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A Study to Assess the Effectiveness of Helfer Skin Tap Technique on Level of Pain and Physiological Parameters during Intramuscular Injection among Infants in a Selected Hospital at Durg (C. G.)

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Abstract: ***Background: Every infant goes through routine immunization in which the child face lots of pain during each immunization. Diphtheria pertusis tetanus immunization is one of them which is administered intramuscularly in the antero - lateral aspect of the thigh i. e, in the vastuslateralis muscle intramuscularly. Several researches explicit that immunization is a stressful experience for the child as well as for the parents. During the clinical experience, the investigator found that immunization causes iatrogenic pain in the infants which causes them discomfort. Investigator also found that a very few studies have been done in this area in the Indian set up. Considering all these facts in mind it is very important to find the effectiveness of helfer skin tap technique in reducing pain in children during immunization. Materials and Methods: The research design selected for the study is a quasi – experimental research design with post - test only non - randomized control group. The conceptual framework was based on Nola Pender's Health promotion model. A self - structured socio - demographic data was used in the study. A neonatal / infant pain scale and duration of cry was used to assess the level of pain or distress in infants. A portable pulse oximetry was used to assess the physiological parameters in infants. The data for the main study was collected from CHC Patan, Durg and C. M. Hospital, Nehru nagar, Bhilai. The sample size consist of 60 infants, 30 each in experimental and control group. The infants were selected by non - probability purposive sampling. The helfer skin tap technique was done on infants of experimental group in which the investigator taps at the vastus lateralis site with the palmer aspect of fingers 16 times before insertion and 3 counts during the procedure. The data obtained from studying subjects were analyzed and interpreted in terms of objectives and hypothesis. Descriptive and inferential statistics was used for data analysis. Results: It was computed that 't' value in relation to neonatal / infant pain score was 4.2 which was highly significant i. e., greater than the table value (2.00) at 0.05 level of significance at df=58. In relation to the duration of cry the computed 't' value was 3 which was significant i. e., greater than the table value (2.00) at 0.05 level of significance at df=58. The 't' value in relation to heart rate was 2.2 which was significant i. e., greater than the table value (2.00) at 0.05 level of significance at df=58. In relation to the oxygen saturation the computed 't' value was 0 which was not significant i. e., less than the table value (2.00) at 0.05 level of significance at df=58. Conclusion: It was found that Helfer skin tap technique is effective on the level of pain and physiological parameters among infants during intramuscular injection.***

Keywords: Helfer skin tap technique, level of pain, physiological parameters and Infants

1. Introduction

Pain is an uncomfortable sensation, or feeling. Pain can be dull and aching, sharp, or throbbing. It can be both physical and mental, and every infant experiences it differently. Babies feel pain when their brains send out special signals to their bodies. A fundamental principle of responsible medical care is not 'do not hurt' but 'do not harm'. Since pain is harmful to children, the care givers are committed in preventing harm to their patients. Pain is a major source of distress for children and their families as well as health care providers. The infants have right to the best level of pain relief that can be safely provided. Therefore we as nurses should take a team approach to reduce pain by using non - pharmacological methods like Helfer skin tap technique to reduce pain.

2. Material and Methods

This Experimental study was carried out on the infants at the vaccination room of CHC Patan, Durg and C. M. Hospital, Nehru nagar, Bhilai from3rdJuly 2017 to 18th July 2017. A total of 60 infants, 30 each in experimental and control group were taken

Study Design: Quasi – experimental research design with post - test only non - randomized control group

Study Location: Vaccination room of CHC Patan, Durg, Chhattisgarh and C. M. Hospital, Nehru nagar, Bhilai, Chhattisgarh.

Study Duration: 3rdJuly 2017 to 18th July 2017

Sample size: 60

Sample size calculation: total sample selected was 60 in which 30 sample were allocated in experimental group whereas 30 sample in control group.

Subjects and selection method: Non probability purposive sampling was used to select the sample of 60 infants, 30

each in control group and experimental group at the vaccination room of CHC Patan, Durg and C. M. Hospital, Nehru nagar, Bhilai from3rdJuly 2017 to 18th July 2017. The helfer skin tap technique was done on infants of experimental group in which the investigator taps at the vastus lateralis site with the palmer aspect of fingers 16 times before insertion and 3 counts during the procedure.

Group - A (N=30 Infants) – Intervention done using Helfer Skin Tap Technique during Intramuscular Injection

Group - B (N=30 Infants) –No Intervention done during Intramuscular Injection.

Inclusion Criteria:

1) Infants aged from birth to 15 weeks both term and post term.
2) Both the sexes.
3) Infants receiving IM injection which includes hepatitis - B, pentavalent - 1, pentavent - 2, pentavalent - 3 and IPV vaccination.
4) Care givers willing to participate in the study.

Exclusion Criteria:

1) Preterm infants.
2) Low birth weight infants.
3) Infants with any congenital anomalies and other diseased conditions.
4) Who are not willing to participate.

3. Procedure Methodology

A formal written permission was obtained from Block medical officer of community health centre, Patan, Durg (C. G.) prior to commencing for the task of data collection. The data collection period for the main study was from 3rd to 18th July. The purpose of the study was explained to the care givers. Confidentiality was assured to all the subjects to get the cooperation from the care givers and informed consent was taken. The infants were identified as per the inclusion criteria. The investigator established a good rapport with the care givers of the infants brought to the immunization room for vaccination and took consent from each participant. A self - structured questionnaire was formed to assess the socio demographic data of the samples of both experimental and control group. The investigator assessed 10 – 12 samples on every immunization day both in experimental and control group i. e, alternate 6 samples/day was designated as experimental and control group. Initially the investigator taught the care givers to hold the child in upright position. In experimental group, after identifying the injection site (vastus lateralis site) the tapping was done 16 times approximately 3 – 5 seconds with the dominant hand before IM injection and 3 times during IM injection to relax the muscle. The skin is then prepared with alcohol swab. The nurse then hold the skin making a V shape with the thumb and the index finger and inserted the needle in to the antero – lateral aspect of the thigh. Simultaneously, the investigator tapped the skin for 3 times. The nurse removed the needle with the continuous tapping done by the investigator. The behaviour of the infant was video recorded for the assessment of neonatal infant pain scale and duration of cry for both experimental and control group. After the intervention the heart rate and oxygen saturation of the infant was recorded using pulse oximetry in both experimental and control group.

4. Statistical Analysis

In the present study investigator planned to analyze the data based on the objectives of the study by using both descriptive and inferential statistics. Socio – demographic variables analysis by using descriptive statistics, frequency and percentage. Frequency and percentage of post test (after helfer skin tap technique) in the assessment of level of pain were done. Frequency and percentage of post test (after helfer skin tap technique) in the assessment of physiological parameters were done. Unpaired “t” test will be computed to determine the significant difference of level of pain between infants of experimental and control group. Unpaired “t” test will be computed to determine the significant difference of physiological parameters between infants of experimental and control group. Karl – Pearson’s correlation formula to find the correlation between level of pain and physiological parameters among infants of experimental group.

5. Result

Table 1, figure 1 represents that in control group, maximum infants 14 (46.67%) were between the age group of 0 to 6 weeks, 9 (30%) were between the age group of 11 to 15 weeks and 7 (23.33%) were between the age group of 7 to 10 weeks. In experimental group, maximum infants 14 (46.66%) were between the age group of 7 to 10 weeks and 8 (26.67%) were between the age group of 0 to 6 weeks and 11 to 15 weeks respectively.

Table 1

Age of the infant (weeks)	Control group (n_1)		Experimental group (n_2)	
	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
Birth to 6 weeks	14	46.67%	8	26.67%
7 to 10 weeks	7	23.33%	14	46.66%
11 to 15 weeks	9	30%	8	26.67%
Total	30	100%	30	100%

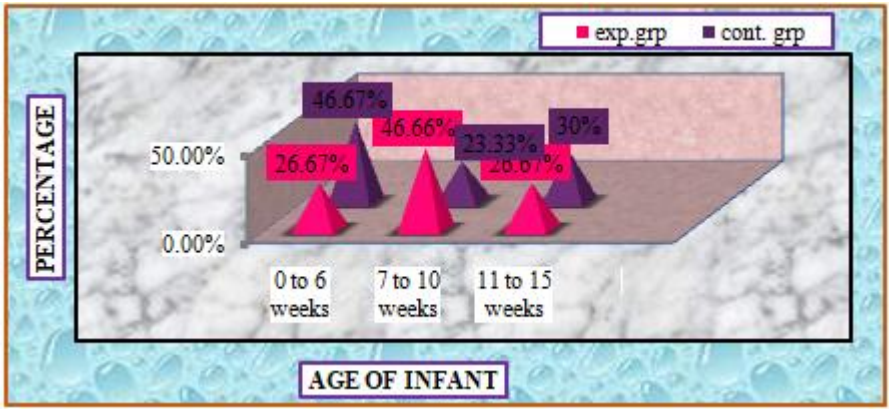

Figure 1

Table 2, figure 2 represents that in control group, maximum infants 17 (56.67%) were female whereas 13 (43.33%) were male. In experimental group, maximum infants 18 (60%) were female whereas 12 (40%) were male.

Table 2

Sex of the infant (weeks)	Control group (n_1)		Experimental group (n_2)	
	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
Male	13	43.33%	12	40%
Female	17	56.67%	18	60%
Total	30	100%	30	100%

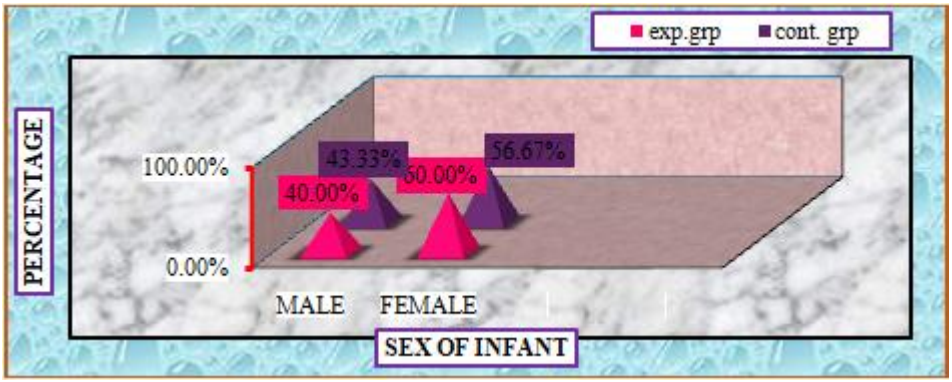

Figure 2

Table 3, figure 3 represents that in control group, maximum infants 26 (86.67%) had term gestational age and 4 (13.33%) had post term gestational age. In experimental group, maximum infants 25 (83.33%) had term gestational age and 5 (16.67%) had post term gestational age.

Table 3

Gestational age of the infant	Control group (n_1)		Experimental group (n_2)	
	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
Term	26	86.67%	25	83.33%
Post term	4	13.33%	5	16.67%
Total	30	100%	30	100%

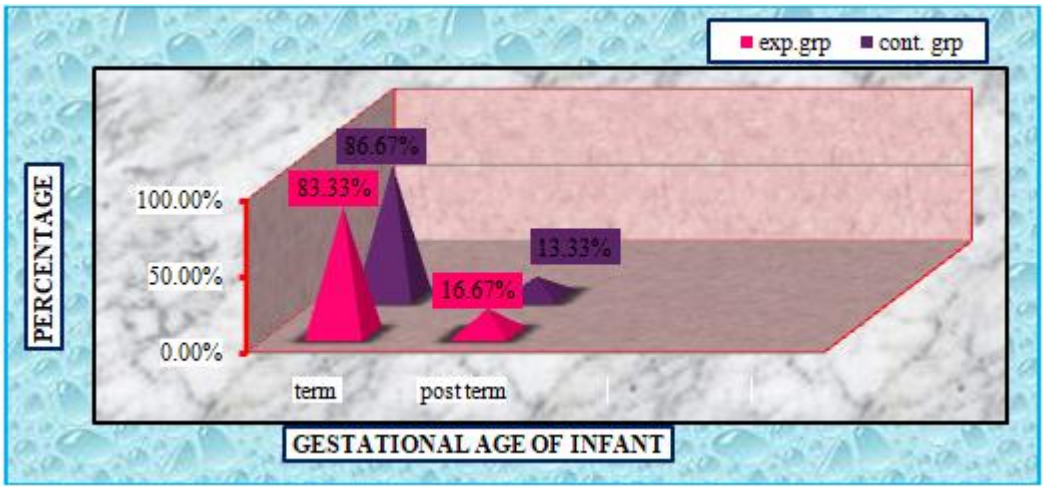

Figure 3

Table 4, figure 4 depicts that in control group, majority 19 (63.33%) of infants resides in the rural area whereas 11 (36.67%) resides in the urban area. In experimental group, maximum 24 (80%) of the infants resides in the rural area whereas 6 (20%) resides in the urban area.

Table 4

Area of residence	Control group (n_1)		Experimental group (n_2)	
	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
Rural	19	63.33%	24	80%
Urban	11	36.67%	6	20%
Total	30	100%	30	100%

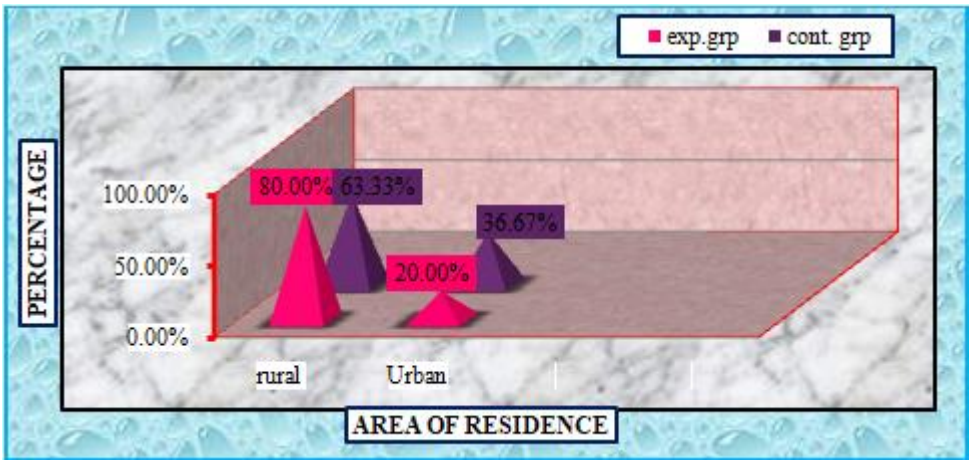

Figure 4

Table 5, figure 5 reveals that in control group, majority 13 (43.33%) of the care givers had higher secondary education, 9 (30%) had graduation and above education, 6 (20%) had primary education and 2 (6.67%) had middle education. In experimental group, maximum 14 (46.67%) of the care givers had higher secondary education, 8 (26.67%) had primary education and 4 (13.33%) had middle as well as graduation and above education.

Table 5

Education of care givers	Control group (n_1)		Experimental group (n_2)	
	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
Primary school education	6	20%	8	26.67%
Middle school education	2	6.67%	4	13.33%
Higher secondary school education	13	43.33%	14	46.67%
Graduation and above	9	30%	4	13.33%
Total	30	100%	30	100%

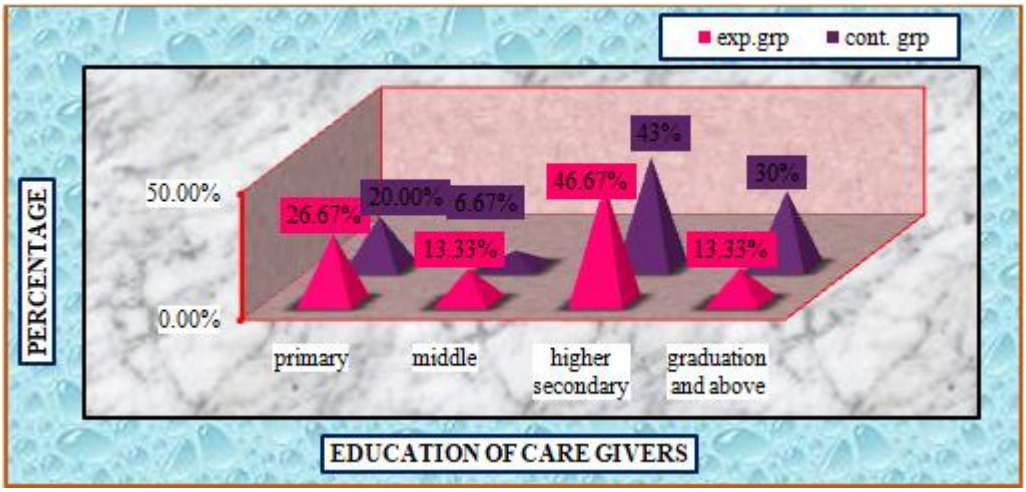

Figure 5

Table 6, figure 6 represents that in control group, maximum 9 (30%) of infants received pentavalent - 3 vaccine, 8 (26.67%) received pentavalent - 1 vaccine, 6 (20%) received Hep - B vaccine, 4 (13.33%) received Pentavalent - 2 vaccine and 3 (10%) received IPV vaccine. In experimental group, maximum 10 (33.34%) of infants received pentavalent - 2 vaccine, 7 (23.33%) received pentavalent - 3 vaccine, 6 (20%) received pentavalent - 1 vaccine, 4 (13.33%) received IPV vaccine and 3 (10%) received Hep - B vaccine.

Table 6

Name of the vaccine	Control group (n_1)		Experimental group (n_2)	
	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
Hep - B	6	20%	3	10%
Pentavalent - 1	8	26.67%	6	20%
Pentavalent - 2	4	13.33%	10	33.34%
Pentavalent - 3	9	30%	7	23.33%
IPV	3	10%	4	13.33%
Total	30	100%	30	100%

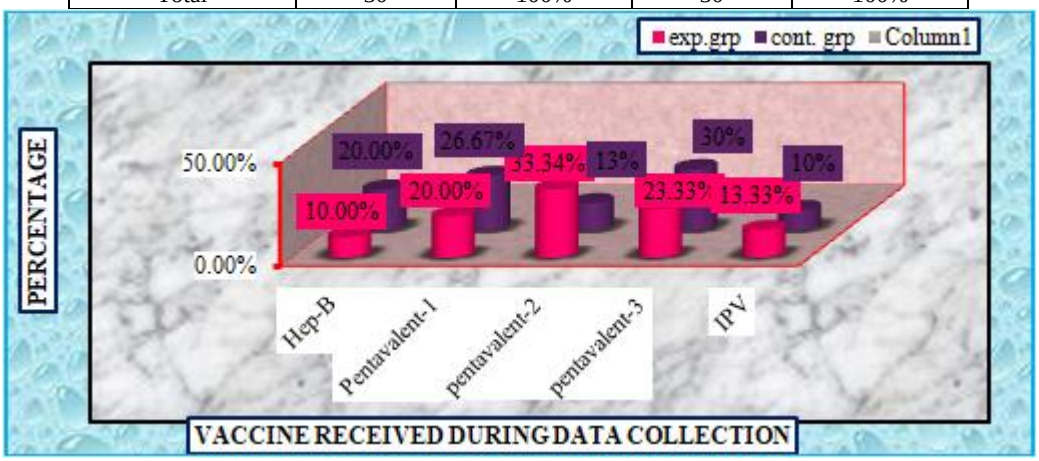

Figure 6

Table 7, figure 7 Shows that in control group, maximum 11 (36.67%) of infants had weight between 2.5 – 3.5kg, 10 (33.33%) had weight between 3.6 – 4.5kg, 9 (30%) had weight between 4.6 - 5.5kg whereas none had weight more than 5.5kg. In experimental group, maximum 15 (50%) of infants had weight between 3.6 – 4.5kg, 8 (26.67%) had weight between 2.5 – 3.5kg, 7 (23.33%) had weight between 4.6 - 5.5kg whereas none had weight more than 5.5kg.

Table 7

Weight of the infant	Control group (n_1)		Experimental group (n_2)	
	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
2.5 - 3.5kg	11	36.67%	8	26.67%
3.6 - 4.5kg	10	33.33%	15	50%
4.6 - 5.5kg	9	30%	7	23.33%
>5.5kg	0	0%	0	0%
Total	30	100%	30	100%

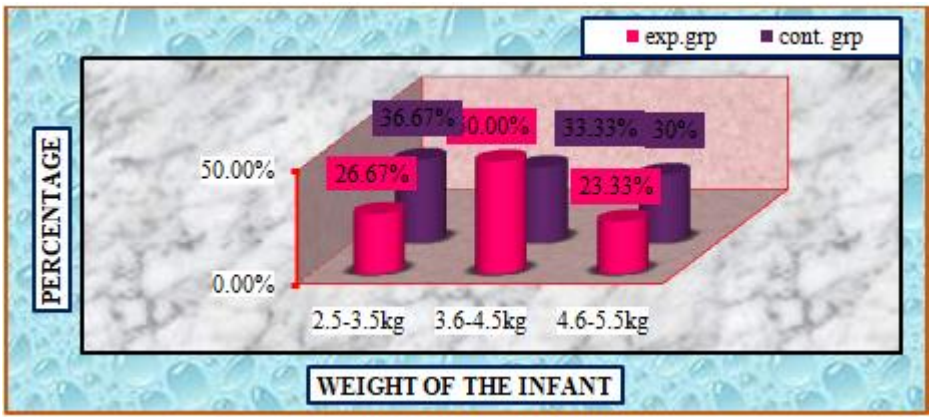

Figure 7

Table 8, figure 8 depicts that in control group, maximum 16 (53.33%) infants had moderate pain, 10 (33.34%) had severe pain, 4 (13.33%) had mild pain whereas none of the infants had no pain. Table 4.8, figure 4.8 depicts that in experimental group, maximum 17 (56.67%) infants had moderate pain, 9 (30%) had mild pain, 4 (13.33%) had severe pain and none of the infants had no pain.

Table 8

Criteria	Score	Control group		Experimental group	
		Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
No pain	0	0	0%	0	0%
Mild pain	1 - 3	4	13.33%	9	30%
Moderate pain	4 - 6	16	53.33%	17	56.67%
Severe pain	>6	10	33.34%	4	13.33%
Total	8	30	100%	30	100%

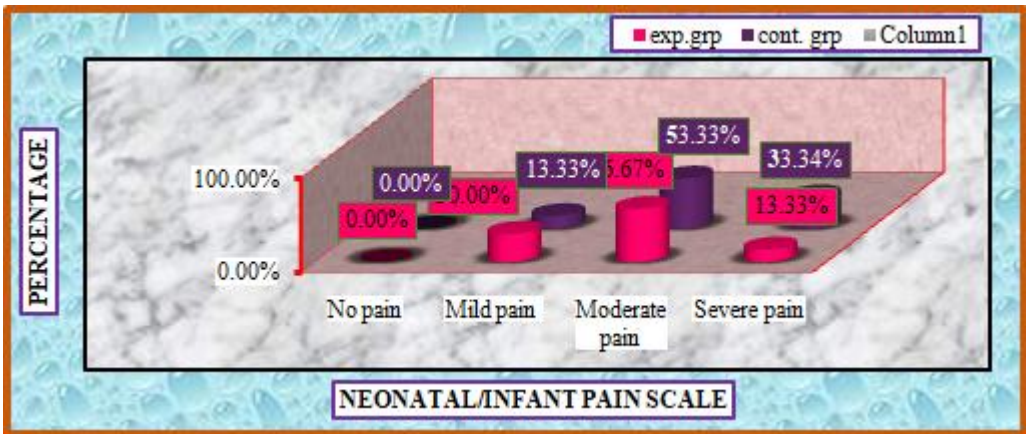

Figure 8

Table 9, figure 9 depicts that in control group, maximum 13 (43.33%) infants had duration of cry between 31 seconds and above, 11 (36.67%) had duration of cry between 21 - 30 seconds, 6 (20%) had duration of cry between 11 - 20 seconds whereas none had duration of cry between 0 - 10 seconds. Table 9, figure 9 depicts that in experimental group, maximum 14 (46.67%) infants had duration of cry between 11 - 20 seconds, 10 (33.33%) had duration of cry between 21 - 30 seconds, 5 (16.67%) had duration of cry between 30 seconds and above whereas only 1 (3.33%) infants had duration of cry between 0 - 10 seconds.

Table 9

Criteria	Score	Control group		Experimental group	
		Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
(0 - 10 seconds)	0	0	0%	1	3.33%
(11 - 20 seconds)	1	6	20%	14	46.67%
(21 - 30 seconds)	2	11	36.67%	10	33.33%
(31 seconds and above)	3	13	43.33%	5	16.67%
Total	6	30	100%	30	100%

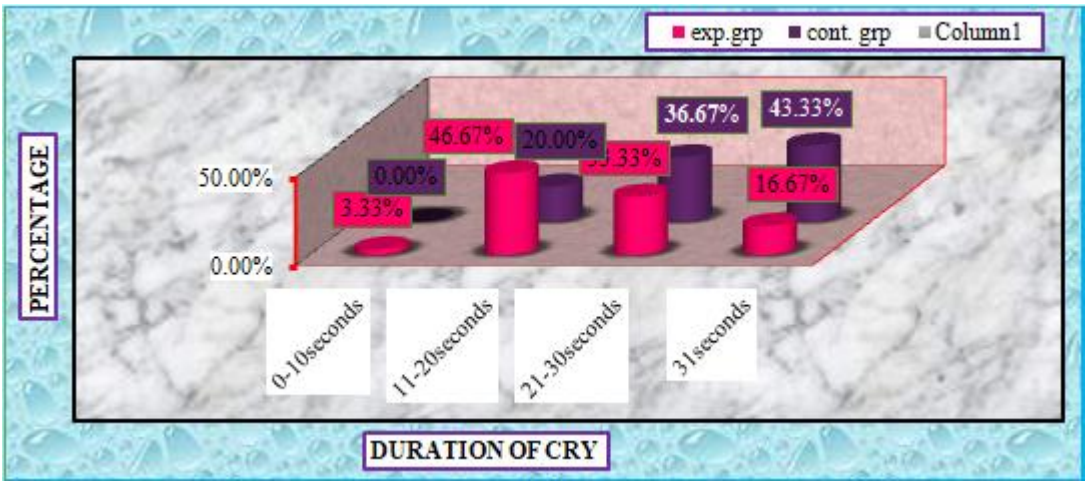

Figure 9

Table 10, figure 10 depicts that in control group, maximum 14 (46.67%) infants had heart rate normal (80 - 160bpm), 12 (40%) had bradycardia (<80bpm), whereas 4 (13.33%) of the infants had tachycardia (>160bpm) during intramuscular injection. Table 4.10, figure 4.10 depicts that in experimental group, maximum 20 (66.67%) infants had heart rate normal (80 - 160bpm), 10 (33.33%) had bradycardia (<80bpm), where as none of the infants had tachycardia (>160bpm) during intramuscular injection.

Table 10

Parameters	Range	Score	Control group		Experimental group	
			Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
Heart Rate	Tachycardia (>160bpm)	3	4	13.33%	0	0%
	Bradycardia (<80bpm)	2	12	40%	10	33.33%
	Normal (80 - 160bpm)	1	14	46.67%	20	66.67%
Oxygen Saturation	Less than 90%	2	14	46.67%	11	36.67%
	90% 0r More than 90%	1	16	53.33%	19	63.33%

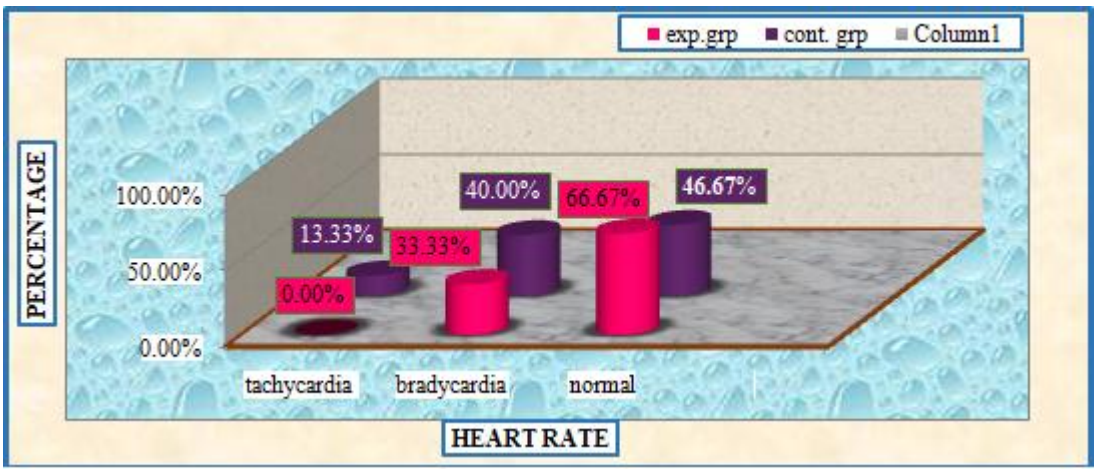

Figure 10

Table 10, figure 11 depicts that in control group, maximum 16 (53.33%) infants had 90% or more than 90% oxygen saturation whereas 14 (46.67%) infants had less than 90% oxygen saturation during intramuscular injection. Table 10, figure 11 depicts that in experimental group, maximum 19 (63.33%) infants had 90% or more than 90% oxygen saturation whereas 11 (36.67%) infants had less than 90% oxygen saturation during intramuscular injection.

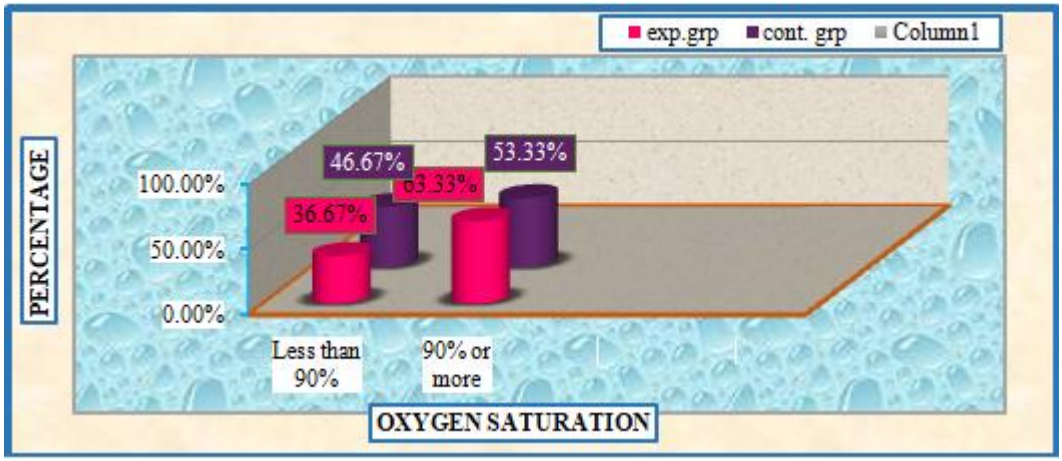

Figure 11

Table 11 shows that the helfer skin tap technique was effective on neonatal/Infant pain score during intramuscular injection among infants as the calculated "t" value is 4.2 at df (58) at the level of significance 0.05 which is greater than the table value. This depicts that there is a significant difference between the level of pain in control group and experimental group.

Table 11

Parameter	Mean Score	Mean Difference	S. D	Df	't' value	Inference
Neonatal/Infant Pain score in Experimental group	4.16	1.5	1.391	58	4.2	Highly significant
Neonatal/Infant Pain score in control group	5.66		1.397			

Table 12 shows that the helfer skin tap technique was effective on duration of cry during intramuscular injection among infants as the calculated "t" value is 3 at df (58) at the level of 0.05 which is greater than the table value. This depicts that there is a significant difference between the duration of cry in control group and experimental group.

Table 12

Parameter	Mean Score	Mean Difference	S. D	Df	't' value	Inference
Duration of cry in Experimental group	1.63	0.6	0.80	58	3	Highly significant
Duration of cry in control group	2.23		0.77			

Table 13 shows that the helfer skin tap technique was effective on heart rate during intramuscular injection among infants as the calculated "t" value is 2.2 at Df (58) at the level of 0.05 which is greater than the table value. This depicts that there is a significant difference between the heart rate in control group and experimental group.

Table 13

Parameter	Mean Score	Mean Difference	S. D	Df	't' value	Inference
Heart rate in Experimental group	1.33	0.33	0.48	58	2.2	Significant
Heart rate in control group	1.66		0.71			

Table 14 shows that the helfer skin tap technique was not effective on oxygen saturation among infants during intramuscular injection as the calculated "t" value is 0.71 at Df (58) at the level of 0.05 which is less than the table value. This depicts that there is no significant difference between the level of pain in control group and experimental group.

Table 14

Parameter	Mean Score	Mean Difference	S. D	Df	't' value	Inference
Oxygen saturation in Experimental group	1.37	0.10	0.49	58	0.71	Not significant
Oxygen saturation in control group	1.47		0.51			

Table 15 and figure 12 shows that there is moderately negative correlation between neonatal/Infant pain score and heart rate during intramuscular injection among infants as the calculated 'r' value of experimental group is - 0.03.

Table 15

Group	Area	Mean	Correlation 'r'	Inference
Experimental group	Neonatal/Infant pain score	4.16	- 0.03	Moderately negative correlation
	Heart rate	1.33		

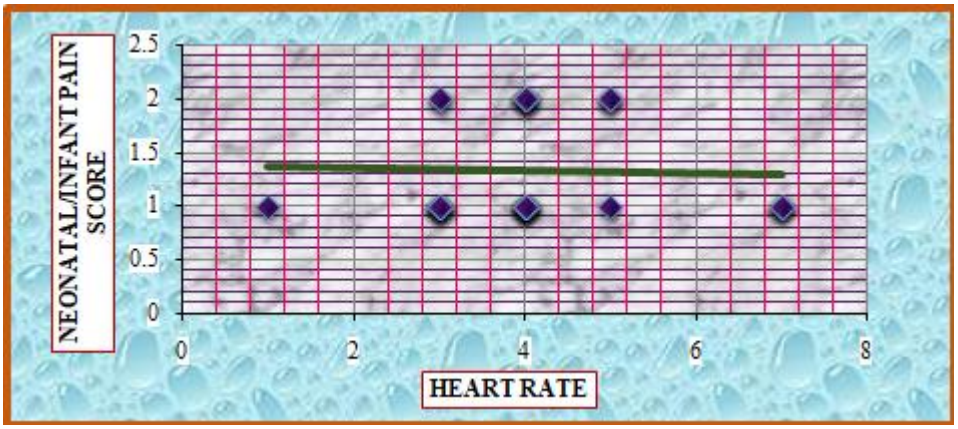

Figure 12

Table 16 and figure 13 shows that there is no correlation between neonatal/Infant pain score and oxygen saturation during intramuscular injection among infants as the calculated 'r' value in experimental group is 0.

Table 16

Group	Area	Mean	Correlation 'r'	Inference
Experimental group	Neonatal/Infant pain score	4.16	0	No correlation
	Oxygen saturation	1.37		

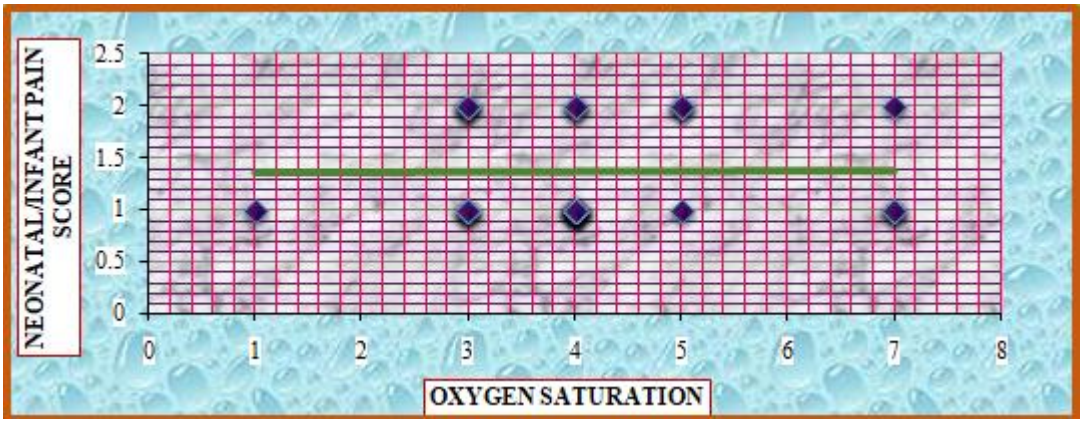

Figure 13

Table 17 and figure 14 shows that there is moderately positive correlation between duration of cry and heart rate during intramuscular injection among infants as the calculated 'r' value of experimental group is 0.05.

Table 17

Group	Area	Mean	Correlation 'r'	Inference
Experimental group	Duration of Cry	1.63	0.05	Moderately positive correlation
	Heart rate	1.33		

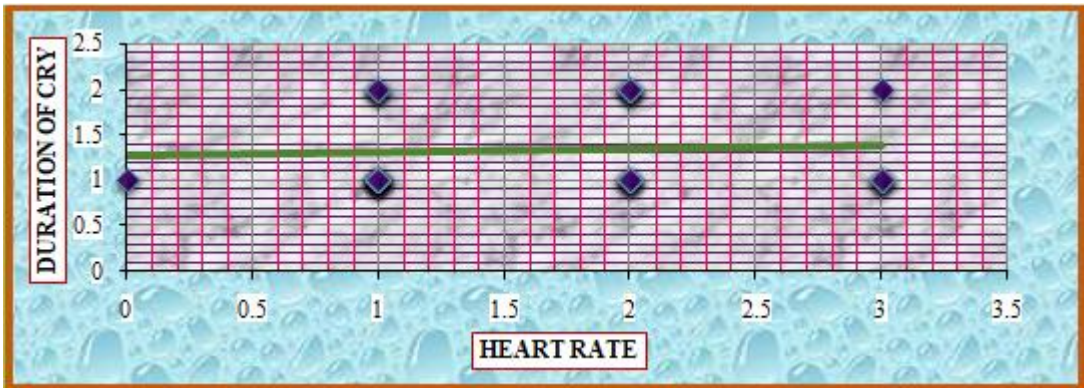

Figure 14

Table 18 and figure 15 shows that there is moderately negative correlation between duration of cry and oxygen saturation during intramuscular injection among infants as the calculated 'r' value of experimental group is - 0.17.

Table 18

Group	Area	Mean	Correlation 'r'	Inference
Experimental group	Duration of cry	1.63	- 0.17	Moderately negative correlation
	Oxygen saturation	1.37		

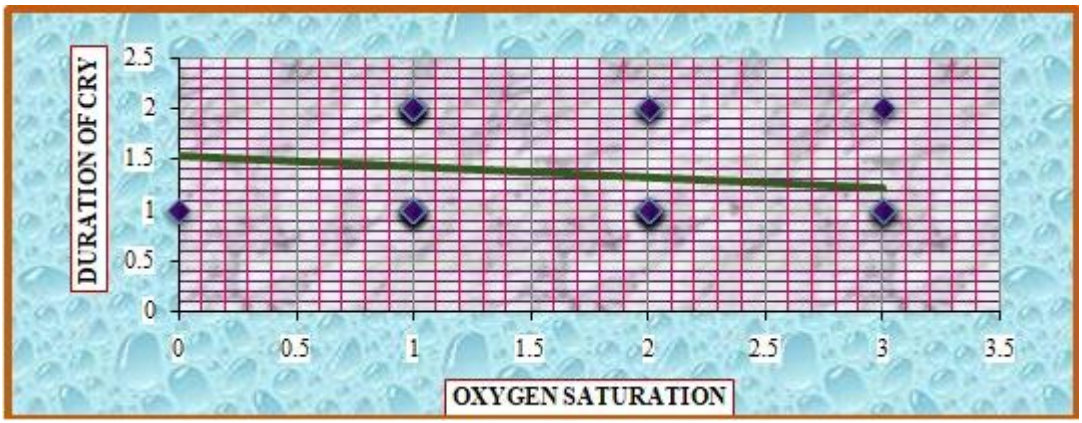

Figure 15

6. Discussion

Pain is an uncomfortable sensation, or feeling. It can be constant (always there) or intermittent (coming and going). Pain can be dull and aching, sharp, or throbbing. It can be both physical and mental, and every infant experiences it differently. Babies feel pain when their brains send out special signals to their bodies. Usually, they are sick or injured when their brains send these signals. Feeling pain is a signal that something is wrong. There are many causes of pain in babies. There are the typical ones, like colic, circumcision, teething, and vaccine (immunization) shots. Some babies may have health problems and may experience pain as part of their disease process or painful treatments.

JAMA paediatrics (2009) states that in a recent study of U. S. paediatricians, more than 90 percent reported at least one parent in their practice had refused to have a child vaccinated in the previous year, most commonly due to the pain caused by multiple vaccines. Therefore, reducing the pain associated with vaccines could increase immunization rates and prevent a resurgence of infectious diseases.

The present study was undertaken to assess the effectiveness of Helfer skin tap technique among infants during intramuscular injection in Community Health Centre Patan, Durg (C. G.) and C. M. Hospital Nehru nagar, Bhilai (C. G.) from3rdJuly 2017 to 18th July 2017 as it found that a very few studies have been done in this area in the Indian set up.

To evaluate the effectiveness of Helfer skin tap technique on neonatal / infant pain score during intramuscular injection among infants, unpaired 't' test was computed and it was found that there was reduction in the neonatal / infant pain score after Helfer skin tap technique as the calculated "t" value is 4.2 at df (58) at the level of 0.05 which is greater than the table value. This shows that there is a significant difference between the level of pain in experimental and control group. This indicated that the Helfer skin tap technique was effective on neonatal/Infant pain score among infants during intramuscular injection.

To evaluate the effectiveness of Helfer skin tap technique on duration of cry during intramuscular injection among infants, unpaired 't' test was computed and it was found that there was reduction in the duration of cry after Helfer skin tap technique as the calculated "t" value is 3 at df (58) at the level of 0.05 which is greater than the table value. This shows significant difference between the duration of cry in experimental and control group. This indicated that the Helfer skin tap technique was effective on duration of cry among infants during intramuscular injection.

To evaluate the effectiveness of Helfer skin tap technique on heart rate among infants during intramuscular injection, unpaired 't' test was computed and it was found that heart rate was normal after Helfer skin tap technique as the calculated "t" value is 2.2 at df (58) at the level of 0.05 which is greater than the table value. This shows a significant difference between the heart rate in experimental and control group. This indicated that the Helfer skin tap technique was effective on heart rate during intramuscular injection among infants.

To evaluate the effectiveness of Helfer skin tap technique on oxygen saturation among infants during intramuscular injection, unpaired 't' test was computed and it was found that there was no change in the oxygen saturation among infants after Helfer skin tap technique as the calculated "t" value is 0 at df (58) at the level of 0.05 which is greater than the table value. This shows no significant difference between the oxygen saturation in experimental and control group. This indicated that the Helfer skin tap technique was not effective on oxygen saturation during intramuscular injection among infants.

Karl Pearson's correlation co - efficient was computed and it shows that there is significant correlation between neonatal/Infant pain score and heart rate. Statistical analysis interprets that the calculated 'r' value of experimental group is - 0.03 which shows that there is moderately negative correlation between neonatal/Infant pain score and heart rate during intramuscular injection among infants whereas that there is no correlation between neonatal / infant pain score and oxygen saturation. Statistical analysis interprets that the

calculated 'r' value of experimental group is 0 which shows that there is no correlation between neonatal/Infant pain score and oxygen saturation during intramuscular injection among infants.

7. Conclusion

Helfer skin tap technique was found to be effective in reducing the level of pain during intramuscular injection among infants.

References

[1] Ball J W, Binder C, Text book of pediatic nursing.4thedn. New Delhi: Pearson education; 2001. p.470.
[2] Basavanthappa. (2005). Pediatric Nursing. (1st ed). New Delhi: Ahuja Publishing house, 545.
[3] Behrman et al. (1995). Textbook of Pediatrics. (15th ed.). Philadelphia: W. B Sunders Company, 126 – 135.
[4] Burns N &Grone SK. Understanding Nsg research.2nded: sauders company: 1989 - 90.
[5] Cowie A P. Oxford Advanced learner"s Dictionary of English.4th ed. Oxford university press; 1989. p.385
[6] Comphell. Formate and style in thesis writing.3thed: mittline; 2008.
[7] Jackson Debra Broad well and Sounders and Rebecca. (1993). Child health nursing – A comprehensive approach to the care of children and their families. (12th ed.), New York: MC Graw Group Hill, 26 - 32.
[8] Kyle T. Essential peditric nursing, NewDeihi: Lppincot William; 2009. P.380
[9] Marlow. R. Dorothy and Redding A. Barbara. (1988). Text book of Pediatric Nursing. (6th ed), Philadelphia: J. B. Lippincott Company, 22, 132, 136.
[10] Mcgrath Pain in children. Newyork: Guitfort publications; 1990. P.3
[11] Polit DF. Research publishes and methods.3rded: Philadelphia; 1995.
[12] Polit Beck. Nursing research 9thed: wolterkluwers, 2011: 733 - 3.
[13] Polit&Hungler. Nsg Research principles & methods, 5thed: Lippincott/philodephia: 1995: 45 - 48.
[14] Perry, A., Potter, P., &Ostendorf, W. (2014). Clinical skills and nursing techniques (8th ed.). St Louis, MO: Elsevier Mosby. [Sharma SK. Nursing research & statistics.1sted: Elsevier publication: 84 - 6.
[15] Potter PA, & Perry AG. (2005). Fundamentals of nursing Concepts, Process and Practice.6th ed. New Delhi: Elsevier publications; USA, p.25 - 9.
[16] SurajGupte. (2004). The Short text book of pediatrics (10th ed), New Delhi: Jaypee brothers medical publishers, 113, 115, 617.
[17] Sundar Rae P. S et al. (1999). An introduction to biostatistics, a manual for students in Health sciences. (2nd ed.) vellore: Christian medical college, 28 – 38.
[18] Treece EV &Treece JW. Element of research &Nsg: Mosby company, 2002: 97 - 99.