

Research Article

A Study to Assess the Effectiveness of Helfer Skin Tap Technique in Pain Reduction among Infants Undergoing Intramuscular Vaccination in Tertiary Care Setting, Coimbatore, Tamil Nadu, India

Menaka J¹, Malarvizhi G², Glory H³

¹M.Sc. Nursing Student, ²Professor and HOD of Child Health Nursing Cum Vice Principal, ³Associate Professor, PSG College of Nursing, Coimbatore, Tamil Nadu, India.

DOI: <https://doi.org/10.24321/2455.9318.201904>

I N F O

Corresponding Author:

Malarvizhi G, PSG College of Nursing, Coimbatore, Tamil Nadu, India.

E-mail Id:

malarvizhi2k5@yahoo.co.in

Orcid Id:

<https://orcid.org/0000-0002-0409-9293>

How to cite this article:

Menaka J, Malarvizhi G, Glory H. A Study to Assess the Effectiveness of Helfer Skin Tap Technique in Pain Reduction among Infants Undergoing Intramuscular Vaccination in Tertiary Care Setting, Coimbatore, Tamil Nadu, India. *Int J Nurs Midwif Res* 2019; 6(1): 11-16.

Date of Submission: 2018-12-03

Date of Acceptance: 2019-06-24

A B S T R A C T

Introduction: Pain is a common and disagreeable sensation for children and adult. Every child has his or her own perception of pain. Routine immunizations are the most frequent painful medical procedure during childhood. Health care professionals trying to provide vaccine to the infants with a less painful experience at their level of comfort. Skin tapping (Helfer skin technique) is one of the methods which keeps the muscles relaxed and thus reduce pain while administering IM vaccination. The aim of the present study was to reduce the pain level of infants those who receive vaccination.

Materials and Methods: Quantitative research approach, quasi experimental, timeseries design was adopted. The study was conducted in pediatric vaccination clinic in a tertiary care Hospital, Peelamedu, Coimbatore. Purposive sampling technique used to select the eligible population. Simple random sampling technique was used to allocate the 60 study subjects to treatment and routine group which comprised 30 in each group. FLACC pain scale was used to assess the vaccination pain for before giving vaccination, 1, 5 and at 10 minutes after vaccination among infants undergoing intramuscular vaccination. Paired and student t-test was used to compare the differences in pain scores.

Result: There was a significant reduction in pain perception among infants in treatment group during vaccination (5.30 ± 1.74 , $p < 0.001$), after the vaccination at 1st minute (3.93 ± 1.51 , $p < 0.001$) and 5th minute (2.03 ± 1.69 , $p < 0.001$) and at 10th minute (0.39 ± 0.79 , $p < 0.001$) than the routine group. Female infants 15 (50%) experienced severe pain compared with male infants 12 (40%) in routine group ($\chi^2 = 6.44$, $P < 0.01$). For other demographic variables there was no association in treatment and routine group.

Conclusion: Helfer skin tap technique was effective in reducing the IM vaccination pain during and after the vaccination.

Keywords: Infants, FLACC Pain Scale, Helfer Skin tap Technique, Pain, Penta and easy Six Vaccine

Introduction

Child survival is a field of public health concerned with reducing child mortality. Child survival interventions are designed to address the most common causes of child deaths that occur, which include communicable diseases. Among children under the age of 5 alone, an estimated 5.6 million children die each year mostly from such preventable causes. In developing countries, child mortality rates related to communicable disease is reduced by introducing low-cost immunization.¹

Vaccinations are the safest and most effective way to prevent serious illness and death. In fact, vaccinations prevent approximately 2.5 million deaths every year. However, despite the success of vaccinations in preventing morbidity and mortality, some countries struggle to maintain high levels of vaccination update.²

Intra muscular injection is common yet a complex technique used to deliver medication and vaccination deep into the large muscles of the body. Intra muscular injection route provides faster drug absorption than the subcutaneous route because the muscle has greater vascularity.³

Injection for vaccination is the most common source of iatrogenic pain in childhood. It is administered repeatedly to almost all children throughout infancy, childhood and adolescence. The pain associated with such injections is a source of distress for children, their parents and those administering the injection. If not addressed, this pain can lead to pre procedural anxiety in the future, needle fear and health care avoidance with vaccination schedules. It is estimated that up to 25% of adult have a fear of needles, with most fear developing in childhood. About 10% of population avoids vaccination and other needle procedure because of pain.⁴

A descriptive, survey was conducted in the child health center in Canada to find the pain response among 100 children (3-15yrs) undergoing intramuscular vaccination. The result revealed that the two third of children ($M \pm SD = 6.1 \pm 2.9$) and one-quarter of adolescent acknowledged some degree of needle fear ($M \pm SD = 4.34 \pm 1.78$).⁵

DPT vaccine generates more pain due to the presence of an inactivated whole cell component of pertussis. Most Whole cell Pertussis vaccines are available in combination with Diphtheria (D) and Tetanus (T) vaccines; contain aluminum salts as an adjuvant and thiomersal as a preservative. Immunization with Whole cell Pertussis vaccines is effective and inexpensive than a cellular pertussis.⁶

Helper skin tap technique is tapping over the intramuscular site with the palmar aspect of finger 16 times before and the 3 counts during the procedure. Skin tapping in the area close to the site of an immunization injection will activate A-beta neuron which will close the gate. Transmission of

pain signals arising from the injection site will, therefore, be inhibited at the level of the spinal cord. The proximity of tapping and injection site would be expected to facilitate gating for the appropriate spinal neurons.⁷

A true experimental study was conducted in Manipal college of nursing among 60 infants, to determine the effectiveness of skin tap technique in pain reduction during the DPT vaccination. A post test only control group design was adopted for the study. The study revealed that there was a significant difference ($t = 7.14$ at $p < 0.001$) in level of pain between experimental & control group.⁸

A study was conducted to assess the effectiveness of Helper skin tap technique and routine technique on pain reduction among 50 children receiving intramuscular injection at Government General Hospital, Puducherry. The study results indicated that the perception of pain intensity is less when intramuscular injection is administered using Helper Skin Tap Technique ($t = 4.9$, $p < 0.05$).⁹

It is a simple & cost effective non pharmacological technique. It can be performed by a skilled nurse.

Considering all the above facts motivated the investigator to conduct this study to determine the effectiveness of Helper skin tap technique in reduction of vaccination pain among infants those who are receiving Penta and Easy Six vaccines.

Materials and Methods

The research design adopted was quantitative research approach, quasi experimental, time series design. Purposive sampling technique used to select the eligible population. Simple random sampling technique was used to allocate the 60 study subjects to treatment and routine group which comprised 30 in each group. FLACC pain scale was used to assess and observe the vaccination pain among infants (6-14 weeks) undergoing intramuscular vaccination at the vaccination room of the pediatric OPD of PSG hospitals. Pre assessment was done 5 minutes prior to the administration of IM vaccination for both groups and Helper skin tapping was given to infants of treatment group. During Intramuscular vaccination the pain assessment was done in both the groups and post test level of pain was assessed at 1, 5 and at 10 minutes using FLACC pain scale. The study duration was one month.

After getting clearance from Institutional Human Ethics Committee data collection was done. Pilot study was conducted for a period of one week Through the pilot study inter rater reliability ($r = 0.94$) and practicability of the tool and feasibility of the study has been established.

The tool for the study consists of two section:

Section A: Demographic Variable

The demographic variables that includes infants age, gender,

weight, gestational age at birth, Name of the vaccine, Frequency of vaccine.

Section B

FLACC pain scale. The FLACC Scale was Developed by Sandra Merkel, Voepol-Lewis T.et al., (1997).

It consists of characteristics like Face, leg, Activity, Cry, consolability which is measured to assess pain level for infants between the ages of 6-14 wks.

Each criterion was assigned a score of 0,1 or 2. The FLACC pain scale had marking from 0 to 10, where 0 indicate relaxed and comfortable and 10 indicate severe pain. The interpretation of FLACC pain rating scale had the score of 0 (relaxed and comfortable), 1-3 (mild pain), 4-6 (moderate pain), 7-10 (severe pain). FLACC scale had an established inter rater reliability value of 0.88.

Result

Descriptive and inferential statistics was used for analysis and interpretation of the results.

Section I

Table 1, shows that out of 60 Infants, the mean age at weeks of infants in treatment and routine group was 11.3 weeks and 10.4 weeks respectively. The mean gestational age at birth in treatment & routine group was 37.9 wks respectively.

The mean weight in treatment group is 4.9kg & routine group was 4.98kg respectively. Majority of the Infants 43 (71.67%) had easy six vaccines. Twenty seven (45%) of infants had second dose of vaccine.

Figure 1, shows that during pre assessment in treatment group 27 (90%) infants were relaxed and comfortable where as in routine group 23 (76.77%) infants were relaxed and comfortable. During vaccination in treatment group 19 (63.33%) infants experienced moderate pain where as in routine group most of the infants 27 (90%) experienced severe pain, only 3 (10%) infants experienced moderate pain. On post assessment at 1st minute in treatment group 18 (60%) infants had moderate pain where as in routine group 12 (40%) infants had severe pain.

Table 1. Comparison of mean value of infants undergoing intramuscular vaccination in treatment and routine group according to demographic variables

Demographic Variable	Treatment group n=30				Routine group n=30				χ^2 value	p-value
	Male	%	Female	%	Male	%	Female	%		
Age and Gender (Age in weeks)										
6 weeks	2	6.67%	1	3.33%	5	16.66%	2	6.67%		
10 weeks	7	23.33%	7	23.33%	4	13.33%	9	30%		
14 weeks	8	26.67%	5	16.67%	5	16.66%	5	16.67%		
Mean age at weeks	11.3±2.64				10.4±3.03				3.35	0.195
35-36wks	1	3.33%	1	3.33%	2	6.67%	1	3.33%		
37-38wks	8	26.66%	11	36.67%	9	30%	7	23.33%		
39-40wks	8	26.67%	1	3.33%	3	10%	8	26.66%		
Mean gestational age at weeks	37.9±1.06				37.9±1.32				4.20	0.51
3.6-4.5kg	3	10%	2	6.67%	6	20%	3	10%		
4.6-5.5kg	9	30%	11	36.67%	3	10%	9	26.67%		
5.6-6.5kg	5	16.67%	-	-	5	16.66%	4	13.33%		
Mean age of weight	4.9±0.1				4.98±0.84				15.67	0.056
Name of the vaccine										
Easy six	15	50%	8	34.78%	6	20%	14	46.67%		
Penta vac	2	6.67%	5	16.66%	8	26.67%	2	6.67%		
Dosage of vaccination										
I st Dose	2	6.67%	1	3.33%	5	16.66%	2	6.67%		
II nd Dose	7	23.33%	7	23.33%	4	13.33%	9	30%		
III rd Dose	8	23.33%	5	16.67%	5	16.66%	5	16.66%		

N=60

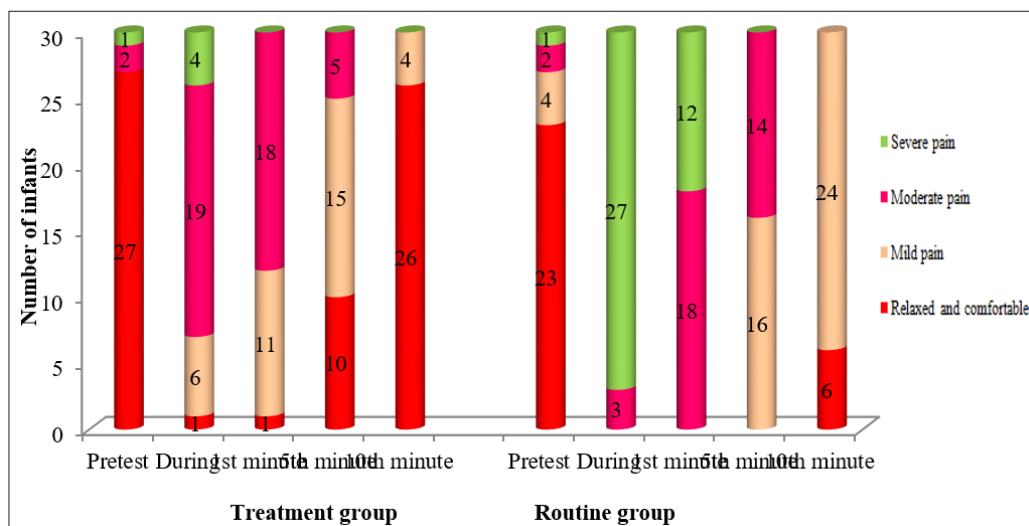


Figure 1. Multiple stacked bar diagram shows the frequency distribution of various degree of pre and post test FLACC pain score between treatment and routine group

Five minutes after the vaccination in treatment group 15(50%) infants had mild pain, 10(33.33%) infants were relaxed and comfortable where as in routine group 16(53.33%) and 14(46.67%) infants experienced mild pain moderate pain respectively. Ten minutes after the vaccination 26(86.6%) infants were relaxed and comfortable in treatment group where as in routine group 6(20%) infants were relaxed and comfortable and 24(80%) infants experienced mild pain.

infants were relaxed and comfortable ($M \pm SD = 0.60 \pm 1.89$), during vaccination infants experienced moderate pain ($M \pm SD = 5.30 \pm 1.74$) and post test at 1st minute infants had mild pain ($M \pm SD = 3.93 \pm 1.51$), 5th minutes infants experienced mild pain ($M \pm SD = 2.03 \pm 1.69$) and at 10th minute infants were relaxed and comfortable ($M \pm SD = 0.30 \pm 0.79$). It shows that there was a significant reduction of pain score during vaccination ($t = 10.32$ at $p < 0.001$) and after the vaccination at 1st minute ($t = 7.756$ at $p < 0.001$), 5th minute ($t = 3.139$ at $p < 0.001$). Hence there was a significant reduction in pain perception among infants undergoing intramuscular vaccination with Helfer skin tap technique.

Section II

The data presented in Table 2, describes that during pretest

Table 2. Comparison of pre and post test level of intramuscular vaccination pain among infants undergoing intramuscular vaccination pain in treatment group by using paired 't' test

S. No.	Treatment group	Mean \pm SD	Calculated 't' value	Table value	p-value
1.	Pre test	0.60 \pm 1.89	10.32	3.64	0.001***
2.	During	5.30 \pm 1.74			
3.	1 st minute	3.93 \pm 1.51	7.756	3.64	0.001***
4.	5 th minute	2.03 \pm 1.69	3.139	3.64	0.001***
5.	10 th minute	0.30 \pm 0.79	0.835	0.85	0.425

Note: Statistically significant * $p < 0.05$, *** $p < 0.001$

Table 3. Comparison of pre and post test level of pain among infants undergoing intramuscular vaccination pain in routine group

S. No.	Routine group	Mean \pm SD	Calculated 't' value	Table value	p-value
1.	Pre test	0.93 \pm 1.89	20.79	3.64	0.001***
2.	During	8.70 \pm 0.2			
3.	1 st minute	6.43 \pm 1.04	16.10	3.64	0.001***
4.	5 th minute	4.03 \pm 1.33	9.02	3.64	0.001***
5.	10 th minute	1.87 \pm 1.17	2.21	1.69	0.05*

Note: Statistically significant * $p < 0.05$, *** $p < 0.001$

Table 3, Indicates that in routine group during pretest infants were relaxed and comfortable ($M\pm SD=0.60\pm 1.89$), during vaccination infants experienced severe pain ($M\pm SD=8.70\pm 0.2$), and post test at 1st minute infants had moderate pain ($M\pm SD=6.43\pm 1.04$), 5th minute infants had moderate pain ($M\pm SD=4.03\pm 1.33$) and at 10th minutes infants experienced mild pain ($M\pm SD=1.87\pm 1.17$). It shows that there was a significant difference in the pain perception during vaccination ($t=20.79$ at $p<0.05$), after the vaccination at 1st minute ($t=16.10$ at $p<0.001$), 5th minute ($t=9.02$ at $p<0.001$) and at 10th minute ($t=2.21$ at $p<0.05$).

Section III

Table 4, Indicates that there was a significant difference in the pain level of infants in the treatment group and routine group (over all $M\pm SD=2.89\pm 2.18$, 5.42 ± 2.93 , $t=3.79$). During the intramuscular vaccination in treatment group infants experienced moderate pain (5.30 ± 1.74) where as in routine group experienced (8.70 ± 1.02) severe pain. Post test level of pain at 1st minute the treatment group infants had mild pain (3.93 ± 1.51) where as in routine group infants had moderate pain (6.83 ± 1.04), at 5th minute in treatment group infants experienced mild pain (2.03 ± 1.69) where as in routine group infants experienced moderate pain (4.03 ± 1.33) at 10th minute in treatment group infants were relaxed and comfortable (0.30 ± 0.79) where as in routine group infants experienced mild pain (1.87 ± 1.17).

to pretest the subject since they adopted post test only design.¹⁰

In current study infants pain perception was assessed during and after intramuscular Vaccination, which shows that Helfer skin tap technique is effective in reduce the vaccination pain during and after vaccination at 1st, 5th, & at 10th minute. The findings of the above study are in line with an experimental study on effectiveness of Helfer skin tap technique during IM injection among 100 full term neonates born in labor room, reveals that there was a significant decrease in the pain score between the administration of IM injection with Helfer skin tap technique ($z=4.003$, $p<0.001$).¹⁰

The present study shows that a significant association was found between the gender with the pain level of infants during intramuscular vaccination in routine group ($p<0.01$) & most of the 15 (50%) female infants experienced severe pain compared with male infants 12 (40%) in routine group. A similar experimental study confirms that there was a significant association between the pain score and selected demographic variable like gender & weight ($p<0.001$)⁸.

Conclusion

Vaccination pain is a major source of distress for children and their families as well as health care providers. Tapping

Table 4. Comparison of pain score at various time intervals of intramuscular vaccination pain between treatment and routine group of infants undergoing intramuscular vaccination

Post-test	Treatment group	Routine group	Calculated 't' value	Table value	p-value
	Mean \pm SD	Mean \pm SD			
During	5.30 \pm 1.74	8.70 \pm 1.02	9.20	3.46	0.001***
1 st minute	3.93 \pm 1.51	6.83 \pm 1.04	8.30	3.46	0.001***
5 th minute	2.03 \pm 1.69	4.03 \pm 1.33	5.09	3.46	0.001***
10 th minute	0.30 \pm 0.79	1.87 \pm 1.17	6.07	3.46	0.001***
Over all mean and SD	2.89 \pm 2.18	5.42 \pm 2.93	3.79	3.46	0.001***

n=30

Note: Statistically significant *** $P<0.001$

Discussion

The present study explored that there was a significant reduction in pain perception during vaccination ($t=10.32$, $p<0.001$), After the vaccination at 1st minute ($t=7.756$, $p<0.001$), 5th minute ($t=3.139$, $p<0.001$). The current study was designed as a pretest and post test design presuming that infants may have anticipatory pain related to procedure and new technique.

An experimental study on effectiveness of Helfer skin tap technique during IM injection among 100 full term neonates born in labour room clarifies that there was no possibilities

over the skin is one of the complimentary techniques to keep the muscles relaxed. It is an accepted fact that pain reduction will occur while giving injection with Helfer skin tap technique.

Recommendation for Further Study

- The similar study can be conducted in large group of population.
- The similar study can be conducted in all age group of children.
- A study to can be conducted to assess the effectiveness of Helfer skin tap technique on pain reduction among children undergoing various type of vaccination.

Conflict of Interest: None

References

1. Parkin PC. Order of Vaccine Injection and Infant Pain Response. *Arch Pediatr Adolesc Med* 2014; 163(5): 69-72.
2. Pirra T, Champion GD, Bustos T et al. Factor associate with infant pain response following an immunization injection. *Early Hum Dev* 2007; 83(5): 319-26.
3. Taddio A, Chambers CT, Halperin SA et al. Inadequate pain management during routine childhood immunizations: the nerve of it. *Clin Ther* 2009; 31(Suppl2): S152-S167.
4. Sparks L. Effective intervention for reducing immunization pain. *J Pediatr Nurs* 2014; 51(2): 74-78.
5. Taddio A, Ilersich AL, Ipp M et al. Physical interventions and injection techniques for reducing injection pain during routine childhood immunizations: systematic review of randomized controlled trials and quasi-randomized controlled trials. *Clin Ther* 2009; 31(Suppl2): S48-S76.
6. Vathani G, Kumari MJ. To assess the effectiveness of Helfer skin tap technique on pain reduction among the patients receiving intramuscular injection. *Inter J Cur Res* 2017; 9(9): 57-60.
7. Marry JR. Effectiveness of skin tap technique in reducing pain response. *Inter J Pediatr* 2015; 4(1): 22-26.
8. Therese M, Devi S. Effectiveness of Helfer Skin Tap Technique and routine technique on pain reduction among children receiving intramuscular injection. *Int J Nurs Sci Res* 2014; 3(10): 1446-1449.
9. Sivapriya MS, Kumari CL. A study to assess the effectiveness of Helfer skin tap technique on pain during intramuscular injection among neonates born in labour room of a selected tertiary level hospital. *Int J Nurs Sci Res* 2015; 4(1): 56-57.
10. Adele pilitteri. *Child Health Nursing*. 5thed Philadelphia: W. B. Saunders Publication; 2007.