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RESEARCH ARTICLE

EFFECT OF MUSIC THERAPY IN REDUCING INVASIVE PROCEDURAL PAIN- A QUASI EXPERIMENTAL STUDY

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ABSTRACT

Background: Illness and hospitalisation expose children to unfamiliar and unpleasant feelings. Pain is a physiological and psychological experience that children encounter during hospitalization. Many

Methodology: Quasi experimental post tests only design was adopted. 80 children aged 3-7 years who underwent invasive procedures were selected using convenience sampling technique and randomly assigned to experimental (n=40) and control (n=40) groups. Data was collected using FLACC Behavioral pain assessment scale.

Result: The mean pain score of children in experimental group (3.88) was lower than control group (8.15). The independent't' value (t=15.448) computed between experimental and control group was statistically significant at $p<0.05$. Children consider, needle procedure is the most distressing experiences of medical-related care. Music has the potential to decrease the need for pharmacotherapy. Music can distract the child and decrease the pain perception.

Objective: To determine the effectiveness of music therapy on pain among children subjected to invasive procedures and to find out the association between pain and selected demographic variables.

BACKGROUND

Children are the future of our society and special gifts to the world. Children need accessible, continuous, comprehensive, coordinated and compassionate care that focuses on their changing physical and emotional needs (Kyle T 2008). Worldwide, children represent a higher proportion of the population, with children younger than age 15 accounting for 1.8 billion (28%) of the world's 6.4 billion persons (Kliegman *et al.,* 2007). Children are the major receivers of health care. In India about 35 % of total populations are children below 15 years of age. Children fall in the most important age group in all societies (Dutta P 2009). Illness and hospitalization expose children to unfamiliar and unpleasant feelings. Children may undergo a wide range of intervention in hospitals, many of which can be stress full, traumatic and painful (Movahedi A F *et al.,* 2006).

Venipuncture and other invasive procedures (blood draws, intramuscular injections, heel pricks) are the most commonly performed painful procedures in children. These can be a terrifying and painful experience for children and their families (Ricci S S, *et al.,* 2009). Although the degree of pain during common medical procedures is less than during severe illnesses and injuries, millions of children experience these procedures which cause considerable distress. Children requiring needle sticks (intramuscular injections, intravenous catheters, blood sampling) view this procedure as frightening and a significant source of pain (Movahedi A F *et al.,* 2006).

Pain is one of the most common causes of human suffering. Pain is a warning sign for physical harm. Pain is typically undertreated. (Farhadi A *et al.,* 2011). Pain is unique and it is considered as personal and subjective experience of a person and no two individual can experience pain in exactly the same manner (Smeltzer S C,*et al.,*2004).

The International Association for study of Pain (IASP) defines pain as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage". (Klossne J N, *et al.,* 2010). Pain is a physiological and psychological experience that children encounter during hospitalization. The paediatric pain experience may be influenced by multiple factors such as tissue damage, affective state, developmental stage, culture, personality style, past experience with pain, meaning of pain and situational or environmental factors (Goforth K E *et al.,* 2008)

From the first lullaby, the first soothing, rocking, parent's embrace, a baby is receptive to sound and movement (Carey *et al.,* 2009). Music for healing is a practice that has persevered through time and it has a powerful influence on physical well-being. Ancient healers and philosophers regarded music as a bridge between the body, soul, and earth (Gousie P J 2011). From birth, music has an effect on children's growth and development. Music can soothe, pacifyand promote a sense of security. The gate control theory of pain reveals that pain receptors send the pain signals to the brain and when the

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distracters such as music is used, it can block certain pain pathways and decrease the amount of perceived pain (Klassen J A *et al.,*2008). In the sixth century, the Greek philosopher Pythagoras, who is considered as the founder of music therapy and geometry, believed that music greatly contributed to health and he prescribed music and a specific diet to restore and maintain the harmony of the body and soul. (Nilsson U, 2008). The major priority for patients, parents, and healthcare providers is to manage the pain effectively (Walker S. M. 2008). The development of guidelines for the care of children with pain was based on retrieval and review of articles related to post operative, procedural and trauma pain (Rowen S *et al.,* 2007). A non-pharmacological model of pain management known as music therapy has proved to aid in comforting children during invasive procedures. The development of this pain management intervention stemmed from the growing need to develop applicable paediatric pain management for children undergoing invasive procedures such as venipuncture, heel sticks, and intramuscular injections Gousie P J 2011). An effective pain therapy to block or modify the myriad physiologic responses to stress has become an essential component (Gehdoo R P 2004). In clinical practice, music intervention can be used to create an environment that stimulates and maintains relaxation, well-being, and comfort. Nightingale believed it is the responsibility of nurses to control the patient's environment in order to promote healing (Nilsson U, 2008). Music and medicine are considered as partners from the beginning of western medical practice *(Pratt R R, 2004).*
Melody is the key-note of Indian Music. The 'Raga' is the basis of melody. The concept of Music Therapy is dependent on right use of the basic elements of music, such as notes, rhythm, volume, beats and piece of melod (Sundar and Sumathy2007). Auditory perception of music occurs in the auditory centre of the temporal lobe of the brain, which then signals the thalamus, midbrain, pons,amygdala, medulla, and hypothalamus (Nilsson U). It is proved that the active uses of music therapy interventions shorterned the length of hospital stay. Music therapy is an effective complementary approach that can bring therapeutic outcomes in the management of paediatric patients (Stouffer J W *et al.,* 2007). The society of Paediatric Anaesthesia, at its 15th annual meeting at New Orleans, Louisiana (2001) clearly defined the alleviation of pain as a "basic human right", irrespective of age, medical condition, treatment, primary service response for the patient care or medical institution (Gehdoo R P, 2004).

The present trends in nursing profession attempts to encompass non-pharmacological approaches to pain relief. This study being one of such attempts has considered examining the efficiency of music as a diversional and complementary therapy in order to minimize the pain during invasive procedures.

OBJECTIVES

1) To determine the effectiveness of music therapy on pain among children subjected to invasive procedures.
2) To find out the association between pain and selected demographic variables.

MATERIALS AND METHOD

The research design adopted for the study was quasi experimental post-test only design. The study assessed the effectiveness of music therapy on pain among children subjected to invasive procedures. The researcher also examined the age of child, gender, religion, type of family, area of residence, type of invasive procedure, care giver who was present during invasive procedure and the previous experience of the child during invasive procedure.

Sample

The present study was conducted in the paediatric wards and paediatric O.P.D of Yenepoya Medical College Hospital , Highland Hospital and Research Center and Vishal Children's and Maternity Hospital, Mangalore, Karnataka, India. The study consists of 80 children in the age group of 3 years to 7 years who were subjected to invasive procedures with equal number (n=40) of children in experimental and control group. The samples were selected using non-probability convenience sampling technique and randomly assigned into experimental and control group.

Instruments

The data collection instrument consists of a demographic proforma and FLACC behavioural pain assessment scale. The demographic proforma includes, age of the child, gender, religion, type of family, area of residence, type of invasive procedure, care giver who was present during invasive procedure, the previous experience of the child for invasive procedure.

Procedure

Institutional review board approval was obtained for this project from both the recruitment hospital and the Yenepoya University, Mangalore. The right to privacy for subjects was guaranteed during the project. The instrument contained only project numbers and contained no other means by which the completed instrument could link with any individual subject. An informed written consent was obtained from the parents to participate in the study followed by an interview schedule to obtain the base line information with the help of demographic proforma. After that the investigator had taken the child along with the caregiver to the procedure room. An Indian Classical Music of brindhavan raga, which was played through headphone for a period of 10 minutes along with the routine care to the children in the experimental group whereas only routine care was carried out to those in control group. Music therapy was started 4 minutes prior to the invasive procedure and continued throughout the procedure till it gets finished by 10 minutes. The pain level was observed during the procedure using FLACC behavioural pain assessment scale.

RESULTS AND DISCUSSION

Independent't' test was used to test the effectiveness of music therapy on pain during invasive procedures in children. The independent't' test in table 1 indicates that there is a statistically significant difference ($t=15.448, p<0.005$, $df=78$) between the mean post test pain score (M=3.88) of children in experimental group and the mean post test pain score (M= 8.15) of children in control group.

The table 2 shows the 'F' value computed between the venipuncture and intramuscular injection pain score of children in experimental and control group was statistically significant

at p<0.05 level of significance. The calculated 'F' ratio was greater than the tabled F-ratio, i.e. 2.730.

Table 1 Effectiveness of music therapy on pain during invasive procedures

N=80

Group	Mean	Standard Deviation	Mean Difference	Unpaired 't' test
Control Group	8.15	0.834	4.275	15.448*
Experimental group	3.88	1.539		

t (78)=1.66 p <0.05 * Significant

This means that music therapy had a significant effect in pain perception during invasive procedures and there was a significant difference in pain scores among the children (F3, 76) = 2.730, p<0.05) according to the type of invasive procedure. The mean score of children who had undergone for venipuncture (2.85 ±0.875) with music therapy was much less than other children. This indicates that the music therapy was much effective on pain during venipuncture than intramuscular injection. There was no association between demographic variables and pain score of children.

Table 2 ANOVA for comparing the effectiveness of music therapy on venipuncture and intramuscular pain between experimental and control group.

Groups	Mean	Standard Deviation	Mean Percentage	ANOVA (F) Value
Experimental-Venipuncture	2.85	0.875	28.50	
Control-Venipuncture	8.0	0.795	80.00	
Experimental-Intramuscular Injection	4.90	1.373	49.0	135.168 *
Control-Intramuscular Injection	8.30	0.866	83.00	

t(3,76) =2.730 p<0.05 *Significant

The present study is supported by a prospective randomised clinical trial conducted by Balan R et al (2009) at Seth G S medical College and KEM Hospital, Mumbai to determine the efficacy of eutatic mixture of local anaesthetic agents (EMLA) and Indian classical music (raaga Todi) in reducing pain due to venipuncture in children. Fifty children aged 5-12 years requiring venipuncture were enrolled in the clinical trial. They were randomly assigned into three groups: local anaesthesia group, music group and control group. The pain was assessed after the intervention. The study concluded that pain experienced during venipuncture can be significantly reduced by using EMLA or Indian classicalmusic and no change in the control group.

A similar study was conducted Caprilli S et al (2009) at Florence, by University of Florence, Italy, to determine the effectiveness of interactive music as a treatment for pain and stress in children during venipuncture. The sample included were 108 children (4-13 years of age) undergoing blood tests. The samples were randomly assigned to a music group (n=54) or to a control group (n=54). The distress experienced by the child was assed prior, during and after the blood test. The results showed that distress and pain intensity was significantly lower (p<.001; p<.05) in the music group compared with the control group.

CONCLUSION

The main purpose of the study was to implement and evaluate an evidence based practice change to eliminate the pain during invasive procedures in children. The researcher has carried out this study to provide more effective and applicable strategy for pain reduction in children during invasive procedure.

This study concludes that music is effective in altering the pain in children during invasive procedures. Health professionals are confronted with the responsibility to care for children in pain. It is important for the health professionals to alter the painful response as much as possible during invasive procedures. They must meet the challenges in relieving pain by distracting the children.

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