48%)
	6	11 (37.93%)	10 (34.48%)
	7	01 (3.44%)	07 (24.13%)
	8	15 (51.72%)	08 (27.58%)
	9	00 (0.0%)	01 (3.44%)
	$Mean \pm SD$	6.9±1.15	6.79±1.06
Post-operatively	4	12 (41.37%)	02 (6.89%)
	5	01 (3.44%)	08 (27.58%)
	6	15 (51.72%)	10 (34.48%)
	7	00 (0.0%)	05 (17.24%)
	8	01 (3.44%)	04 (13.79%)
	9	00 (0.0%)	00 (0.0%)
	$Mean \pm SD$	5.2 ± 1.1	6±1.2

Table 2: Pre and post operative VAS scale of patients in music given group and music not given group

The comparison of heart rate (HR) between two groups for preoperative, intra-operative and post-operative scenarios was statistically significant (p < 0.05), that means music therapy was effective to maintain HR in normal range. The mean of pre-induction and post induction systolic blood pressure (SBP) noted for in music given group lied within normal range. The mean of pre-induction and post induction diastolic blood pressure (DBP) noted for in music given and in music not given group was slightly less than normal range, (Figure 3). Thus, SBP and DBP was not affected by music.





Figure 3: Comparison of haemodynamic parameters between music given and Music not given group

The comparison of respiratory rate between two groups for pre-operative, intra-operative and post-operative scenarios was not statistically significant (p>0.05), that means music therapy has no effect in maintaining respiratory rate (Figure 4).



Figure 4: Comparison of respiratory rate between two groups

DISCUSSION

Historically, music is even older than language; healing sounds have always been considered as an important aid in the medical practice. In recent times, growing need to provide integral care for pain, anxiety, and psychological well-being in perioperative periods has led researchers to scientifically study the effects of music therapy. Studies have reported that exposure to music does produce certain neuro-endocrinal and psychoneuroimmunological changes in the body which can contribute to its healing effect [9]. In the present study, we allowed participants to listen to their favorite music. We expected that prior familiarity with the music might help our patients feel at home in the strange environment of recovery and facilitate distraction from undesired experiences such as pain and anxiety. In agreement with our results, some previous studies demonstrated the efficacy of patient-selected music in the perioperative period [10-12] even with comparable effects with standard sedative music [13]. The most common age group of patients in music given group and music not given group was 26-30 years with the mean age of patients in music given group and music not given group was 25.8±2.8 and 27.8±3.8 years respectively which was comparable with the study done by Sarkar D et al [14], Halder A et al [15] and Ebneshahidi A et al [16].

For pregnant women, music can be used to reduce their stress, anxiety, and depression [17]. In the present study, the most common Hamilton Anxiety Score noted between 6-10 in music given group (55%) and music not given group (59%). Mean of Hamilton Anxiety Score in music given group and music not given group was $6.7\pm2.8 \& 10.8\pm3.4$ respectively. Thus, the Hamilton Anxiety Score of patients in music given group was significantly lower than the music not given group (p<0.001). Similarly, Sarkar D et al [14] and Sharma A et al [18] found that music is effective in reducing anxiety in patients

undergoing surgery. Studies evaluating the effects of music interventions in surgical patients have examined music provided at different times (preoperatively, intraoperatively, and/or postoperatively), with different patient populations, and using different types of musical selections. There are several positive reports regarding the effects of music on perioperative anxiety levels [19, 20].

The most common Maternal Satisfaction Score of patients in music given group (59%) and music not given group (71%) noted for grade 2 and grade 1 respectively. The Maternal Satisfaction Score of patients in music given group was significantly higher than the music not given group (p<0.008). These findings are in accordance with the previous studies [6,14].

The most common score of VAS scale noted was 8 and 6 in music given group (52%) and music not given group (35%). Mean of pre-operative VAS scale in music given group and music not given group was 6.9 ± 1.15 and 6.79 ± 1.06 respectively and which was comparable between two groups. While the post-operative VAS of patients in music-given group was significantly lower (5.2 ± 1.1) than music-not-given group, (6 ± 1.2), (p=0.007). These findings are comparable with the study conducted by Halder A et al [15] and Ebneshahidi A et al [16].

The mean of pre-induction and post induction heart rate noted for in music given group lied within normal range. The mean of post induction heart rate noted for in music not given group lied within normal range but was slightly higher than music given group. Similar findings are reported in Chang S et al study [6]. The comparison of heart rate between two groups for pre-operative, intra-operative and post-operative scenarios was statistically significant (p < 0.05), that means music therapy is effective to maintain heart rate in normal range. However, the comparison of SBP and DBP between two groups for pre-operative, intra-operative and post-operative scenarios was not statistically significant (p>0.05), that means music therapy has no effect in maintaining in SBP and DBP which is comparable with the Masoud AT et al [21] where SBP and DBP was not affected by music. The mean of preinduction and post induction respiratory rate noted for in music given group and music not given group was lied normal range. The comparison of respiratory rate between two groups for pre-operative, intra-operative and post-operative scenarios was not statistically significant (p>0.05), that means music therapy has no effect in maintaining respiratory rate. The relaxation response results in generalized decreased sympathetic nervous system activity, leading to reduction in Respiratory rate, heart rate and blood pressure and elevations in peripheral temperatures via vasodilatation [22].

CONCLUSION

This prospective randomised study found that music therapy can be used as interventional method for women undergoing cesarean section or labor delivery. The music therapy reduces the pain, discomfort and anxiety and thereby enhances mother satisfaction after section. Music therapy is cheap, easily applicable therapy which has positive effects to reduce pain, anxiety and gives ease to deal with surgical or psychological pressure.

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