

Bubble Popping: An Effective Diversion During Vaccination For Toddlers Of Odisha

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Abstract: *Background: Children are always dependent, can't say about their needs or pain always. This cannot be neglected at any cost as excess pain can damage nerve cells & many more. But Consideration about pain during procedures for toddlers is a less talked topic as far as the actual application is concerned in Odisha. Thus the researcher felt the need of doing a study on this Diversional therapy as bubble popping can easily distract and hold the mind of the children for a while & is cheap. Aim & Objective: To evaluate the effect of bubble popping therapy on behavioral response to pain perception among toddlers during parenteral vaccination. Material & methods: Thus a quasi-experimental study was conducted among 60 samples (13-24 months), where both experimental & control groups contain 30 samples each. Purposive sampling techniques were adopted. Experimental group were given diversion during parenteral vaccination. FLACC behavioral pain assessment scale was used to measure the behavioral response to the level of pain. Result: The mean score of the control group was 7.68 & that of the experimental group is 4.48 with a mean difference 3.20. The obtained 't' value is 8.42 at 'p' < 0.05 (2.01). Henceforth we rejected the null hypothesis and accepted the research hypothesis. Conclusion: Thus bubble popping is effective in reducing pain among toddlers during vaccination.*

Keywords: Pain Perception, Bubble Popping, Toddler, Parenteral, Vaccination, Behavioural Response.

Introduction

India has total 121.1 Cr population out of which 16.45 Cr are children of 0-6 years age which constitute around 13.59% of the total population given by Census 2011.¹

Children are very important in deciding the future of a nation. If taken care of properly can bring a drastic change in the world. And like education, health is the basic right of every child. Along with that we should not forget the fact that the children are always dependent. They will not say about their need on their own, as of fact they cannot understand it. Thus it is the prime responsibility of parents & as well as health care provider to often address their needs & to look for any clues of need in them.²

A child often gets pain during invasive procedures in hospitals. As per a study child shows more fear & increased pain perception towards diagnostics & monitoring procedures. Inadequate pain management is leading to many acute & chronic health issues in children. Some of them are physical & psychological threat, damage to neuronal circuit of spinal cord etc.^{3,4,5}

According to UNICEF, In Odisha the low level of skills during different procedures and treatment of medical and paramedical staff is still existing like a challenge. The ultimate result of this is poor quality service delivery. One such example is the opting for painless procedures in hospitals during the vaccination of toddlers. The importance of such needs to be understood by all healthcare providers, so that the worst health outcome due to painful procedures among children can be avoided.⁶

According to an article published by the United States, CDC a child of < 6 years is getting 29 parenteral vaccination on an average.⁴ There are many lively examples in form of research evidence of consequences of not giving adequate analgesia to children during any invasive procedures like child became more distressed, increased sensitivity to behavioral response, the pain perception has the link between the cognitive & emotional center in the brain, as a result, the painful experience stays in the mind of the child, creating increased pain perception in the subsequent procedures, which may require more dose of analgesia and finally the medical insult.^{7,8}

On the other hand comparing both pharmacological to nonpharmacological intervention, the Diversional therapy is nowadays getting more popularity because of feasibility for every setting as far as the side effects, preparation & cost is concerned.⁸ There are many non-pharmacological pain management therapy available for children during painful procedures like the use of cartoons, Diversional therapy using computer, imagination technique etc.^{9,10,11} Popping the blown bubble is one of them. The researcher selects this as it can be able to hold the attention of the child for some time because it involves the activity of engaging the child.^{12,13}

Aims & objectives

To evaluate the effect of bubble popping Diversional therapy on behavioral response to pain perception during parenteral vaccination among the toddlers of Odisha

Methods & materials

Study Type- True experimental study.

Study population- The present study was carried out in the year 2018-19 in the vaccination unit of selected tertiary care hospitals i.e IMS & SUM Hospital, Bhubaneswar, Odisha. Two groups of sample in the form of experimental & control was taken & each group is comprised of 30 toddlers. The age group is 13-24 months. The samples were selected using a consecutive sampling technique.

Development of tool- The data were collected by using the self-structured demographic Performa & standardized FLACC pain scale after the checking for validity (given to 7 experts) & reliability (0.08 by Cronbach alpha formula)

Pilot study- also conducted on 20 samples first before the actual study to see the feasibility for conducting the study.

Sample size calculation

The formula used for calculating sample size in this study is

$$n = (\sigma_1 + \sigma_2)^2 \frac{(Z_{1-\alpha/2} + Z_{1-\beta})^2}{(m_1 - m_2)^2}$$

Where

- σ_1 = is the SD of the experimental group from a similar Diversional therapy study that is 1.96
- σ_2 = is the SD of the control group (2.56),
- $(m_1 - m_2)^2$ = is the square of mean difference (7.2),
- $Z_{1-\alpha/2}$ = is the level of significance at 0.05 that is 1.96,
- $Z_{1-\beta}$ = the power of the researcher considers for detecting the difference, which is considered as 0.10 in this study. $Z_{0.90}$ = 1.28 from Gaussian table

After calculation the sample size was found out to be 29.7, So each group was taken 30 samples

Study design and data collection procedure- Post-test only control group design was adopted to find out the effect of bubble therapy on pain level of toddler in both experimental & control group and also the relationship between the various demographic variables (age, gender, number of siblings, previous history of parenteral vaccination) with post-intervention level of pain.

A total of 60 samples were chosen as per the sample size calculation formula. Out of 60 samples 30 samples in the control group & another 30 samples in the experimental group were allotted randomly. Here in this study no pretest done. first the intervention (bubble-popping therapy) was introduced to the interventional group & none of the treatment given to the control group. Then lastly only the post-test score was taken in both the groups. And the level of pain was documented.

Consent- written consent was taken from the parents of the toddlers before the data collection by explaining about the study purpose & ensuring about the confidentiality.

Ethical Approval- Ethical approval was taken from the institutional ethical committee (IEC) of IMS & SUM Hospital.

Data analysis- The collected quantitative data were analyzed by using descriptive & inferential statistics of frequency & percentage distribution, t-test & ANOVA with the help of SPSS version 20

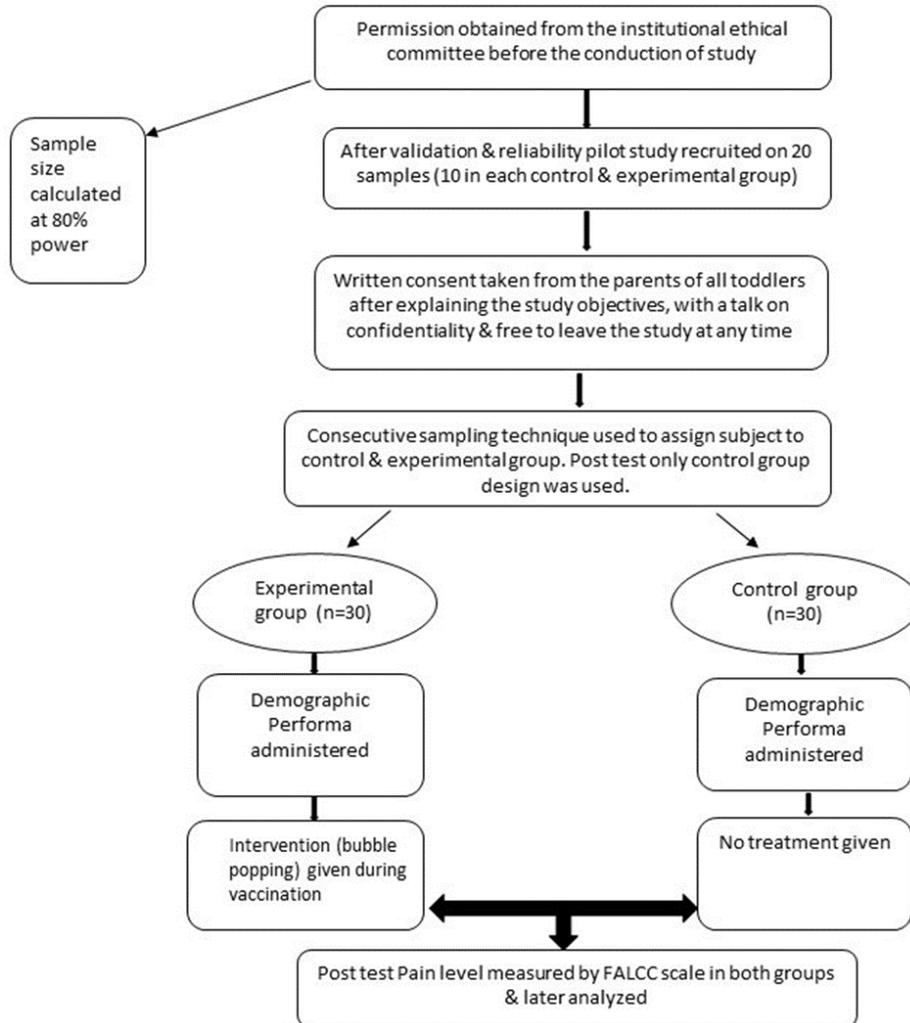


Figure 1. Flow Chart

Result-

Table 1. Description of demographic variable of both the groups (n=30+30)

Code no	Socio-demographic Parameter	Control group	Experimental Group
		%	%
1.	Age		
	A)13-16 months	36%	36%
	B)17-20 months	28%	32%
	C)21-24 months	36%	32%
2.	Gender of the child		
	A)male	60%	60%
	B)female	40%	40%

3.	Education of mother		
	A)no formal education	0%	0%
	B)primary level	12%	12%
	C)secondary level	20%	20%
	D)higher secondary level	36%	36%
	E)graduate level & above	32%	32%
4.	Previous history of hospitalization		
	A)yes	32%	32%
	B)no	68%	68%
5.	Monthly family income		
	A) < Rs 10,000/-	12%	12%
	B) Rs 10,000-20,000/-	24%	24%
	C) Rs 20,000-40,000/-	48%	48%
	D)> Rs 40,000/-	16%	16%
6.	No. Of siblings		
	A)0	36%	36%
	B)1	36%	36%
	C)2	24%	24%
	D) more than 2	4%	4%
7.	Type of family		
	A)nuclear family	56%	44%
	B)joint family	44%	56%
8.	Residence		
	A)urban	52%	52%
	B)rural	48%	48%
9.	Birth weight of the child		
	A)<1000gms	0%	0%
	B)1000-1500gms	12%	8%
	C)1501-2500gms	24%	28%
	D)2501-3500gms	60%	60%
	E)>3500gms		0%
10.	Previous experience of vaccination		
	A)yes	100%	100%
	B)no	0%	0%
11.	Caregiver of child during vaccination		
	A)mother	80%	80%
	B)father	12%	12%
	C)other person	8%	8%

A total of 60 samples were studied, in which a maximum of 36% of the sample in the control group were in the age group between 13-16 months and 21-24 months whereas In the experimental group the majority 36% of the sample were found in 13-16 months. The majority of 56% have nuclear families in the control group and joint family in the experimental group. (Table-1)

All 60% of the sample were male, Majority (36%) of the parents have higher secondary education, Very less sample (32%) have a history of hospitalization, Very less 24% have 2 siblings,

all 62% resides in urban, no child has birth weight <1000gm, all the sample have some past vaccination experience and lastly around 80% of the child were accompanied by their mothers in both the groups. (Table 1)

Table 2. Description of level of pain score in both groups (n=30+30)

Sl no.	Scale	Control group	Experimental group
1	Released and comfortable (0)	0%	0%
2	Mild comfort(1-3)	0%	40%
3	Moderate pain(4-6)	20%	48%
4	Severe pain(7-10)	80%	12%

The level of pain is shown above in the form of frequency and percentage among the control group and the experimental group shows a maximum of the control group samples have severe pain whereas the maximum of the sample in the experimental group were having mild & moderate pain only (Table-2).

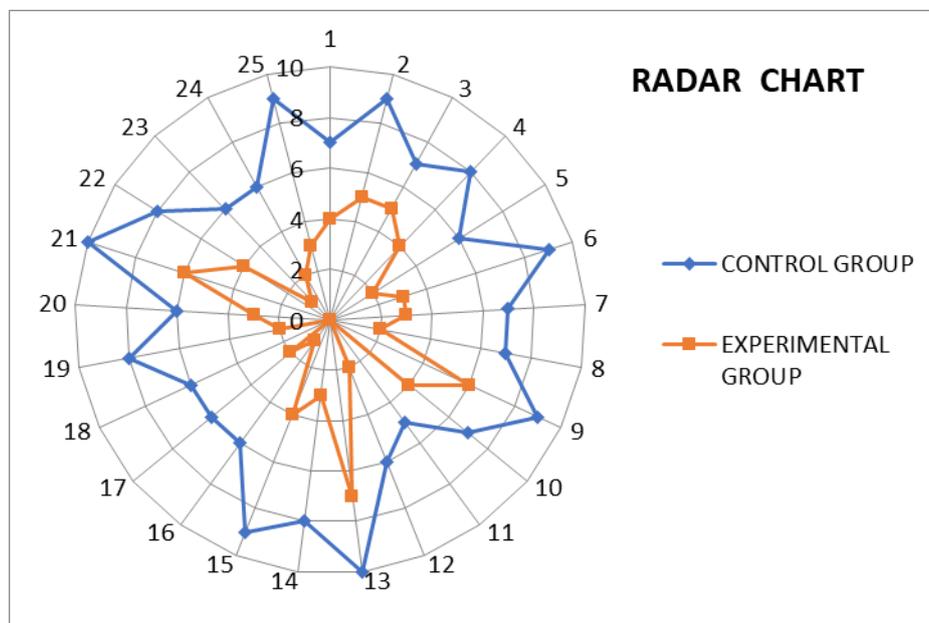


Figure 2. Radar Chart showing the comparison of pain scores in both groups

Radar chart showing the pain score distribution in both the groups where for the experimental group the pain score range only between 0-8 whereas in the control group it is very widely distributed. (Figure 2).

Table 3. T-test among both the groups (n=30+30)

Mean value		't' Test Value	P-value (table)	df	Remark
Control group	Experimental Group				
7.68	4.48	8.42	2.01 at <0.05	48	Significant difference present

The data represented in table no. 3 depicts that the mean score of the control & experimental group is 7.68 and 4.48 resp. and the mean difference is 3.20. The obtained 't' value (8.43) was found to be significant at P-value(<0.05).

Hence the calculated t value (8.42) is more than the tabulated t value (2.01) at p =0.05, level of significance, hence the null hypothesis rejected and thereby the alternative hypothesis is accepted, which means there is a strong significant difference exists between the pain score of control group to the experimental group. This concludes that the bubble popping is found effective in distracting the toddlers during parenteral vaccination.

Table 4. ANOVA table showing data of both groups **(n=30+30)**

ANALYSIS OF VARIANCE (ANOVA) TABLE						
<i>Source s of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P</i>	<i>F critical value</i>
Between the Groups	0.98	1	0.98	0.4929	**	0.4860
Within the Groups	95.44	48	1.99			
Total	96.42	49				

ANOVA table also confirms that there are significant differences between both the groups, as the calculated 'F' value(0.49) is more than the tabulated value (0.48) leading to rejection of the null hypothesis. (table-4)

Discussion-

In the present study FLACC pain scale is used & the bubble popping is found to be effective in both t-test, Radar chart & ANOVA test. This finding is supported by a study done by Shrestha R, Jeneta B.J, 2018 where the investigators used cartoon therapy for reducing pain levels among pre-schoolers during IV injections. They also used the FLACC scale & also the Diversional therapy was found to be effective.¹⁴

The current study shows the mean post-test score of the experimental group is low whereas that of the control group is high because of the level of pain, which is supported by Singh S, Chanu SE, and Chaudhary A, 2017. In their study the mean post-test score of exp. Group is 1.2 ± 0.54 & that of the control group is 4.5 ± 1.9 . That means the level of pain in the control group is more than the intervention group.¹⁵

The current study is conducted on the toddlers between 13-24 months whereas most of the intervention with Diversional therapy done on children of 0-14year age, which is a counter to this study.^{14,15}

In another experimental study on 3 different diversions on pain reduction, most of the sample (91%) were girls & the rest were boys whereas in our study maximum (68%) were boys & the rest were girls. This is counter for my study.¹⁶

None of the studies on diversion therapy did ANOVA Analysis but we in our study did this, where we also got a significant difference between the groups.¹⁴⁻¹⁷.

Conflict of interest- None

Ethical Permission: Approved

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