Comparison of Selected Distraction Techniques to Alter Pain Responses among Children Receiving Immunization

Lalzampuii* and Archana Maurya

1Department of Child Health Nursing, Smt. Radhikabai Meghe Memorial College of Nursing, Datta Meghe Institute of Medical Sciences (Deemed to be University), Sawangi (Meghe), Wardha, Maharashtra, India.

ABSTRACT

Background: Immunization plays a vital role in global health for children. Children should have taken routine immunization universally for the prevention of diseases. While receiving immunization, most children are experiencing pain and show anxiety and sadness. In this study, the more effective distraction techniques between toys and music was compared which will also be necessary to apply to children in the forthcoming.

Objectives: 1) To assess the alter pain response by toys as a distraction technique among children receiving immunization. 2) To assess the alter pain response by music as a distraction technique among children receiving immunization. 3) To compare the alter pain responses by toys and music as a distraction technique among children receiving immunization. 4) To associate the alter pain responses with selected demographic variables.

Methods and Materials: An interventional research approach was used in this study with experimental research design. 60 samples were selected by Simple Random Sampling Technique. A structured demographic questionnaire and FLACC Pain Scale were used to collect the data.
Follow-up period was not required as the response of the pain in both groups were immediately assessed during immunization. Data were analyzed using SPSS Software 22.0 and Chi square was used to find the association between the alter pain responses with demographic variables.

**Results:** The finding shows that the mean score of music was 4.33 with SD of ±1.32 when compared to toys 3.70 with SD of ±1.36. The measured ‘t’ value i.e. 2.07 was less than the tabulated value at 5% level of significance. Therefore, toys were more effective when compared to music as a distraction technique (P<0.05) to alter pain responses among children receiving immunization. There were no association between the alter pain responses with demographic variables.

**Conclusion:** As toys were found to be more effective to alter pain responses than music, a related study can be conducted to compare the alter pain responses between male and female children during immunization. This study recommends that a similar study can be replicated to compare and analyze the distraction techniques between male and female to alter pain responses among children.

**Keywords:** Compare; distraction techniques; alter; pain responses; children; immunization.

1. INTRODUCTION

Children are adored by their families and are a treasure for the Nation. The distress and fear of immunization of the child are disconcerting and frustrating not only for the child but also for the parents, relatives as well as health care personnel. Almost all children are having the fear of injection. The child’s anxiety and fear can be substantiated by crying, refusal to co-operate and misbehaving, etc[1].

Immunization is selected for the prevention of diseases by parents to protect their children from diseases. Children should get immunized regularly as per the immunization schedule. Although it causes only minor discomfort in children, it instills in them a fear of the "shot" that may last into adulthood. Immunization is essential in the prevention and control of communicable diseases[2]. Children can recollect their painful experiences of unpleasant situations for a period, which can be an issue in later life and affect their acceptance of health care interventions [3].

Different strategies could be used individually or conjointly with treatment to offer decent and adequate pain relief and situational self-control to children [4]. The distraction methods for immunization can be of different types as cold application, tactile stimulation.

The distraction technique is one of the non-pharmacological interventions which swerves the attention of an individual from an unpleasant stimulus by diverting the attention of an individual or by altering the mindset of an individual. The distraction technique is associated with altering the attention of children and redirecting the exasperating situation towards something more pleasurable and is more effective for younger children [5]. Children, as well as their parents and even the health care professionals who are giving immunizations, also experience anxiety and distress. It is necessary to prepare the child before administering the immunization to reduce pain and anxiety and for the health care personnel to lessen the child’s anxiety and to gain cooperation with the child [6].

To find out the altered pain responses; different types of behavioural scales can be employed in children conjointly with adults. The behavioural scale helps the health care professionals to assess whether there is an altered behavioural response to children and adults or not.

The distraction technique is an effective approach to altering and reducing the responses and reducing the pain during the invasive procedure and is easily applicable to children and parents. Injections for immunizations can be avoided by parents and children due to the pain experienced during the procedure, which causes pain and distress for both parents and children. Physicians may with-hold and rearrange the vaccination schedule to avoid excessive pain and anxiety for children and their parents. Distraction techniques are an effective way of altering behavioural responses and reducing pain for children in most settings[7].

Although the illness burden of vaccine-preventable diseases has decreased in our country as a result of childhood immunization, it remains unacceptably high in contrast to developed countries and many developing
countries. One obvious reason for this could be that individual vaccine coverage does not match the aim of sustained high coverage required to control or eradicate a disease. The vaccine coverage for BCG, polio and measles during 1995 to 1996. However, the trend has recently shifted and the normal immunization program had faltered Concerns about the reemergence of a few of these readily preventable deadly illnesses arose when vaccine coverage fell [8].

There are children visiting immunization clinics with their parents. They felt the discomfort of the ‘shot’ and started crying during the immunization. Although there are distraction techniques for altering pain response during immunization, it is also necessary to compare the more effective distraction techniques between toys and music, which would be helpful for later intervention during immunization.

Different distraction techniques are employed to alter the pain responses of children. Toys and music are the two familiar distraction techniques that are effective in varying pain responses in children. It is also necessary to compare the more effective distraction techniques between toys and music, which will also be imperative to apply to children in the future.

2. MATERIALS AND METHODS

The study was based on interventional research approach with experimental research design. Simple Random Sampling Technique was used and 60 samples were participated from Paediatric Unit at selected hospitals in Wardha. The samples were categorized in two groups (30 samples for toys and 30 samples for music). The inclusion criteria were 1) Children at the age of 6 months to 5 years who are receiving immunization. 2) Parents who are willing to participate in the study with their children. 3) Children who present during data collection. The exclusion criteria were 1) Children with mental problems. 2) Children who are having neurological problems. The routes of the administration of immunization were mainly intramuscular and subcutaneous. Informed written consent was gathered from parents of participants for participation in the study. Necessary information concerning the study was given to parents prior to data collection. A structured demographic questionnaire which consists of age, gender, birth weight, present weight, attempt of injection, area of residence, previous knowledge of mother regarding immunization and FLACC Pain Scale were used to collect the data. The FLACC Pain Scale is a standardized pain scale consists of Face, Legs, Activity, Cry, Consolability which was categorized between 0-2 scales with a total of 0-10 scores. The FLACC Pain Scale was employed as this scale can be used to assess the level of pain of children from 2 months to 7 years. Reliability analysis was done by Parallel form method of reliability and was 92.41% (0.859). The assessment of the behavioural score was categorized as:

| Level of behaviour      | Behavioural Score |
|-------------------------|-------------------|
| Relaxed and comfortable | 0                 |
| Mild discomfort         | 1-3               |
| Moderate pain           | 4-6               |
| Severe discomfort/pain  | 7-10              |

2.1 Statistical Methods

The data was analyzed by SPSS version 22.0 and the level of significance was found to be P=.046.

3. RESULTS

Table 1 shows percentage wise distribution regarding demographic variables (age, gender, birth weight, present weight, attempt of injection, area of residence and previous knowledge of mother regarding immunization).

Distribution of subjects according to age shows that 11 (36.70%) of children in toys and 22 (73.30%) in music were at the age group of 6-21 months, 8 (26.7%) in toys and 5 (16.7%) in music were at the age group of 22-37 months, 3 (10%) in toys and 1 (3.30%) in music were at the age group of 38-53 months and 8 (26.7%) of children in toys and 2 (6.70%) in music were at the age group of 54-60 months.

Distribution of subjects according to gender shows that 18 (60%) of children in toys and 15 (50%) in music were males and 12 (40%) in toys and 15 (50%) in music were females. Distribution of subjects according to birth weight shows that 29 (96.7%) of children in toys distraction technique and 30 (100%) in music technique were having normal weight and 1 (3.30%) in toys technique had low birth weight.

Distribution of subjects according to their present weight shows that 10 (33.33%) of the children in toys and 20 (66.67%) of children in music techniques were having their present weight of 6-10 kg, 8 (26.7%) of children in toys and 5
(16.67%) in music techniques were having their present weight of 10.1-12 kg, 3 (10%) children in toys and 2 (6.66%) children in music techniques were having the present weight of 12.1-13.5 kg and 9 (30%) of children in toys and 3 (10%) of children in music techniques were having the present weight of 13.6-14.8 kg.

Distribution of subjects according to their attempt of injection shows that none of the children in both toys and music techniques had 1st and 2nd attempt of injection, there was no children having 3rd attempt of injection in toys and 5 (16.7%) of children in music had 3rd attempt of injection, 30 (100%) of children in toys technique were having more than 4 attempts and 25 (83.3%) of children in music were having more than 4th attempt of injection.

Distribution of subjects according to their area of residence shows that 11 (36.70%) of children in toys and 22 (73.30%) in music technique were residing in urban areas and 19 (63.30%) of children in toys and 8 (26.70%) of children in music technique were residing in rural areas.

Distribution of subjects according to their previous knowledge of mother regarding immunization shows that 29 (96.70%) of the mothers of children in toys technique and 30 (100%) in music technique had previous knowledge regarding immunization.

Fig. 1 shows the assessment of behavioural score to alter pain responses by toys. The result shows that 15 (50%) of children had mild discomfort pain, 14 (46.67%) of children were having moderate pain and 1 (3.33%) of them were having severe pain. Mean behavioural score was 3.70±1.36 and minimum score was 2 and maximum score was 6.

| Demographic Variables                             | Toys          | Music       |
|--------------------------------------------------|---------------|-------------|
| Age(months)                                      |               |             |
| 6-21 months                                      | 11 (36.7%)    | 22 (73.3%)  |
| 22-37 months                                     | 8 (26.7%)     | 5 (16.7%)   |
| 38-53 months                                     | 3 (10%)       | 1 (3.3%)    |
| 54-60 months                                     | 8 (26.7%)     | 2 (6.7%)    |
| Gender                                           |               |             |
| Male                                             | 18 (60%)      | 15 (50%)    |
| Female                                           | 12 (40%)      | 15 (50%)    |
| Birth Weight                                     |               |             |
| Normal(2.5-3 kg)                                 | 29 (96.7%)    | 30 (100%)   |
| Low birth weight (2.5kg)                         | 1 (3.3%)      | 0 (0%)      |
| Very low birth weight (<1.5kg)                   | 0 (0%)        | 0 (0%)      |
| Extremely low birth weight(<1 kg)                | 0 (0%)        | 0 (0%)      |
| Present Weight                                   |               |             |
| 6 -10 kg                                         | 10 (33.33%)   | 20 (66.67%) |
| 10.1-12 kg                                       | 8 (26.7%)     | 5 (16.67%)  |
| 12.1-13.5 kg                                     | 3 (10%)       | 2 (6.66%)   |
| 13.6-14.8 kg                                     | 9 (30%)       | 3 (10%)     |
| Attempt of injection                             |               |             |
| 1st Attempt                                      | 0 (0%)        | 0 (0%)      |
| 2nd Attempt                                      | 0 (0%)        | 0 (0%)      |
| 3rd Attempt                                      | 0 (0%)        | 5 (16.7%)   |
| > 4th Attempt                                    | 30 (100%)     | 25 (83.3%)  |
| Area of Residence                                |               |             |
| Urban                                            | 11 (36.7%)    | 22 (73.3%)  |
| Rural                                            | 19 (63.3%)    | 8 (26.7%)   |
| Previous knowledge of mother regarding immunization|             |             |
| Yes                                              | 29 (96.7%)    | 30 (100%)   |
| No                                               | 1 (3.3%)      | 0 (0%)      |
Fig. 2 shows the assessment of behavioural score to alter pain responses by music. The result shows that 9 (30%) of the children had mild discomfort pain, 19 (63.33%) were having moderate pain and 2 (6.67%) were having severe pain. Mean behavioural score was 4.33±1.32 and minimum score was 2 and maximum score was 7.

Fig. 3 shows the comparison of behavioural score between toys and music to alter pain responses among children receiving immunization. The measured 't' value i.e. 2.07 is less than the tabulated value at 5 % level of significance. The value 'P' assessed was .046. Hence, it is statistically interpreted that there is a significant toys was more effective when compared to music as a distraction technique to alter pain responses among children receiving immunization. Thus, H₁ is accepted. There socio-demographic characteristics of children is statistically not associated with their alter pain responses.

Fig. 2. Assessment of Behavioural Score of children to alter pain responses by music as a distraction technique
4. DISCUSSION

In the present study, the findings of the study were discussed with reference to the objectives stated and with the findings of the other studies in the section. The distribution of samples after comparison between selected distraction techniques shows that the mean behavioural score of children in toys was lesser i.e. 3.70 when compared to the mean behavioural score of music which was 4.33. There is no significant association of alter pain responses with selected demographic variables (age, gender, birth weight, present weight, attempt of injection, area of residence and previous knowledge of mother regarding immunization). The value ‘P’ assessed was .046. Hence, it is statistically interpreted that there is a significant toys was more effective when compared to music as a distraction technique to alter pain responses among children receiving immunization.

Thus, H₁ is accepted.

A study was conducted to reduce pain during immunization of formula-fed infants. Infants were divided in two groups - formula feeding prior to the procedure and infants who did not formula fed. The Neonatal Infant Pain Scale (NIPS) and FLACC scale were used to evaluate the infants. The outcome shows that infants born with full-term, who were formula fed had experienced reduced pain during vaccination in the recovery phase [9].

A randomized clinical trial of 144 children under the age of 6 months was performed and assigned to the research group (i.e. breastfeeding, vapocoolant spray, control group). The results indicate that breastfeeding during immunization has a greater analgesic impact on immunization pain relative to pre-immunization vapocoolant spray application. There was a substantial difference in pain between the babies who received vapocoolant spray during injection and those who were breastfeeding [12].

Another study was conducted to compare the effectiveness of two distraction techniques in altering behaviour responses to pain among children (1-3 yrs) receiving immunization at selected immunization clinics and the result
shows that toy is more effective as a distractor as compared to music [13].

A study was conducted “To assess the effectiveness of new distraction technique on pain associated with injection of local anesthesia for children”. The study was conducted among 5-7 years old children and Pain Faces Scale and FLACC Scale were used for the study. It was concluded that audiovisual glasses were effective to reduce pain during local anaesthesia [14].

Another study was performed for children receiving immunization to compare the two short, inexpensive methods, party blower and pinwheel. The results of the comparison shows substantial party blower outcomes in the ranking of reduced distress for children [15].

An evaluative study was conducted to assess the effect of an active distraction technique on pain in preschool children receiving diphtheria, pertussis and tetanus immunization. The results revealed that children who were taught to blow out air during their shots had significantly fewer pain behaviours and demonstrated a trend towards lower subjectively reported pain. The mean pain behaviour was lower than that of the control group in the experimental group [16].

The findings of the present study also show that there was no significant association between the distraction techniques and the demographic variables which is supported by the above studies.

5. CONCLUSION

From this study, it was concluded that toys was more effective as compared to music. Nurses and other health care personnel should understand the behavior of children while administering immunization. They should make sure that children are comfortable and education should be inclined to parents prior to immunization which will help them emotionally and psychologically.

CONSENT

As per international standard, parental written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

The ethical approval was obtained from the Institutional Ethical Committee with Ref. No. DMIMS (DU)/IEC/2018-19/7766.

ACKNOWLEDGEMENT

I am obliged to express my appreciation to my guide and faculties for their convincingly guidance during the course of time and the financial support from the institution for this study. I am boundlessly grateful to the author and publishers for their contribution for the success.

I am also grateful to Dr. Seema Singh, Principal, Smt.Radhikabai Meghe Memorial College of Nursing and Sr. Tessy Sebastian, Nursing Director, Acharya Vinoba Bhave Rural Hospital, Datta Meghe Institute of Medical Sciences (Deemed to be University), Sawangi (Meghe) Wardha, Maharashtra India for their timely support and valuable suggestions. I am extended my gratitude to Dr. Sachin Damke, HOD & Professor, Dept. of Paediatrics, Acharya Vinoba Bhave Rural Hospital, Datta Meghe Institute of Medical Sciences (Deemed to be University), Sawangi (Meghe), Wardha, Maharashtra, India for his valuable suggestions and guidance.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Shankar Shanmugam R, Subramani G. Effectiveness Of Distraction Techniques Upon Pain Among Children Receiving Immunization. International Journal of Scientific Research. 2016;5(2):517-20.
2. Agras S, Sylvester D, Oliveau D. The epidemiology of common fears and phobias. Compr Psychiatry. 1969;10(2):151-6.
3. Baeyer Von CL, Marche TA, Rocha EM, Salmon Karen. Children’s memory for pain:overview and implications for practice. The Journal of Pain. 2004;5(5): 241-249.
4. Ball W Jane, Bindler Ruth. Pediatric Nursing: Caring for children. 2nd Edition. Stamford, Ct; Appleton & Lange. 1998;231-37.
5. Mc Carthy AM, Kleiber C. A conceptual model of factors influencing children's responses to a painful procedure when parents are coaches. J Pediatr Nurs. 2006;21(2):88-98.
6. Schechter NL, Zempsky WT, Cohen Lindsey, Mc Grath PJ, Mc Murtry CM, Bright NS. Pain Reduction During Pediatric
Immunizations: Evidence-Based Review and Recommendations. American Academy of Pediatrics. 2007;119(5):1184-98.

7. Cleve LV, Johnson L, Pothier P. Pain responses of hospitalised infants and children to venipuncture and intravenous cannulation. J Pediatr Nurs. 1996;11(3):161-8.

8. N Madhavi, D Manikyamba. Evaluation of immunization status and factors responsible for drop outs in primary immunization in children between 1-2 years – a hospital based study. Int J Pediatr Res. 2016;3(5):329-334.

9. Bos-Veneman NGP, Otter M, Reijnveeld Sa. Using feeding to reduce pain during vaccination of formula-fed infants: A randomised controlled trial. Archives of Disease in Childhood. 2018; 103(12):archdischild-2017-313488.

10. Cohen LL, MacLaren JE, Fortson BL, Friedman A, DeMore M, et.al. Randomized clinical trial of distraction for infant immunization pain. Pain. 2006;125(1-2):165-71.

11. Sparks L. Taking the "ouch" out of injections for children. Using distraction to decrease pain. MCN Am J Matern Child Nurs. 2001;26(2):72-8.

12. Boroumandfar K, Khodaei F, Zahra Abdeyazdan, Maryam Maroufi. Comparison of vaccination-related pain in infants who receive vapocoolant spray and breastfeeding during injection. Iran J Nurs Midwifery Res. 2013;18(1):33–37.

13. Sharma MC, Mendonca TL. Effectiveness of Two Distraction Techniques in Altering Behaviour Response to Pain among Children (1-3 years) Receiving Immunisation at Selected Immunisation Clinics in Mangalore. International Journal of Science and Research. 2015; 4(9):141-45.

14. El-Sharkawi HF, Housseiny AE, Mahmoud A. Effectiveness of New Distraction Technique on Pain Associated With Injection of Local Anesthesia for Children. Pediatr Dent. 2012;34(2):e35-8.

15. Bowen AM, Dammeyer MM. Reducing children's immunization distress in a primary care setting. J Pediatr Nurs. 1999;14(5):296-303. DOI:10.1016/S0882-5963(99)80029-3.

16. French GM, Painter EC, Coury DL. Blowing away shot pain: a technique for pain management during immunization. Pediatrics. 1994;93(3):384-8.