Painless Injection: Effect of Helfer Technique on Pain Perception and Trypanophobia among Patients Taking Analgesics

Dr. EmanTharwatMohamed[1], Dr. Mahmoud Ali Mahmoud[2], Dr. Naglaa Fawzy Hanafy[3]

(1) Lecturer in Medical Surgical Department, Faculty of Nursing, Cairo University
(2) Lecturer of General Surgery, Faculty of Medicine, Cairo University, Egypt
(3) Assist Professor in Medical Surgical Department, Faculty of Nursing, Cairo University

Abstract

Background: Pain originating from intramuscular (IM) injection must not be underestimated. Nurses commonly administer intramuscular injections, which can be painful and distressing for patients. The Helfer skin Tap Technique can help lessen the pain associated with these injections. **Aim:** To evaluate the effect of Helfer Skin Tap Technique on pain perception and trypanophobia among patients taking analgesics. **Design:** Pre-posttest quasi-experimental research design was utilized to achieve the aim of the current study. **Setting:** The current study was conducted in general surgical departments at Elkasr AlEini University Hospital, Egypt. **Sample:** A purposive sample of one hundred (100) adult male and female patients receiving intramuscular analgesics injection, and fulfilled the inclusion criteria. **Tools:** Three tools were utilized: (1) Demographic and Medical Data Sheet, (2) Numerical Pain Rating Scale, and (3) Anxiety Rating Scale. **Results:** Highly statistical significant differences were observed between the two interventions (Standard Technique and Helfer Skin Tap Technique) in relation to pain and anxiety levels. **Conclusion**: Helfer Skin Tap Technique is effective in reducing pain and alleviating anxiety among patients regarding intramuscular injection**. Recommendation:** The study should be conducted among adult patients undergoing various types of injection and different intramuscular sites.

keywords: Helfer Skin Tap Technique, IM injection, Patients Taking Analgesics, Trypanophobia and Pain Perception.

Introduction

Medication is a substance used in the diagnosis, treatment, cure, relief and prevention of health problems. The various routes of medication administrations are topical, oral, sublingual, buccal, and parenteral .Injections are considered the gold standard in the parenteral administration of various types of drugs. Intramuscular (IM) injection is one of the common parenteral routes of administration worldwide **(Karabey& Karagozoglu, 2020; Güven, KüçükakçaÇelik & Calpbinici, 2020).**

Additionally, intramuscular (IM) injection is known as an administration of medication penetrably through a skin puncture by a syringe, and insertion of needle deeply inside the body for prophylactic or curative purposes **(Legrand et al., 2019).** Depending on the injection site, the administration of medication is limited to be between 2 and 5 milliliters. It is often administered in the deltoid muscle of the arm, the vastus lateralis muscle of the leg, the ventrogluteal and dorso-gluteal muscles of the buttocks **(Nakajima et al., 2020).**

Even though IM injections are considered a simple technique, it can cause very serious complications, if there are inappropriate administration techniques **(Mahato, 2019).**These complications are considered as pain at the injection site, allergic reaction, injury to the blood vessels, abscess, nerve injury, tissue necrosis, and muscular atrophy. Among these, localized muscular pain is the most common side effect resulted from administration of intra muscular injection **(Nirosha, 2021).**The anxiety of the needle insertion, the stings, the injections, still exist as the second common complain. Needle phobia has been described in the literature as trypanophobia (anxiety of needles injection) **(Hempel, 2020).**When IM injections delivered with a proper technique, its complications can be limited **(Demir, &Aydin, 2021; Babu, Venkadalakshmi, Dhandapani & Chopra, 2022).**

Trypanophobia, is an overwhelming anxiety of medical procedures that involve needles. It is closely related to phobias of needles, pins or sharp objects. Although needle phobia is common, it can have severe consequences that may lead to patients' avoidance or delay in

receiving medical care, or failure in following the prescribed treatment. Trypanophobia may have many causes as hypersensitivity to pain (hyperalgesia), and negative or traumatic memories triggered by seeing a needle **(Adebayo & Mwankabatika, 2021).**

Apparently, IM injections are the foremost health care procedure worldwide which causes pain and distress to the patient. Furthermore, the mechanical and chemical effects of the drug during and post its injection can enhance pain (Nirosha, 2021). Actually, there are several factors which influence patients' experiences of pain during intramuscular injection such as anxiety, culture, age, gender, past experience and expectation of pain relief measures (**Rautela, Thomas& Rita, 2020; Demir & Aydin, 2021).**

Pain originating from IM injection must not be underestimated, because it can affect negatively the nurse-patient relationship. Pain relieving measures are the most patients' fundamental right, so it is counted from nurses' responsibility to apply the most effective approach for pain management **(Mahato, 2019).** Nurses have legal and ethical responsibilities for managing pain and relieving suffering. Effective pain control measures not only alleviate discomfort, but also improves patients' quality of life, in addition to promote quality care and patient satisfaction **(Jyoti, Arora, & Sharma, 2018; Ayinde, Hayward& Ross, 2021).**Actually, the pain perceived during IM injection according to the American pain society is referred as "the fifth vital sign" to stress. It is counted from the nursing management responsibilities which require effective pain relief strategies, as well as continuous assessment. Therefore, using the effective approach in pain management is one of the primary responsibilities of nurses **(Karabey & Karagozoglu, 2020; Ayinde, Hayward, & Ross, 2021).**

Unfortunately, it is reported that nurses' techniques in administering intramuscular injections were traditional rather than evidence based **(Ayinde, Hayward, & Ross, 2021; Demir& Aydin, 2021).** Administration of IM injection in a precise way helps in decreasing pain and suffering to achieve the greatest therapeutic effect **(Negi, 2019; Helfer, 2021).**

Nurses uses many methods to control patients' pain resulted from IM injection, such as skin tapping, applying pressure, heat, and cold compresses, as well as the Z-track technique **(Abdelkhalek, 2019; Bilgeet al., 2019; Bilgen & Balcı, 2019; Bilgic, 2021)**. Besides, appropriate selection of the injection site may help in reducing pain and anxiety caused by IM injection **(Shree, 2020).**

Various techniques as muscle relaxation, and deep breathing are considered some coping strategies that helps lessen symptoms and decrease anxiety **(Güven, KüçükakçaÇelik& Calpbinici, 2020; Daharnis, Ifdil, Amalianita, Zola& Putri, 2021).** Helfer Skin Tap Technique is one of the techniques used to promote muscle relaxation, emotional comfort, distraction, feeling of well-being, and pain relief during intramuscular injections **(Neupane, Thomas& Thakur, 2019; Peter& Mathew, 2019; Mohamed, Shehata & Abolwafa, 2021).**

Helfer Skin Tap Technique is a non-pharmacological pain management technique which describes the mechanical stimulation induced by tapping technique **(Chengwu & Ginting, 2022).** It can diminish the influence of small, pain-carrying fibers and alters the balance between the small diameter fibers that carry pain impulses to the brain, and the large diameter fibers that do not carry pain impulses. The large diameter fibers i.e. non-pain fibers block or sedate the small diameter fibers to slow the response to pain through the effective skin tapping technique, thus it helps to decrease pain as described in gate control theory **(Karabey, & Karagozoglu, 2021)**

Helfer Skin Tap Technique was developed by Nurse Joanne Helfer in 1998 in an attempt to alleviate pain associated with IM injection by tapping the skin over the injection site before and during the procedure in order to relax muscle **(Mahato, 2019; Helfer, 2021).** This technique is based on providing pain control through mechanical stimulation with rhythmic touching to the injection area which is easy-to-apply and enhancing pain relief approach **(Dimpleshree, Ramasambasivan, Mahariba, & Princy, 2020).** Also, it provides a distraction during intramuscular injection and thus helps to decrease pain as described by gate

control theory **(Neupane, Thomas, & Thakur, 2019; Demir & Aydin, 2021).**

Also, it is considered a touch therapy, that includes tapping over the intramuscular injection site with the palmer part of the fingers 16 times before and the three counts during the procedure to relax the muscle making a "V" with the thumb and other fingers of the non-dominant hand followed by tapping the skin again for three times during the insertion and removal of the needle **(Neupane, Thomas, & Thakur, 2019; Negi, 2019).** Tapping the skin in the area surrounding the site of an injection activated A-beta neuron, which could obstruct the gate. Transmission of pain signals that arise from the injection site would, therefore, be hindered at the spinal cord level **(Menaka, 2018).**

Since relieving pain is regarded as one of the most fundamental human rights, it is the nurse's duty to employ the most efficient pain management techniques. It is both morally and legally required of nurses to manage pain and alleviate suffering. Pain management enhances quality of life in addition to reducing physical discomfort **(Kenner, Altimier & Boykova, 2020).** So, it is valuable that nurses can apply Helfer Skin Tap Technique to evaluate its effect on pain perception and trypanophobia among patients taking analgesics.

Significance of the study

About 16 billion IM injections are administered every year throughout the world, and most of them are performed for medical objectives. Pain is the most common local reaction and side-effect developed from I.M injections, which resulted when the sharp needle penetrates the skin. Chemical and mechanical effects are also leading factors to pain **(Kaur, 2019; Chaudhari &Vageriya, 2019).**Trypanophobia is defined as an anxiety affecting patients during IM injection (Shree, 2020).

Symptoms of trypanophobia include profuse sweating, high blood pressure, tremor, palpitations, dry mouth, nausea, dizziness, and insomnia. These symptoms can greatly disrupt patients physically and psychologically **(Hudswell, Pinson, Ramdave& Bradley, 2020; Adebayo & Mwankabatika, 2021).**

It is important to use evidence-based approaches in order to highlight the concept of quality in the delivery of nursing care. There are few numbers of studies evaluating the effectiveness of Helfer Skin Tap Technique in reducing IM injection pain. Thus the researchers were motivated to pursue the current study which hopefully can add to the nursing practice. Optimistically, the results of the current study may help in controlling the suffering of adult patients who are receiving intramuscular injection. Eventually, the present study results can provide recommendations that should be reflected in nursing education and support the nursing practice and research field regarding the management of intramuscular pain.

It is anticipated that, the findings of the current study may help to improve the quality of patient care and establish evidence based data that can promote nursing practice and research. Additionally, it is hoped that this study will generate alternative attention and motivation for further researches into this topic. Therefore, the aim of the current study was to evaluate the effect of Helfer Skin Tap Technique on pain perception and trypanophobia among patients taking analgesics.

Operational definitions

Helfer Skin Tap Technique:

In this study, it refers to a technique in which the researchers tap the intra muscular injection site (dorsogluteal muscle) by using the palmer aspects of fingers 16 times rhythmically nearly 5 seconds before the insertion of needle using the V tap (spreading the thumb and index finger) and insert the needle immediately and continues to tap throughout the procedure, and 1, 2 and 3 counts while removing the needle during intramuscular injection.

Pain Perception:

In the current study, it is the unpleasant feeling occurs when a stimulus for pain is present and it is the patient's interpretation of the pain felt with the administration intramuscular injection in the form of analgesics as measured by numerical pain

rating scale before and within 1st minute after injection administration.

Trypanophobia (Anxiety about needle injections):

In the current study, it is the anxiety resulted from needles puncture performed as a result of administration of analgesics through intramuscular route. It is measured by anxiety rating scale before and within 1st minute after injection administration**.**

Patients Taking Analgesic:

It refers to both genders who receive analgesic medication through intramuscular route with injection volume of 3cm at 90 degree angle and size of needle is 23 gauges into dorsogluteal muscles at the surgical departments.

Aim of the study

The aim of the current study was to evaluate the effect of Helfer Skin Tap Technique on pain perception and trypanophobia among patients taking analgesics.

Research hypotheses

To achieve the aim of the current study, the following hypotheses were postulated to be tested:

H$_1$: There will be statistically significant reduction in pain perception level between patients who will receive Standard Technique (first injection) and Helfer Skin Tap Technique (second injection) at the same study group.

H$_2$: There will be statistically significant reduction in anxiety level between patients who will receive Standard Technique (first injection) and Helfer Skin Tap Technique (second injection) at the same study group.

H$_3$: There will be a statistically significant difference between selected baseline variable and pain level between patients who will receive Standard Technique (first injection) and Helfer Skin Tap Technique (second injection) at the same study group.

H$_4$: There will be a statistically significant difference between selected baseline variables and anxiety level between patients who will receive Standard Technique (first injection) and Helfer Skin Tap Technique (second injection) at the same study group.

Methods

Research Design:

Pre-posttest Quasi-experimental research design was used to achieve the aim of the current study. This design is one of the quasi-experimental designs in which the researchers observe or measure the subjects before and after the intervention (Stratton, 2019).

This design can be diagrammed as follows:

O$_1$ &   O$_2$

In the current study, this design will help to determine the effect of Helfer Skin Tap Technique (intervention/independent variable) on pain perception and trypanophobia among patients taking analgesics (dependent variable) by conducting the assessment before and after the intervention.

In the present study there was one study group. Participants were received the first intramuscular analgesic injection using Standard Technique followed by Helfer Skin Tap Technique for the next dose of injection.

O1 = Pretest (baseline data)

O2= Posttest (the First intramuscular analgesic injection using Standard Technique followed by Helfer Skin Tap Technique for the next dose of injection as prescribed in the same study group).

Schematic representation of research design:

Group	The First Injection (1st injection dose)	The Second Injection (2nd injection dose)
Study group	Standard Technique	Helfer Skin Tap Technique

Setting:

The current study was conducted in general surgical departments located in the second and third floors at Elkasr AlEini University Hospital, Egypt. Both sides (right and left) of two surgical wards in the second floor and

three surgical wards in the third floor were involved in the current study.

Subjects:

A purposive sample of one hundred (100) adult male and female patients receiving intramuscular injection and fulfill the inclusion criteria were included in the study.

Sample size:

Sample size calculation: The sample size with a 95% confidence level, 0.5 standard deviation (the predicted variation), and a 5% (0.05) margin of error was calculated using the following formula.

$$n = \frac{z^2 * p * (1-p)/e^2}{1 + \frac{z^2 * p * (1-p)}{e^2 * N}}$$

(N is the population size (sample).P 0.5, Z is the standard normal value 1.96 with confidence level 95%. E is the margin of error 0.05. A total number of 100 adult male and female patients were estimated to conduct the current study.

Inclusion Criteria:

The following inclusion criteria were established: Adult post-operative surgical patients who were:

Conscious male and female patients (rationalized as being able to perceive and describe pain) and received analgesics injection through intramuscular route (IM injection).IM injection recommended site is dorso-gluteal muscle, and able to express their degree of pain were included in this study.

Exclusion Criteria:

Patients received any type of oral or parenteral (IV) analgesic medications prior to administration, or took sedatives in less than two hours before the procedure. Patients underwent painful procedures such as biopsy and endoscope procedures within 1 hour before the procedure. Administration site that was burned, tender, red, swollen, inflamed, or scarred was excluded. Patients unable to assume lateral position with knee slightly flexed. Those who suffered from impaired circulation, or any bleeding disorders, and peripheral vascular disease (sensory perceptual alterations) as neuritis were excluded from this study.

Tools:

The data of the current study were collected using the following tools:

Tool I: Demographic and Medical Data Sheet:

It was developed by the researchers after reviewing related literature and it was composed of two parts: **Part One: Demographic Data:** It included data related to patient's demographic characteristics as age, gender, education, occupation, and marital status. **Part Two: Medical Related Data:** it includes data related to Body Mass Index (BMI), History of previous IM injection and previous IM injection complications.

Tool II: Numerical Pain Rating Scale:

A numerical pain rating scale is an adopted tool used to assess the level of pain during intramuscular injection. It consisted of a segmented numerical scale with 11 points ranged from 0 to 10. Patients were asked to select a corresponding number from 0 to 10 according to the severity of their pain to indicate the pain intensity they were experiencing **(Boonstra et al., 2016).** A score of 0 was considered as No pain. Score 1-2 was considered as Mild pain. Score 3-6 was considered as Moderate pain. Score 7-9 was considered as Severe pain. Finally score 10 was considered as Worst/ very severe pain.

Tool III: Anxiety Rating Scale:

The scale adopted from **(Cao et al., 2017).** It is presented to the patients in form of large pictures of facial expressions of increasing levels of anxiety portrayed by a visual analogue scale for anxiety. Knowing that the Faces Anxiety rating Scale was a single-item, five-point self-reported scale, consisted of five faces represented the levels of anxiety, where the first item represented a neutral or "no anxiety" face and the last item represented "highest anxiety". Specific categorical levels of anxiety were utilized, namely no anxiety, mild, mild-moderate, moderate, moderate-high or highest anxiety.

Validity and reliability of tools

Validity: The face validity of the second and third tools was tested by panel of five experts (two from the department of Medicine and three from the department of Medical Surgical Nursing).

Reliability: The reliability of pain and anxiety rating scale tools were determined by using inter rater reliability method. It was computed using spearman rank coefficient method. The reliability of the pain rating scale was found to be 0.94 (Alghadir, Anwer, Iqbal, & Iqbal, 2018). Additionally, 'r' value for the anxiety rating scale was ('r') = 0.8(Cao, et al, 2017).These tools were found to be highly reliable for the study.

Procedure

Once the official permission was granted to proceed with the current study from the Research Ethics Committee-Faculty of Medicine-Cairo University, the researchers move forward as the following:

The Preparatory Phase: Based on the inclusion and exclusion criteria, patients were selected .The researchers informed patients about the nature and aim of the current study. The confidentiality was assured and their written consent was taken individually. For those who were illiterate the consent was taken from them orally in case they agreed to participate in the current study.

The Implementation Phase: Firstly baseline data was collected from all patients that were enrolled in the study group. The researchers utilized Tool (I) Demographic and Medical Data Sheet to collect demographic and related medical data. Intramuscular injection was given along with the administration of Standard Technique (first injection dose) and Helfer Skin Tap Technique (second injection dose). In the current study there was only one study group (in form of pre-post quasi experimental study). Patients received the first intramuscular analgesic injection using Standard Technique followed by Helfer Skin Tap Technique for the next dose of injection and assessment was done utilizing Numerical Pain Rating Scale (Tool II) and Anxiety Rating Scale (Tool III) within the 1st minute after each

injection. The time taken to administer single IM Injection which includes preparation of medication and administration was from 10 – 15 minutes. The whole procedure lasted from 25-30 minutes.

Standard Technique: (Neupane, Thomas & Thakur, 2019).

➢ Place the patient in a comfortable side lying position with knees flexed.

➢ After preparing the skin, uncap the syringe in the dominant hand. Make a large V with the thumb and index finger of the non-dominant hand.

➢ Insert the needle at a 90 degrees angle into the muscle.

➢ Inject the medication slowly into the muscle after aspirating to avoid medicine entry into the vein.

➢ Remove the needle, and press the area gently.

➢ Dispose the needle in a puncture-proof container and syringe in the container.

➢ Wash hands and document the post-intervention pain level and anxiety of the patient within 1 minute after IM injection.

Helfer Skin Tap Technique: (Khanra, &Lenka, 2018; Nirosha, 2021).

There were two basic points in Helfer Skin Tap Technique: muscle relaxation, which physically decreased the resistance to needle entry, and diversion, by simultaneous tap of the skin while the needle was inserted and removed. The procedure steps were as the following:

• Perform hand hygiene.

• Prepare the medication.

• Explain the procedure and provide privacy to the patient.

• Administer IM injection to patients in dorso-gluteal muscle with patient in side-lying with knees flexed and muscle relaxed.

• Clean the injection site with alcohol swab to remove the surface bacteria.

• Uncap the Syringe with the dominant hand.

- Make a large "V" with the index finger and thumb of the non-dominant hand and tap the muscle which is intended to use the palmer aspect of the fingers 16 times before the insertion. Immediately after skin tapping, insert the needle at a 90- degree angle into the muscle.

- After inserting the needle, aspirate to prevent injection into a vessel, inject the medication slowly while continue tapping near the injection site 3 times when the injection given

- Continue tapping near the injection site, simultaneously tap the skin with the V tap of the non- dominant hand till the needle is withdrawn. Counts 1, 2 and 3 while removing the needle.

- The taps must be firm using entire hand to ensure stimulation of the large fibers. The wide span of the hand promotes broad stimulation of the large muscle fibers around the injection site. A light tap will not have the same effect. Tapping several times helps to relax the muscle more, and counting to three helps the nurse to synchronize the muscle tap with the needle insertion. It is extremely important that the needle entry be simultaneously done with a skin tap to ensure painless injection.

- Assess the posttest level of pain and anxiety within 1st minute after administration of injection by using the numeric and anxiety rating scale.

- Dispose the needle in a puncture-proof container and syringe in the container.

- Wash hands and document the post-intervention pain and anxiety level of the patient within 1st minute after injection.

The Evaluation Phase: In this phase, evaluation of patients' responses after implementation of Helfer Skin Tap Technique and Standard Technique regarding their measure parameters, as follows; assessed the post-test level of pain and anxiety within 1stminute after administration of injection by using the numeric pain rating scale and anxiety rating scale.

Ethical considerations

For ethical concerns, the study's conduct was authorized by the hospital director and the Faculty of Medicine's Ethics Committee under number (514-2023). Following an explanation of the nature and aim of the study, patients gave their informed consent individually. The researchers made it clear that participation in the study was completely optional and that data coding ensured anonymity and confidentiality.

Statistical analysis

The current data was coded and tabulated using a personal computer. Statistical Package for Social Science (SPSS) version 21 was used (Rahman & Muktadir, 2021). Data was formed and presented using descriptive statistics as frequencies and percentage…etc. Also inferential analysis in form of t-test, chi-square test and MH test,…etc. Statistical significance was considered at P-value ≤ 0.05.

Results

Table 1: showed that the highest percentage of patients (49%) in the study group were married and allocated in age group ranged between 41 to <61with the mean age of (45.72 ± 11.36). Concerning gender (52%) of them were females, while (41%) of the patients were university graduates. Regarding occupation, (78%) of them was working. In addition, (93%) of patients had history of previous IM injection and 62% in the same study group had no previous IM injection complications.

Figure (1): In relation to patients' Body Mass Index, figure 1 showed that (33%) of the patients had grade II obesity.

Concerning patients' pain perception levels, table (2) indicated that, the highest percentage of patients in the first injection (Standard Technique) reported mild pain, while more than half of them in the second injection (Helfer Skin Tap Technique) reported no pain (48% & 58% respectively). A highly statistical significant differences were found between the two interventions in the same study group in relation to pain level (MH = 5.1 at P= 0.003). ***Therefore, the first research hypothesis was supported.***

Concerning patients'' anxiety levels, table (3) indicated that, the highest percentage of patients in the first injection (Standard Technique) reported mild anxiety, while about two third of them in the second injection (Helfer Skin Tap Technique) reported no anxiety (45% & 67% respectively). A highly statistical significant differences were found between the two interventions in the same study group in relation to anxiety level (MH = 6.8 at P= 0.002). *Therefore, the second research hypothesis was supported.*

As regards relation between selected demographic and medical variables and scores of pain level, table (4) illustrated that there was a significant relation between pain level and selected variables (gender, previous IM injection complications & Body Mass Index

(BMI) in the first injection (Standard Technique) as (x^2=4.078, 8.49 & 9.47 at p value= 0.048, 0.001& 0.005 respectively), while in the second injection (Helfer Skin Tap Technique) there was only a significant relation between pain level and Previous IM injection complications and Body Mass Index (BMI) (x^2=6.8 & 5.1 at p value=0.002 & 0.003). *Therefore, the third research hypothesis was supported.*

As regards relation between selected demographic and medical variables and anxiety level, table (5) showed that there was no significant relation between anxiety and selected variables in both Standard and Helfer Skin Tap Techniques in the study group. *Therefore, the fourth research hypothesis was rejected.*

Table (1): Frequency and Percentage Distribution of Demographic and Medical Variables in the Study Group. (n = 100)

| Demographic variables	Study Group	
	No.	%
Age:		
20 < 41	34	34.0%
41 <61	49	49.0%
61 and above	17	17.0%
Mean± SD	45.72 ± 11.36	
Gender:		
Male	48	48.0%
Female	52	52.0%
Marital status:		
Married	49	49.0%
Single	17	17.0%
Divorced	20	20.0%
Widow	14	14.0%
Occupation:		
Worked	78	78.0%
Not worked	22	22.0%
Education:		
Illiterate	20	20.0%
School education	39	39.0%
University graduate	41	41.0%
History of previous IM injection:		
Yes	93	93.0%
No	7	7.0%
Previous IM injection complications		
Yes	38	38.0%
No	62	62.0%
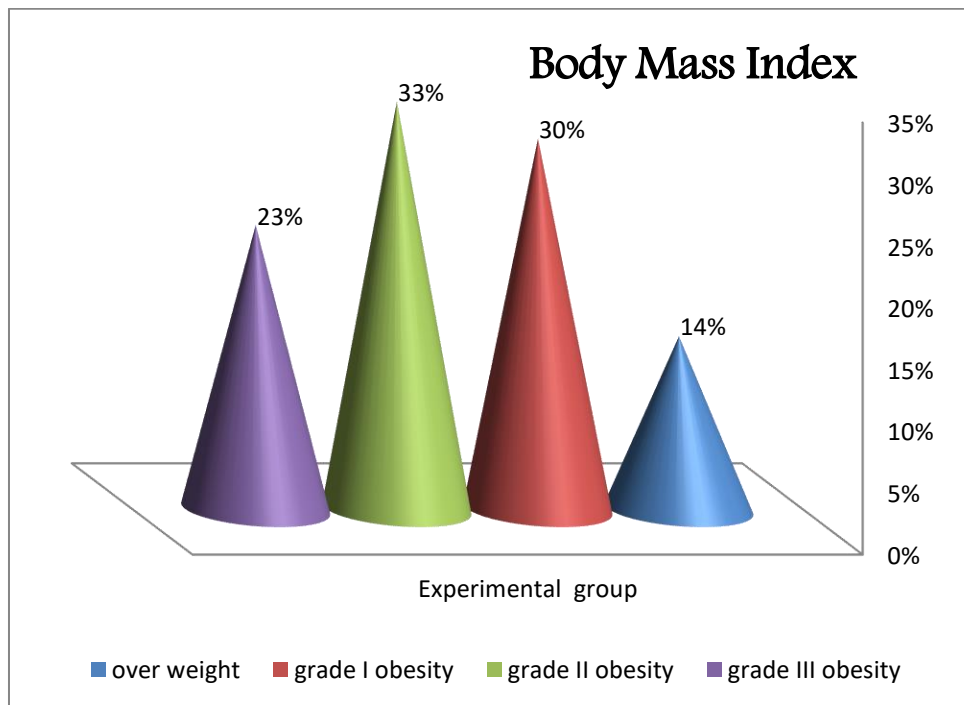
Body Mass Index

Figure (1): Percentage Distribution of Body Mass Index among the Study Group (n =100)

Table (2): Comparison of Pain Perception levels among Patients Receiving Intramuscular Injection by Standard Technique and Helfer Skin Tap Technique (n = 100)

Numeric pain rating scale (Pain perception level)	Study Group				MH	P-value
	First Injection (Standard Technique)		Second Injection (Helfer Technique)			
	No.	%	No.%			
-No pain (score 0)	31	31.0	58	58.0	5.1	0.003**
-Mild pain (score 1-2)	48	29.0	37	37.0		
-Moderate pain (score 3-6)	19	19.0	5	5.0		
-Severe pain (score 7-9)	2	2.0	0	0.0		
-Worst pain (score 10)	0	0.0	0	0.0		

MH: test of Marginal homogeneity for related groups
*P ≤0.05 (significant) & ** highly significant at 0.001*

Table (3): Comparison of Anxiety levels among Patients Receiving Intramuscular Injection by Standard Technique and Helfer Skin Tap Technique (n = 100)

Anxiety Rating Scale	Study Group				MH	P value
	First Injection (Standard Technique)		Second Injection (Helfer Technique)			
	No.	%	No.%			
-No anxiety	41	41.0	67	67.0	6.8	0.002**
-Mild anxiety	45	45.0	29	29.0		
-Mild- Moderate anxiety	12	12.0	4	4.0		
-Moderate anxiety	2	2.0	0	0.0		
-Moderate –high anxiety	0	0.0	0	0.0		
-Highest anxiety	0	0.0	0	0.0		

MH: test of Marginal homogeneity for related groups
*P ≤0.05 (significant) & ** highly significant at 0.001*

Table (4): Selected Demographic and Medical Variables in relation to Pain Level among the Study Group (n = 100).

Selected Demographic and Medical Variables	Pain Level First Injection (Standard Technique)		Pain Level Second Injection (Helfer Technique)	
	X^2	P-Value	X^2	P-Value
-Age	0.640	0.726	0.128	0.90
-Gender	4.078	0.048*	0.60	1.86
-Education	0.757	0.685	0.35	0.95
-History of previous IM injection	0.79	0.426	0.72	0.476
-Previous IM injection complications	8.49	0.001**	6.8	0.002**
-Body Mass Index (BMI)	9.470	0.005**	5.1	0.003**

*** P ≤0.05 (significant)*

Table (5): Relation between Selected Demographic and Medical Variables with the Anxiety Level among the Study Group (n=100).

Selected Demographic and Medical Variables	Anxiety Level First Injection (Standard Technique)		Anxiety Level Second Injection (Helfer Technique)	
	X^2	P-Value	X^2	P-Value
-Age	2.39	0.065	1.27	0.309
-Gender	1.40	0.253	0.445	0.812
-Education	0.102	0.99	0.887	0.533
-History of previous IM injection:	0.892	0.529	1.22	0.328
-Previous IM injection complications	1.43	0.242	0.21	0.83
-Body Mass Index (BMI)	0.602	0.699	0.44	0.66

*** P ≤0.05 (significant)*

Discussion

Regarding demographic characteristics, about half of the study group's age ranged between 41 to less than 61 years with the mean age of (45.72 ± 11.36). Considering to gender, more than half of them were females. Regarding to occupation, more than two third of the patients were worked. With regard to educational status, more than one third of them were graduated.

Findings from the current study agreed with the results that were mentioned by **Karabey and Karagozoglu (2021),** who examined the effect of Helfer Skin Tap Technique and Shot Blocker application on pain. Their findings showed that the distribution of patients according to their gender was examined as the highest percentage of the study group consists of females. The majority of patients were between the ages of 38-58.

In the same line another study conducted by **Jyoti, Arora and Sharma (2018),** explored the effect of Helfer Skin Tap Technique on IM injection pain among adult patients. The study

showed that the majority of patients were university graduates. Furthermore, regarding to pervious exposure of intra-muscular injection in the study group within the current study, the majority of them had that exposure. In addition to previous IM injection complications in the study group more than half of them had no previous IM complications. In the same contexts with these results, **Dimpleshree, Ramasambasivan, Mahariba and Princy (2020),** who studied the effect of Helfer Skin Tap Technique on pain reported that more than half of patients had no previous complication of IM.

In relation to patients' Body Mass Index, the current study showed that about one third of them were grade II obesity. This study contradicted with a study conducted by Karabey and Karagozoglu (2021), who examined The Effect of Helfer Skin Tap Technique and Shot Blocker Application on Pain. Their results showed that the highest percentage of the Helfer Skin Tap Technique group and Shot Blocker group's BMI was 18.50-24.99kg/m2 (healthy weight). Additionally, study conducted by **Jyoti, Arora and Sharma (2018),** explored the effect of Helfer

Skin Tap Technique on IM injection pain among adult patients. Their results showed that about two thirds of the patients had BMI between25-29.9 (overweight).

Regarding the effectiveness of Helfer Skin Tap Technique and Standard Technique on Pain Level, the current study findings demonstrated that there was significant decrease on pain level with the application of Helfer Skin Tap Technique than Standard Technique as the highest percentage of patients reported mild pain with Standard Technique. While reported no pain with the application of Helfer Skin Tap Technique. Additionally, the current study revealed that there was highly statistical significant differences were found between the two interventions in the same study group in relation to pain level.

Findings of the current study was in line with a study conducted by **Khanra and Lenka (2018),** who studied the effect of Helfer Skin Tap Technique on pain associated with intramuscular injection among adult patients. Their findings revealed that the mean pain scores in injections performed using Helfer Skin Tap Technique was found to be significantly lower than those of the control group.

Furthermore, **Mahato (2019),** studied the Effectiveness of Helfer's Skin Tap Technique versus routine technique on pain reduction among patients receiving intramuscular injections. Their findings revealed that Helfer Skin Tap Technique was found to be effective in reducing injection pain than Routine Technique. Similarly, **Dimpleshree, Ramasambasivan, Mahariba and Princy (2020),** examined the effectiveness of Helfer Skin Tap Technique on pain experience among patients receiving intramuscular injection. Their findings showed that, the mean and SD was 3.03 ± 1.60 in study group, whereas mean and SD was 5.57 ± 2.33 in control group. The calculated value of 4.90 which shows statistically significant difference at p<0.001 level, clearly demonstrated that there was significant reduction in pain experience after using Helfer Skin Tap technique.

Moreover, the current study results were consistent with the study by **Chaudhari and Vageriya (2019)**, who examined the effectiveness of Helfer Skin Tap Technique in

reduction of level of pain. The study findings revealed that there was a statistically significant difference in pain intensity during vaccination among study and control group at p-value 0.001. Additionally, the pain level of study group was less than control group. It also demonstrated that, Helfer Skin Tap Technique is effective to reduce the level of pain. Actually the researchers verified this result because of the Helfer Skin Tap Technique steps which focused on bending knee, tapping and using entire hand…etc was found to be effective in controlling pain level.

Along the same line, another similar study conducted by **Karabey and Karagozoglu (2021),** their results demonstrated a reduction in the mean pain scores of the Helfer Skin Tap Technique, which was used to provide pain control in IM injection application, compared to the standard application. Additionally, another study agreed with the current study findings was conducted by **Jyoti, Arora, and Sharma (2018); Neupane**, **Thomas**, and **Thakur (2019)** explored the Effectiveness of Helfer Skin Tap Technique for the IM injection pain among adult patients. Their results revealed that the use of the Helfer Skin Tap Technique to provide pain control in IM injection application was found to be significantly effective in reducing pain due to injection

As regards relation between selected demographic and medical variables and scores of pain level, the current study explored that there was a significant relation between pain and selected variables (gender, previous IM injection complications and BMI) in the first injection (Standard Technique) at p value= 0.048, 0.001&0.005 respectively). While in the second injection (Helfer Skin Tap Technique) there was only a significant relation between pain and previous IM injection complications and Body Mass Index (BMI) at p value=0.002&0.003). However, when the literature was examined, it has been stated that the perceived pain associated with injection was less in patients with thick subcutaneous adipose tissue. The current study did not show parallelism with the literature in this aspect. Apparently the current study explained that findings as the Standard IM injection technique

had its negative relation that affected by several factors as BMI, however the Helfer Skin Tap Technique naturalized that effect.

Furthermore, **Rautela, Thomas and Rita (2020)** studied the true experimental study to assess the effectiveness of Helfer Skin Tap Technique on the level of pain during intramuscular injection of tetanus toxoid among antenatal mothers. Their findings revealed a significant association between the levels of pain experienced by antenatal mothers during intramuscular injection with Helfer Skin Tap Technique in the study group and selected variables such as religion and BMI as the calculated Fisher's exact test value which was significant at p≤0.05, but no association was found with other selected variables.

Moreover, more than half of the study group were females, the current study explored that there was a significant relation between pain and selected variables as gender. According to the current researchers' explanation, females had more expressed and perceived pain level than males because male denied and hide their pain to protect their masculine image. And also search about Men and women difference in their pain tolerance reported that, male tolerate to pain was more than females because of hormonal and psychological factors. Considering age, the current study showed that there was not statistical significant difference between age and pain perception. Additionally about half of patients' age ranged between 41 to less than 61 years with the mean age of (45.72 ± 11.36).The physiological changes and regressions in the transmission and perception of pain with the advancement of age, it might be an expected result that elderly patients experience less pain after injection. Contradicted findings were obtained in the study conducted by **Jyoti, Arora, and Sharma (2018)** which reported that there was a significance association between pain scores in relation to occupation and marital status, but no statistical significance found with gender and educational background.

Concerning anxiety level among patients receiving intramuscular injection by Helfer Skin Tap Technique and Standard Technique in the same study group, the current study findings demonstrated that there was significant decrease in anxiety level with the application of Helfer Skin Tap Technique than the Traditional technique, as more than one third of patients in the first injection (Standard Technique) reported mild anxiety, while more than two third in the second injection (Helfer Skin Tap Technique) reported no anxiety. Additionally, there was a highly statistical significant differences were found between the two intervention in the same study group in relation to anxiety scores severity level. That finding was consequently logic in form as much as pain decreased as much as anxiety diminished.

As regards relation between selected demographic and medical variables and scores of anxiety level, the current study showed that there was no significant relation between anxiety and selected variables in Standard and Helfer Skin Tap Techniques at the same study group. On the other hand, the study results were supported by **Menaka, Malarvizhi, and Glory (2019);** Peter and Mathew (2019),who cleared that, no statistically significant relation between the demographic variables and pain during intramuscular administration of the vaccine for infants receiving the vaccine utilizing Helfer Skin Tap Technique.

Apparently three out of the four hypothesis of the current study were supported; that gave an optimistic futuristic view about the nursing role in decreasing and controlling pain and anxiety for those patients who have to be treated with medications of IM as analgesics on daily bases.

Conclusion

Applying Helfer Skin Tap Technique was highly effective in reducing and controlling pain perception during intramuscular injection as the present study showed that Helfer Skin Tap Technique is effective in reducing pain and alleviating anxiety among patients receiving intramuscular injection. Additionally, there was a highly statistical significant differences were found between the two intervention Helfer Skin Tap Technique and Standard Technique in the same study group in relation to pain and anxiety scores severity level.

Recommendations

- The study should be conducted among adult patients undergoing various types of injection and different intramuscular sites.

- Helfer Skin Tap Technique should be included in the curriculum of medical surgical nursing to teach nursing students how to be applied during intramuscular analgesics injection.

- Application of the Helfer Skin Tap Technique during IM analgesics injection of adult patients should be recommended for all nurses in the hospital setting to reduce pain and anxiety levels.

- Replication of the study on larger sample in different setting and different population with limited influence of extraneous variables like type of medication in order to validate the findings and make generalizations.

References

Abdelkhalek, W. S. S. (2019). The Effect of Shot Blocker and Z–Track Techniques on Reducing the Needle Pain and Anxiety Associated With Intramuscular Injection. International journal of Nursing Didactics, 9(12), 31-38.

Adebayo, P., &Mwankabatika, R. (2021). Needle phobia and pain among electrodiagnostic subjects: Preliminary survey. Journal of the Neurological Sciences, 429, 225.

Alghadir, A. H., Anwer, S., Iqbal, A., & Iqbal, Z. A. (2018). Test–retest reliability, validity, and minimum detectable change of visual analog, numerical rating, and verbal rating scales for measurement of osteoarthritic knee pain. Journal of pain research, 851-856.

Ayinde, O., Hayward, R. S., & Ross, J. D. (2021). The effect of intramuscular injection technique on injection associated pain; a systematic review and meta-analysis. PloS one, 16(5), e0250883.

Babu, J. J., Venkadalakshmi, V., Dhandapani, M., & Chopra, S. (2022). Pain, Drug Leakage and Inflammation Associated with Intramuscular Injections of Magnesium Sulfate in Preeclamptic Women: A Descriptive Study. Nursing & Midwifery Research Journal, 18(1), 35-44.

Bilge, S., Aydin, A., Gun, C., Aldinc, H., Acar, Y. A., Yaylaci, S.,& Balci, V. (2019). Comparison of the efficacy of ShotBlocker and cold spray in reducing intramuscular injection-related pain in adults: A prospective, randomized, controlled trial. Saudi medical journal, 40(10), 996.

Bilgen, B. S., &Balcı, S. (2019). The effect on pain of Buzzy® and Shot Blocker® during the administration of intramuscular injections to children: a randomized controlled trial. Journal of Korean Academy of Nursing, 49(4), 486-494.

Bilgic, S. (2021). The Comparison of The Effectiveness of Local Ice and Manual Pressure Application in Decreasing Pain Related to Intramuscular Injection. Clinical and Experimental Health Sciences, 11(2), 302-307.

Boonstra, A. M., Stewart, R. E., Köke, A. J., Oosterwijk, R. F., Swaan, J. L., Schreurs, K. M., & SchiphorstPreuper, H. R. (2016). Cut-off points for mild, moderate, and severe pain on the numeric rating scale for pain in patients with chronic musculoskeletal pain: variability and influence of sex and catastrophizing. Frontiersin psychology, 7, 1466.

Cao, X., Yumul, R., ElvirLazo, O. L., Friedman, J., Durra, O., Zhang, X., & White, P. F. (2017).A novel visual facial anxiety scale for assessing preoperative anxiety. PLoS One, 12(2), e0171233.

Chaudhari H, Vageriya V, (2019).   The effectiveness of helfer skin tap technique in reduction of level of pain among children ISSN: 2319/7064. SJIF(2020):7.803

Chengwu, Z., & Ginting, J. B. (2022). Influence before and after Early Mobilization of Changes in Pain Levels in Post Orthopedic Surgery Patients at Royal Prima Medan Hospital in 2021. Britain International of Exact Sciences (BIoEx) Journal, 4(1), 24-30.

Daharnis, D., Ifdil, I., Amalianita, B., Zola, N., &Putri, Y. E. (2021). The Effectiveness of Ego-state Therapy in Reducing Trypanophobia. Addictive Disorders & Their Treatment, 20(1), 61-65.

Demir, S. O., & Aydin, A. K. (2021). Investigation of Nurses' Knowledge of Intramuscular Injections and Factors Affecting Injection Site Preference: A Case-Based Survey. International Journal of Caring Sciences, 13(3), 1578.

Dimpleshree, K., Ramasambasivan, R., Mahariba, S. K., &Princy, K. (2020).Effectiveness of helfer skin tap technique on pain experience among the patients receiving intramuscular injection. TNNMC Journal of Medical & Surgical Nursing, 8(1), 24-30.

Güven, Ş. D., KüçükakçaÇelik, G., & Calpbinici, P. (2020). Effect of Helfer skin tap technique on pain associated with intramuscular injection among adult: A randomized controlled study.

Helfer, J. K. (2021). Painless injections: Helfer skin tap technique. Journal of Surgery and Surgical Research, 7(1), 017-019.

Hempel, E. (2020). Trypanophobia. Family Medicine, 52(10), 759-759.

Hudswell, L., Pinson, J., Ramdave, S., & Bradley, J. (2020). No needle to fear: An approach to needle phobic patients. Asia Oceania Journal of Nuclear Medicine and Biology, 8(2), 160.

Jyoti, G., Arora, S., & Sharma, B. (2018). Helfer Skin Tap Technique for the IM injection pain among adult patients. Nursing and Midwifery Research, 14(3), 18.

Karabey, T., &Karagozoglu, S. (2020). Use of non-pharmacological methods for pain control in intramuscular injection applications: a systematic review. IOSR-JNHS, 9(2), 1-6.

Karabey, T., &Karagozoglu, S. (2021).The Effect of Helper Skin Tap Technique and ShotBlocker Application on Pain in Deltoid Muscle Injection. Clinical and Experimental Health Sciences, 11(4), 721-726.

Kaur, S. (2019).An experimental study to assess the effectiveness of helfer skin tap technique on procedural pain among patients in selected civil hospitals of Punjab. Int J Health Sci Res, 9(9), 103-109.

Kenner. C, Altimier L, Boykova (2020). Comprehensive neonatal nursing sixed., USA springer Publishing Care, Company, LLC, chapter 23, pain in the newborn and infant pp. 549.

Khanra, S., &Lenka, A. (2018). Helfer Skin Tap Technique on Pain Associated With Intramuscular Injection among Adult Patients. International Journal of Nursing Education, 10(3).

Legrand, G., Guiguet-Auclair, C., Viennet, H., Aumeran, C., Reynaud, D., Badrikian, L., &Debost-Legrand, A. (2019). Nurses' practices in the preparation and administration of intramuscular injections in mental health: A cross-sectional study. Journal of Clinical Nursing, 28(17-18), 3310-3317.

Mahato, E. (2019). Effectiveness of Helfer's Skin Tap Technique Versus Routine Technique on Pain Reduction among Patient's Receiving Intramuscular Injections. International Journal of Nursing Education, 11(1).

Menaka, J. (2018). A Study to assess the effectiveness of Helfer skin tap technique on pain reduction among infants undergoing intramuscular vaccination in tertiary care setting, Coimbatore (Doctoral dissertation, PSG College of Nursing, Coimbatore).

Menaka, J., Malarvizhi, G., & Glory, H. (2019). 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. International Journal of Nursing & Midwifery Research (E-ISSN: 2455-9318), 6(1), 11-16.

Mohamed, S., Shehata, B.H., &Abolwafa, F.N. (2021). Effect of Helfer Skin Tap Technique on Reducing Pain levels Among Newborn Receiving Hepatitis B-vaccine. Egyptian Journal of Health Care, 12(2), 1550-1561.

Nakajima, Y., Fujii, T., Mukai, K., Ishida, A., Kato, M., Takahashi, M., &Nakatani, T. (2020). Anatomically safe sites for intramuscular injections: a cross-sectional study on young adults and cadavers with a focus on the thigh. Human Vaccines &Immunotherapeutics, 16(1), 189-196.

Negi, P. (2019). Effectiveness of Helfer skin tap technique on pain reduction during intramuscular injection among infants. International Journal of Advance Research and Development, 4(3), 34-9.

Neupane, M. U., Thomas, L. P., & Thakur, R. (2019).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. Bangalore. IJHSR, 1, 95-103.

Nirosha, A. (2021). A Study to Assess the Effectiveness of Helfer Skin Tap Technique on Level of Pain among Infants Undergoing Intramuscular Injection in Ashwin Hospital, Coimbatore (Doctoral dissertation, PPG College of nursing, Coimbatore).

Peter, B., & Mathew, B. (2019).Pain Level of Infants Receiving Helfer Skin Tap during Vaccination.Vaccine, (48.6), 50-0.

Rahman, A., &Muktadir, M. G. (2021). SPSS: An imperative quantitative data analysis tool for social science research. International Journal of Research and Innovation in Social Science, 5(10), 300-302.

Rautela, M., Thomas, S., & Rita, P. D. (2020). A True Experimental Study to Assess the Effectiveness of Helfer Skin Tap Technique on the Level of Pain during Intramuscular Injection of Tetanus Toxoid among Antenatal Mothers in a selected Hospital of Delhi. Amarjeet Kaur Sandhu, 12(1), 46.

Shree, M. K. R. (2020). Factors influencing patients' fear during hospital visit. Journal of Contemporary Issues in Business and Government, 26(2), 782-788.

Stratton, S. J. (2019). Quasi-experimental design (pre-test and post-test studies) in prehospital and disaster research. Prehospital and disaster medicine, 34(6), 573-574.