

# Effect of Distraction Technique During Immunization to Reduce Behaviour Response Score (FLACC) to Pain in Toddlers

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## Introduction

Unfortunately, pain is a natural and unavoidable part of childhood. While most pain is the result of minor scrapes and bruises, there is a very different kind of pain that is associated with the delivery of healthcare. Painful medical procedure is a fact of life. Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage<sup>1</sup>. For paediatric patients medical procedure are often painful, unexpected and heightened by situational stress and anxiety leading to an overall unpleasant experience. In spite of its frequency, pain in infant, children and adolescent is often under estimated.

The routine vaccine injections are some of the most common and most painful procedures during childhood especially when they are administered without adopting any pain management practice<sup>2,3</sup>. Uncontrolled pain experience in early period of life has a negative and long lasting effect such as distress<sup>4,5</sup> and can negatively affect the development of central nervous system<sup>6-8</sup>. Moreover fear and avoidance of medical care during adulthood are partially related to experiences of many painful procedures and fears experienced during childhood. With the continued introduction of new vaccines, children may now receive up to 20 injections by their second birthday<sup>9</sup>. Unfortunately, despite an increased focus on pain assessment and management, infant injection related pain remains largely untreated.

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## Abstract

**Introduction:** Distraction techniques are important non pharmacological tools to reduce pain in infants and children. Few data are available regarding their effectiveness in toddlers. We have assessed effectiveness of audio-visual distraction techniques in toddlers during and after vaccination. **Materials and Methods:** The study used a quasi experimental three group pre-test post test design. For all the three groups, the injections were administered by same staff nurse. Group- 1 (120 Patient) was encouraged to see and play with light and sound producing toy. Group- 2 (120 Patient) children were encouraged to see cartoon movie and children of control group- 3 (110 patient) were immunized without any distraction technique. A question form was used to determine the infant's characteristics and the Face, Leg, Activity, Cry, Consolability (FLACC) Pain Scale was used to assess the level of pain. Data was collected between 1<sup>st</sup> April 2012 and 30<sup>th</sup> September 2012. **Results:** The mean pain score of test group during procedure (Group-1: 2.30 & Group-2: 3.65) were lower than the score of control group (Group-3: 5.30). Similarly after procedure Score (Group-1: 4.62 & Group-2: 2.79) were lower than the score of control group (Group-3: 6.20). **Conclusion:** The lower pain score in response to vaccination in test group indicates that distraction technique i.e. light & sound producing toys and cartoon movies are practical way to reduce pain during routine medical interventions in toddler.

**Key words:** Distraction, toddler, toys, pain score, immunization.

Various simple methods effectively reduce the pain response of newborns undergoing routine procedures, such as heel lancing. Swaddling, holding, and providing the oral tactile stimulation of sucking on a pacifier are effective non-pharmacologic approaches<sup>10-14</sup>. Oral

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sucrose is an effective pharmacologic analgesic that acts via endogenous opioid pathways<sup>15-22</sup>. The analgesic effect of oral sucrose alone<sup>23</sup> or combined only with parent holding<sup>24</sup> has been reported to be limited in infants beyond the newborn period.

Numerous studies have focused on the efficacy of various methods of distracting attention to minimize acute pain in a paediatric population, specially toddler and preschool children such as movies<sup>25</sup>, party blowers<sup>26</sup>, nonprocedural talk<sup>27</sup>, interactive robots<sup>28</sup>, virtual reality goggles<sup>29</sup>, kaleidoscopes<sup>30</sup>, bubbleblowing<sup>31</sup>, short stories<sup>32</sup> and music<sup>33</sup>. None of these options totally abolishes the pain from injections, but distraction, in general, helps moderately in preschool age and older children<sup>34</sup>.

Regardless of the medical procedure, reducing pain and stress may help children cooperate during the treatment and develop a positive attitude that will benefit both the patient and healthcare provider during future medical experiences. The young patient will have a more positive memory related to the procedure by reducing or alleviating the pain, which will reduce the stress and anxiety. By relieving pain and stress, the healthcare provider faces a less anxious and more cooperative child, resulting in a better medical outcome.

## Materials and Methods

**Study design:** The study used a quasi experimental three group pre-test post test design.

**Setting and Samples:** The research was conducted in Out Patient setting of Department of Paediatrics at Tertiary care teaching Institute in Central India from 1<sup>st</sup> April to 30<sup>th</sup> September 2012. It is a tertiary care teaching Hospital in Central India having visit of more than 100 patients in Out Patient Department every day. Orientation about the study topic and procedure was given to staff member including nurse, vaccination clerk and parents. Written consent was obtained from parents to participate in study. The child along with caregiver was taken to immunization room. During the vaccination procedure, the parents of infants in both groups were allowed to calm their babies by touching and talking to them, but not to feed and do anything that would distract the infant's attention (giving toys, showing a dummy, clapping, etc.). Toddler who comes first to the healthcare centre for vaccination were assigned to the test group -1, who came in second place to the centre were assigned to test group -2 and third one to the control group-3. It was lasted in this way. For all the three groups, the injections were administered by same staff nurse. Group- 1 (120 Patient) was encouraged to see and play with light and sound producing toy. Group- 2 (120 Patient) children were encouraged to see cartoon

movie and children of control group- 3 (110 patient) were immunized without any distraction technique.

### Exclusion criteria:

1. Presence of any neurological or chronic disorders.
2. No treatment of any kind received at a healthcare institution before the study.
3. No analgesic medicine taken in the last three hours before the vaccination procedure.
5. Not being accompanied by a parent.
5. Not crying before vaccination procedure.
6. Subcutaneous vaccination i.e. MMR, Chickenpox

**Question Form:** This form, prepared by the researchers, based on relevant literature, comprised questions to collect participants' demographic data, such as, gender, age, and weight. Information was collected from parents of the children, who had volunteered to participate in the study.

### Face, Legs, Activity, Cry, Consolability Pain Scale (FLACC):

The FLACC is used to assess the behavioural reactions to pain by infants and children (two months to seven years), who cannot express their own pain and with whom oral communication cannot be established<sup>35</sup>. The FLACC pain scale assess five behavioural areas (facial expression of the child, the position of the legs, activity, crying, and consolability) with scores ranging from 0 to 2 for each item.

Using the FLACC Pain Scale, the toddler's behavioural reaction to the pain during and after the vaccination was determined in the control and test groups. These responses were coded separately by the researcher and a registered nurse, who was blind to the subject group.

### Data analysis:

In the evaluation of the data, the crying durations of the infants were recorded and scored in seconds, and the pain reaction during and after procedure were scored between 0 and 10, according to the FLACC Pain Scale. For the data analysis, Statistical Package for the Social Sciences (SPSS 11.0) computer program was used. Statistical significance was considered at a p value less than 0.05.

ANNOVA test is to assess the significance of difference of pre procedure observation between experimental group-1, experimental group-2 and control group-3. Unpaired t-test was used to determine the significance differences of means of distraction technique between the three groups.

## Results

There were 162 female babies (46.29%) and 188 male babies (53.71%) (Table 1). Most number of patients came to hospital for DPT booster dose (79.4%) (Table 2). It may be because of age group we have selected for study (1-3 Years). As per the data of table 2 most of children came for DPT booster dose.

There is significant difference in the behavioural score of group-1 and group-3 ( $t=18.29$ ,  $p<0.05$ ). It indicates that distraction technique i.e. light and sound producing toys are effective to reduce pain in toddler during immunization (Table 3).

There is significant difference in the behavioural score of group-2 and group-3 ( $t=9.93$ ,  $p<0.05$ ). It indicates that distraction technique i.e. cartoon movie is effective to reduce pain in toddler during immunization (Table 4).

There is significant difference in the behavioural score of group-1 and group-2 ( $t=7.759$ ,  $p<0.05$ ). It indicates that distraction technique i.e. light and

sound producing toys are more effective than cartoon movie to reduce pain in toddler during immunization (Table 5).

There is significant difference in the behavioural score of group-1 and group-3 ( $t=11.29$ ,  $p<0.05$ ) after immunization. It indicates that distraction technique i.e. sound and light producing toys are effective to reduce pain in toddler even after immunization (Table 6).

There is significant difference in the behavioural score of group-2 and group-3 ( $t=22.73$ ,  $p<0.05$ ) after immunization. It indicates that distraction technique i.e. cartoon movie is effective to reduce pain in toddler even after immunization (Table 7).

There is significant difference in the behavioural score of group-1 and group-2 ( $t=13.35$ ,  $p<0.05$ ) after immunization. It indicates that distraction technique i.e. cartoon movie is more effective than light and sound producing toys to reduce pain in toddler after immunization (Table 8).

**Table 1:** Frequenting (f) and percentage (%) distribution of selected variables

Sr. No.	Variables	Group I		Group II		Group III	
1.	Age in months						
		f	%	f	%	f	%
	12-18	79	65.8	82	68.3	73	66.4
	19-24	31	25.8	24	20	20	18.2
	25-30	10	8.4	14	11.7	17	15.4
2.	Sex of Children						
	Male	66	55	63	52.5	59	53.6
	Female	54	45	57	47.5	51	46.4

**Table 2:** Frequenting (f) and percentage (%) distribution of vaccines

Vaccine	Group I		Group II		Group III	
	f	%	f	%	f	%
DPT	98	81.7	93	77.5	87	79.1
Hepatitis 'B'	10	8.3	14	11.7	9	8.2
Others	12	10	13	10.8	14	12.7

**Table 3:** Comparison of Behavioural Response scores in group I & III during immunization Group I: 120 and Group III: 110

Behavioural Response During Immunization	Standard Deviation	Mean difference	Standard Error mean	"t"
Group I (Mean: 2.3) Group III (Mean: 5.3)	1.24	3	0.164	18.29

**Table 4:** Comparison of behavioural response (FLACC) & III during immunization

**Group II: 120 and Group III: 110**

Behavioural response during Immunization	Standard Deviation	Mean difference	Standard Error mean	"t"
Group I (Mean: 3.650) Group III (Mean: 5.3)	1.12	1.65	0.148	9.93

**Table 5:** Comparison of behavioural response (FLACC) in Group I and II during immunization. Group I: 120 and Group II: 120

Behavioural response during immunization	Standard Deviation	Mean difference	Standard Error mean	“t”
Group I (Mean: 2.30) Group II (Mean: 3.65)	1.39	1.35	0.174	7.759

**Table 6:** Comparison of behavioural Score (FLACC) in Group I and III after immunization.**Group I: 120 and Group III: 110**

Behavioural response during immunization	Standard Deviation	Mean difference	Standard Error mean	“t”
Group I (Mean: 4.62) Group III (Mean: 6.20)	1.07	1.58	0.14	11.29

**Table 7:** Comparison of Behavioural Response (FLACC) in Group II & III after immunization**Group II=120 and Group III=110**

Behavioural response during immunization	Standard Deviation	Mean difference	Standard Error mean	“t”
Group II (Mean: 2.79) Group III (Mean:6.20)	1.14	3.41	0.150	22.73

**Table 8:** Comparison of Behavioural response (FLACC) in Group I and II after immunization.**Group I: 120 and Group II: 120**

Behavioural response during immunization	Standard Deviation	Mean difference	Standard Error mean	“t”
Group I (Mean: 4.62) Group II (Mean: 2.79)	1.06	1.83	0.137	13.35

## Discussion

Immunization becomes a part of children's life. As it protects children from many diseases but it can become stressful for both parents and children. Distraction techniques are effective, easy, and economical and needs no special training.

Previous studies addressing non pharmacological methods, such as parental holding, sucrose, and breastfeeding, confirmed pain reduction in infants when they were subjected to painful procedures. Pain reduction was also reported in previous studies when using various distraction methods in American children during vaccination<sup>38,39</sup> and during other injection procedures<sup>32</sup> as well as in American infants during vaccination<sup>40,41</sup>. Finding of our study indicates that distraction technique i.e. light and sound producing toys and cartoon movies are effective in reducing pain during and after immunization. Results are comparable with other studies<sup>40,41</sup>. It has been reported that distraction strategies that use two senses (visual with audio) appears to be more effective in reducing pain than the use of either one alone; and content, intensity, and combinations of multisensory stimuli are important elements of distraction interventions<sup>42</sup>.

## Conclusion

In conclusion, light and sound producing toys and cartoon movies with both visual and auditory elements is a validated and reliable observational measure and a practical way of distracting infants from vaccination pain. It can be regularly used to reduce pain during the vaccination procedure.

*Limitations of this study;* First, variables such as pain score and crying durations were subjective and based on observational measures. Physiological indices (e.g., heart rate, blood pressure and oxygen saturation) could have been assessed to more accurately determine this factor. Secondly there is difficulty in managing behaviour of parents during vaccination. Parents of control groups are more comfortable during study which may be contributory factor for toddler's anxiety and pain<sup>43</sup>.

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