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Effectiveness of Facilitated Tucking Position on Level Pain During Pentavalent Vaccination Among Infants at Selected Primary Health Centres, Bengaluru, Karnataka State

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Abstract*: The pain associated with such injections is a source of distress for children, their parents and those administering the injections. If not addressed, this pain can lead to procedural anxiety in the future, needle fears and health care avoidance behaviors, including nonadherence with vaccination schedules. A true experimental study aimed to assess the effectiveness of facilitated tucking position on level of pain during pentavalent vaccination among infants in selected primary health centers, Bengaluru. Objectives: 1. To assess the level of pain during the pentavalent vaccination among infants in experimental and control group. 2. To assess the effectiveness of facilitated tucking position on level of pain during pentavalent vaccination among infants in experimental group. 3. To find out an association between the level of pain among infants receiving pentavalent vaccination with their selected demographic variables. Methods: A quantitative research approach, true experimental post- test only control group design was used, with non-probability purposive sampling technique. The sample size was 30 infants in experimental group and 30 infants in the control group. Data was collected from 60 infants using structured interview questionnaire which consists of the demographic, infant variables, maternal variables, clinical variables, parenting factors and Neonatal Infant Pain Scale Score checklist was used to assess the level of pain among infants. Facilitated tucking position was given during pentavalent vaccination to the experimental group and control group received vaccination without the intervention, post-test was scheduled during vaccination. Results: The findings of the analysis revealed that Mean pain score among the infants in the experimental group was 5.0 with SD of 1.37 whereas mean pain score of the infants in the control group was 5.7 with SD of 1.22. The mean difference score was 0.7. The calculated independent 't' test value of t- value= 2.2, was found to be statistically significant at p< 0.05 level and the p- value= 0.03. which infers that there was evidence that facilitated tucking position was effective in reducing pain level among infants during pentavalent vaccination. Interpretation and conclusion: In the present study, the researcher analysed the effectiveness of facilitated tucking position among infants during pentavalent vaccination; the results infer that there was a subsequent reduction in the level of pain in experimental group. Hence it is proved that facilitated tucking position is effective in reducing the pain level among infants during pentavalent vaccination.

***Keywords*: Effectiveness, Facilitated Tucking Position, Pain, Pentavalent Vaccination, Infant.**

1. Introduction

The pentavalent vaccine was introduced in India through the national immunization programme. It was started as a pilot study in Kerala and Tamil Nadu and so far, has been subjected to many studies and clinical trials on safety and efficacy [1]. This vaccination is one vaccine against five diseases, it provides protection to a child from 5 life threatening diseases - mDiphtheria, Pertussis, Tetanus, Hepatitis B and Hib. DPT (Diphtheria, Pertussis, Tetanus) and Hep B arealready part of routine immunization in India by 2011 later Hib vaccine is a new addition.

Together, the combination is called Pentavalent [2].

In India, the study conducted by serum institute of India noted that the common local reactions reported after the administration of PVV (Pentavalent vaccine) 0.5 ml of vaccine to the infant of age group of 6, 10 and 14 weeks, were pain, swelling, and redness at the injection site, which subsides in 2 days. The common systemic reactions were fever, irritability, and unusual crying [3].

Immunization is a global health and development success story, saving millions of lives every year. Vaccines reduce risks of getting a disease by working with your body's natural defenses to build protection. When you get a vaccine, your immune system responds. The number of completely unvaccinated children increased by 5 million since 2019. To prevent more than 20 life threatening diseases, helping people of all age live longer, healthier lives. Immunization currently prevents 3.5-5 million deaths every year from diseases like diphtheria, tetanus, pertussis, influenza and measles. Immunization is a key component of primary health care and an indisputable human right. Vaccines are also critical to the prevention control of infectious disease outbreaks. Yet despite tremendous progress, vaccination coverage as plateaued in recent years and dropped since 2020 [4].

These methods are valuable alternatives for pain control

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during brief invasive procedures performed on new-born. Although sweet solutions and breast feeding are widely suggested for decreasing acute immunization discomfort, their usage in clinical practice has limits. When compared to psychological or pharmacological therapies for pain alleviation, physical interventions are the least expensive and easiest to be implemented (Reis et al. 1998) swaddling, shushing, swinging, sucking and posture are typical ways for reducing acute vaccination pain. The purpose of this study is to evaluate the pain among infants during pentavalent vaccination performed in the facilitated tucking position and the classical holding position, respectively [5].

2. Materials and Methods

A. Research Approach

Quantitative experimental research approach is applied to find out how well the intervention is effective and to prove the facilitated tucking position is useful in reducing vaccination induced pain during vaccination.

B. Research Design

Research design can be defined as a blueprint to conduct a research study, which involves the description of research approach, study setting. sampling size, sampling technique, tools and method of data collection and analysis to answer specific research questions or for testing research hypotheses. The research design used for the study was True experimental design – Two groups. Post-test-only control design.

1) Variables Under the Study

A variable is anything that has quantity and quality that varies. Variables are qualities, properties or characteristics of person, things or situations that change or vary,

The following variables were used for the study

- *Independent variable*: facilitated tucking position provided for experimental group.
- *Dependent variable*: vaccination induced Pain.
- *Demographic variable*: Age, gender, birth weight, birth order, medical illness, previous exposure to painful exposures, and parenting factors.

C. Setting of the Study

The setting was selected based on acquaintance of the researcher with the Guide, institution, feasibility of conducting the study, availability of the sample, permission and proximity of the setting for the investigation. The study was conducted in, Primary Health Centre, Harohalli, Ramanagara, Bengaluru.

D. Population

In the present study target population are infants receiving pentavalent vaccination at Primary Health Centre, Harohalli, Ramanagara, Bengaluru.

E. Sample

Sample is defined as representative unit of a target population, which is to be worked upon by researchers during their study. In the present study, the sample comprises of Infants receiving pentavalent vaccination who meets the inclusion criteria at Primary Health Centre, Harohalli, Ramanagara, Bengaluru.

F. Sampling Technique

Sampling is the process of selecting a portion of the population to obtain data regarding a problem. In this study the subjects were selected by using nonprobability sampling (purposive sampling) technique

G. Sample Size

The sample size comprises of 60 Infants, 30 subjects were allocated to Experimental group and 30 subjects to Control group by using purposive sampling method.

H. Criteria for Sample Selection

The sampling frame structured by the researcher consists of the following criteria.

I. Inclusion criteria

Infants belongs to the age group less than 1 year.

- Infants who are both male and female.
- Infants receiving pentavalent vaccine.
- Mothers of infants who are willing to participate in the study.
- Infants who are available at the time of study.

J. Exclusion criteria

- Infants who are sick.

K. Selection and Development of the Tool

To meet the objectives of the study the tool was developed by the investigator.

The tool used for the study consists of structured interview questionnaire and Neonatal Infant Pain Scale checklist to assess the effectiveness of facilitated tucking position on level of pain during pentavalent vaccination among infants.

L. Selection of the Tool

A structured interview questionnaire to collect the demographic variable data and Neonatal Infant Pain Scale checklist to assess the level of pain and the effectiveness of facilitated tucking position on level of pain during pentavalent vaccination among infants.

M. Development of the Tool

Structured interview questionnaire to collect the demographic variable data and Neonatal Infant Pain Scale checklist was used to assess the level of pain and the effectiveness of facilitated tucking position on level of pain during pentavalent vaccination among infants.

The following steps were carried out to prepare the tool.

1. Review of literature
2. Consultation with the guide, Subject experts of Pediatric Nursing, Pediatricians and statistician.
3. Establishment of tool validity and reliability

1) Description of the Tool

The demographic proforma is used to collect the selected demographic data and the Neonatal Infant Pain Scale (NIPS) score checklist is used to assess the level of pain in infants.

The tool comprised of two sections namely

Section 1: Socio Demographic variable proforma.

Section 2: Neonatal Infant Pain Scale (NIPS) Score checklist.

N. Data Collection Procedure

1) Phase-1: Pre Assessment Phase

- A formal permission was obtained from the concerned authority from the, primary health center, Primary Health Centre, Harohalli, Ramanagara, Bengaluru. and clearance from the institutional ethical committee.
- The purpose of the study was explained to the subjects' mother and written informed consent was taken from the mother in the Primary Health Centre, Harohalli, Ramanagara, Bengaluru.
- Total 60 infants that fulfil the selection criteria were selected by non-probability sampling technique and randomly allocated by purposive sampling method into two study groups, in which 30 infants as experimental group and remaining 30 infants as control group.
- The demographic baseline proforma was collected from the 60 subject's mothers, those who met the inclusion criteria.

2) Phase-2: Intervention Phase/Assessment Phase

The scheduled intervention is administered to the experimental group with tucking position and held in the position by the researcher on their mother's lap in supine position until vaccine is administered by the vaccinator, to the control group the pentavalent vaccine was administered as per the hospital procedure.

3) Phase-3: Post Assessment Phase

Assessment of the pain level was done by the researcher using video captured during vaccination by researcher assistant and also by using Neonatal Infant Pain Scale (NIPS) checklist on both experimental and control group.

O. Plan for Data Analysis

After the data collection from the mothers of infants, the collected data were organized, tabulated, summarized and analyzed. The data were analyzed according to objectives and hypothesis of the study by using both descriptive and inferential statistics.

P. Descriptive Statistics

1. Analysis of socio demographic data were done by using frequency and percentage distribution.
2. The pentavalent vaccine induced pain level among infants were analyzed by computing frequency, percentage, mean and standard deviation.

Q. Inferential Statistics

1. Chi-square test was used to find out the association between the levels of pain with their selected demographic variables among infants receiving pentavalent vaccination.
2. Unpaired 't' test was used to find out the significant difference between the level of pain and also to determine the effectiveness of facilitated tucking position on level of pain during pentavalent vaccination.
3. The analyzed data were presented in the form of tables, graphs and diagrams.

R. Ethical Consideration

The ethical consideration was taken into account for the purpose of the study to evaluate the effectiveness of facilitated tucking position on level of pain during pentavalent vaccination among infants. Ethical clearance was taken from the institutional ethical committee. A formal Prior permission was obtained from the concerned authority of the selected Primary Health Centre. Informed Consent was taken from the subject's mothers before the study by explaining all the procedure.

Confidentiality of the samples was assured. Thus, the ethical issues were censured in the study and doesn't have any other ethical issues.

3. Results

The table 1, depicts that, out of 30 patients each infant in the Experimental group and control group, majority 21(70.0%) of the infants in Experimental Group and 23(76.7%) infants in Control Group were term babies.

The table 2 revealed that, majority 14(46.7%) of each infant in experimental group weighing less than 2.5kg and between 2.5-3.5kg respectively where as in control group, majority 19(63.3%) of the infants weigh between 2.5-3.5kg.

Table 1
Frequency and Percentage distribution of the study participants according to their gestational age

		Experimental group		Control group	
S.No.	**GA**	**Frequency**	**Percentage**	**Frequency**	**Percentage**
1	Term	21	70.0%	23	76.7%
2	Preterm	02	6.7%	04	13.3%
3	Post term	02	6.7%	02	6.7%
4	LBW	05	16.7%	01	3.3%
Total		**30**	**100.0**	**30**	**100.0**

Table 2
Frequency and Percentage distribution of the study participant according to their low birthweight

		Experimental group		Control group	
S.No.	**LBW (kg)**	**Frequency**	**Percentage**	**Frequency**	**Percentage**
1	< 2.5	14	46.7%	7	23.3%
2	2.5-3.5	14	46.7%	19	63.3%
3	>3.5	2	6.7%	4	13.3%
Total		**30**	**100.0**	**30**	**100.0**

Table 3
Frequency and percentage distribution of the study participants according to their age

		Experimental Group		Control Group	
S.No.	**Age (weeks)**	**Frequency**	**Percentage**	**Frequency**	**Percentage**
1	1.5-2 months	9	30.0%	14	46.7%
2	2.5-3 months	9	30.0%	4	13.3%
3	3.5-4 months	6	20.0%	11	36.6%
4	>4 months	6	20.0%	1	3.3%
Total		**30**	**100.0**	**30**	**100.0**

Table 4
Comparison of pain score among the infants in the Experimental Group and Control Group (*N=60 (30=30)*)

Group	N	Mean	Std. Deviation	Std. Error Mean	t-value	df	P-value P<0.05
Experimental	30	5.0	1.37	0.25			
Control	30	5.7	1.22	0.22	2.2	58	0.03(S)

****p<0.05, S- Significant*

The data given in table 3 shows that among Experimental Group majority 9(30%),9(30%) were in the age group of 1.5-2 months and 2.5-3 months respectively. Among Control Group majority 14 (46.7%) were in the age group of 1.5-2 months, and minority 4(13.3%) were between 2.5-3 months and 1(3.3%) were >4 months.

The table 4, depicts that mean pain score among the infants in the Experimental Group was 5.0 with SD of 1.37 whereas mean pain score of the infants in the Control Group was 5.7 with SD of 1.22. The difference in the mean pain score was statistically significant

Conclusion: It was concluded that mean pair score among the infants in the Experimental Group was significantly less in comparison with Control Group with t-value=2.2 and p-value =0.03. There was evidence that facilitated tucking position was effective in reducing pain level among the infants during the pentavalent vaccination.

Mean, difference in Mean, and Percentage reduction in pain during the during the pentavalent vaccination among the infants in Experimental Group and Control Group.

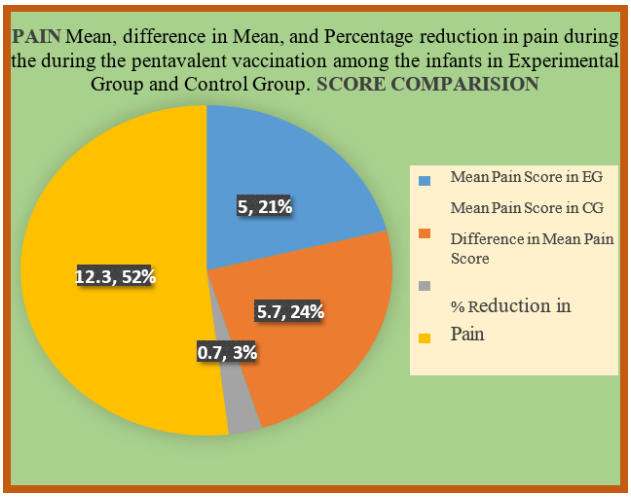

Fig. 1. Score Comparison

From the above Figure, it was clear that, mean pain score among the infants in the Experimental Group was 5.0 whereas mean pain score among the infants in the Control Group was 5.7. The difference in mean pain score was 0.7 and percentage reduction in pain score among the infants was 12.3% than Control Group.

Conclusion: It was concluded that, facilitated tucking position was effective in reducing the pain 12.3% more during pentavalent vaccination among the infants in Experimental Group than Control Group.

The table 5 revealed that, Association was not significant between the levels of pain among the infants receiving pentavalent vaccination with their socio-demographic variables such Gestational Age (GA), Birth weight, age, gender, birth order, type of feeding, last fed, nature of birth, previous history of medical illness and surgery, exposure to invasive procedure, and care taker

4. Discussion

A report finding is never sufficient to convey their significance. The meaning that researchers give to the results plays an important role in the report.

This chapter deals with the detailed discussion of the data and results of the study in brief as interpreted from the descriptive and inferential statistics, in accordance with the objectives and the hypothesis of the study.

The present study was conducted to compare the effectiveness of facilitated tucking position on level of pain during pentavalent vaccination among infants in selected Primary Health Centre, Bengaluru.

The facilitated tucking position is the position of the baby in its mother's womb. It calms the neonate and helps it feel safe and maintain body control. It also improves sleep quality, stabilizes physiological parameters, gives a sense of security, supports motor development, and optimizes energy use**.** Exposure of premature babies to painful procedures is associated with changes in brain development, regardless of other factors. Facilitated tucking reduces the expression of pain in premature infants. which has great impact and effect in reducing pain level during invasive procedures among infants and this research confirms the same.

The researcher adopted Quantitative experimental approach, true experimental design, post-test only control group design. 60 samples were selected by non-probability (purposive sampling method) sampling technique. The level of pain during pentavalent vaccination was assessed using Neonatal Infant Pain Scale score checklist. Sister callista's Roy Adaptation Model Nursing Theory was adopted for conceptual framework in the study.

Table 5
Association between the levels of pain among the infants receiving pentavalent vaccination with their socio-demographic variables. *N=60(30=30)*

S.No.	Pain		Chi-square	Df	p-value	Result
	≤M	>M				
Gestational Age						
Term	34	10	3.761(a)	3	.289	NS
Preterm	3	3				
Post term	4	0				
LBW	5	1				
Birth Weight (kg)						
< 2.5	27	6	1.147(a)	2	.564	NS
2.5-3.5	4	2				
>3.5						
Infant age						
15.2-2	17	6	2.580(a)	3	.461	NS
2.5-3.0	10	3				
3.5-4.0	12	5				
>4.0	7	0				
Gender						
Male	24	6	.373(b)	1	.542	NS
Female	22	8				
Birth order						
First	24	9	1.170(a)	2	.557	NS
Second	17	3				
Third	5	2				
Types of Feeding						
Breast Feeding	39	12	.717(a)	2	.699	NS
Artificial Feeding	5	2				
Weaning	2	0				
Last Feed given						
< 30Min Ago	17	6	.158(b)	1	.691	NS
>30 Min Ago	29	8				
Nature of birth						
Vaginal	24	6	.373(b)	1	.542	NS
LSCS	22	8				
Previous history of medical illness						
Yes	10	4	.280(b)	1	.597	NS
No	36	10				
Previous history of surgery						
Yes	1	0	.310(b)	1	.578	NS
No	45	14				
Explosive to invasive procedure						
Yes	46	14	****			
No	00	00				
Care taker of the infant						
Mother	1	0	0.310(b)	1	0.578	NS
Parents	45	14				

***Chi-square can't be calculated because invasive procedure is constant

The findings of the study were discussed under the following headings,

1. Socio Demographic characteristics of Infants in Experimental and Control Group.
2. Objectives and hypothesis of the study.

A. Socio Demographic Characteristics of Infants in Experimental and Control Group

1) Gestational Age

The present study reveals that in Experimental group, majority 21(70.0%) of the Infants were term babies and 5 (16.7%) were Low Birth Weight (LBW) babies and remaining 2+2=4 (6.7%) was pre term and post-term babies. whereas in Control group, majority 23 (76.7%) of the participants were term babies and 4(13.3%) of the participants were preterm babies, and the remaining 2 (6.7%) and 1 (3.3%) of them were post-term and Low Birth Weight babies (LBW) respectively.

The study supported by a Similar study from Kisku J. (2019) reported that among the experimental group, majority 33(82.5%) were term infants, 6(15%) were preterm and minority 1(2.5%) was post term infant.

2) Birth Weight

The present study reveals clearly that, majority 14(46.7%) of each infant in experimental group weighing less than 2.5kg and between 2.5-3.5kg respectively where as in control group, majority 19(63.3%) of the infants weigh between 2.5- 3.5kg.

The study supported by a Similar study from Kisku J. (2019) revealed that in control group majority 32(80%) had birth weight of 2.5-3.5 kg and minority 4 (10%) were less than 2.5 kg and more than 3.5 kg respectively. Among experimentall group majority 33(82.5%) were of birth weight between 2.5–3.5 kg 6 (15%) were less than 2.5 kg and minority 1 (2.5%) was more than 3.5 kg.

3) Age

The present Study findings shows that among Experimental group majority 9(30%),9(30%) was in the age group of 1.5-2 months and 2.5-3 months respectively and 6(20%),6(20%) was in the age group of 3.5-4 months and >4 months respectively.

Among Control group majority 14 (46.7%) were in the age group of 1.5-2 months, 11(36.6%) were between 3.5-4 months and minority 4(13.3%) were between 2.5-3 months and 1(3.3%) were >4 months

The study supported by a Similar study from Kisku J. (2019) revealed That among control group majority 16(40%) were in the age group of 10-14 weeks 14(35%) were within 6-10 weeks and minority 10 (25%) were 14-18 weeks. Among experimental group majority 24 (60%) were in the age group of 6-10 weeks 12(30%) were between 10-14 weeks.

4) Gender

The present study revealed that, majority 16(53.3%) each of the infants in Experimental Group and Control Group were male and female respectively, and remaining 14(46.7%) each of the infants in Experimental Group and Control Group were female and male respectively.

The study supported by a Similar study from Kisku (2019), given that in control group, majority 24(60%) were females and 16 (40%) minority were males. Among the experimental group, majority 26(65%) were males and minority 14(35%) were females.

5) Birth Order

The present study findings showed that, majority 18(60.0%) 15(50.0%) infants in Experimental Group and Control Group were in first order of birth and only few 2(6.7%) in Experimental Group and 5(16.7%) in Control Group were in Third birth order.

The study supported by a Similar study from Kisku J. (2019) infers that in control group, majority 29(72.5%) were the second born 10(25%) were first born and minority 1(2.5%) were of more than third birth order and none were third born. Among the experimental group majority 18(45%) were the first and second born in the family and least 4(10%) were the third born and none were of more than third birth order

6) Type of Feeding

The present study findings revealed that, majority 27(90.0%) of the infants in Experimental Group had breast feeding where in Control Group, 24(80.0%) infants were getting breast feeding and only 1(3.3%) each infant in Experimental Group and Control Group were on weaning.

The study supported by a Similar study from Kisku J. (2019) shows that among control group majority 36(90%) were on breast feeding 3(7.5%) were on both breast feed and artificial feed least 1(2.5%) were on artificial feed. Among experimental group, majority 29(72.5%) were on breast feeding 8(20%) were on both artificial and breast feed and minority 3(7.5%) were on artificial feed.

7) Last Feed Given

The present study Shows that among Experimental Group, majority 16 (53.3%) were breast fed more than 30 min ago and minority 14 (46.7%) were given feeding less than 30 min ago. And among Control Group, majority 21 (70.0%) were breast fed more than 30 min ago and minority 9 (30.0%) were given feeding less than 30 min ago.

The study supported by a similar study from Kisku J. (2019) noted that among control group, majority 23(57.5%) were breast fed more than 30 minutes ago and minority 17(42.5%) were given feed less than 30 minutes ago. Among experimental group majority 38(95%) were breast fed less than 30 minutes ago and minority 2(5%) were breast fed less than 30 minutes ago.

8) Nature of the Birth

The present study findings reveal that majority 15(50.0%) infants in experimental and control group had vaginal delivery and remaining 15(50.0%) in Experimental Group and Control Group had LSCS delivery

The study supported by a Similar study from Kisku J. (2019) given that Majority 28(70%) of the infants in control group are delivered through LSCS, and 24(60%) in experimental group are delivered the infant through LSCS.

9) Previous History of Medical Illness

In the present study it was noted that, majority 22(73.3) and 24(80.0%) infants in Experimental Group and Control Group had no previous history of medical illness respectively whereas 8(26.7%) infants in Experimental Group and 6(20.0%) in Control Group had previous history of medical illness

The study supported by a similar study from Kisku J. (2019) given that majority 34(85%) infants in control group had no previous history of any medical illness, and 31(77.5%) infants in experimental group had no previous history of medical illness.

10) Previous History of Surgery

The present study revealed that only 1(3.3%) of the infants in Experimental Group had previous history of surgery where as in Control Group, none of the infants had previous history of surgery.

The study supported by a similar study from Kisku J. (2019) given that majority 36(90%) in control group had no previous history of surgery, and 39(97.5%) in experimental group had no previous history of surgery.

11) Exposure to Invasive Procedure

The present study reveals that, all 30(100. %) infants in experimental and control group were exposed to invasive procedure

The supported by a similar study from Kisku J. (2019) given that majority 36(90%) in control group were not exposed to any invasive procedures. And 31(77.5%) in experimental group were not exposed to invasive procedure.

12) Care taker of the Infant

In the present study it was seen that, parents were the care taker of all 30(100.0%) of all the infants in the Experimental Group where as in Control Group 29(96.7%) infants had parents as care taker and 1(3.3%) infant safe kept by mother.

5. Objectives and Hypothesis of the Study

A. Assessment of Level of Pain During Pentavalent Vaccination by Using NIPS Score Checklist Among Postnatal Mothers in Selected Maternity Hospitals, Bengaluru

The present study showed that majority 20(66.7%) of the infants in experimental group had sever level of pain whereas 24(80.0%) of the infants in Control Group had sever level of pain during the pentavalent vaccination.

Conclusion: it was concluded that facilitated tucking position

had reduced level of pain among the infants in the experimental group than control group

The study supported by a similar study from M. Sumathi et.al (2023) revealed that majority17(56.7%) of infants had mild pain, 10(33.3%) of the infants had no pain, and minority 3(10.0%) of then experienced moderate pain among control group majority of 17(56.7%) of the infants had moderate pain ,7(23.3%) 0f the infants had severe pain and minority 6(20.0%) of the infants experienced mild pain Therefore, the hypothesis H2 stated "There will be a significant difference in the level of pain perception during pentavalent vaccine among infants in experimental and control group" was accepted.

The study supported by a Similar study from Kisku J. (2019) reveals that among control group majority 31(77%) had severe pain 9(22.5%) had moderate pain. Among experimental group majority 27(67.5%) had moderate pain 11(27.5%) had mild pain 2(5%) had severe pain and least 0(0%) had no pain

Therefore, the hypothesis H1 stated "There is a significant difference in the level of pain perception during Pentavalent Vaccination among infants in experimental group and control group" was accepted.

B. Finding the Effectiveness of Facilitated Tucking Position on Level of Pain Perception Among Infants in Experimental Group

The present study reveals on comparing the pain scores between the experimental and control group it was seen that mean pain score among the infants in the experimental group was 5.0 with SD of 1.37 whereas mean pain score of the infants among the infants in the control group was 5.7 with SD of 1.22. The difference in the mean pain score was statistically significant

Conclusion: It was concluded that mean pair score among the infants in the Experimental Group was significantly less in comparison with Control Group with t-value=2.2 and p-value =0.03. There was evidence that facilitated tucking position was effective in reducing pain level among the infants during the pentavalent vaccination

The supported by a similar study from M. Sumathi et.al (2023) revealed that the findings and the analysis shows that the post -test mean score of pain during pentavalent vaccination among infants in the experimental group was 1.27 with standard deviation of 1.11 and the mean score in the control group was 3.77 with standard deviation of 1.16. The mean difference score was 2.50. The calculated student independent „t" test value of t= 8.501 was found to be statistically significant at $p<0.005$ level which infers that facilitated tucking position administered among the infants during pentavalent vaccination was found to be effective in reduction of pain among the infants in the experimental group than the infants in the control group who had undergone hospital routine measures

The study supported by a similar study from Kisku J. (2019) infers the level of pain perception among infants in control and experimental group. Among control group overall mean score was 5.32 with SD Of 0.85 and among experimental Group overall mean score was 3.42, with SD of 0.95, Mean Difference was 1.9 and Mean Standard Deviation was 0.1. The calculated unpaired 't' value was 9.59 which was foundto be statistically significant at $p<0.05$ level which indicates that the infants who were given facilitated tucking position had reduced pain during Pentavalent vaccination.

Therefore, the hypothesis H2 stated "There is a significant relationship between the facilitated tucking position and the level of pain during Pentavalent Vaccination among infants in experimental group." was accepted.

C. Association between the Level of Pain Among Infants Receiving Pentavalent Vaccination with their Selected Demographic Variables

The present study reveals Chi-square can't be calculated because invasive procedure is constant and the findings shows that, Association was not significant between the levels of pain among the infants receiving pentavalent vaccination with their socio-demographic variables such Gestational Age (GA), Birth weight, age, gender, birth order, type of feeding, last fed, nature of birth, previous history of medical illness and surgery, exposure to invasive procedure, and care taker.

The study supported by a similar study from M. Sumathi et.al (2023) revealed that the association of level of pain perception and selected demographic variables among the infants in experimental group with selected demographic variables. The findings reveals that the level of pain perception on facilitated tucking position was no significant association with the selected demographic variables like gender of the infant, gestational age of the infant, birth weight of the infant, birth order of the infant, type of feeding, last feed given, educational status of the mother, occupation of the mother and place of living and There is a significant association was found in the selected demographic variables of age of infant and nature of birth. Hence the research hypothesis (H3) was accepted.

The study supported by a similar study from Kisku J. (2019) revealed that, Association was not significant at significance level 0.05 between the levels of pain among the infants receiving pentavalent vaccination with their socio-demographic variables such Gestational Age (GA), Birth weight, age, gender, birth order, type of feeding, last fed, occupation of the mother, educational status of the mother, place of living, nature of birth, previous history of medical illness and surgery, and exposure to invasive procedure.

Therefore, the hypothesis H3 stated "There is a significant association between the level of pain among infants receiving Pentavalent vaccination with their selected demographic variables". Was rejected.

D. Limitations

1. The investigator found difficulty in getting number of samples within the scheduled time.
2. The investigator had difficulty in controlling the infants during the procedure.

E. Recommendations

The researcher presents strong recommendation to the pediatric nurses, to involve actively on prevention of the long-term consequences of repeated painful stimuli through the simple cost-effective nursing measure, facilitated tucking

during Pentavalent vaccination. The study recommends the following for further research.

- The researcher recommends for implementing the facilitated tucking in infants undergoing Pentavalent vaccination in the immunization centers or in hospital OPD by the students in affiliated hospitals.
- A comparative study can be conducted to compare the effectiveness of facilitated tucking with other non-pharmacological pain relief measures.
- The study can be replicated with large samples in various other settings for reinforcement and generalization.
- Further study can be held to find out on the effectiveness of facilitated tucking position on other diagnostic procedures.

F. Conclusion

Facilitated Tucking Position was an effective measure in reducing the level of pain during Pentavalent vaccination among Infants. Since it is an easy method to apply and practice, the nurses can be taught by the experts to apply tucking position and they can practice in Vaccination centers, hospitals and clinics.

6. Summary

The essence of any research project lies in reporting the findings. This sectionpresents the summary of the study and its major findings along with implications. The main aim of the study was to assess the effectiveness of facilitated tucking position on level of pain during pentavalent vaccination among infants at selected Primary Health Centre Bengaluru.

For different age groups (as infants, children, adolescence and adults), there are various pain-relieving interventions available which doctors and nurses can provide during vaccinations.. Facilitated tucking position was also one of the best methods to reduce vaccination pain in the infants. Therefore, facilitated tucking position can be used to reduce the pain during the vaccination in the infants.

References

[1] Ministry of Health and Family Welfare, *Immunization Handbook for Medical Officers*, New Delhi: Government of Karnataka, 2009. [Online]. Available: https://g.co/kgs/rVnCmk

[2] M. Bairwa, M. Pilania, M. Rajput, P. Khanna, N. Kumar, M. Nagar, and S. Chawla, "Pentavalent vaccine: a major breakthrough in India's Universal Immunization Program," *Hum. Vaccin. Immunother.*, vol. 8, no. 9, pp. 1314–1316, Sep. 2012.

[3] World Health Organization, "Health topics: vaccines and immunizations," *WHO*, 2022. [Online]. Available: https://www.who.int/health-topics/vaccines-and-immunization

[4] D. K. Cope, "Neonatal pain: The evolution of an idea," *The American Association of Anesthesiologists Newsletter*, Sep. 1998. [Online]. Available: www.asahq.org/Newsletters/1998/09_98/Neonatal_09_98.html

[5] R. Sethi and G. Nayak, "Effect of 24% oral sucrose in pain reduction during venipuncture in neonates," *Asian J. Nurs. Educ. Res.*, vol. 5, no. 4, pp. 457, Oct. 2015.

[6] S. Kucukoglu, S. Kurt, and A. Aytekin, "The effect of the facilitated tucking position in reducing vaccination-induced pain in newborns," *Ital. J. Pediatr.*, vol. 41, no. 61, Aug. 2015.

[7] J. P. Yadav, A. Agrawal, and V. D. Sawant, "Effect of facilitated rocking movement in reducing vaccination-induced pain in young infants: A randomized control trial," *Bull. Natl. Res. Cent.*, vol. 46, no. 1, pp. 1–6, Dec. 2022.

[8] J. Trück, S. Kelly, S. Jawad, M. D. Snape, M. Voysey, and A. J. Pollard, "Differences in immunization site pain in toddlers vaccinated with either the 10- or the 13-valent pneumococcal conjugate vaccine," *Pediatr. Infect. Dis. J.*, vol. 37, no. 4, pp. e103–e106, Apr. 2018.

[9] World Health Organization, "Health topics: vaccines and immunizations," *WHO*, 2022. [Online]. Available: https://www.who.int/health-topics/vaccines-and-immunization

[10] V. S. Fontes, C. J. Ribeiro, R. A. Dantas, and M. D. Ribeiro, "Pain relief strategies during immunization," *Br. J. Pain*, vol. 1, pp. 270–273, Jul. 2018.

[11] N. L. Schechter et al., "Pain reduction during pediatric immunizations: evidence-based review and recommendations," *Pediatrics*, vol. 119, no. 5, pp. e1184–e1198, May 2007.

[12] R. Sethi and G. Nayak, "Effect of 24% oral sucrose in pain reduction during venipuncture in neonates," *Asian J. Nurs. Educ. Res.*, vol. 5, no. 4, p. 457, Oct. 2015.

[13] S. Kucukoglu, S. Kurt, and A. Aytekin, "The effect of the facilitated tucking position in reducing vaccination-induced pain in newborns," *Ital. J. Pediatr.*, vol. 41, no. 1, pp. 1–7, Dec. 2015.

[14] M. Connelly, D. P. Wallace, K. Williams, J. Parker, and J. V. Schurman, "Parent attitudes toward pain management for childhood immunizations," *Clin. J. Pain*, vol. 32, no. 8, pp. 654–658, Aug. 2016.

[15] F. R. Berberich and N. L. Schechter, "Pediatric office pain: crying for attention," *Pediatrics-English Edition*, vol. 129, no. 4, pp. e1057, Apr. 2012.

[16] J. Jose and J. Umarani, "Effect of ice application in reducing pain perception of toddlers during immunization," *Int. J. Res. Sci. Res.*, vol. 4, no. 5, pp. 630–633, 2013.

[17] M. Grech, "Reducing procedural pain in preterm infants by facilitated tucking," B.Sc. thesis, Univ. Malta, 2022.

[18] "Administration of oral sucrose to reduce immunization-induced pain and distress for infants one to eighteen months of age," 2012.

[19] K. Y. Nagi, *Administration of oral sucrose to reduce immunization-induced pain and distress for infants one to eighteen months of age*, M.S. thesis, Univ. of Hong Kong, 2012.

[20] V. Bharathi, C. Pavithra, and M. Sumathi, "Effectiveness of facilitated tucking position on level of pain perception during pentavalent vaccination among infants in a selected hospital, Erode," Doctoral dissertation, Vivekanandha College of Nursing, Apr. 2023.

[21] S. E. M. Diab, "The effect of facilitated tucking position on premature outcomes and pain intensity induced by invasive procedure in premature," *Egypt. J. Health Care*, vol. 14, no. 1, pp. 463–474, Mar. 2023.

[22] A. A. Mohammed, A. Elsharkawy, and R. I. Radwan, "Effect of facilitated tucking and gustatory stimulation on preterm neonates' physical growth and behavioral regulation," *Menoufia Nurs. J.*, vol. 8, no. 1, pp. 13–30, Mar. 2023.

[23] G. Altay and S. Küçükoğlu, "Effects of the facilitated tucking position on physiological parameters, comfort, and breastfeeding performance in late preterm infants: A randomized controlled trial," *Midwifery*, vol. 115, p. 103492, Dec. 2022.

[24] J. Joshy and M. P. Omana, "Effectiveness of facilitated tucking on pain and physiological parameters during heel lancing among neonates," *Int. J. Nurs. Educ. Res.*, vol. 10, no. 3, pp. 249–254, 2022.

[25] B. Pouraboli et al., "The effect of facilitated tucking on the pain intensity induced by chest tube removal in infants," *Adv. Neonatal Care*, vol. 22, no. 5, pp. 467–472, Oct. 2022.

[26] L. Rajavelu, R. Ramachandran, M. Dash, and K. Durairaj, "The effect of the facilitated tucking position, kangaroo mother care position in reducing vaccination-induced pain in newborns," Nov. 2022.

[27] D. A. Doaa, "Crossover study: Effect of facilitated tucking position on preterm infants pain and suction duration during endotracheal suctioning," *Egypt. J. Health Care*, vol. 13, no. 4, 2022.

[28] N. Sharma, "A study to assess the effectiveness of facilitated tucking position on pain perception among neonates during vaccination in selected hospital of Panipat, Haryana," *Int. J. Nurs. Educ.*, vol. 13, no. 3, pp. 131–135, Jun. 2021.

[29] S. M. Samudre and D. M. Kale, "A study to assess the effectiveness of facilitated tucking on pain during venipuncture among neonates admitted in selected neonatal intensive care units," Aug. 2020.

[30] M. Joseph, R. K. Sasi, and A. Michael, "Effect of facilitated tucking on physiological and behavioural responses to pain among infants receiving vaccination," *Indian J. Forensic Med. Toxicol.*, vol. 14, no. 4, Oct. 2020.

[31] M. G. Neto et al., "The effect of facilitated tucking position during painful procedure in pain management of preterm infants: a systematic review and meta-analysis," *Eur. J. Pediatr.*, vol. 179, no. 5, pp. 699–709, May 2020.

[32] J. Kisku, "A true experimental study to assess the effectiveness of facilitated tucking position on level of pain perception during pentavalent vaccination among the infants in selected hospital OPD in Erode," *M.Sc. thesis*, Shivparvathi Mandradiar Inst. of Health Sci., College of Nursing, Palayakottai, India, Oct. 2019.

[33] M. V. Tondale, "Effectiveness of facilitated tucking on pain among infants undergoing DPT vaccination," *Int. J. Sci. Res. Publ.*, vol. 9, no. 1, pp. 39–44, Jan. 2019.

[34] V. M. Vishnu and G. Drisya, "Effect of facilitated tucking position on pain among infants receiving intramuscular immunization," *Int. J. Pediatr. Nurs.*, vol. 10, May–Aug. 2021.

[35] C. Bidyalaxmi, P. Vetriselvi, and B. Adhisivam, "Effect of facilitated tucking on pain during hepatitis B vaccination among newborns: A randomized controlled trial," *Int. J. Curr. Med. Pharm. Res.*, Jun. 2020.

[36] M. Bueno *et al.*, "The effectiveness of repeated sucrose for procedural pain in neonates in a longitudinal observational study," *Front. Pain Res.*, vol. 4, Art. no. 1110502, Feb. 2023.

[37] A. B. Eissler, L. Stoffel, M. Nelle, S. Hahn, and S. Zwakhalen, "Pain responses in preterm infants and parental stress over repeated painful procedures: A randomized pilot trial," *J. Matern.–Fetal Neonatal Med.*, vol. 36, no. 1, Art. no. 2183753, Dec. 2023.

[38] N. Prabhadevi, "A study to assess the effectiveness of distraction on level of pain perception among infants receiving DPT immunization in selected hospital, Chennai," *Asian J. Nurs. Educ. Res.*, vol. 12, no. 2, pp. 197–200, Apr. 2022.

[39] S. V. Sankpal, P. M. Naregal, V. R. Mohite, and R. B. Karale, "Effectiveness of facilitated tucking in reducing the pain response during venipuncture among preterm neonate admitted in NICU and postnatal ward at tertiary care hospital," *unpublished*.

[40] A. S. Francisco *et al.*, "Positioning effects for procedural pain relief in NICU: Systematic review," *Pain Manag. Nurs.*, vol. 22, no. 2, pp. 121–132, Apr. 2021.

[41] E. Avcin and S. Kucukoglu, "The effect of breastfeeding, kangaroo care, and facilitated tucking positioning in reducing the pain during heel stick in neonates," *J. Pediatr. Nurs.*, vol. 61, pp. 410–416, Nov. 2021.

[42] S. Davari, L. Borimnejad, S. Khosravi, and H. Haghani, "The effect of the facilitated tucking position on pain intensity during heel stick blood sampling in premature infants: A surprising result," *J. Matern.–Fetal Neonatal Med.*, vol. 32, no. 20, pp. 3427–3430, Oct. 2019.

[43] H. F. Peng *et al.*, "Non-nutritive sucking, oral breast milk, and facilitated tucking relieve preterm infant pain during heel-stick procedures: A prospective randomized controlled trial," *Int. J. Nurs. Stud.*, vol. 77, pp. 162–170, Jan. 2018.

[44] A. Ganguly, P. J. Bhadesia, A. G. Phatak, A. S. Nimbalkar, and S. M. Nimbalkar, "Pain profile of premature infants during routine procedures in neonatal intensive care: An observational study," *J. Fam. Med. Prim. Care*, vol. 9, no. 3, pp. 1517–1522, Mar. 2020.

[45] C. Balice-Bourgois *et al.*, "A systematic review of clinical practice guidelines for acute procedural pain on neonates," *Clin. J. Pain*, vol. 36, no. 5, pp. 390–398, May 2020.

[46] K. Shaffer, "Pediatric pain management during intravenous line placement: Nursing perceptions and interventions," *unpublished manuscript*, 2019.

[47] S. Kucukoglu, S. Kurt, and A. Aytekin, "The effect of the facilitated tucking position in reducing vaccination-induced pain in newborns," *Ital. J. Pediatr.*, vol. 41, no. 1, pp. 1–7, Dec. 2015.

[48] O. Lopez *et al.*, "The effect of facilitated tucking on procedural pain control among premature babies," *J. Clin. Nurs.*, vol. 24, nos. 1–2, pp. 183–191, Jan. 2015.

[49] H. Peyrovi, M. Alinejad-Naeini, P. Mohagheghi, and A. Mehran, "The effect of facilitated tucking position during endotracheal suctioning on physiological responses and coping with stress in premature infants: A randomized controlled crossover study," *J. Matern.–Fetal Neonatal Med.*, vol. 27, no. 15, pp. 1555–1559, Oct. 2014.

[50] M. Alinejad-Naeini, P. Mohagheghi, H. Peyrovi, and A. Mehran, "The effect of facilitated tucking during endotracheal suctioning on procedural pain in preterm neonates: A randomized controlled crossover study," *Glob. J. Health Sci.*, vol. 6, no. 4, pp. 278–286, Jul. 2014.

[51] A. Axelin, S. Salanterä, and L. Lehtonen, "'Facilitated tucking by parents' in pain management of preterm infants—a randomized crossover trial," *Early Hum. Dev.*, vol. 82, no. 4, pp. 241–247, Apr. 2006.

[52] X. Cong *et al.*, "The impact of cumulative pain/stress on neurobehavioral development of preterm infants in the NICU," *Early Hum. Dev.*, vol. 108, pp. 9–16, May 2017.

[53] K. Martakis, C. Hünseler, K. Thangavelu, A. Kribs, and B. Roth, "Pain-related reactions among premature infants with gestational age < 26 weeks: An observational cohort study," *Neonatology*, vol. 110, no. 4, pp. 261–266, Nov. 2016.

[54] M. S. Esfahani *et al.*, "A comparative study on vaccination pain in the methods of massage therapy and mothers' breast-feeding during injection of infants referring to Navabsafavi Health Care Center in Isfahan," *Iran. J. Nurs. Midwifery Res.*, vol. 18, no. 6, pp. 494–500, Nov. 2013.

[55] S. Gibbins *et al.*, "Comparison of pain responses in infants of different gestational ages," *Neonatology*, vol. 93, no. 1, pp. 10–18, Jul. 2007.

[56] M. Ipp, P. C. Parkin, N. Lear, M. Goldbach, and A. Taddio, "Order of vaccine injection and infant pain response," *Arch. Pediatr. Adolesc. Med.*, vol. 163, no. 5, pp. 469–472, May 2009.

[57] A. L. Williams, A. Z. Khattak, C. N. Garza, and R. E. Lasky, "The behavioral pain response to heelstick in preterm neonates studied longitudinally: Description, development, determinants, and components," *Early Hum. Dev.*, vol. 85, no. 6, pp. 369–374, Jun. 2009.

[58] K. A. Hartley, C. S. Miller, and S. M. Gephart, "Facilitated tucking to reduce pain in neonates: Evidence for best practice," *Adv. Neonatal Care*, vol. 15, no. 3, pp. 201–208, Jun. 2015.

[59] H. Obeidat, I. Kahalaf, L. C. Callister, and E. S. Froelicher, "Use of facilitated tucking for nonpharmacological pain management in preterm infants: A systematic review," *J. Perinat. Neonatal Nurs.*, vol. 23, no. 4, pp. 372–377, Oct. 2009.

[60] N. Salmani, K. Dehghani, Z. Karjoo, and A. Sadeghnia, "Effect of facilitated tucking created with simulated hands on physiological pain indicators during venipuncture in premature infants," *Iran. J. Neonatol.*, vol. 8, no. 4, Dec. 2017.

[61] M. R. Swain and M. Dash, "Comparison of benefits of facilitated tucking position and kangaroo mother care position: A study of PHC, Boudh, Odisha, India," *IDC Int. J.*, May–Jul. 2019.

[62] A. Pekyigit and A. Açikgöz, "Effects of white noise and facilitated tucking during heel-stick sampling on the pain response of healthy term newborns: A randomized controlled study," *J. Pediatr. Res.*, vol. 10, no. 1, pp. 1–8, 2023.

[63] Q. Cai *et al.*, "Efficacy and safety of non-pharmacological interventions for endotracheal suctioning pain in preterm infants: A systematic review," *Nurs. Open*, vol. 10, no. 2, pp. 424–434, Feb. 2023.

[64] A. Çantaş Ayar, İ. Kahriman, D. Küçük Alemdar, and Y. Özoran, "Effect of using white noise, embracing, and facilitated tucking on pain during heel-lance blood sampling in newborns," *Early Child Dev. Care*, vol. 193, no. 4, pp. 547–558, Mar. 2023.

[65] Q. Shen, Z. Huang, H. Leng, X. Luo, and X. Zheng, "Efficacy and safety of non-pharmacological interventions for neonatal pain: An overview of systematic reviews," *BMJ Open*, vol. 12, no. 9, Art. no. e062296, Sep. 2022.