

Effectiveness Music Therapy with Conventional Intervention on Preoperative Anxiety Among Children Undergoing Surgeries in Selected Hospitals of Rajasthan: A Pilot Study

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Abstract

Introduction: Increasing attention is being paid to a variety of non-pharmacological interventions for reduction of preoperative anxiety such as music therapy, music medicine interventions, and visual imagery technique for the children undergoing surgeries. **Method:** Randomized controlled trial was conducted to assess the effectiveness of music therapy with conventional intervention on preoperative anxiety with total 24 children undergoing surgeries, aged between 4 to 12 years. Samples were equally distributed to 2 groups (12 in each group). Experimental group received prerecorded instrumental music for 15 to 30 minutes duration minimum 3 times a day, along with conventional interventions and control group received conventional interventions. Hamilton anxiety rating scale was used to measure the preoperative anxiety level. Data was computed in SPSS-16 **Result:** The mean and SD score of pre and post test in experimental group and control group was 7 ± 3.43 , 1.67 ± 2.06 and 19.67 ± 14.88 , 19.08 ± 12.12 respectively. The percentage of effect was 76.1 % and 2.89% in experimental and control group respectively. The effect size of the music therapy was 1.88. (Cohen'sD). So the intervention was effective in reducing anxiety level of the children preoperatively. **Conclusion:** The music therapy could be passive or active type but if it is based on child preference it will have very good impact on reducing anxiety level of the child and it will keep the children relaxed before going to surgery.

Keywords: Music therapy conventional interventions, preoperative anxiety and children undergoing surgeries.

Introduction

Background

Each year, more than 2 million children undergo surgical procedures. Children, their parents, and the nurses who care for them find the perioperative phase to be more stressful. 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

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through different stages of physical, emotional, and psychological development. Parental separation and 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 are 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, can transmit to their children.¹

Preoperative anxiety in children contributes to a myriad of physical and psychological sequelae. 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

To reduce child anxiety, sedatives and anti-anxiety drugs are regularly administered before surgery. However, these may prolong patient recovery and often have negative side effects. Therefore, a variety of non pharmacological interventions is paid increasing attention for reduction of preoperative anxiety such as music therapy, music medicine interventions, and visual imagery technique.¹⁵

Music interventions may provide a sensible alternative to sedatives and anti anxiety drugs for reducing preoperative anxiety. Interventions are categorized as 'music medicine' when passive listening to pre-recorded music is offered by medical personnel.¹⁶

Music therapy is a technique of complementary medicine that uses music prescribed in a skilled manner by a trained therapist. Patients overcome physical, emotional, intellectual, and social

challenges with the help of these programs. These applications range from improving the wellbeing of geriatric patients in nursing homes to lowering the stress level and pain of women in labor.

Nurses must have an understanding of the impact of surgery on children and families to help ease the stress of this difficult time.¹⁷ This present study focuses on effect of music therapy with conventional interventions in management of preoperative anxiety in children.

Need for the study

Children less than 15 years of age undergo approximately 2,159,000 surgeries annually in the United States, the reported incidence of preoperative anxiety in children is between 40% and 60%.¹⁸ The incidence of preoperative anxiety is reported to be 60- 65 % in children. The risk factors are; excessive parental anxiety,¹⁹ high operative pain, unfamiliar hospital environment, uncertainty about the outcome from the intervention, redo-surgery, parental detachment, stranger anxiety, previous unpleasant experience from hospital and children age above 7 yr. Parents having adjustment problem and less self-efficacy carry high preoperative anxiety in young children.²⁰ Children express preoperative anxiety in the form of excessive crying, agitation, worriness, cessation of play and probable vocalizing of their fear. These stressful situations lead to an increase in heart rate, sweating and sympathetic response. That leads to longer induction time, delayed recovery, more postoperative pain, longer hospital stay and high cost, high level of stress hormones and inflammatory markers, postoperative behavioral changes and high anxiety in subsequent surgery. The proper assessment and management of preoperative anxiety helps to address those anxiety needs and aid for better recovery.²¹

A study concluded that Interventions to treat or prevent childhood preoperative anxiety and possibly decrease the development of negative behaviors post surgery. Such interventions include sedative premedication, parental presence during anesthetic induction, behavioral preparation programs, music therapy, visual imagery technique, acupuncture and the use of toys, games, video and cartoons to keep the child engaged during preoperative period.²² Children facing terminal illness and other chronic illness, undergoing surgeries are supported with music therapy interventions that are both developmentally appropriate as well as age appropriate. Because music therapy is a powerful,

nonthreatening and non-invasive approach and unique outcomes are possible. Music therapy can help a child manage pain and stressful situations and provide opportunities for socialization, self-expression and communication. Music therapy supports siblings, parents and extended family members throughout the child’s illness and during the grief journey.²²

A systematic review and meta-analysis of three RTC studies indicates that music interventions may have a statistically significant effect in reducing post-operative pain, anxiety and distress in children undergoing a surgical procedure. Evidence from that review and other reviews suggests music therapy may be considered for clinical use.²³ There was plenty of evidence to show that music therapy used in health care settings can help calm patients. And given there are no side effects associated to this therapy, it’s certainly a treatment worth trying.

The children aged ≥ 4 may be interested in listening music and may show personal preferences to choose music as well as better able to express anxiety. The purpose and primary objectives of this study is to determine effect of Music therapy with conventional interventions in management of preoperative anxiety in children.

Methodology

Research and sampling design: The research approach for this study was Quantitative approach. The effectiveness of music therapy with

conventional interventions on preoperative anxiety among children undergoing surgery was assessed in experimental and control groups. Randomized controlled trial research design was used to answer the research question. This pilot study was carried out in pediatric surgical ward of UMAID hospitals in Rajasthan in a controlled environment. Children aged between 4 to 12 years with mild to severe anxiety, who were planned for surgeries such as herniaphy inguinal hernia’s, explorative laporatomy with appendectomy for appendicitis, anorectalplasty for fistula, orchidopexy for undescended testis, cystoscopic valve ablation for PUVD, colostomy closure, open reduction for tibial fracture, incision and drainage for cyst in lower limb and incision and drainage of submandibular abscess were participant of this study. The Children undergoing emergency surgery, Mentally retarded children, Children with hearing impairment, Children undergoing ear surgeries and Children participating in any other clinical trial were not included in the study. The sample size was calculated by Cochran’s Sample Size Formula. This pilot study included (24 samples, 12 in each group) 1/3rd of the total sample size of the main study. The sample was chosen purposively and randomly distributed into 2 groups through computer-generated randomization allocation sequence. The type of randomization was block randomization using randomly varying block sizes to ensure equal numbers of participants into each group (Experimental group and control group)

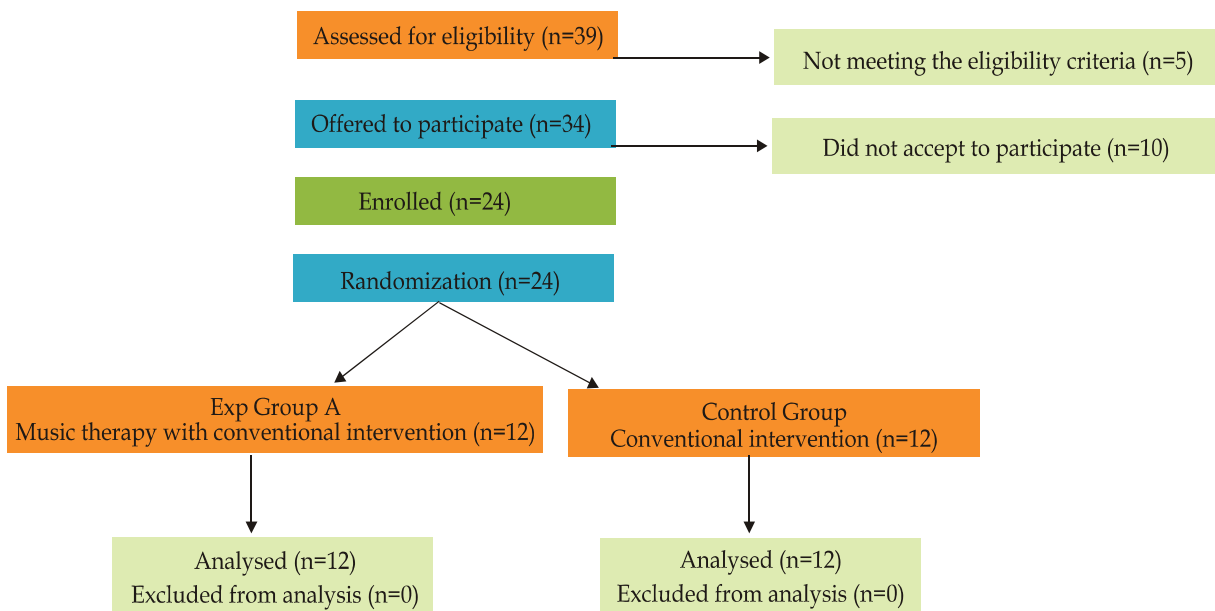


Fig. 1: CONSORT Diagram showing the flow of participation

Instruments: The instrument/tools for the present study were structured standard scales, and tools contain four sections such as.^{24,25} section -1 was demographic variables which includes accompanying parent, age of the child, gender of the child, habitat, religion, socio economic status, duration of preoperative period, previous hospitalization and previous experience with anesthesia/Surgery. The level of parental anxiety was assessed through Numerical Visual Anxiety Scale (NVAS) as the parental anxiety was one of the major confounding variables for child anxiety. NVAS was the standard scale which included scoring 0-10, interpreted as increasing level of anxiety with increasing score. Session-2 was physiological variables which includes pain, respiration and pulse rate. Preoperative pain of the child was assessed through numerical visual pain scale (NVPS). As Pain and anxiety influences each other, it was assessed as secondary outcome; the NVPS was a standard scale with score of 0-10, the pain interpreted as increased severity with increased score. Child respiration, and pulse rate also was monitored. Session -3 was standard rating scale -Hamilton Anxiety rating scale-it was first rating scales developed to measure the severity of anxiety symptoms, and is still widely used today in both clinical and research settings. The scale is intended for everyone and should take approximately ten to fifteen minutes to administer. The scale is not a private document. Since it is in the public domain, it is widely available for administration. The scale contains 14 items and a series of symptoms, and measures both psychic anxiety (mental agitation and psychological distress) and somatic anxiety (physical complaints related to anxiety) the 14 items were anxious mood, tension, fears, insomnia, intellectual, depressed mood, somatic (muscular) somatic (sensory): cardiovascular symptoms, respiratory symptoms, genitourinary symptoms, gastrointestinal symptoms, autonomic symptoms, and behavior at interview. A total score range of 0-56 with each item scored on a scale of 0 (not present) to 4 (severe). Presence of any one symptom given in the each item (14 items) scored for its severity. Session 4 was semi structured check list which included list of conventional intervention that the child received and if any at the time of preoperative period. Most of the children received more than 2 convention interventions which was listed here as parental presence, the use of toys, playing games, watching videos, cartoons, psychological support, storytelling, play therapy, preadmission tour ward and others interventions. The content validity of the tool and interventions

(type of music that reduces anxiety) was validated by 7 experts in the field of nursing, medicine, and music. Language validity of the demographic tool and Hamilton anxiety rating scale was obtained by translating the scale from English to Hindi and back translating the scale from Hindi to English by language experts. The setting reliability of the tool was tested through Chronbachalpha test and it was found to be 0.76.

Description of the intervention and administration of intervention: Experimental group received passive music therapy, i.e. Prerecorded Instrumental music with other conventional interventions. From the day of admission until administering preoperative sedative medications music was played 3 times a day on average, through head phone for the period of 15 to 30 minutes. The researcher administers the music to the children. Children in control 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 and listening, playing actively/passively.

Music therapy administration: After getting the consent the child it was informed that his or her role is to listen to the music for 15 to 30 minutes. The child is positioned comfortable. The calm and quiet environment was provided. The researcher allowed the child to choose the one prerecorded music and allowed to control the volume, activity level, and desire to lead. After instructing the child to close the eyes the researcher administered the chosen prerecorded music through headphone for 15 to 30 minutes. Children were encouraged to making some physical movements to music. Music was played until child feels enough.

Ethical permission was obtained from institutional ethical committee of Dr SN Medical College Jodhpur. The informed consent was obtained from the children above 7 years and from the guardian of children below 7 years.

Data Collectionmethod and analysis: Preparative day -1 (on the day of admission) screened the child for anxiety with -Hamilton Anxiety rating scale (HAM-A) Children with no anxiety were excluded. children who meet the criteria was informed about the purpose of the study and Consent from children above 7 years and from guardian of children below 7 years was obtained. Samples randomly assigned to 2 groups. Obtained demographic data and level of pain, respiratory rate and pulse rate, Administer interventions 3 times a day until receiving

preoperative sedative medication (experimental group prerecorded instrumental musics (15-30 minutes for each time), after intervention children from both the group were reassessed for level of anxiety through HAM-A, reassessed pain and vital signs, and all the samples were questioned and assessed for the conventional interventions received until receiving preoperative sedative medications. The data was compiled for analysis in excel and analyzed with help of SPSS version 16. Independent 't' was computed to know the effectiveness between the groups.

Result

It was inferred from the table-1 that 50% children who exposed to music therapy with convention 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 and post-test. 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 and 16.7% very sever anxiety), were in pretest it was 58.3% with mild anxiety and 41.7% children had severe to very severe anxiety.

It was inferred from the table-2 that the samples in experimental group experienced 76.1 % of reduction in anxiety level, and in control group the reduction rate was 2.89% only when comparing to pretest level of anxiety. The effect size was calculated by Cohen's D and it was 1.88 among children exposed to music therapy and the effect size of control group was only 0.04. So it was interpreted that the music therapy was very effective in reducing preoperative anxiety level of the children when comparing to conventional intervention alone.

Table 3 showed that there was a significant difference exists between pre and posttest anxiety level of the children at $P \leq 0.05$ among children exposed to music therapy (MT). There was no significant difference exists between pre and posttest anxiety level of the children at $P \leq 0.05$ among children exposed to conventional intervention alone. So the intervention (MT) was effective in reducing preoperative anxiety level of the children undergoing surgeries.

Table 1: Frequency and percentage distribution of the samples in each group.

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

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 (Music therapy-with conventional intervention)	7 ±3.43	1.67 ±2.06	-5.33	1.88	76.1
Control Group (Conventional intervention alone)	19.67 ±14.88	19.08 ±12.12	-0.57	0.04	2.89

Table 3: Pre and posttest mean and standard deviation of the samples.

Group	t'	P' (<0.05)
Experimental Group (Music therapy-MT)	5.722	0.00*
Control Group (Conventional intervention-CI)	0.18	0.86

Table 4: Unpaired/Independent t test between the conventional intervention and music therapy with mean and standard deviations.

Between the group test	Independent "t" test	P values	Mean and SD		Mean Difference (% of difference)
			Control group	Experimental group	
Posttest	4.906	.000*	19.08 ±12.12	1.67 ±2.06	-17.417 (91.2%)
Pretest	2.871	.014*	19.67 ±14.88	7 ±3.43	-12.667 (64.4%)

Note: *Asterisk indicate significant association at $p < 0.05$ level.

Table-4 showed that there was a significant difference exist in pre and posttest anxiety level of the children undergoing ($p < 0.05$) surgeries between the groups (computed independent 't' test). But the mean difference in post-test was significantly high (91.2%) between the groups when comparing to pretest mean difference (64.4%) of the groups. So the music therapy with conventional intervention was effective in reducing preoperative anxiety level of the children when comparing to conventional intervention alone.

It was interpreted from the table-5 that most of the children were accompanied by mother (66.7% in experimental group, 58.3% in control group) More than half (58.7%) of the children in experimental group were aged between 4 to 7 years and in control group 50% samples were aged between 7-10 years. Male children in experimental and control group were 83.3% & 92.7% respectively. Majority of the samples (66.7%) in experimental group live in rural area and 75% samples of control group live in urban area. The status of religion was equal

Table 5: Frequency and percentage distribution of samples based on demographic variables

Demographic variables	Frequency	
	Experimental Group	Control Group
1. Accompanying parent		
a) Mother	8 (66.7)	7 (58.3)
b) Father	1 (8.3)	4 (33.3)
c) Others	3 (25)	1 (8.3)
2. Age of the child:		
a) 4 to 7 years	7 (58.3)	4 (33.3)
b) 7-10 years	5 (41.7)	6 (50)
c) 10 to 14 years	0	2 (16.7)
3. Gender of the child:		
a) Male	10 (83.3)	11 (92.7)
b) Female	2 (16.7)	1 (8.3)
4. Habitat :		
a) Rural	8 (66.7)	3 (25)
b) Urban	4 (33.3)	9 (75)
5. Religion:		
a) Hindu	10 (83.3)	10 (83.3)
b) Muslim	2 (16.7)	2 (16.7)
6. Socio economic status of the family (per capita monthly income))		
a) Rs 5357 and above (Upper class)		0
b) Rs 2652 to 5356 (Upper middle class)	3 (25)	4 (33.3)
c) Rs 1570 to 2651 (Middle class)	1 (8.3)	5 (41.7)
d) Rs 812 to 1569 (Lower middle class)	2 (16.7)	2 (16.7)
e) Rs <811 (Lower class)	0	1 (8.3)
7. Duration of preoperative period		
a) 1 day	6 (50)	5 (41.7)
b) 2 days	8 (66.7)	6 (50)
c) 3 days	0	0
d) >3 days	4 (33.3)	1 (8.3)
8. Previous hospitalization		
a) Yes b) No	6 (50)	7 (58.3)
	6 (50)	5 (41.7)
9. Previous experience with anesthesia/Surgery		
a) Yes b) No	1 (8.3)	5 (41.7)
	5 (92.7)	5 (58.3)

From figure one it was interpreted that all accompanying person experience some level of anxiety towards surgery of their children.

in both the groups. In experimental group 66.7% children's had 2 days and 33.3% samples had >3 days of preoperative period and in control group 50% samples had 2 days of preoperative period. In experimental group the history of previous

hospitalization was equal and only one sample had history of experience with surgery. In control group 58.3 % samples were experienced with previous hospitalization and 41.7% had history of previous surgical experience.

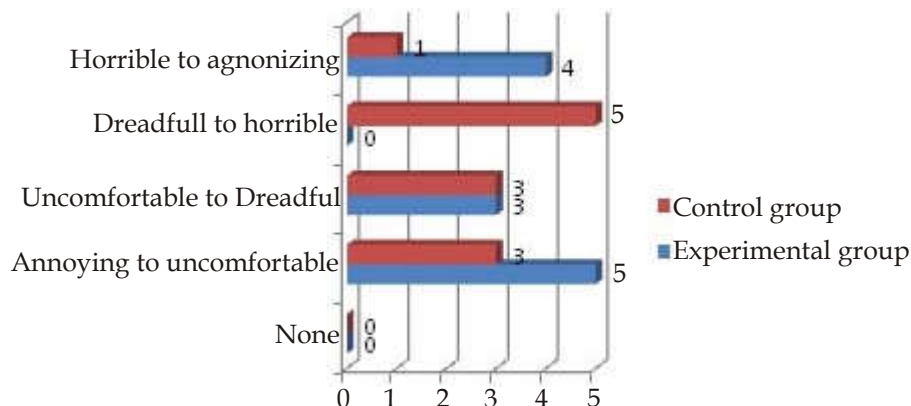


Fig. 2: Level of parental anxiety in between the groups

Table 6: Correlation between Pre-operative pain and anxiety level of children in both the groups

Correlation	Experimental group		Control group	
	r'	P'	r'	P'
Pre-test pain and anxiety level	0.248	0.437	0.246	0.441
Post-test pain and anxiety level	-.06	0.854	0.587	0.045*
Parental anxiety and pretest anxiety level of the children	-.253	0.427	0.355	0.257

Note: *Asterisk indicate significant correlation at $p < 0.05$ level.

Form table-6 it was interpreted that there was no significant correlation exists between preoperative pain and anxiety level of the children in both pre and post-tests score of experimental group. But there was moderate positive correlation exists between post-test pain and anxiety level of children in control group. Same way parental anxiety and children preoperative anxiety also had no correlation in both the groups. Person 'r' correlation was computed.

Discussion

In this present study around 50% children who exposed to music therapy with convention 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 and post-test. 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 and 16.7% very sever anxiety), were in pretest it was 58.3% with mild anxiety and 41.7% children had severe to very severe anxiety. In this present study the mean pre and post test score of

experimental group and control group was 7 ± 3.43 , 1.67 ± 2.06 and 19.67 ± 14.88 , 19.08 ± 12.12 respectively. The percentage of effect was 76.1 % and 2.89% in experimental and control group respectively. The effect size of the music therapy was 1.88. In this present study there was no significant correlation exists between preoperative pain and anxiety level of the children in both pre and post-tests score of experimental group. But there was moderate positive correlation exists between post-test pain and anxiety level of children in control group. Same way parental anxiety and children preoperative anxiety also had no correlation in both the groups.

The finding of this study was supported by the study conducted by Hartling et al (2013)²⁸ on Music to reduce pain and distress in the pediatric emergency department (RTC) the result showed there was a significantly less increase in distress for the music group. Pain scores among children remained the same in the music group, whereas in the standard care group increased by 2 points, while they the difference was considered clinically important.

Similarly the findings of this study was supported by study of Goldbeck L (2012)^{26A} randomized controlled trial of multimodal music

therapy for children with anxiety disorders. MMT was superior compared to TAU (treatment as usual) according to the remission rates after treatment (MMT 67%; TAU 33%; $\chi^2 = 4.0$; $p = 0.046$) and remissions persisted until four months post-treatment. Dimensional measures showed equivalent improvement after either MMT or TAU. This study finding was contrast to the study finding of Kain ZN et al. (2004)²⁷ who assessed interactive music therapy is an effective treatment for pre-induction anxiety. It was found that children who received midazolam were significantly less anxious during the induction of anesthesia than children in the music therapy and control groups. They found no difference in anxiety during the induction of anesthesia between children in the music therapy group and children in the control group.

Conclusion

Music therapy was effective in reducing anxiety level of the children when combined with other conventional interventions. The music therapy could be passive or active type but if it is based on child preference it will have very good impact on reducing anxiety level of the child and it will keep the children relaxed before going to surgery. If music therapy given especially just before giving preoperative medications, the child will experience very less anxiety or no anxiety and that could reduce the post operative stay and improve outcome status of the child

Limitations Recommendations: This study observed preoperative anxiety level of the children undergoing surgeries aged between 4 to 12 years only. But the study can be conducted to assess the post operative outcome of the intervention as well as the study can be conducted for the children <4 years and >12 years. Most of the ample were had mild anxiety level but it could be better if implementing this intervention on children who had moderate to severe anxiety. Music can be encouraged even at the time of surgery. In this present study instrumental music was administer to the children, if it is added with soothing lyrics it could be even better to make them more relaxed.

Conflict of Interest: No actual or potential conflict of interest.

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