

Effectiveness of Music Therapy and Visual Imagery Techniques on Preoperative Anxiety among Children Undergoing Surgeries in Selected Hospitals of Rajasthan- Pilot Study

Mohanasundari SK¹, Padmaja A², Kirtikumar Rathord³, Sunil Kothari⁴

¹Scholar in INC, College of Nursing, AIIMS Jodhpur, Rajasthan, ²Vice-Principal/Professor, College of Nursing, SVIMS, Tirupati.AP., ³Associate Professor, Dept of Pediatric surgery, AIIMS Jodhpur, ⁴HOD of pediatric surgery Department. Dr SNMC Jodhpur

Abstract

Introduction: Increasing attention is nowadays being paid to a variety of non-pharmacological interventions for decreasing preoperative anxiety such as music therapy, music medicine interventions, and visual imagery technique and so on. **Method:** 3 arm RCT was conducted to assess the effectiveness of music therapy and visual imagery techniques on preoperative anxiety with total 36 children aged between 4 to 12 years. Group A received Music therapy and group B received Visual imagery technique for 15 to 30 minutes duration minimum 3 times a day. Group C (control group) received conventional intervention. **Result:** The mean and SD score of pre and post-test in experimental group A, B and C was 7 ± 3.43 & 1.67 ± 2.06 , 15.33 ± 4.86 & 8.83 ± 4.78 , and 19.67 ± 14.88 & 19.08 ± 12.12 respectively. The effect size of group A was 1.88 & Group B was 1.34. **Conclusion:** If music therapy or visual imagery technique given especially just before giving anesthesia, the child will experience very less anxiety.

Key words: Music therapy, visual imagery technique, conventional interventions, preoperative anxiety and children undergoing surgeries.

Introduction

Background:

Each year, > 2 million children undergo surgical procedures. The perioperative phase can be stressful for the children, their parents, and the nurses who care for them. Children may experience anxiety and fear about surgery, pain, separation from parents, unfamiliar surroundings, the unknown, unpleasant sensory stimulation, and loss of autonomy and control.¹ In the immediate preoperative period, which corresponds to 24 hours before surgery, discomfort is imminent for

the children and their family, regardless of the type of surgery, outpatient or hospital approach and cultural context in which the child is inserted.^{2,3} In addition, the susceptibility of the child, lack of understanding about the surgical procedure, unknown hospital environment, fear of physical injury, separation from their parents and feelings of sadness and punishment related to the fact that surgery is a scheduled procedure may contribute to such discomfort.^{4,5}

Several evidence indicate age and temperament of the child, behavioral problems during health care previous surgery and hospitalizations level of parental education and maternal anxiety as factors associated with preoperative anxiety in children.⁶⁻¹⁰

Anxieties in children arise due to their altered interpretation of healthcare surroundings. Anxiety manifestations are variable as children transition through different stages of physical, emotional, and psychological development. Parental separation and

Corresponding Author:

Dr. A Padmaja,

Vice-Principal/Professor, College of Nursing, SVIMS, Tirupati.AP. E-mail: raajinaidu@rocketmail.com. Mob.: 9396805831

induction of anesthesia have been implicated as the most stressful periods for children to endure during their surgical experience.¹¹

Anxiety is a common feeling among children in the preoperative period. As acute stress source, anxiety induces functional changes in the central nervous system, increases the deleterious effects on the child's body when associated with other perioperative stressors¹² produces negative behaviors and high pain intensity scores in the postoperative period.¹³ In addition, anxiety causes sleep disruption, nausea, fatigue, and inadequate responses to anesthesia and analgesia leading to higher costs for the health services and family.¹⁴

Increased anxiety, disturbances in eating and sleeping, as well as increased pain and analgesic use; continue to be psychological problems during postoperative period also. Parents also anxious and their concern about the competency of staff, possible complications, and how to support their child, unfamiliarity of surroundings, role expectations, added to parental stress and anxiety that can transmit to their children.¹

The literature revealed the effects of preoperative pediatric anxiety as contributory to the manifestation of numerous postoperative psychological behavioral changes such as feeding and sleeping problems, bedwetting, withdrawal and apathy, and these symptoms exist up to 2 weeks after surgery.¹⁵

Certain interventions like music may provide a viable alternative to sedatives and anti-anxiety drugs for reducing preoperative anxiety.¹⁶

Visualization & imagery (sometimes referred to as guided imagery) techniques offer yet another avenue for anxiety reduction.¹⁷

Nurses must have an understanding of the impact of surgery on children & families to help ease the stress of this difficult time.¹⁸ Present study focused on effect of two complementary therapies such as music therapy & visual imagery technique with conventional interventions in management of preoperative anxiety in children.

Method

The effectiveness of music therapy & visual imagery technique versus conventional interventions on preoperative anxiety among 36 children aged between 4- 12 years undergoing surgery in UMAID hospital was

assessed in 3 arm Randomized controlled trial research design. The Children undergoing elective/planned surgery were included & children with emergency surgery, mentally retarded, hearing impairment, undergoing ear surgeries & participating in any other clinical trial were not included in the study. The samples were randomly distributed into 3 groups (12 in each) through computer-generated randomization allocation sequence.

Tool has 4 sessions^(19,20) section-1 was demographic variables (e.g. accompanying parent, age of the child, gender of the child, habitat, religion, socio economic status, duration of preoperative period, previous hospitalization & previous experience with anesthesia/ Surgery. The level of parental anxiety was assessed through numerical visual anxiety scale (NVAS) Session-2 was physiological variables (e.g. pain, respiration & pulse rate). Preoperative pain of the child was assessed through numerical visual pain scale (NVPS). Session -3 was standard rating scale -Hamilton Anxiety rating scale. The scale contains 14 items. A total score range of 0-56 is given with each item scored on a scale of 0 (not present) to 4 (severe). Session 4 was semi structured check list of conventional intervention (e.g. The use of toys, playing games, watching videos, cartoons, psychological support, story telling, play therapy, preadmission tour ward & others interventions). The setting reliability of the tool was tested found to be $r=0.76$.

Ethical permission was obtained from institutional ethical committee of Dr SNMC Jodhpur. The informed consent was obtained from the children above 7 years & from the guardian of children below 7 years.

On 1st preparative day children were screened for anxiety with Hamilton Anxiety rating scale (HAM-A). Recorded demographic data, level of pain & vital signs. For group-A from the day of admission until administering preoperative medication, prerecorded instrumental music was played 3 times a day on average, through head phone for the period of 15 to 30 minutes. Group B received prerecorded guided visual imagery audio through headphone for the period of 15 to 30 minutes from the day of admission until receiving preoperative sedative medications. The child received other conventional interventions throughout the preoperative period. The children in all 3 group received two or more conventional intervention as a part of supportive measures which helped to reduce

preoperative anxiety of the children, they are Parental presence, the use of toys, playing games, videos, drawing cartoons, psychological support, storytelling & listening, playing actively/passively. After the intervention children from all 3 groups were reassessed for level of anxiety through HAM-A, reassessed for pain & vital signs, & all the samples were questioned & assessed for the conventional interventions received until receiving preoperative sedative medications. The data was compiled & analyzed with help of SPSS-16.

Results

It was inferred from the table-1 that 50% children who exposed to music therapy with conventional intervention showed improvement in anxiety reduction from mild to no anxiety. There was no one in music therapy group experience neither moderate nor severe anxiety at pre & post-test. The children who exposed to visual imagery technique showed improvement up to 42.4% & anxiety was reduced to moderate to mild & no one had severe anxiety in pre & posttest. Children who received conventional intervention alone suffered from mild to severe level of anxiety in post -test (41.7% mild, 16.7% moderate, 25% severe & 16.7% very severe anxiety), were in pretest it was 58.3% with mild anxiety & 41.7% children had severe to very severe anxiety.

It was inferred from the table-2 that the samples in experimental group A (music therapy) experienced 76.1 % of reduction in anxiety level, were as samples

in experimental group-B (visual imagery technique the anxiety reduction rate was 42.4%, & in control group C the reduction rate was 2.89% only. The effect size was calculated by Cohen's D & it was 1.88 among children exposed to music therapy & it was 1.34 among children exposed to visual imagery technique. So it was interpreted that the music therapy was very effective in reducing preoperative anxiety level of the children when comparing to visual imagery technique. And both the interventions were effective when comparing to conventional intervention alone. As the effect size in control group was only 0.04.

From Table 3 it was interpreted that there was significant difference exist between pre & posttest anxiety level within & between the experimental group A, experimental group B & control group C at $p < 0.05$ level as tested by one way ANOVA.

It was inferred from the table-4 that experimental group A posttest mean was significantly different from the experimental groups B & control Group C. Group B posttest mean was significantly different from group A but not with group C. Were as group C post-test mean was not significantly different from Group A & group B. So it was interpreted that the Music therapy (Group A) was more effective in reducing preoperative anxiety level when comparing to VIT or conventional intervention. The pretest mean was significantly different between group A & B but not with group C.

Table-1: Frequency and percentage distribution of samples in pre and posttest. N=36

Score	Interpretation	Frequency (%)					
		Group-A		Group-B		Group-C	
		Pretest	Post test	pretest	Post test	pretest	Post test
No anxiety	0	0	6 (50)	0	0	0	0
Mild	<17	12 (100)	6 (50)	7 (58.3)	12 (100)	7 (58.3)	5 (41.7)
Mild to Moderate	17-24	0	0	5 (41.7)	0	0	2 (16.7)
Moderate to severe	24-30	0	0	0	0	0	3 (25)
Severe to very severe	>30	0	0	0	0	5(41.7)	2 (16.7)
Total		12		12		12	

Table-2: Pre and posttest mean and standard deviation of the samples

Group	Pretest mean and SD	Posttest mean and SD	Mean differences	Effect size	Percentage of effect
Experimental Group-A (Music therapy-MT)	7 ±3.43	1.67 ±2.06	-5.33	1.88	76.1
Experimental Group-B (Virtual reality therapy-VIT)	15.33 ±4.86	8.83 ±4.78	-6.5	1.34	42.40
Control Group-C (Conventional intervention-CI)	19.67 ±14.88	19.08 ±12.12	-0.57	0.04	2.89

Table-3: One Way ANOVA to find out difference between and within the group on level of anxiety

Group and test		Sum of Squares	df	Mean Square	F	Sig.
posttest	Between Groups	1839.056	2	919.528	15.844	.000*
	Within Groups	1915.250	33	58.038		
	Total	3754.306	35			
pretest	Between Groups	994.667	2	497.333	5.801	.007*
	Within Groups	2829.333	33	85.737		
	Total	3824.000	35			

Table-4: Post hoc test for Multiple Comparisons (Tukey HSD)

Dependent Variable	(I) groups	(J) groups	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Posttest	Group A	Group B	17.417*	3.110	.000*	9.79	25.05
		Group C	10.250*	3.110	.006*	2.62	17.88
	Group B	Group A	-17.417*	3.110	.000*	-25.05	-9.79
		Group C	-7.167	3.110	.069	-14.80	.46
	Group C	Group A	-10.250*	3.110	.006*	-17.88	-2.62
		Group B	7.167	3.110	.069	-.46	14.80
Pretest	Group A	Group B	12.667*	3.780	.006*	3.39	21.94
		Group C	4.333	3.780	.493	-4.94	13.61
	Group B	Group A	-12.667*	3.780	.006*	-21.94	-3.39
		Group C	-8.333	3.780	.085	-17.61	.94
	Group C	Group A	-4.333	3.780	.493	-13.61	4.94
		Group B	8.333	3.780	.085	-.94	17.61

*. The mean difference is significant at the 0.05 level.

Discussion

The mean - pre & post test score of experimental group A was 7 ± 3.43 and 1.67 ± 2.06 and mean difference was -5.33 and the effect size was 1.88 . The mean pre and post -test score of experimental group B was 15.33 ± 4.86 and 8.83 ± 4.78 and mean difference was -6.5 and the effect size was 1.34 . The post-test mean difference in experimental groups B was 18% more when comparing with experimental group A. The mean pre and post -test score of control group was 19.67 ± 14.88 and 19.08 ± 12.12 .

Around 50% Children exposed to music therapy experienced no preoperative anxiety at posttest. The present study shows that the samples in experimental group A (music therapy) experienced 76.1 % of reduction in anxiety level, were as samples in experimental group-B (visual imagery technique) the anxiety reduction rate was 42.4%, and in control group C the reduction rate was 2.89% only when comparing to pretest anxiety level. The find of one way ANOVA interpreted that there was significant difference exist between 3 groups & post hoc test interprets that the Music therapy (Group A) was more effective in reducing preoperative anxiety level of the children when comparing to VIT or conventional intervention.

Similarly the findings of this study was supported by studies conducted by [Goldbeck L \(2012\)²¹](#) on multimodal music therapy for children with anxiety disorders, [Lambert et al \(1996\)²²](#) on effect of hypnosis/guided imagery on the postoperative course of pediatric surgical patients), [Thomas MB \(2003\)²³](#) et al on effect of relaxation & guided imagery on autonomic nervous system & [Hartling et al \(2013\)²⁵](#) on music to reduce pain & distress in the pediatric emergency department. This study finding was contrast to the study finding of [Kain ZN et.al \(2004\)²⁴](#) who assessed interactive music therapy is an effective treatment for pre-induction anxiety.

Conclusion

It was concluded that music & visual imagery technique both are effective in reducing preoperative anxiety level of the children when comparing to children who received conventional intervention alone. Music therapy was even more effective when comparing with visual imagery technique. If music therapy given especially just before giving anesthesia, the child will experience very less anxiety or no anxiety & that could reduce the post-operative stay & improve outcome status

of the child. Music therapy & visual imagery technique can become part of preoperative intervention.

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