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A Study to Assess the Effectiveness of Helfer Skin Tap Technique on Physio-behavioral Parameters during Immunization among Infants at S.V.B.P. Hospital, Meerut

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Abstract

Background: *Immunization is a cornerstone of child health, but intramuscular injections often cause significant pain and distress in infants. The Helfer Skin Tap Technique (HSTT) is a simple, nurse-led, non-pharmacological method that may reduce pain perception.*

Objectives: *To assess the physio-behavioral responses of infants undergoing intramuscular injection without intervention (control group), evaluate the effectiveness of HSTT in reducing pain among infants (experimental group), and determine the association between demographic variables and physio-behavioral responses.*

Methods: *A quasi-experimental post-test only control group design was adopted. Sixty infants (9 months) attending immunization OPD at S.V.B.P. Hospital, Meerut, were purposively sampled and randomly assigned to experimental (HSTT) and control groups. Pain was measured using the Modified FLACC Scale, including physiological parameters (pulse rate, respiration rate) and behavioral indicators (face, legs, activity, cry, Consolability).*

Results: *The mean pain score of the experimental group was significantly lower (7.97 ± 1.73) compared to the control group (12.4 ± 0.96). An independent t-test showed a highly significant difference ($t = 12.30$, $p < 0.05$). No significant association was found between pain scores and demographic variables.*

Conclusion: *Helfer skin tap technique is an effective, safe, and low-cost intervention for reducing pain during infant immunization. Its integration into routine practice can improve the quality of pediatric nursing care and parental satisfaction.*

Keywords: *Helfer Skin Tap Technique, Immunization, Pain Management, Infants, Modified FLACC Scale*

INTRODUCTION

Immunization prevents millions of childhood deaths annually, but painful intramuscular injections often cause physiological and behavioral distress in infants, including crying, tachycardia, and anxiety. Unrelieved pain may have long-term effects on neurodevelopment and health-seeking behaviours. The Helfer Skin Tap Technique, based on gate control theory, uses rhythmic tapping near the injection site to provide tactile stimulation and distraction, thereby reducing pain perception. This study evaluates the effectiveness of HSTT in reducing pain during infant immunization.

Objectives of The Study

- To assess the Physio-behavioral parameters among the infants receiving intramuscular injection in the control group.
- To evaluate the effectiveness of Helfer skin tapping techniques on Physio-behavioral parameters among infants receiving intramuscular injections.
- To associate the Physio-behavioral parameters with selected demographic variables among infants receiving intramuscular injection.

Hypotheses

- H0: There will be no significant effect of Helfer skin tap technique on physio- behavioral parameters associated with intramuscular injection.
- H0(1): There will be no significant association between physio-behavioral parameters related to intramuscular injection among infants and their selected demographic variables.

- H1: There will be significant less perception of pain in infants with Helfer skin tap technique during intra muscular injection.
- H2: There will be a significant association between physio-behavioral parameters related to intramuscular injection among infants and their selected demographic variables.

MATERIALS AND METHODS

- **Design:** Quasi-experimental, post-test only control group design.
- **Setting:** Immunization OPD, S.V.B.P. Hospital, Meerut (U.P.).
- **Sample:** 60 infants aged 9 months, purposively selected.
- **Groups:** Experimental group (HSTT applied before injection), Control group (routine injection).
- **Inclusion Criteria:** Infants aged 9 months, medically stable, attending immunization OPD, and whose parents/guardians gave consent.
- **Exclusion Criteria:** Infants with congenital/neurological disorders, on sedatives or analgesics, critically ill, or whose parents refused consent.
- **Intervention:** In the experimental group, infants received immunization with Helfer Skin Tap Technique and the control group received the routine injection technique without tapping.
- **Tool:**
  - **Demographic Proforma:** Infant's gender, gestational age, and weight.
  - **Modified FLACC Scale:** Pain assessment using facial expression, leg movement, activity, crying, Consolability, pulse rate, and respiration rate.
- **Data Analysis:** Descriptive statistics summarized demographics and pain scores. Inferential statistics (unpaired t-test, chi-square test) were applied; $p < 0.05$ was considered significant.

RESULT

Section-I

Table1.1: Frequency and percentage distribution of samples of experimental group according to their demographic variables
(N=30)

S. No.	Demographic Variables	Frequency	Percentage
1.	**Gender**		
	(a) Male	15	50%
	(b) Female	15	50%
2.	**Gestational age at birth of the infants**		
	(a) <37 weeks	4	13.3%
	(b) 37-40 weeks	26	86.7%
	(c) >40 weeks	00	00
3.	**Weight of the infants**		
	(a) <7.5 kg	3	10%
	(b) 7.5 kg-9.5 kg (c)>9.5kg	25	83.3%
		2	6.7%

Table1.2: Frequency and percentage distribution of samples of control group according to their demographic variables.
(N=30)

S.No.	Demographic Variables	Frequency	Percentage
1.	**Gender**		
	(a) Male	16	53.3%
	(b) Female	14	46.7%
2.	**Gestational age at birth of the infants**		
	(a) <37 weeks	5	16.7%
	(b) 37-40 weeks	25	83.3%
	(c) >40 weeks	0	00

3.	Weight of the infants (a) <7.5 kg (b) 7.5 kg-9.5 kg (c)>9.5kg	 5 24 1	 16.7% 80% 3.3%

SECTION-II

Analysis of the Modified FLACC scale score to evaluate the effectiveness of Helfer skin tap technique in infants during the intramuscular injection.

Table 2.1: Distribution of the level of Pain score of Modified flacc scale in experimental Group (N=30)

S.NO.	LEVEL OF PAIN	FREQUENCY(f)	PERCENTAGE (%)
1	Mild pain (1-4)	1	3.3%
2.	Moderate pain (5-10)	28	93.4%
3.	Severe pain (11-14)	1	3.3%

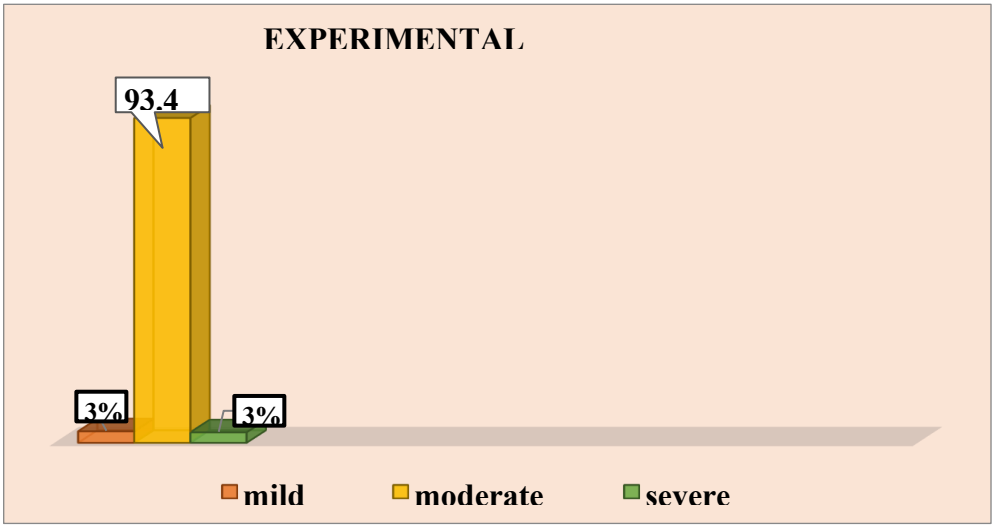

Figure4.7: Distribution of the level of pain score of Modified flacc scale in Experimental Group

Table 2.2: Distribution of the level of Pain score of Modified flacc scale in Control Group (N=30)

S.NO.	LEVEL OF PAIN	FREQUENCY(f)	PERCENTAGE (%)
1	Mild pain (1-4)	00	00%
2.	Moderate pain (5-10)	00	00%
3.	Severe pain (11-14)	30	100%

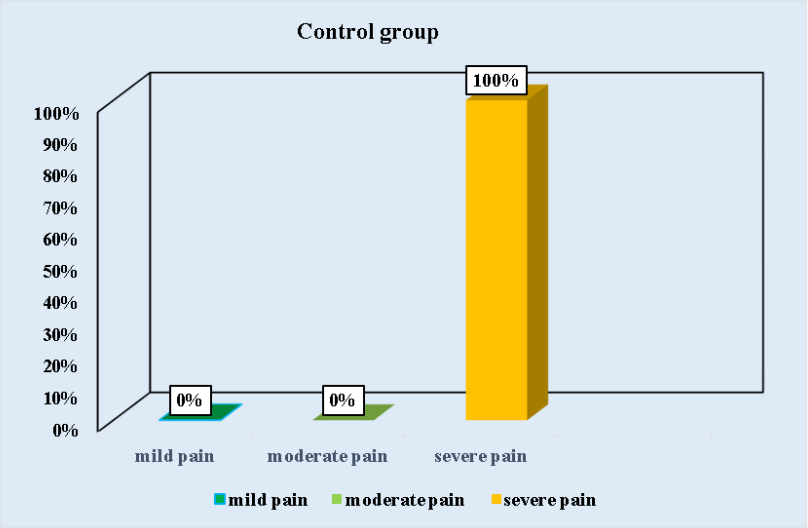

Figure 4.8: Distribution of level of pain score of Modified flacc scale in Control Group

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Table2.3: Comparison of the modified flacc scale score among experimental and control group (N = 60; Experimental = 30, Control = 30)

S. No.	Level of pain	Experimental group(n=30)	%	Control group(n=30)	%
1.	Mild pain (1-4)	1	3.3%	0	00%
2.	Moderate pain (5-10)	28	93.4%	0	00%
3.	Severe pain (11-14)	1	3.3%	30	100%

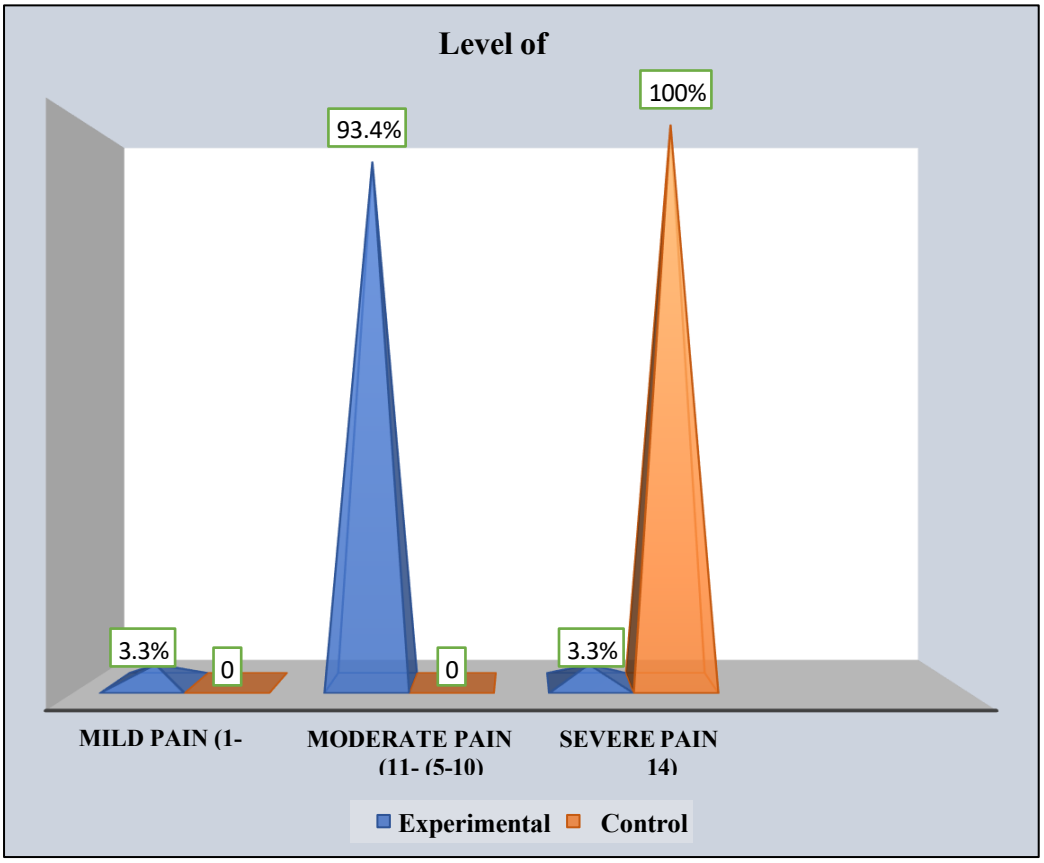

Figure 4.9: Comparison of Pain level score of Modified flacc scale among Experimental and Control Group

Table2.4: Comparison of Mean Modified FLACC Scale Scores Between Experimental and Control Group (N = 60, n1 = 30, n2 = 30)

Group	Sample size (N=60)	Mean ($\bar{x}$)	Standard Deviation (SD)	Mean difference	Calculated t value	Table t- value	df	Significance
Experimental Group	30	7.97	1.73	4.43	12.30	2.001	58	significant
Control Group	30	12.4	0.96					

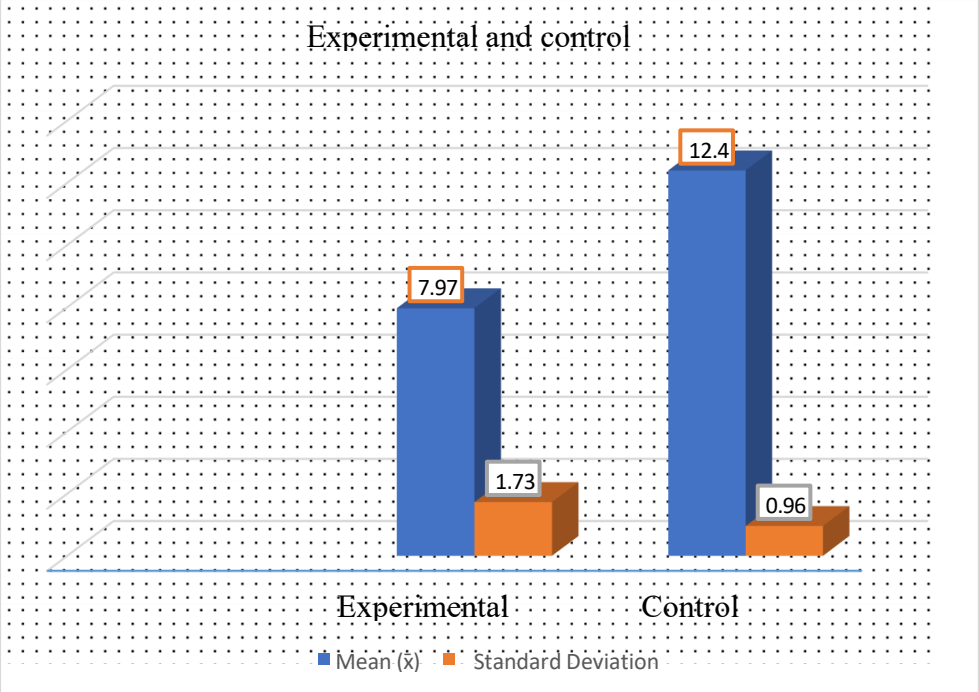

Figure 4.10: Comparison of mean pain level score of Modified flacc scale among Experimental and Control Group

SECTION III (A): Association between physio-behavioral parameters of experimental group and selected demographic variables.

Table 3.1: Association between Physio-behavior Parameters of Experimental Group with their Selected Demographic Variables

S. No.	Demographic Variable	Category	Mild Pain (1–4)	Moderate Pain (5–10)	Severe Pain (11–14)	Chi- square Value	p- Value	Df	Remark
1.	Gestational Age at Birth	<37 weeks	0	4	0	0.329	5.99	2	NS* (p<0.05)
		37–40 weeks	1	24	1				
		>40 weeks	0	0	0				
2.	Gender of Infant	Male	0	15	0	2.142	5.99	2	NS* (p<0.05)
		Female	1	13	1				
3.	Weight at Immunization	<7.5 kg	0	3	0	0.429	9.49	4	NS* (p<0.05)
		7.5–9.5 kg	1	23	01				
		>9.5 kg	0	2	0				

NS*- Not significant at p<0.05 level of significance

Section III (B): Association between Physio-behavior Parameters of control Group with their Selected Demographic Variables

In this control group, the demographic variables have no statistically significant association with pain level as measured by the Modified FLACC Scale – because only one level (Severe) was observed for all infants. Since all infants scored in the Severe range, a Chi- square test cannot detect a relationship between demographic variables and pain level.

DISCUSSION

The present study demonstrated that the Helfer Skin Tap Technique (HSTT) significantly reduced pain

during infant immunization compared to routine injection. Infants in the experimental group had notably lower mean FLACC scores, confirming the effectiveness of Helfer skin tap technique as a simple, nurse-led, and non-pharmacological intervention.

These results are consistent with earlier studies (Sahoo et al., 2025; Kaur et al., 2024; Mishra et al., 2023) that reported significant pain reduction with HSTT. Unlike sucrose, topical anaesthetics, or mechanical devices such as ShotBlocker®, HSTT requires no additional resources, making it feasible in high-volume immunization settings. Thus, integrating HSTT into practice can enhance infant comfort, parental satisfaction, and overall quality of pediatric nursing care.

CONCLUSION

The Helfer Skin Tap Technique (HSTT) was found to be a safe, simple, and cost-effective intervention that significantly reduced pain among infants during immunization compared to routine injection. Its ease of use and nurse-led nature make it highly feasible for integration into routine pediatric practice.

Limitations

- The study was conducted in a single hospital setting, limiting generalizability.
- The sample size (n=60) was relatively small.
- Only 9-month-old infants were included, so findings may not apply to other age groups.
- The study assessed immediate pain responses only, without long-term follow-up.

Recommendations

- Conduct larger, multicentre studies across pediatric age groups.
- Compare HSTT with other non-pharmacological pain relief methods.
- Assess feasibility in varied clinical settings with long-term follow-up.
- Develop parent education and evidence-based guidelines for routine use.

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