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EFFECTIVENESS OF HELFER SKIN TAP TECHNIQUE ON PAIN INTENSITY DURING INTRAMUSCULAR INJECTION AMONG ADULT CLIENTS

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ABSTRACT

Background: Intramuscular injection is a common procedure for drugs that may cause pain, anxiety, and other issues. It is the responsibility of health care personnel to provide painless treatment. This study was conducted to evaluate the effectiveness of Helfer skin tap technique on the intensity of pain during intramuscular injection among adult clients. **Method:** A quasi-experimental post-test only control group design was conducted among 72 adults (36 experimental and 36 control) attending the Vaccine OPD of Sukraraj Tropical and Infectious Disease Hospital using purposive sampling. Pain intensity during intramuscular injection was assessed using the Numerical Pain Rating Scale. Mann–Whitney U test, and Fisher's exact test were used for data analysis, with statistical significance set at $p < 0.05$. **Results:** The findings revealed that participants in the experimental group experienced lower pain intensity during intramuscular injection compared to the control group. Most participants in the experimental group reported mild pain, whereas the majority in the control group reported moderate pain. The median pain score was lower in the experimental group (2.00) than in the control group (4.50), and the difference was statistically significant ($p < .001$). No significant association was found between pain intensity and demographic variables. **Conclusion:** The study findings conclude that the Helfer skin tap technique tends to reduce pain during intramuscular injection compared to the conventional technique.

KEYWORDS: *Helfer skin tap technique, Intramuscular injection, Pain intensity.*

INTRODUCTION

Background of the Study

The dorsogluteal, ventrogluteal, deltoid, and vastus lateralis muscles are common IM sites.[1] Intramuscular (IM) injections are absorbed more quickly than subcutaneous injections because of the greater blood supply to the muscles of the body.[2] According to the International Association for the Study of Pain (IASP, 2020),[3] pain is an unpleasant emotional and sensory experience connected to real or possible tissue damage. The American Pain Society (1995)[4] recognizes pain as the fifth vital sign, focusing on its significance and the necessity for healthcare professionals to prioritize effective pain management and regular monitoring. Patients usually try to avoid procedures due to pain. IM injections can cause discomfort at the injection site, which may be influenced by factors such as anxiety, cultural background, age, gender, and expectations regarding pain management.[5] Study shows that any IM injection can cause pain at the injection site.[6] Although IM is a simple procedure, it can lead to severe complications if not performed using proper techniques.[7]

The Helfer skin tap technique was developed in 1998 by Ms. Joanne Keiffer Helfer, BSN, RN, from California, USA, which aims to reduce pain by tapping the skin before and during treatment and is based on the Gate control theory, which suggests that mechanical tapping causes the stimulation of large-diameter fibers (transmitting pressure, touch, and vibration signals) which inhibits the activity of small-diameter fibers

(transmitting pain signals), thereby slowing the pain perception. In a descriptive, quantitative study conducted by Helfer among 74 patients in a suburban emergency department, 96% of participants reported reduced pain, while 4% reported both injection as painless injection. Additionally, 88% of participants reported skin tap technique as completely painless. The study concluded that pain intensity significantly decreased when IM injections were administered using the Helfer technique.[8] Applying mechanical stimulation and distraction during intramuscular (IM) injections helps alleviate discomfort and promote muscle relaxation, aligning with the principles of the gate control theory.[9] The Helfer skin tap technique is a simple and efficient intervention for pain relief, though it requires some time to perform.[10]

A true experimental study conducted among adult patients receiving IM Injection of Shimla, India, regarding effectiveness of Helfer skin tap technique showed decreased mean pain in the experimental group compared to that of the control group (1.70 ± 1.368 vs 4.00 ± 1.462) at t-value statistically significant at a 0.05 level. Additionally, a significant association was found between the pain level in the experimental group and the frequency of injection administration.[11]

A study conducted at the Patan Academy of Health Sciences among adult females receiving the TD vaccine showed that the average pain score in the experimental group was lower compared to the control group (1.77 ± 0.37 vs 4.06 ± 1.28). The study found a statistically significant difference in pain scores between two groups during IM injections ($p < 0.001$).[12]

Every individual has the right to receive treatment without pain. It is the responsibility of healthcare professionals to ensure that medications are administered with minimal pain and discomfort. In Nepal, there is limited research studies on the effectiveness of Helfer skin tap technique for IM injections. Therefore, the researcher aims to evaluate the effectiveness of this technique on reducing pain during IM injections.

OBJECTIVES OF THE STUDY

General Objective

The general objective was to find out the effectiveness of Helfer skin tap technique on the intensity of pain during IM injection among adult clients in a hospital.

Specific Objectives

The specific objectives of the study were.

i. To assess the intensity of pain during IM injection by Helfer skin tap technique in the experimental group among adult clients
ii. To identify the intensity of pain during IM injection by conventional technique in the comparison group among adult clients
iii. To compare the pain score during IM injection in the experimental and comparison group among adult clients
iv. To measure the association of intensity of pain during IM injection with selected demographic variables among adult clients

Theoretical Framework

In 1969, German theorist Ernestine Wiedenbach, introduced the "Prescriptive theory." This theory focused on creating specific situations to guide healthcare providers in achieving desired goals. It consisted of three primary components:

The Central purpose: It was a desired level of health; a nurse aims to achieve or sustain for their patient and reflects their unique responsibility in providing care. In this study, the primary objective was to minimize the pain intensity.

The Prescription: It was the method applied to achieve the central purpose. After identifying philosophy and respecting the patient's autonomy and uniqueness, the nurse creates a care plan with patient. This plan, or prescription, served as a guideline for action to achieve the nurse's central purpose.

The Realities: They were contextual factors present in the urgent condition that influenced the accomplishment of the central purpose. They were specific circumstances influencing the provision of care. These circumstances could be categorized into five key aspects: Agent, Recipient, Goal, Means, and Framework.

Agent: It was the healthcare personnel, such as a nurse, who was responsible for performing the intervention. In this study, the researcher served as the agent.

Recipient: It was the individual receiving care, typically a patient who was dependent on others for assistance. The participant in this study was an adult client receiving an IM injection of Hepatitis B.

Goal: It was the desired outcome of the nurse. The main aim of the present study was to determine the effectiveness of Helfer skin tap technique in reducing pain intensity during IM injections.

Means: It consisted of strategies, techniques, and tools used to attain a specific goal. In the present study, the main goal was accomplished through the use of Helfer skin tap technique and pain measurement using the Numerical Pain Rating Scale.

Framework: It was the context that included human, environmental, professional, and organizational factors. The framework for this study was the vaccine outpatient department at Sukraraj Tropical and Infectious Disease Hospital, Teku.

Wiedenbach emphasized that nursing practice encompassed the following core components:

Identification of the patient's need for help: Demographic variables, such as age, gender, education, occupation, marital status, and previous history of intramuscular injections, for adult clients receiving Hepatitis B vaccination through the IM route were identified.

Ministration of the help needed: In this study, the experimental group received IM injections using Helfer skin tap technique, while the control group was given injections using the conventional method.

Validation that the help provided would indeed be helpful to the client: It was a trial involving the administration of IM injections to the experimental group using Helfer skin tap technique, while the control group received injections via the conventional method.[13]

Modified Wiedenbach's Prescriptive Theory

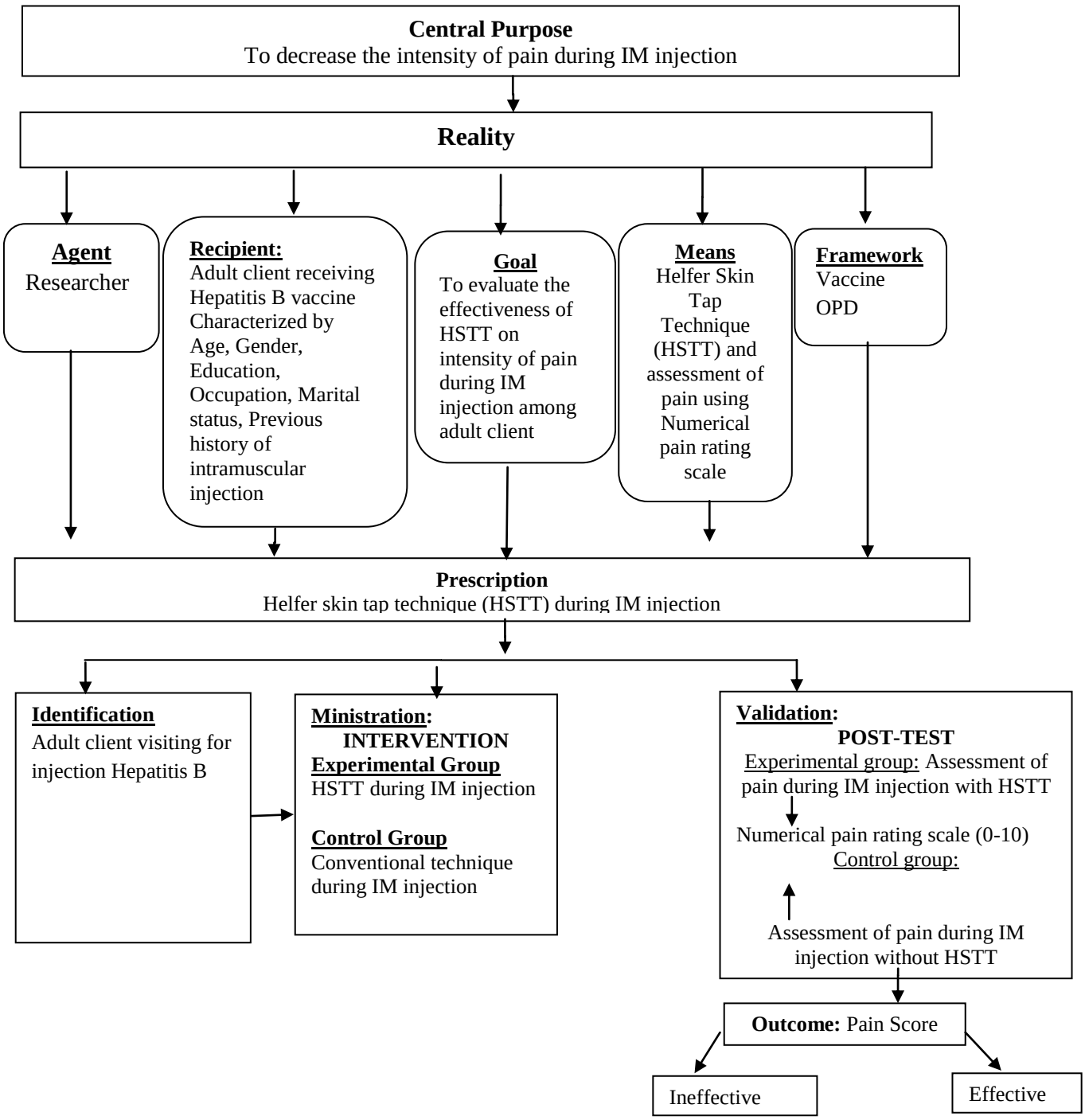


Figure 1: Theoretical framework based on Wiedenbach's Prescriptive Theory (1969)

1.3 Hypotheses

Null Hypothesis

H_o (1): There is no significant difference in pain score of adult clients receiving intramuscular injection by the Helfer skin tap technique and the conventional technique.

Alternate Hypothesis

H_1 (1): There is a significant difference in pain score of the adult clients receiving intramuscular injection by the Helfer skin tap technique and the conventional technique.

1.4 Operational Definition

Helfer Skin Tap Technique: This technique involved rhythmically tapping the deltoid area with the palm of the non-dominant hand for about 5 seconds to help relax the muscle. Then, using the non-dominant hand, three taps were made on the site with the thumb and index finger, with a V-tap: "1, 2, 3." On the third count, the needle was inserted, and the Hepatitis B vaccine was injected slowly perpendicularly. The needle was removed while the skin was simultaneously "V" tapped again with the non-dominant hand.

Conventional Technique: It involved identifying the deltoid muscle and injecting the needle at a 90-degree angle. The Hepatitis B vaccine was then injected slowly before removing the needle.

Effectiveness of Helfer Skin Tap Technique: It was a reduction in the intensity of pain by application of the Helfer skin tap technique during IM injection of Hepatitis B among the experimental group and intensity of pain was assessed by Numerical pain rating scale in both the experimental and control group within one minute following the intramuscular injection.

Intramuscular injection: It was administration of injection Hepatitis B into the deltoid muscle at Ninety degrees.

Intensity of Pain: It was the perception of pain experienced by adult clients during an intramuscular injection, which was measured by use of the Numerical pain rating scale. (Nepali version) within one minute where '0' represented no pain; '1-3' represented mild pain; '4-6' represented moderate pain; '7-10' represented severe pain.[14]

MATERIALS AND METHODS

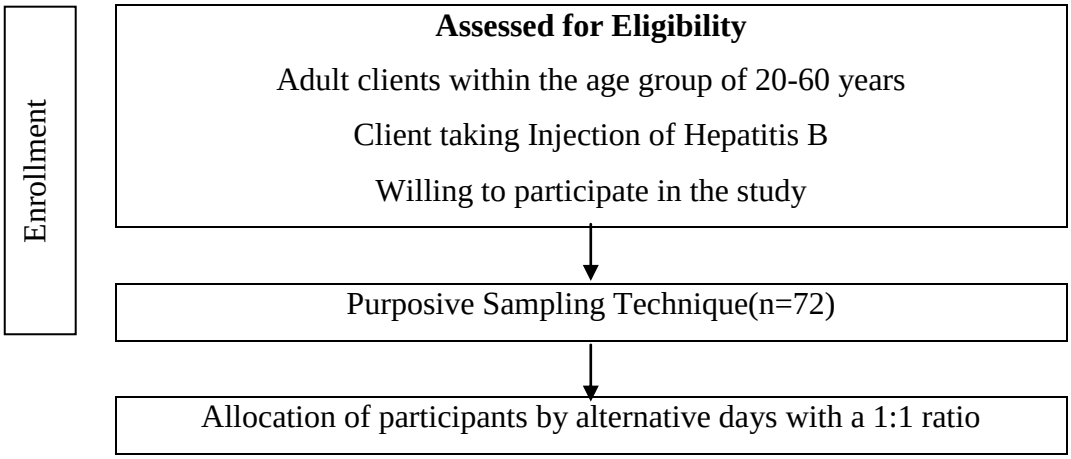
Research Design

A quasi-experimental posttest-only non-equivalent control group design was used for the study to assess the effectiveness of Helfer skin tap technique on the intensity of pain during IM injection among adults. The Helfer technique was carried out in an experimental group, whereas the conventional technique was carried out in the comparison group. Both groups were assessed on pain level during the procedure by the Numerical Pain Rating Scale, as shown in Figure 2.

Experimental Group → Intervention (Helfer Skin Tap Technique) → Pain Assessment

Control Group → Conventional Technique → Pain-assessment

Figure 2: Posttest Only Non-Equivalent Control Group Design.



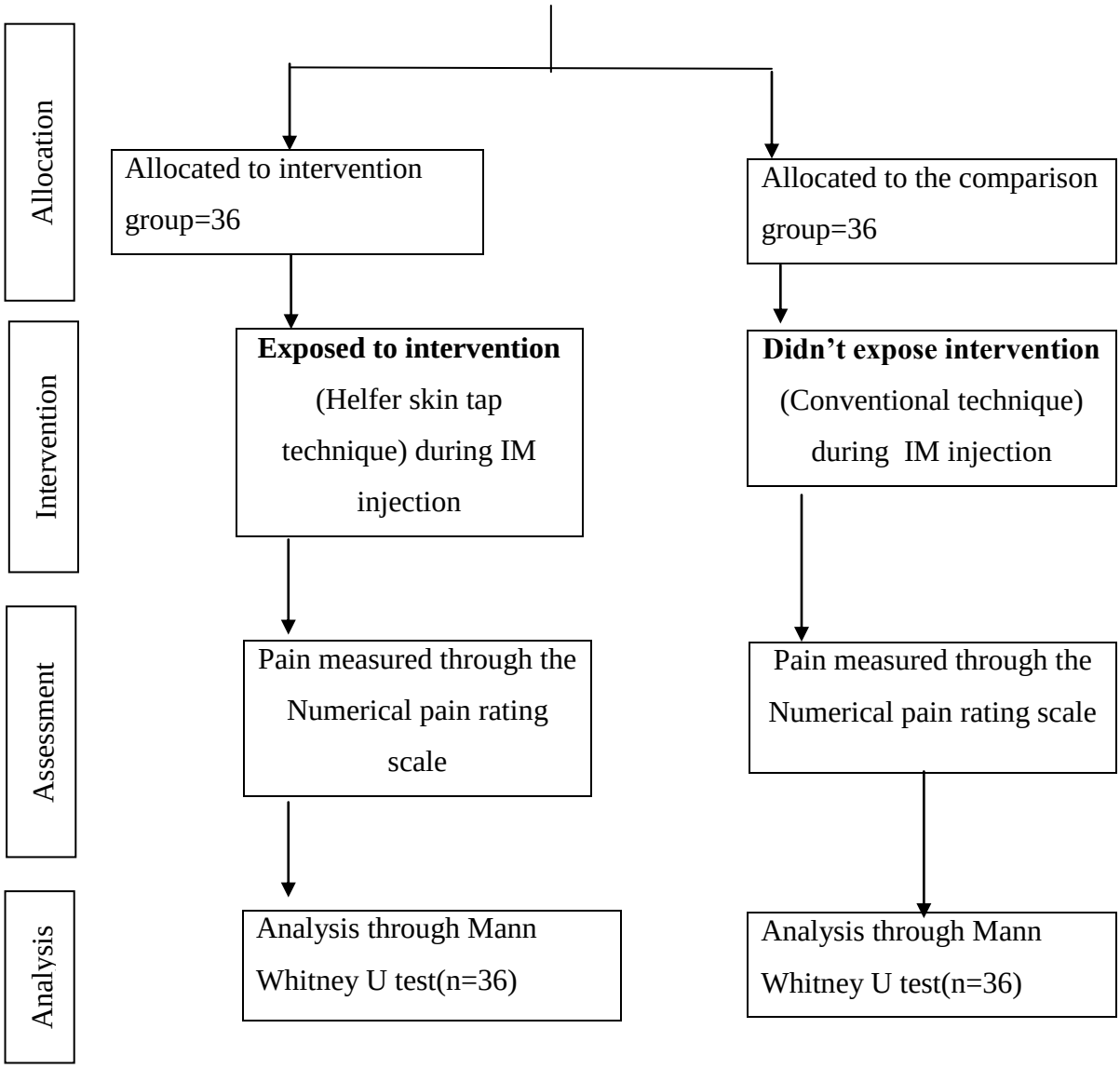


Figure 3: Flow chart of Research study.

Research Setting and Population

Setting: The study was conducted in the central hospital, Sukraraj Tropical and Infectious Disease Hospital, Teku. It was established in 1990 BS. Currently, it has a capacity of 100 inpatient beds. An average of 3-4 clients visit OPD per day to get injections of Hepatitis B. Services being provided by the hospital are: Inpatient facilities, 24-hour Emergency Services, OPD Services, Anti-Retro Viral Therapy Services, Anti-Rabies Vaccine Services, Equine Rabies Immunoglobulin (ERIG), Adult Immunization Program, DOTS Program, etc. The researcher selected this setting due to the availability of samples and the feasibility of the study.

Study Population: The study population was adult clients (20-60 years) visiting vaccine OPD for injection of Hepatitis B.

Sampling Procedure

Non-probability purposive sampling method was used. The sample size was calculated by the following formula:

$$n = \frac{2(Z_{\alpha/2}+Z_{\beta})^2 (\sigma_1^2+\sigma_2^2)}{(\mu_1-\mu_2)^2}$$

where,

n= required sample size

$Z_{\alpha/2}$ = standard error associated with the confidence level=95%=1.96

Z_{β}=power of test=80%=0.84

σ_1= Standard deviation of outcome variable of Group I (Experimental Group) from the previous study

σ_2= Standard deviation of outcome variable of Group II (Control Group) from the previous study

μ_1= Mean score of Group I (Experimental Group) from the previous study

μ_2= Mean score of Group II (Control Group) from the previous study

Previous study: A study to assess the effectiveness of the Helfer skin tap technique on the level of pain during IM injection among adults in a selected hospital, in India, among 80 adult patients (40 in each group) revealed results after intervention measured by Numerical Pain Rating Scale as follows.[9]

$\sigma_1 = 0.474$ $\mu_1 = 1.68$

$\sigma_2 = 0.463$ $\mu_2 = 2.12$

Now applying the formula,

$$n = \frac{2(Z_{\alpha/2}+Z_{\beta})^2 (\sigma_1^2+\sigma_2^2)}{(\mu_1-\mu_2)^2}$$

$$n = \frac{2(1.96+0.84)^2 (0.474^2+0.463^2)}{(1.68-2.12)^2}$$

$n = 35.55$

$= 35.55 \sim 36$

$= 36$

The required sample size was 36 subjects in each group.

Criteria for Sample Selection

Inclusion criteria

- Adult client receiving IM injection in the deltoid muscles for Hepatitis B vaccine aged between 20 - 60 years
- Client who were willing to participate during the period of data collection

Exclusion Criteria

- Any painful procedure within one hour before the study.

Instrumentation

A structured interview schedule was used to collect the data for the study which was developed by reviewing the literature and consulting with the research advisor. The transition from English to Nepali was done by bi-linguistic, and the back translation was done by the researcher with the help of peers. The interview schedule consisted of two parts.

Part I consisted of questions on socio-demographic variables: age, gender, education, occupation, marital status, and previous history of IM injection.

Part I consisted of the Numerical Pain Rating Scale-Nepali version (freely available on Google), which was a validated 11-point rating scale ranging from 0–10.[14]

0: No pain
1-3: Mild pain
4-6: Moderate pain
7-9: Severe pain

Content Adequacy of the instrument: It was established by consulting with the research advisor and research expert of the Nepalese Army Institute of Health Sciences, College of Nursing (NAIHS- CON), based on their valuable suggestions and constructive feedback, the necessary modification was done in an instrument.

Reliability of the instrument: The Numerical pain rating scale was a reliable tool with test-retest reliability (intra-class correlation coefficient: 0.81).[14]

Pretesting was conducted among 10% of the sample size (n=72). i.e., 8 clients (4 clients in each group). These clients were excluded from the main study.

Intervention

Two groups were chosen for the study. i.e., the experimental and control group. Helfer skin tap technique was used in the experimental group, while the conventional technique in the control group. Pain intensity was measured by the use of a Numerical pain rating scale in each group within one minute. Doctor's order and patient identification was verified and necessary items such as dry cotton, syringes, and Hepatitis B injections, were gathered and prepared in both groups along with hand hygiene.

Helfer skin tap technique in Experimental Group

i. The patient was instructed to relax their arm by allowing it to hang loosely at their side.
ii. After identifying the deltoid muscle as the injection site, the skin was gently tapped several times with the palm of the non-dominant hand for about five seconds to help relax the muscle.
iii. Deltoid muscle was tapped rhythmically with the palm of the non-dominant hand for about five seconds to help relax the muscle. Then, using the non-dominant hand, three taps were made on the site with the thumb and index finger with V tap "1, 2, 3." On the third count, the needle was inserted, and the Hepatitis B vaccine was injected slowly perpendicularly.
iv. After aspiration, the medication was injected slowly and needle was removed while the skin was simultaneously "V" tapped again with the non-dominant hand.

Conventional Technique in Control Group

i. The patient was instructed to relax their arm by allowing it to hang loosely at their side. The injection site was identified on the deltoid muscle.
ii. The syringe was held with the dominant hand, and the needle was inserted at a 90-degree angle into the site.
iii. After aspiration, the medication was injected into the muscle.
iv. The needle was withdrawn, and gentle pressure was applied to the injection site.

Ethical Consideration

The proposal was approved by the research committee of NAIHS-CON. Ethical approval was obtained from the Institutional Review Committee (IRC) of NAIHS, and formal written permission was obtained from the medical superintendent of Sukraraj Tropical and Infectious Disease Hospital after submitting a request letter from NAIHS-CON. Informed written consent was taken from each participant, and privacy was maintained by collecting data in a separate corner. The dignity of the participants was maintained by giving liberty to discontinue the study if they wanted. Confidentiality was

maintained by assuring them that the collected information would be used only for study purposes without revealing their identity.

Data Collection Procedure

At first, a coin was tossed (If head: control and if tail: experiment). The control group was selected for the first day of data collection. Alternate days were used for the control and experimental group, respectively till the targeted sample size was obtained. After taking written informed consent from participants, baseline demographic information was collected from each participant. Then, the Helfer skin tap technique was carried out for the experimental group, and the conventional technique was carried out in the control group. Then, a structured interview schedule in Nepali translation was used for pain assessment by the Numerical Pain Rating Scale-Nepali version within one minute of IM injection. The time required for each participant was 5-10 minutes. About 3-4 participants were included in the study per day. Data were collected each day (9 am-3 pm) except public holidays. Data were collected within 4 weeks from the 8th September, 2024 to the 8th October, 2024.

Data Analysis Procedure

The collected data were edited, classified, and coded. The coded data were entered, cleaned, and tabulated by Statistical Package for Social Science (SPSS) version 16. All the collected data were analyzed and interpreted by using descriptive statistical techniques (i.e., Number, Percentage, Mean, Median, Quartiles, and Standard deviation). The Shapiro-Wilk test was used to test the normality of data related to pain.

The inferential statistics were used based on the distribution of data obtained and checked for the normality test of the pain score. As the data were not normally distributed (i.e., $p < 0.05$), the independent Mann-Whitney U test was used to compare the median pain scores of the experimental and control group, evaluating the effectiveness of Helfer skin tap technique in reducing pain intensity during IM injections. Fischer's exact test($p<0.05$) was used to find out the association of intensity of pain with selected demographic variables.

RESULTS OF STUDY

Table 1: Demographic Characteristics of Participants in Experimental and Control Group.

n=72

Characteristics	Experimental group(n=36) Number (Percent)	Control group(n=36) Number (Percent)	P-value
Age (in years)			
20-30	26(72.2)	20(55.6)	0.220
30-40	5(13.9)	11(30.6)	
≥40	5(13.9)	5(13.9)	
Mean±S.D(in years)	28.47 ±9.69	30.17 ±9.22	
Gender			
Male	20(55.6)	13(36.1)	0.098
Female	16(44.4)	23(63.9)	
Educational Status			
Can read and write	32(88.9)	33(91.7)	>0.999#
Can't read and write	4 (11.1)	3(8.3)	
If can read and write, Level of Education			
Basic to Secondary Level (1-12)	15(46.87)	16(48.48)	0.897
Bachelor and above	17(53.12)	17(51.51)	
Marital Status			
Single	21(58.3)	14(38.9)	0.099
Married	15(41.7)	22(61.1)	
Occupation			
Services	18(50.0)	13(36.1)	0.458
Student	12(33.3)	14(38.9)	
Others	6(16.7)	9(25.0)	

*Others** include Agriculture, Business, House manager*
P-value significant at <0.05; # Fisher's exact test

Table 1 reveals that the mean age was 28.47 ±9.69 years in the experimental group and 30.17±9.22 years in the control group. More than half of the participants (55.6%) in the experimental group were male whereas the majority of the participants (63.9%) in the control group were female. Most of the participants (88.9%) in the experimental group can read and write, whereas almost all participants (91.7%) in the control group can read and write. In both groups, more than half of the participants (53.12% in the experimental group and 51.51% in the control group) had Bachelor's and above education. Likewise, more than half of the participants (58.3%) in

the experimental group were single, and the majority of the participants (61.1%) in the control group were married. Regarding occupation, half of the participants (50%) in the experimental group were involved in services, whereas the highest proportion of participants (38.9%) in the control group were students. Furthermore, the p-value, tested using the chi-square test and Fisher's exact test, suggests that there was no statistically significant difference between two groups in respect to age, gender, education, marital status, occupation, which signifies that the participants in both group were similar.

Table 2: Previous History of Intramuscular Injection of Participants in the Experimental and Control Group n=72

Characteristics	Experimental group(n=36)	Control group(n=36)	P-value
	Number (Percent)	Number (Percent)	
Previous History of Intramuscular Injection			
Yes	23(63.9)	22(61.1)	0.808
No	13(36.1)	14(38.9)	
If Yes, Previous Number of Dose			
One dose	20(86.95)	18(81.81)	0.826
More than one dose	3(13.04)	4(18.18)	

**P value significant at <0.05*

Table 2 indicates that in experimental group, the majority of participants (63.9%) had a previous history of IM injection. Among them, most of the participants (86.95% of the participants had a previous history of intra-muscular injection. Similarly, in control group, majority of the participants (61.1%) had a previous history of intra-muscular injection. Among them, 81.81% of the participants had received single dose of IM injection in their previous history. Furthermore, the p-value tested using the chi-square test suggested that there was no statistically significant difference between these two group with respect to previous history of intramuscular injection.

Table 3: Intensity of Pain among Participants in Experimental and Control Group.

Intensity of Pain	Experimental Group Number (Percent)	Control Group Number (Percent)
No Pain (0)	5(13.9)	-
Mild Pain (1-3)	27(75.0)	6(16.7)
Moderate Pain (4-6)	4(11.1)	27(75.0)
Severe Pain (7-10)	-	3(8.3)
Total	36(100%)	36(100%)

Table 3 shows that most of the participants (75.0%) in the experimental group experienced mild pain, whereas most of the participants (75.0%) in the control group experienced moderate pain. None of the participants in the experimental group experienced severe pain, and all participants in the control group experienced pain during IM injection.

Table 4: Comparison of Pain Score among Participants in the Experimental and Control Group during Intramuscular Injection.
n=72

Score	Experimental Group (n=36)	Control Group (n=36)	Mann-Whitney U value	P-value
Mean±SD	2.00±1.33	4.92±1.38	72.00	<0.001*
Median (Q1,Q3)	2.00(1.00,3.00)	4.50(4.00,6.00)		

**P value significant at <0.05*

Table 4 depicts a least mean pain score (2.00±1.33) and median pain score [2.00(1.00,3.00)] in the experimental group compared to that of a mean pain score (4.92±1.38) and median pain score [4.50(4.00,6.00)] in the control group with significant difference at p-value < 0.001. Hence, the null hypotheses were rejected. So, there was significant difference in pain score in the experimental and control group.

Table 5: Association of Intensity of Pain with Demographic Variables and Previous History in Experimental Group. **n=72**

Characteristics	Intensity of Pain in the Experimental Group		P-value
	None to Mild pain(n=33) Number (Percent)	Moderate to Severe pain(n=3) Number (Percent)	
Age (in years)			
<30	23(69.7)	3(100.7)	0.545
≥30	10(30.3)	-	
Gender			
Male	19(57.6)	1(33.3)	0.574
Female	14(42.4)	2(66.7)	
Educational Status			
Can read and write	29(87.9)	3(100.0)	0.695
Can't read and write	4(12.1)	-	
Marital Status			
Single	20(60.6)	1(33.3)	0.559
Married	13(39.4)	2(66.7)	
Occupation			
Services	14(42.4)	2(66.7)	0.574
Non-services	19(57.6)	1(33.3)	
Previous History of Intramuscular Injection			
Yes	21(63.6)	2(66.7)	>0.999
No	12(36.4)	1(33.3)	

P-value from Fisher's exact test significance at <0.05 level

As per Table 5, the intensity of pain in the experimental group was not statistically associated with demographic variables and previous history.

Table 6: Association of Intensity of Pain with Demographic Variables and Previous History in Control Group. **n=72**

Characteristics	Intensity of Pain in the Control Group		P-value
	None to Mild pain (n=5) Number (Percent)	Moderate to Severe pain(n=31) Number (Percent)	
Age (in years)			
<30	2(40.0)	17(54.8)	0.650
≥30	3(60.0)	14(45.2)	
Gender			
Male	1(20.0)	12(38.7)	0.634
Female	4(80.0)	31(63.9)	
Educational Status			
Can read and write	4(80.0)	29(93.5)	0.370
Can't read and write	1(20.0)	2(6.5)	
Marital Status			
Single	1(20.70)	13(41.9)	0.342
Married	4(80.0)	18(58.1)	
Occupation			
Services	3(60.0)	8(25.8)	0.154
Non-services	2(40.0)	23(74.2)	
Previous History of Intramuscular Injection			
Yes	2(40.0)	20(64.5)	0.287
No	3(60.0)	11(35.5)	

P-value from Fisher's exact test significance at <0.05 level

As per Table 6, the pain intensity in the control group was not statistically associated with demographic variables and previous history.

DISCUSSION

Discussion related to the level of pain among adult clients

Regarding pain level, the present study findings showed that in the experimental group, none of the participants experienced pain, 75.0% of participants experienced mild pain, whereas none of the participants experienced severe pain, but in the control group, all participants experienced pain,75.0% experienced moderate pain, and 8.3% of the participants experienced severe pain. The finding of this study is similar to the study conducted among 60 patients (20-60 years) in India in which among experimental group, 28.3% of the participants didn't perceive pain, 71% of participants experienced mild pain, none of them perceived moderate and severe pain while in control group, all participants perceived pain, 66.7% perceived moderate pain, and 31.7% of the participants perceived severe pain.[18]

The present study findings are also somewhat similar to the findings of the study conducted among 60 adults (≥18 years) in India, which revealed that among the experimental group, 23.3% of participants reported no pain, 66.7% experienced mild pain, and 10% reported moderate pain, with none experiencing severe pain. Whereas in the control group, all participants reported pain, 63.3% reporting moderate pain, while severe pain was not experienced by any participant.[11]

Discussion related to the comparison of pain scores between the experimental and control groups

This finding is similar to the finding of a study conducted in Turkey among 120 patients (18-65 years) receiving the Hepatitis B vaccine, which revealed that the median pain score through Helfer skin tap technique was lower in comparison with the median pain score of patients through the standard technique (4.00 vs 7.00) at a significant level of 0.001. So, an alternate hypothesis is accepted. So, this technique reduced pain over the standard technique.[16]

The result of the present study is similar to the result of a study conducted among 80 hospitalized adults (20-45 years) in India, which showed a lower mean pain score in the study group compared to the mean pain score in the control group (2.00 ± 0.92 vs 6.75 ± 1.98) with a statistically significant difference at $p \leq 0.05$. Consequently, the null hypothesis is rejected, revealing a reduction in pain perception by Helfer skin tap.[17]

Discussion related to the association of intensity of pain with demographic and previous history

The present study did not show a significant association of intensity of pain with demographic variables, i.e., age, gender, education, marital status, occupation, and previous history of IM injection in both the experimental and control groups. It revealed that those variables did not affect the intensity of pain among the participants. Pain perception might be due to Helfer skin tap technique. The finding is consistent with a study conducted among 50 patients in India, which revealed no significant association between the level of pain and demographic variables such as age, gender, education, and occupation.[18]

Similarly, the finding of the present study is similar to the finding of a study conducted among 40 patients in India, which revealed no significant association of pain score with selected demographic variables such as age, gender, and education at a 0.05% level of significance in both groups receiving IM injection through routine and Helfer skin tap technique.[19]

The findings of the present study are consistent with the findings of the study conducted among 60 admitted patients in India, which did not show a significant association of pain level with the age and gender of patients.[11]

The result of the present study is contrary to a study conducted among 80 hospitalized adults (20-45 years) in India, which revealed a significant association between the level of pain and socio-demographic variables such as age, gender, and educational status at a 0.05 significance level in the control group. However, the experimental group showed no significant association between pain level and these socio-demographic variables.[17] This might be due to differences in the study population in the control and experimental groups.

The findings are also in contrast with another study conducted among 80 individuals aged 18–60 in India, which reported a significant relationship between pain level and educational status at a 0.05 significance level.[20] This might be due to other variables like chronic disease conditions, Neuropathy, and the use of analgesic medicine.

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Implication

Nursing Practice

The findings of the study might be helpful to provide the basis for evidence-based practice for painless intramuscular injection, which could be implemented in clinical practice.

Nursing Education

The findings of the study might help to upgrade the skill of intramuscular injection using Helfer skin tapping technique, which can be included in the curriculum of nursing students.

Nursing Administration

The findings of the study might be helpful for nursing administrators to formulate guidelines for the procedure of IM injection technique based on this technique.

Nursing Research

The findings of the study could serve as foundational data for further research in this field.

CONCLUSION

The study result concludes that Helfer skin tap technique is more effective to reduce pain associated with IM injection than the usual conventional technique. The statistical analysis signifies that participants in both experimental and control group were similar. There was no significant association of intensity of pain during IM injection with selected demographic variables among adult clients. So, significant reduction in pain level might be due to Helfer skin tap technique applied in the experimental group during IM injection.

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