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A comparative study to assess the effectiveness of ice pack application vs manual pressure on pain at pentavalent vaccination site among infants attending immunization clinic in selected hospital, Bangalore

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Abstract

The present study was aimed to study to assess the effectiveness of ice pack application Vs manual pressure on pain at pentavalent vaccination site among infants attending immunization clinic in selected Hospital, Bangalore. The objectives of the study were to assess the effectiveness of ice pack application on pain during pentavalent vaccination among infants, to assess the effectiveness of manual pressure application on pain during pentavalent vaccination among infants, to assess the level of pain during pentavalent vaccination among control group and to compare the findings between ice pack application, manual pressure and control group. Quasi Experimental post-test only control group design was used for this study. The samples were selected using purposive sampling technique. 60 samples were selected to assess the effectiveness of ice pack application and manual pressure application on pain at pentavalent vaccination site among infants using NIPS scale (Lawrence, Adcock, McGrath, and others, 1993). Out of 60 samples, 20 samples were selected for three groups of ice pack application, manual pressure and control group. The result shows that nearly half of infants receiving ice pack application showed mild level of pain (mean value 2.4), manual pressure application showed moderate level of pain (Mean value 4.7) and control group showed severe level of pain (mean value 5.2). The study concluded that ice pack is effective than manual pressure on reducing level of pain at pentavalent vaccination site among infants.

Keywords: Effectiveness, pain, infants, pentavalent vaccination, ice pack, manual pressure

Introduction

Children are precious to their family. Parents want their child to be safe from diseases for this reason, they choose immunization as a preventive measure; routine immunization is an almost universal experience for children. Immunization is a proven tool for controlling and eliminating life-threatening infectious diseases and is estimated to avert 2 million deaths each year. Immunization is one of the best cost-effective health investments, with proven strategies which make it accessible to even the hardest to reach and vulnerable populations. Immunization has well defined target groups, it can be implemented effectively through outreach programmes, and vaccination does not require any major lifestyle modifications.

A pentavalent vaccine is a combined vaccine with five individual vaccines conjugated into one, intended to activity protects people from 5 potentially deadly diseases. The main example is a vaccine that protects against Haemophilus influenza type B (a bacterium that causes meningitis, pneumonia and otitis), whooping cough, tetanus, hepatitis B and diphtheria.

Routine immunization causes a significant burden of pain and distress can lead to serious physical and emotional consequences, such as increased oxygen consumption and alterations in blood glucose metabolism. In addition, the experiences of pain early in life may lead to long-term consequences for the child.

Pharmacological and non-pharmacological methods are used to relieve pain in newborn and infants. Non pharmacological methods are alternatives for pain control, which implement small non-invasive attempts to reduce the pain. Position change, kangaroo care and touch, massage, teat giving, sucrose giving, breastfeeding, playing music and distractions among these methods. In addition, methods such as cold application, massage, vibration, injection techniques and manual pressure application are used to reduce pain during invasive attempts.

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Objectives

1. To assess the effectiveness of ice pack application on pain during pentavalent vaccination among infants.
2. To assess the effectiveness of manual pressure application on pain during pentavalent vaccination among infants.
3. To assess the level of pain during pentavalent vaccination among control group.
4. To compare the findings between ices pack application, manual pressure and control group.

Hypothesis

H₁: There will be a significant difference in level of pain between infants who receive ice pack application and control group during pentavalent vaccination.

H₂: There will be a significant difference in level of pain between infants who receive manual pressure application and control group during pentavalent vaccination.

H₃: There will be a significant difference in level of pain among infants who receive ice pack application and those who receive manual pressure during pentavalent vaccination.

Materials and Methods

Research approach

This study is intended to assess the effectiveness of ice pack application vs manual pressure application at pentavalent vaccination site among infants. Hence evaluative research approach was used for the present study.

Research design

Research design used for this study is Quasi Experimental post-test only control group design.

Table 1: Schematic presentation of research design

Group	Treatment	Post-test
E1	X1	O1
E2	X2	O1
C	-	O1

E1: Experimental Group I receiving Ice pack application.

E2: Experimental Group II receiving manual pressure.

C: Control group.

X1: Application of ice pack.

X2: Application of manual pressure.

O1: Assessment of pain using NIPS behavior scale.

Research variables

- **Independent variables:** Application of ice pack and manual pressure to infants receiving pentavalent vaccination.
- **Dependent variables:** Pain among infants during pentavalent vaccination.
- **Demographic variables:** Age, Gender, Birth order, Breastfeeding status of infant, present pentavalent dose and previous exposure of IM injection.

Setting of the study

Study was undertaken in the paediatric OPD'S immunization clinic of Vydehi Hospital and Research centre, Bangalore.

Population

The population for the present study includes infants who

are receiving first, second or third dose of pentavalent vaccination during data collection period.

Sampling procedure

- **Sampling technique:** Purposive sampling technique was used for selection of samples.
- **Sample size:** The sample size of the present study consisted of total 60 infants, out of which 20 will be in Experimental Group I (Ice pack group), 20 will be in Experimental Group II (Manual pressure group) and 20 will be in control group.
- **Sampling Criteria:** Sampling criteria also referred to as eligibility criteria; include the list of characteristics essential for the eligibility or membership in the target population.

Research criteria

Inclusion Criteria

- Infants (6 weeks-14 weeks).
- Parents who are willing to participate in the study.
- Infants receiving pentavalent vaccination in the selected immunization clinic.

Exclusion criteria

- Infants who are critically ill.
- Pre mature and low birth infant.

Tools for Data

The tools used for the study were:

Section I: Demographic data of the child

Section II: NIPS scale for assessing the level of pain in infants.

Section I

Demographic Performa of the child

Instruction

Dear parents please answer to the following questions by giving appropriate response. The information obtained will be used for the purpose of study and the confidentiality of information will be maintained.

Date: _____ Code: _____

1. Age in weeks-----.

2. Gender

Male

Female

1. Birth Order

First

Second

Third

More than third

2. Is the child on breastfeeding?

Yes

No, if no specify the reason-----

Is the child getting any feedings other than breast feeding?

No

Yes, if yes specify what-----and why-----()

6. Present due dose of DPT vaccination

a) 1st

- b) 2nd ()
 c) 3rd ()

7. Previous exposure to IM injection.

- a) No ()
 b) Yes. ()

If yes, specify-----injection

And mention if any measures taken to relieve pain during previous exposure-----

Data Collection Process

Initially statement of the problem was “A comparative study to assess the effectiveness of ice pack application Vs manual pressure on pain at DPT vaccination site among infants attending immunization clinic in selected hospital, Bangalore”. DPT vaccination site has been changed to pentavalent vaccination site with the approval of ethical committee because during the study DPT vaccination was replaced by pentavalent vaccination throughout the country by Government of India.

The formal written permission for data collection was obtained from the HOD of paediatric department. Data collection was done on 60 samples (20 in each group) in the immunization clinic of Vydehi Hospital and Research Centre, Bangalore. The samples were selected by purposive sampling technique. First 20 samples were allocated in the ice pack application group, second 20 samples were

allocated to the manual pressure application group and last 20 samples were allocated to the control group. The parents were explained about the study, and the confidentiality of the response was also maintained. Written consent was obtained from parents. Data was collected on demographic variables. Interventions were applied in both experimental groups. First group received ice pack application for 30 seconds prior to the pentavalent vaccination and second group received manual pressure application for 20 seconds prior to pentavalent vaccination. Control group had not received any intervention. Post test scoring was assessed.

Results

Organization of Results: The results of the study are presented in the following sections.

Section-I: Frequency and percentage distribution of the samples according to demographic variables.

Section-II (a): Frequency and percentage distribution of the samples according to level of pain among experimental group and control group.

Section-II (b): Comparison of the post-test pain level of the samples between the experimental group and control group.

Section-I

Table 2: Frequency and percentage distribution of the samples according to demographic variables.

	Demographic profile	Ice group		Manual pressure group		Control group		Total	
		Frequency	%	Frequency	%	Frequency	%	Frequency	%
1.	Age in weeks								
a	6-8 wks.	7	35	9	45	12	60	28	46.67
b	9-11wks.	8	40	4	20	2	10	14	23.33
c	12-14wks.	3	15	2	10	5	25	10	16.67
d	15-17wks.	2	10	5	25	1	5	8	13.33
2.	Gender								
a	Male	9	45	10	50	14	70	33	55
b	Female	11	55	10	50	6	30	27	45
3.	Birth Order								
a	First	17	85	9	45	11	55	37	61.67
b	Second	3	15	10	50	8	40	21	35
c	Third	0	0	1	5	1	5	2	3.33
d	More than third	0	0	0	0	0	0	0	0
4	Child's is on breastfeeding								
a	Yes	20	100	19	95	19	95	58	96.67
b	No	0		1	5	1	5	2	3.33

Above Table 2 shows that nearly half (46.67%) of children were between the age group of 6 weeks-8 weeks and only 13.33% were between 15-17 weeks. 55% of children were male and 45% were female.

As per the birth order majority (61.67%) of children were first born and 3.33% were third born. According to the

breastfeeding status of subjects 96.67% were on breastfeeding and 3.33% were not.

The majority of subjects in all the three groups i.e. in ice pack group 20(100%) children, in manual pressure group 19 (95%) children and control group 19 (95%) were not getting any feeding other than breastfeeding.

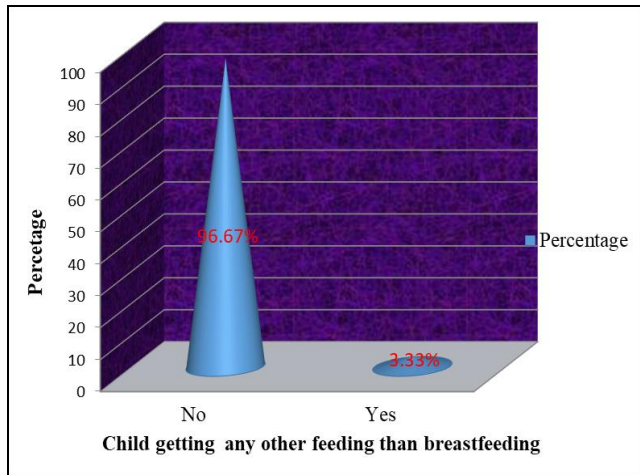


Fig 1: A cone diagram representing the distribution of subjects according to children getting any feedings other than breastfeeding.



Fig 2: A pie diagram representing the distribution of subjects according to present dose of pentavalent vaccination.

The 43.34% of children were come for first dose of pentavalent vaccine, and 23.33% were for third dose.

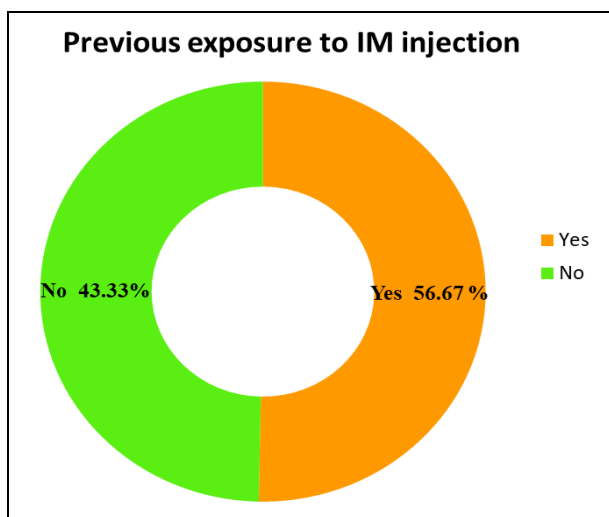


Fig 3: A doughnut diagram representing the distribution of subjects according to previous exposure of IM injection.

More than half (56.67%) of children had previous IM injection exposure and 43.33% were not had any exposure.

Section-II (a): Frequency and percentage distribution of the samples according to the level of pain in ice pack application group, manual pressure application group and control group.

Table 3: Frequency and percentage distribution of the samples according to the level of pain in ice pack application group, manual pressure application group and control group

Groups	Mild		Moderate		Severe	
	F	%	F	%	F	%
Ice pack	11	55%	7	35%	2	10%
Manual pressure	0	-	9	45%	11	55%
Control group	1	5%	2	10%	17	85%

Above Table 3 shows that more than half (55%) of samples in ice pack application group were having mild pain. In manual pressure group also more than half (55%) were having severe pain. In control group only 5% were having mild pain and majority (85%) were having severe pain.

Section II (b)

Table 4: Comparison of the post-test pain level readings of the samples between the ice pack, manual pressure and control group.

Sources	Sum of square	Degree of freedom	Mean square	"F" Value	At 5% "F" Value
Between the groups	39.2	2	44.6	33.55	3.15
Within the groups	76.2	57	1.33		
Total	165.4	59	45.93		
Level of significance	At the level of 0.05				

The Table 4 shows that there is a significant reduction in pain level in both the interventional group at 0.05 level of significance with ANOVA 'F' value of 33.55. Thus, it shows both the interventions were effective in reducing level of pain during pentavalent vaccination.

Discussion

The discussion is organized under the following headings:

Section I: Findings related to selected demographic variables.

Section II: Findings related to effectiveness of ice pack application and manual pressure application on pain level during vaccination.

Section I

Findings related to selected demographic variables

In this study, nearly half (46.67%) of children were between the age group of 6 weeks-8 weeks and only 13.33% were between 15-17 weeks. Similar study findings can be seen in a study conducted in Employees state insurance corporation Hospital Bangalore, in which the mean age of children in experimental group and control group were 67%. Most 55% of children were male and 45% were female. In another study, 50% of children were male and 50% were female.

As per the birth order majority (61.67%) of children's birth order was first and 3.33% were third born. Similar findings are not found.

According to the breastfeeding status of children, 96.67% were on breastfeeding and 3.33% were not. The present study findings are supported by another study in which the majority 84% children were on breastmilk.

The majority (96.67%) of children were not getting anything other than breast milk. Only 3.33% of children were not on exclusively breast milk because of insufficient breast milk of mother. Results of a similar study shows that out of 60 children who participated in the study, more than half of them were on exclusively breastfeeding.⁴¹ The 43.34% of children were come for first dose of pentavalent vaccine, and 23.33% were for third dose. In another study conducted by Ms. Kavitha K in Bangalore among infants supported above findings

More than half (56.67%) of children had previous IM injection exposure and 43.33% were not had any exposure. Similar findings not found.

Section II: Findings related to effectiveness of ice pack application and manual pressure application on pain level during vaccination.

- In this study, the investigator found that more than half of samples in ice pack application group were having mild pain (55%) and only (10%) children were having severe pain. The present study findings shows that there a significant difference in the level of pain between infants who receive ice pack application and control group during pentavalent vaccination. The mean value of ice pack application was 2.4 and in control group was 5.2. Since there will be a significant difference in level of pain between infants who receive ice pack application and control group during pentavalent vaccination, null hypothesis (H_1) is rejected.
- The above mentioned results were supported by a study conducted in Mangalore to assess the effectiveness of ice application on pain among toddlers receiving immunization. The result of the study showed that the mean post-test value computed between experimental and control group pain scores are statistically significant. The study concluded that ice application is a safe and effective complimentary alternative method in pain management and it can be safely added to many other tools used by pediatric nurses and physicians.
- In the present study investigator found that there was some reduction in the level of pain in infants using manual pressure application at injection site during vaccination. Less than half of children (45%) were having moderate pain and (55%) of children were having severe pain. The present study findings concluded that there a significant difference in the level of pain between infants who receive manual pressure application and control group during pentavalent vaccination. The mean value of manual pressure application group was 4.7 and in control group was 5.2. Since, there will be a significant difference in level of pain between infants who receive manual pressure application and control group during pentavalent vaccination, null hypothesis (H_2) is rejected.
- The above mentioned findings were supported by an experimental study was conducted to determine the effectiveness of pressure at the injection site. 212 infants were randomly assigned to 2 groups. The experimental group (N=106) received IM injection of the DPT with the application of manual pressure at the

injection site and the control group (N=106) without manual pressure. After IM injections a significant ($p<0.0001$) pain reduction in the experimental group compared to control group was observed: 1.90+/-1.27 vs 5.16+/-1.37 (mean pain reduction: 63.2%), 88.5% of the infants in the experimental group and 11.4% in the control group rated the pain as < 3 . Thus, this study recommended that the application of manual pressure in the reduction of pain during IM injection.

- In the present study, mean value (ice pack 2.4 and manual pressure 4.7) shows that there was a significant difference in level of pain among infants who receive ice pack application and those who receive manual pressure during pentavalent vaccination. Since, there will be a significant difference in level of pain among infants who receive ice pack application and those who receive manual pressure during pentavalent vaccination, null hypothesis (H_3) is rejected.

Conclusion

The main aim of the study was, to assess the effectiveness of ice pack application Vs manual pressure on pain at pentavalent vaccination site among infants attending immunization clinic in selected Hospital, Bangalore". Data were collected from 60 infants, using NIPS scale and the data was analyzed by descriptive and inferential statistics and presented in the form of tables and graphs.

The findings of the study revealed that there is a significant reduction in the level of pain in all the three groups at 0.05 level of significance with ANOVA 'F' value of 33.55.

The study concluded that there is significance difference between the groups, ice pack application group, manual pressure application group and control group. Both interventions were effective in reducing level of pain in infants during pentavalent vaccination.

The process of study was a benefiting experience to the investigator. It helped to understand and assess the level of pain in infants during pentavalent vaccination. The study also facilitated the researcher to recognize the role of ice pack and manual pressure in reducing level of pain among pentavalent vaccination, which can be included into holistic nursing care.

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