

Original Research Article

## A Study to Assess the Effectiveness of Helfer Skin Tap Technique on the Level of Pain during Intramuscular Injection among Adults in a Selected Hospital, Bangalore

Ms. Uma Neupane<sup>1</sup>, Prof. PrabhaLisThomas<sup>2</sup>, Dr. Raghbendra Thakur<sup>3</sup>

<sup>1</sup>Lecturer, B&B Medical Institute, Gwarko, Lalitpur, Nepal.

<sup>2</sup>Professor, Krupanidhi College of Nursing, Bangalore, India.

<sup>3</sup>Medical Co-ordinator, Health at Home, Kathmandu, Nepal.

Corresponding Author: Ms. Uma Neupane

### ABSTRACT

**Background:** Intra muscular injection is common yet a complex technique used to deliver medication deep into the large muscles of the body. Pain at injection site is one of the most commonly-reported local reactions associated with administration of a vaccine/medication. Pain management in invasive procedure is a challenge to the nurse and injections will be an excellent relief for those who are scared of needles. Helfer skin tap technique provides a mechanical stimulation and distraction during intramuscular injection and thus helps to decrease pain as described by gate control theory which keeps the muscles relaxed and thus reduce pain while administering IM injection.

#### Objectives:

1. To compare the level of pain during intramuscular injection among adults of the experimental and control group.
2. To find the association between pain level and selected baseline variables of adults of the experimental and control group.

**Materials and Methods:** Study design used is quasi-experimental study with Post-test only design with control group. Study setting includes in-patient and outpatient department of St. Philomena's Hospital, Bangalore which is a 400 bedded private multi-specialty hospital. Study sample includes is 80 adults. Sampling technique used is Purposive sampling to select the eligible population and simple random sampling is used to allocate the subjects into experiment and control group. Tool used includes numerical pain rating scale.

**Results:** The data collected was analyzed using descriptive and inferential statistics. The study findings high lights that 32.5 % of the adults in the experimental group had mild pain, 67.5% perceived moderate pain during IM injection by using Helfer skin tap technique. 77.5% of the adults in the control group had moderate pain, 17.5% perceived severe pain during IM injection by using standard technique. There is no significant difference in pain score of the adults receiving intramuscular injection in experimental and control group  $p < 0.05$ . This study explored the effect of Helfer skin technique (rhythmic tapping) over the skin before and during IM injection in relation to pain.

**Interpretation And Conclusion:** The present study findings supported that there is a significant difference in the pain score in the IM administration with Helfer skin tap technique.

**Keywords:** Helfer skin tap technique, intramuscular injection, adult.

### INTRODUCTION

*"Cure sometimes, treat often, comfort always."*

*-Hippocrates*

Medicine is considered as one of the most important necessity to all of us. Medications are used to diagnose, treat, or

prevent illness. <sup>[1]</sup> Medication is a substance used in the diagnosis, treatment, cure, relief, or prevention of health problems. <sup>[2]</sup> The route prescribed for administering a medication depends on the properties and desired effect of the medication and the patient's physical and mental condition. The various route of medication administration are oral routes, sublingual administration, buccal administration, parenteral routes and topical administration. <sup>[3]</sup>

An injection is the introduction of a drug, vaccine, contraceptive or other therapeutic agent into the body using a needle and syringe. Intramuscular (also IM or im) injection is the injection of a substance directly into a muscle. Depending on the injection site, an administration is limited to between 2 and 5 milliliters of fluid. Sites that are bruised, tender, red, swollen, inflamed or scarred are avoided. Intramuscular injections are often given in the deltoid muscle of the arm, the vastuslateralis muscle of the leg, and the ventrogluteal and dorsogluteal muscles of the buttocks. <sup>[4]</sup>

Intramuscular injection of medication is a procedure commonly performed by nurse and is associated with discomfort, pain and trauma to the injected tissue. There are several factors which influence person's experiences of pain during intramuscular injection such as anxiety, culture, age, gender and expectation of pain relief. These factors may increase or decrease the experience of pain during intramuscular injection. Even though it can cause tissue, musculoskeletal and neurological complications such as abscess, tissue necrosis, muscle damage and nerve injury; if delivered with a proper technique, its complications are very rare and minimal as compared to the intravenous injections. <sup>[5]</sup>

Good injection technique can help in reducing pain and discomforts. The proper administration of intramuscular injection is necessary to minimize the discomfort and pain to achieve the maximum therapeutic effect. Although performed routinely by nurses, it is a complex procedure requiring

decisions regarding the injection site, volume of the drug to be injected, position of the client during injection and methods to keep the site relaxed to reduce the pain. <sup>[6]</sup>

There are different/various methods used by the nurses to reduce pain during intramuscular injections such as applying pressure, tapping the skin, giving injections to a relaxed muscle, applying heat and cold. Among the different physical interventions, the most effective are application of pressure and tapping the skin before injection. <sup>[7]</sup>

Nurses are ethically or legally responsible for managing pain and relieving suffering. <sup>[8]</sup> Tapping over the skin is one of the various techniques to keep the muscle relaxed. <sup>[9]</sup> It is an accepted fact that there is reduced pain in giving injection to a relaxed muscle. <sup>[10]</sup>

Helfer skin tap technique developed by Ms Joanne Keiffer Heifer BSN.RN in 1998 is an attempt to alleviate pain in which tapping of the skin over the injection site before and during the procedure is done to relax muscle. Helfer skin tap technique is one among the types of touch therapy. Skin tap technique includes tapping over the intramuscular injection site with the palmer aspect of the dominant hand sixteen times to relax the muscle making a "V" with the thumb and other fingers of the non-dominant hand and tap the skin again for three times during the insertion and removal of the needle. The mechanical tapping stimulation over the skin by this technique alters the balance between the small diameter fibres that carry pain to the brain, and the large diameter fibres that do not carry pain. The large diameter fibres i.e. non-pain fibres block the small diameter fibres to slower the response to pain through effective skin tapping. <sup>[11]</sup>

As administration of intramuscular injection is a common nursing intervention, incorporating helper skin tap technique during intramuscular injection can reduce pain associated with the injection and enhance the comfort of the patients. Hence, the investigator was motivated to check the

effectiveness of Helfer skin tap technique which can be easily incorporated in the routine practice during intramuscular injection to reduce pain.

**Objectives**

1. To compare the level of pain during intramuscular injection among adults of the experimental and control group.
2. To find the association between pain level and selected baseline variables of adults of the experimental and control group.

**Hypotheses**

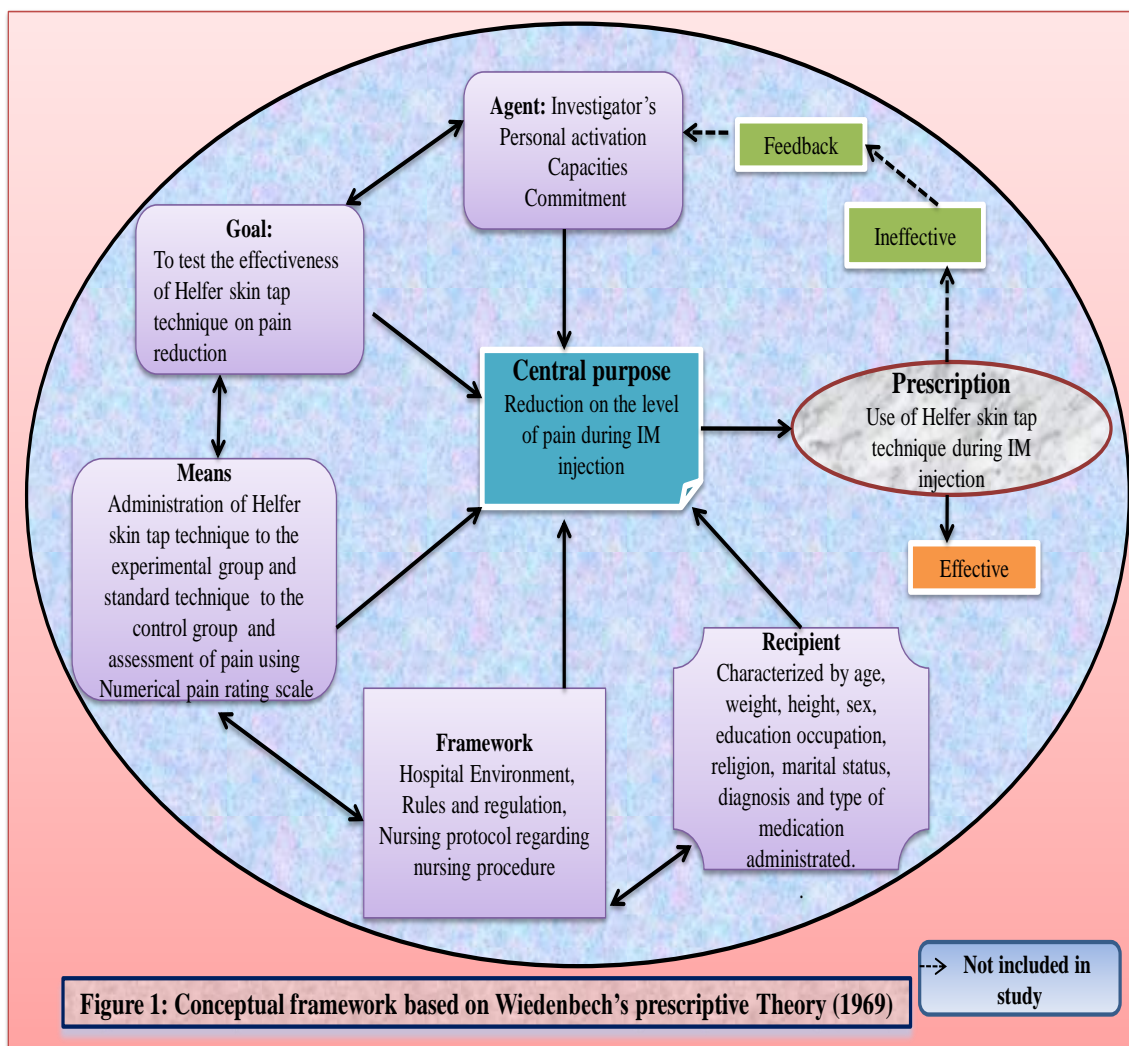
H<sub>1</sub>: There is a significant difference in pain score of the adults receiving intramuscular injection in experimental and control group.

H<sub>2</sub>: There is a significant association between the pain scores and selected baseline variables of the adults of experimental group and control group.

**Conceptual Framework**

The conceptual framework used in this study was based on the prescriptive theory, which was introduced by Ernestine Wiedenbach in the year 1969. This theory includes three concepts which are

1. The central purpose that the practitioner recognizes as essential to the practice of the discipline.
2. The prescription for the fulfillment of the central purpose.
3. The realities of the immediate situation that influence the fulfillment of the central purpose [12]



## RESEARCH METHODOLOGY

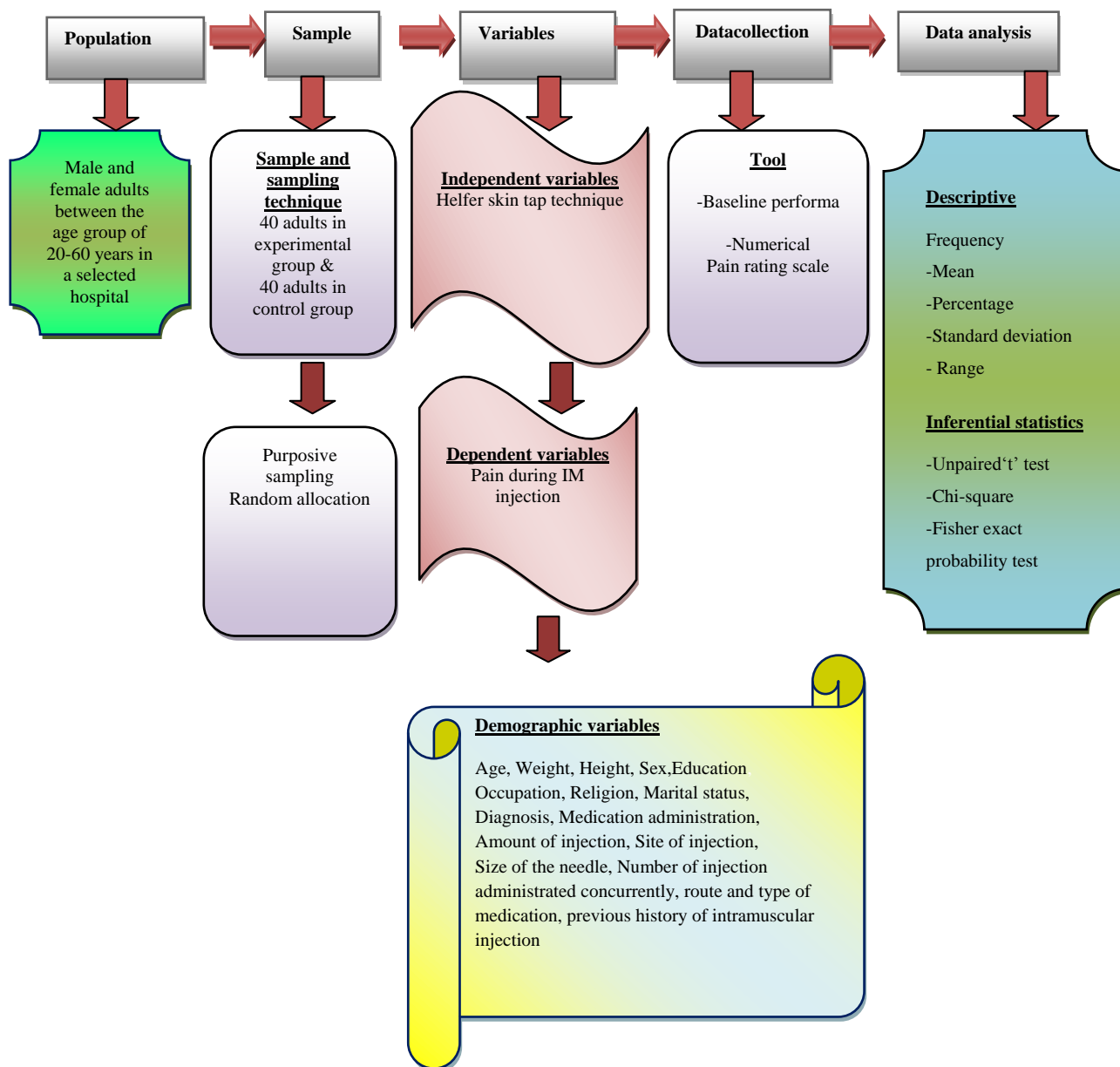


Figure 2: Schematic representation of the study design

### Research Approach

A Quantitative research approach was adopted considering it as the most appropriate in view of the nature of the problem and to accomplish the objectives of the study.

### Research design

A quasi-experimental study with Post-test only design with control group was used for the study.

Group                      Intervention      Post test

E → X → OE<sub>1</sub>  
C → OC<sub>1</sub>

E: Experimental group which consisted of 40 adults who are receiving intramuscular injection in selected hospital.

C: Control group which consisted of 40 adults who are receiving standard technique.

X: Administration of Helfer skin tap technique before and during the intramuscular injection.

OE<sub>1</sub>: Post test assessment on the level of pain after intervention in the experimental group.

OC<sub>1</sub>: Post test assessment on the level of pain after standard technique in the control group.

### **Settings**

The present study was conducted in St. Philomena's Hospital; Bangalore which is a 400 bedded private multi-specialty hospital located at No. # 4, Campbell Street, Viveknagar, Bangalore. The hospital has a statistics of 20-30 adults/day who used to visit out-patient department and around 10-15 adults/ day received intramuscular injection. The common intramuscular injections which are given as Tetanus toxoid, steroids and analgesic.

### **Population**

The study population consisted of adults within the age group of 20-60 years in selected Hospital, Bangalore.

### **Sample and sample size**

80 adults who were either admitted in the hospital or attending outpatient department of the selected hospital, out of which 40 subjects each were randomly assigned to the experimental group and the control group.

### **Sampling technique**

Purposive sampling technique was used to select the hospital and the subjects are selected and assigned randomly to the experimental and control group.

### **Description of the tool:**

The tool consisted of 2 sections

Section I: Baseline Proforma to assess sample characteristics

It consisted of age, height, weight, gender, marital status, education, occupation, religion, diagnosis of patient, medication administered, amount of injection administered, site of injection, site of injection, size of needle, number of injection administered concurrently, route and name of medication and previous history of IM injections.

Section II: Numerical pain rating scale

A numerical pain rating scale was used to assess the level of pain during intramuscular

injection. The numerical pain rating scale is ranging from point 0 to point 10. A score of '0' is considered as 'No pain', '1-3' is considered as 'Mild pain', '4-6' is considered as 'Moderate pain' and '7-10' is considered as 'Severe pain'.

### **Validity of the tool**

Content validity of the tool was established by 11 experts in the field of nursing. Modifications were made based on suggestion and comments given by the experts, after consulting with the guide. All the items of the tool received 100% agreement from the experts.

### **Reliability of the tool**

The reliability of the tool i.e. numerical pain rating scale was established by administering the tool to 10 patients at St. Philomena's Hospital, Bangalore. The reliability was computed using inter rater method and the Karl Pearson's coefficient of correlation. The obtained value of coefficient of correlation 'r' was 0.97. Hence the tool was highly reliable.

### **Technique of Data Collection**

Based on the inclusion and exclusion criteria, subjects were selected. The investigator introduced her to the subjects and the purpose of the study was explained to them, the confidentiality was assured and written consent was obtained. At first baseline information were collected from the subjects. For the experimental group, intramuscular injection was given along with administration of Helfer skin tap technique and assessment was done by using numerical pain rating scale. For the control group, administration of medication done with standard technique and assessment was done by using numerical pain rating scale and response scores were entered by the researcher in the score sheet.

## **ANALYSIS AND RESULT**

### **Section 1: Description of baseline characteristics of the adults in the experimental and control group.**

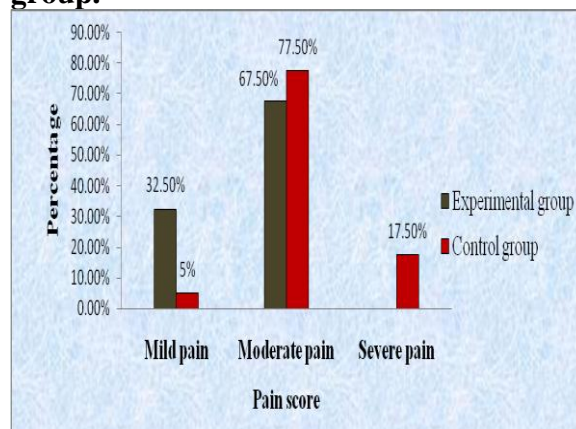
In present study, majority (42.5%) of the subjects in the experimental group and 35% of subjects in control group were in the



age group of 21-30 years, majority (75%) of subjects in experimental group and 60% of subjects in control group were females, equal percentage of the subjects (37.5%) in experimental and control group were educated up to PUC level, 35% of subjects in experimental group and 27.5% of subjects in Control group were skilled workers, majority of the subjects in the experimental (72.5%) and control group (67.5%) were Hindu, majority (50 %) of subjects in experimental group and 55% in control group were over-weight, majority (37.5%) of subjects in experimental group and 30% of subjects in control group were diagnosed with pregnancy, 37.5% of subjects in experimental and 30% of control group received TT as injection and 42.5% of subjects in experimental group and 35% of subjects in control group received 1ml of medication, more than half (57.5%) of subjects in the experimental group and 65% of subjects in control group received injection at ventrogluteal site; 24 gauge needle was used for all subjects; none of the subjects received concurrent injection and

all the subjects had previous history of injection.

### Section 2: Description of level of pain during intramuscular injection among adults in experimental group and control group.



In the figure 3 shows that majority (67.5 %) of subjects in experimental group had moderate pain and 32.5% had mild pain. The figure also reveals that 77.5% of subjects in control group had moderate pain and 17.5% had severe pain during IM injection.

### Section 3: Comparison of pain score in experimental and control group during intramuscular injection among adults. $n_1=40, n_2=40$

Experimental group			Control group			t-value	Inference
Mean	SD	Range	Mean	SD	Range		
1.68	0.474	3-5	2.12	0.463	3-7	4.292	*HS

\*HS- Highly significant at 0.01 level,  $t_{78}= 1.665$ .

The data presented in the table 1 reveals that the mean pain score of adults in the experimental group ( $1.68 \pm 0.474$ ) was lower than the mean pain score of subjects in the control group ( $2.12 \pm 0.463$ ). The computed 't' value was greater than table value at 0.01 level of significance. Hence, the null hypothesis was rejected and it was inferred that Helper skin tap technique was effective in reducing the level of pain during intramuscular injection among adults.

Table 4: Comparison on the mean pain score of adults in experimental and control groups during intramuscular injection according to the site of injection  $n_1=40, n_2=40$

Site of injection	Experimental group		Control group		t-value	df	Interference
	Mean	SD	Mean	SD			
Deltoid site	3.94	0.75	5.27	1.22	3.75	30	*HS
Gluteal site	3.91	0.73	5.64	0.99	6.796	46	*HS

\*HS- Highly significance at 0.01 level,  $t_{30}= 1.696, t_{46}= 1.679$

The data presented in the table 2 reveals that the mean pain score of adults in experimental group who received injection at deltoid site (3.94) and gluteal site (3.91) was lower than the mean pain score of

adults in control group who received injection at deltoid site (5.27) and gluteal site (5.64). The computed 't' value is greater than table value at 0.01 level of significance. Hence, the null hypothesis was

rejected and it was inferred that Helfer skin tap technique was effective in reducing the level of pain during intramuscular injection at gluteal and deltoid site.

#### **Section 4: Association of pain level with the selected demographic variables of adults of the experimental group and control group.**

The selected demographic variables age, gender, education, occupation and religion have no significant association on pain score of adults during intramuscular injection in the experimental and control group at 0.05 level of significance.

### **DISCUSSION**

#### **Section 1: Description of baseline characteristics of the adults in the experimental and control group.**

The findings of the study revealed that that majority of the subjects in the experimental group (42.5%) and in control group (35%) were between the age group of 21-30years, 75% of subjects in experimental group and 60% of subjects in control group were females and all of them were married. These findings are supported by a study conducted to evaluate the intensity of pain experienced by respondents given IM injection with/without Helfer skin tap technique in Mumbai which showed that 46.66% of subjects in the experimental group and 66.66% of the subjects in the control group were in the age group of 20-30 year, majority of subjects in experimental and control group were females and all of them were married. [13]

In the present study majority (37.5%) of subjects in experimental group and 30% of subjects in control group were diagnosed with pregnancy and 37.5% of subjects in experimental and 30% of control group received Tetanus toxoid vaccination. These findings can be correlated with the study conducted in Manipal, where 100% of subjects in experimental and control group received DPT vaccination. [14]

In relation to education, an equal percentage (37.5%) of subjects in the experimental and control group were

educated up to PUC level, where 35% of subjects in experimental group and 27.5% of subjects in Control group were skilled workers. This is supported by the findings of the study which was conducted in Mumbai where majority (53.34%) of subjects in the experimental and 60% of adults were educated up to primary level and 26.67% of subjects in experimental group and 13.33% of subjects in Control group were skilled workers. [14]

#### **Section 2: Description of level of pain during intramuscular injection among adults in experimental group and control group.**

The findings of the present study revealed that 67.5 % of subjects had moderate pain and 32.5% had mild pain in experimental group while 77.5% of subjects had moderate pain and 17.5% in control group had severe pain. These findings of the study are supported by the study findings reported in a study conducted in Egypt to assess the efficacy of Helfer skin tap technique on pain intensity which reported that 23 % of subjects had moderate pain and 34% had mild pain in experimental group while 39% of subjects had moderate pain and 27 % in control group had severe pain during intramuscular injection. [15]

#### **Section 3: Comparison of pain score in experimental and control group during intramuscular injection among adults.**

The present study findings revealed that the mean pain score of subjects in experimental group was 1.68 with standard deviation  $\pm 0.474$  and in the control group, the mean pain score was 2.12 with standard deviation  $\pm 0.463$ . The unpaired 't' test computed to compare the level of pain between the groups showed a significant difference in the mean pain score between the groups ( $t_{78} = 4.292$ ,  $P < 0.001$ ). Similar findings were obtained in a study conducted in Bangalore to assess the effectiveness of Helfer skin tap technique during intramuscular injection. The study reported a mean pain score of 1.5 with  $\pm 1.1$  and 2.9  $\pm 1.2$  in the subject receiving intramuscular injection with Helfer skin tap technique and

under standard technique respectively. The findings also revealed a significant difference between the mean pain score of the subjects with or without Helfer skin tap technique ( $t_{59} = 13.23$ ,  $P < 0.001$ ). These findings highlight the effectiveness of Helfer skin tap technique on reducing pain during intramuscular injection. [9]

These findings are contradictory to the findings reported in a study conducted in Mumbai, in which there was no significant difference in the pain perception by the respondents with the two procedures of administering IM injection, with and without tapping technique. Since all the subjects received Inj. Penidura which is considered to be a painful injection and limited sample size ( $n_1 = 15$ ,  $n_2 = 15$ ) might have resulted in the difference in findings. [13]

#### **Section 4: Association of pain level with the selected baseline variables of adults of the experimental group and control group.**

The association of pain level with the selected baseline variables of adults of the experimental group and control group was calculated using Fisher Exact test. The variables age, gender, education, occupation and religion had no significant association on the level of pain during intramuscular injection in the experimental and control group. Similar findings were obtained in another study which reported that there is no significant association between age, diagnosis, previous hospitalization, educational level of subjects and pain during intramuscular injection.

#### **CONCLUSION**

Injections are the foremost health care procedure worldwide which causes pain and distress to the patient. Injection pain is associated with the penetration of the skin by the needle and to the mechanical and chemical effects of the drug during and posts its injection. Pain relieving measures are the most fundamental requisite of human right, thus it's the responsibility of the nurse to use best approach to pain management.

Effective pain control measures not only alleviate discomfort, but also promote client's quality of life. Therefore, the study was undertaken to assess the effectiveness of Helfer skin tap technique on the level of pain during intramuscular injection among adults in a selected Hospital, Bangalore.

In conclusion findings of this study strongly emphasise the importance of making Helfer skin technique is a compulsory step in IM injection and thus we can reduce agony of our patients. The standards for nursing care clearly support a holistic care of our clients.

#### **RECOMMENDATIONS:**

- A similar study can be conducted/ replicated on a large sample to generalize the study findings.
- A comparative study can be conducted between Helfer skin tap technique and other complementary therapies like acupressure, reflexology, cryotherapy and others strategies.
- A similar study can be performed by using other design such as cross over design.
- A study can be conducted to assess the knowledge and skill of staff nurses in administering various injection techniques and treatment modalities.
- A study can be conducted to assess the patient's perception of pain regarding different type and site of injection administration as well as type of the medication administered.

#### **ACKNOWLEDGEMENT**

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