

# Effect of Breastfeeding on Relieving Pain during Immunization in Infant

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## ABSTRACT

### Background

Advantages due to immunization are numerous and cannot be avoided but at the same time pain inflicted on babies needs to be addressed when possible. Pain associated with immunization injections has often been overlooked when remedies are available.

### Objective

To find out the effect of breastfeeding on relieving pain during immunization injection in infants.

### Method

An experimental study was conducted at Immunization clinic of B.P. Koirala Institute of Health Sciences (BPKIHS). Total 124 subjects were divided randomly into two groups. Experimental subjects were allowed to breastfeed for 5-10 minutes before immunization while control group was immunized without breastfeeding. Interview Questionnaire was used to obtain demographic variables and measurements were obtained. Measures of pain was recorded using duration of cry and Modified Behavior Pain Scale, by Taddio et al. Data was analyzed by using SPSS 20.0 where variables were assessed with frequency tables, Pearson's Chi-Square test, independent t test and Mann Whitney U test.

### Result

The mean pain score in experimental group was 7.10 and in control group 7.56 which was statistically significant ( $p=0.001$ ). The median duration of cry was significantly shorter in experimental group i.e. 25 seconds (IQR: 20-30) than control group 42.5 seconds (IQR: 30-61.5) ( $p < 0.001$ ).

### Conclusion

Breastfeeding before immunization is effective in reducing pain in infants.

## KEY WORDS

*Breastfeeding, Immunization, Infants, Pain*

## INTRODUCTION

Most of the injectable vaccines are administered early in child's life.<sup>1,2</sup> Infants, experience pain similarly and probably more intensely than older children and adults.<sup>3</sup> However, the issue of analgesia in young babies has been largely neglected in most clinical settings, despite subjecting them to painful diagnostic and therapeutic procedures.<sup>3-5</sup>

Infants are also at risk of adverse long term effects on behavior and development, through inadequate attention towards pain relief in early life. The majority of people with needle fears develop in childhood.<sup>6,7</sup> It is estimated that up to 25% of adults have needle fears.<sup>8</sup> Most of the time children state that among their worst fears during hospitalization are those related to various nursing procedures and to injections and needles.<sup>9,10</sup> Nurses thus have a responsibility to help children cope with needle-related medical procedures and their potentially negative effects.<sup>9,11</sup>

Pain assessment in infants is challenging because infants are unable to verbalize the presence and intensity of their pain.<sup>12,13</sup> Treating pain during childhood immunization has the potential to reduce distress during the procedure and makes immunization experience less traumatizing for children and their families.<sup>4</sup> Several studies advocated that breastfeeding as reliable remedy to alleviate pain during immunization.<sup>14-20</sup> But in our country, such study is lacking. So the researcher has conducted study with the objective to find out effect of breastfeeding on relieving pain during immunization injection.

## METHODS

Experimental study was conducted at immunization clinic of B.P. Koirala Institute of Health Sciences, a tertiary level hospital of eastern Nepal from 21<sup>st</sup> December 2014 to 17<sup>th</sup> January 2015. Total 124 Infants between 6 to 20 weeks of life who were brought for pentavalent vaccine were included consecutively. Sample size was calculated based on the study done by Kaur et al. using MBPS, considering the population means between groups are equal with probability of 0.9 (power test) and 0.05 level of significance.<sup>14</sup> (Power and Sample size program version: 3.0.34).

The samples were randomly allocated either into the experimental or control group by lottery method. Sixty two pieces of paper for experimental and sixty two pieces of paper for control group was prepared and put into a bowl and shuffled. Single piece of paper at a time was drawn by lottery method before assigning the sample to the group without replacement method.

The data was collected in three phases. In phase one interview regarding demographic variables, anthropometric measurement and positioning of the infants was performed before immunization. Infants under experimental group

were allowed breastfed for 5-10 minutes. In phase two the behavioral response of pain using MBPS was observed and recorded by the researcher herself following immunization. In phase three heart rate and duration of cry was recorded after immunization. Mothers of both groups were allowed to breastfeed their infants as need felt by them. Total duration of data collection for each subject was 15-20 minutes.

Ethical clearance was obtained from Institutional Review Committee, IRC before conducting the study (reference no 156/071/072-IRC). Verbal permission for data collection was obtained from Head of Departments of Pediatric and Adolescent Medicine and matron. Informed written consent was taken from the mother of infants. Sample was selected as per the set criteria.

Preterm infants and infant having current illnesses and neurological deficit were excluded from the study. Those infants who were not interested to breastfeeding during the time of data collection were not included in the experimental group and the Infants breast fed within one hour of immunization were excluded from the control group.

The tool had two parts, first of which consisted a semi-structured questionnaire including socio-demographic and anthropometric measurements: age, gender, parental ethnicity, birth order, birth weight, current weight and length. Second section consisted Modified Behavioral Pain Scale (MBPS) developed by Robieux et al. and modified by Taddio et al.<sup>21</sup> It is an observational check list for behavioral response of pain which scores from 0 to 10 based on facial expression, cry and body movement and categorizes as mild=0-3, moderate=4-6, severe=7-10. Pretesting among twelve infants (10% of total sample size), six in each group, experiment and control was done in immunization clinic of BPKIHS, Dharan, one week prior to the data collection period. Infants participated in pretesting were not included in the study. Concurrent validity between MBPS and VAS scores-correlation coefficient was documented as 0.68 ( $p < 0.001$ ) and test-retest reliability was 0.95,  $p < 0.01$ .<sup>22</sup>

Collected data was coded and then entered into the master chart prepared in Microsoft Excel 2010. Entered data were checked, verified and then transferred to SPSS-20.0 version for further analysis. The distribution of the variables was assessed with frequency tables and Pearson Chi-square test was applied to compare the two categorical variables. Independent t-test was applied to compare the pain score and Mann Whitney U test was applied to compare duration of cry. P value  $\leq 0.05$  was considered as statistically significant at 95% confidence interval.

## RESULTS

More than half of the infants were male in both groups i.e. 51.6% in experimental and 53.2% in control. The mean

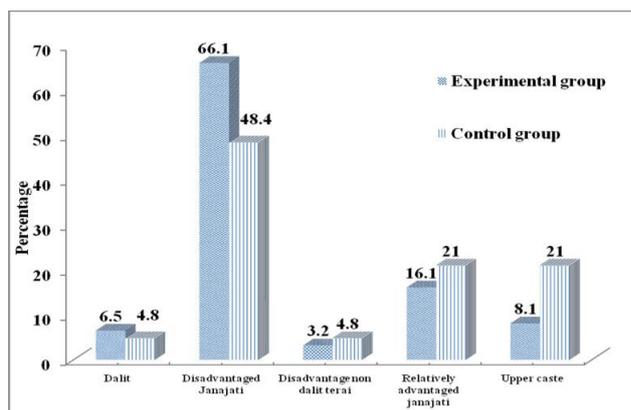
**Table 1. Demographic Characteristics of Infant (n=124)**

Characteristics	Category	Experiment group (n=62)		Control group (n=62)		P value
		Frequency	Percentage	Frequency	Percentage	
Gender	Male	32	51.6	33	53.2	0.86
	Female	30	48.4	29	46.8	
PNC age (Weeks)	6-9	19	30.6	20	32.3	0.58
	10-13	22	35.5	18	29	
	14-20	21	33.9	24	38.7	
	Mean age ±SD: 11.29 (M)4.05±SD		11.69 (M)4.47±SD			
Mean age ±SD: (11.49±4.25) Range: 6-20						
Birth order	First	28	45.2	27	43.5	
	Second	27	43.5	31	50.0	
	Third	5	8.1	4	6.5	
	Fourth	1	1.6	0	0	
	Fifth	1	1.6	0	0	
Birth Weight (gm)	Less than 2500	8	12.9	7	11.3	
	2500-3900	51	82.3	53	85.5	
	More than 3900	3	4.8	2	3.2	
Mean birth weight ±SD: (3152±453.84) Range: 2300-4400						
		3172 (M)480±SD		3131 (M)428±SD		
		6198(M) 1364±SD		6233(M) 932±SD		
Mean weight ±SD: 6216±1156						
		6071(M) ±1132		5866(M) ±1020		
Mean weight ±SD: 5970±1074						
Current Weight (gm)*	6137(M) 1248.5±SD		6061(M) 983.7±SD			
	Mean weight ±SD: (6099±1120) Range: 4000-9100					

\*= Pearson Chi-square test

age of the infants was 11.49 weeks. Among experimental group, 45.2% of the subjects were first child while 43.5% of the subjects were second child. While in control group 43.5% were first child and 50% of the subjects were second child. Mean birth weight of the total subjects was 3152 gram with standard deviation ± 453.84. In both groups, majority of the infants were with normal birth weight. Experimental group comprised 82.3% normal birth weight infants, whereas in control group it was 85.5%. The mean current weight of the infants was 6099 gm with standard deviation ± 1120. However there was slight difference between mean weight among male and female between the groups (Table 1). Distribution of parental ethnicity was depicted in figure 1.

The measures of pain in relation to the mean pain score using MBPS was found to be statistically significant between experiment (7.10) and control group (7.56), (p=0.001) and



**Figure 1. Distribution of Parental Ethnicity (n=124)**

**Table 2. Comparison of Net Pain Scores among Experimental and Control Group (n=124)**

Characteristics	Category	Experiment group (n=62)		Control group (n=62)		p value
		Mean	±SD	Mean	±SD	
Total pain Score**	MBPS	7.10	0.65	7.56	0.80	0.001

\*\*= Independent t-test

**Table 3. Comparison of Duration of Cry (n=124)**

Characteristics	Category	Experiment group(n=62)	Control group(n=62)	P value
Duration of Cry (Second)* (n=124)	Mean±SD	26.89±14.56	50.40±25.56	< 0.001
	Median	25	42.50	
	Inter Quartile Range	20-30	30-61.5	

\*= Mann Whitney U test

shown in table 2. Similarly, duration of cry was found to be significantly shorter in experimental group 25 (IQR=20-30) seconds than control group 42.5 (IQR=30-61.5) seconds (p < 0.001) which is shown in Table 3. Study showed that the mean pain score was not associated with demographic variables like gender, age, birth weight, current weight and ethnicity.

## DISCUSSION

Immunization is the most cost effective health service in developing country like Nepal. However, vaccine injections are associated with significant pain and fear among children and their parents as well. At the mean time, study showed that by applying effective pain relieving measures, experience of immunization can be made less painful.

Study revealed that more than half of the subjects were male in both groups i.e. 51.6% in experimental and 53.2% in control group. Total male infants were 52.42% and female were 47.58%. This finding is consistent with the study conducted by Kaur et al. where number of male in both experimental and control group were higher (63%, 58%).<sup>14</sup>

In both groups, majority of infants had normal birth weight. It might be because only term and healthy infants were included in the study. The mean birth weight of the infants was 3152 gm. The mean postnatal age of the infants was 11.49 weeks. Mean weight for age among male infants was less than 50<sup>th</sup> percentile whereas in female it was more than 50<sup>th</sup> percentile.<sup>23</sup>

The study revealed that about three fourth (70%) of the subjects belonged to Hindu religion. This might be because around 85% of the Nepalese are Hindu. The ethnic group was divided into six categories and more than half of the subjects belonged to disadvantaged janajati. The rationale for this could be because the study was conducted in Dharan, Sunsari, where Rai and Limbu are the largest ethnic groups.<sup>24</sup>

Infants and children react to pain by exhibiting specific behaviors. The primary behavioral categories used to help identify pain in this population include facial expression, body activity/motor movement, and crying/verbalization. Body posture, changes in muscle tone, and response to the environment are also indicators of pain.<sup>11,13,22</sup>

The mean pain score among the experimental group was 7.10 and 7.56 in the control group. The difference was statistically significant ( $p = 0.001$ ). This finding is similar to the study conducted by Kaur et al.<sup>14</sup> Modarres et al. also had similar conclusion in a study which showed breastfeeding reduces pain and is effective way for pain relief during hepatitis B vaccine.<sup>16</sup> This finding is also consistent with the study by Boroumandfar et al. which suggest that breastfeeding during vaccination in infants under 6 months of age is an effective, natural, safe, accessible, and inexpensive method without side effects to reduce vaccination related pain compared to application of vapocoolant spray before vaccination.<sup>25</sup> However, the study finding is contradictory to the findings of study conducted by Bilgen et al. that showed breast feeding only before procedure had no effect on reducing pain during heel prick.<sup>26</sup>

Infants show high-pitched, tense, and harsh cries as long as pain persist.<sup>20</sup> This study also measured the duration of

cry which was significantly shorter in experimental group 25 seconds (IQR: 20-30) and 42.5 seconds (IQR: 30-61.5) ( $p < 0.001$ ). This finding coincided with the study conducted by Kaur et al., where mean duration of cry in experimental group was significantly reduced i.e. 49.4 seconds than control group ( $p < 0.01$ ).<sup>14</sup> This finding is also consistent with the study conducted by Razeq et al. that showed breastfeeding and skin to skin contact significantly reduces crying in infants receiving immunization.<sup>1</sup>

This finding is also consistent with the study conducted by Gray et al. where mean duration of cry is reduced by 90% in breastfed neonates.<sup>20</sup> This finding is also consistent with the meta-analysis study of Shah et al. which showed that breastfeeding significantly diminished the length and intensity of infant's cry, compared to the use of a pacifier or taking glucose or sucrose and/or being hugged.<sup>18</sup> This finding is also consistent with other study conducted by Carbajal et al. that concluded maternal breastfeeding significantly reduced the length of infant's cry during blood sampling, compared to placebo group.<sup>15</sup> However, no such studies were found to be contrary to this finding.

## CONCLUSION

This study concluded that breastfeeding before immunization in infants is effective in reducing pain. The study also did not find any risk associated with such intervention. Hence this is an ideal method for pain relief due to injections in infants being effective, easily available and free of cost. This also sets a platform for future research in evaluating effectiveness of breastfeeding to alleviate pain during other minor procedure. The study finding was based on observation of researcher; there is chance of observation bias. Same staff could not be allocated to administer the injection for all the infants.

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