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Article · February 2020

DOI: 10.15520/ijnd.v10i02.2820

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Effect of Helfer skin tap tecnique on pain associated with intramuscular injection among adult: A randomized controlled study

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DOI: https://doi.org/10.15520/ijnd.v10i02.2820

Abstract- Objective: The purpose of this study was to determine the effects of Helfer skin tap technique (HSTT) on pain depending on intramuscular (IM) injection. ***Methods:*** The study was randomized controlled study in the injection polyclinic between September 18 and December 9 2017. The study was completed with totally 100 patients, 50 of them in the experimental group and 50 of them in the control group. The IM injection was applied to the experimental group by HSTT and to the control group by standard technique. Data were collected using a questionnaire and Visual Analog Scale (VAS). ***Results:*** The mean VAS score was differ between groups. The VAS score reduced significantly after HSTT intervention in experimental group whereas reduction was not significant in control group. ***Conclusions:*** The study showed that HSTT was effective on pain depending on IM injection.

Keywords: Helfer Skin Tap Technique, Intramuscular injection, Pain, Adult, Nursing.

INTRODUCTION

IM drug administration, one of the most important practices of the nurses, is the process of delivering the drug to the deep muscle tissue [(1,2)].

It is stated that it is made at least 16 billion injections in all the countries of the world every year and 95% of them are made for the treatment of diseases [(3)]. IM route is the most preferred way in drug administration since it is absorbed faster in comparison with oral and subcutaneous routes, and due to the safe applicability of irritant drugs [(1,4,5)].

Drug administration with IM route put forth the priority of patient safety concept because it is a part of the treatment of illnesses and requires knowledge and skills [(2,3,6)]. Because; serious complications such as intramuscular fibrosis and contracture, abscess, paralysis, nerve injury, accidental intravenous injection, necrosis, periostitis, cellulitis and hematoma may occur when IM injections are not applied with careful and proper technique [(2,5,7)]. In addition, IM injection is an application that causes pain and discomfort besides curing and treatment. The factors that cause pain during IM injection are the needle selection, not to change the needle after drawing the drug into the injector, the chemical structure of the drug, the using technique, the making of injection faster than 1ml/10sn and amount of the injected drug [(8-10)]. Nursing interventions for reducing or eliminating the complications and pain that occur are setting the patient in a suitable position, giving information to the patient, making the patient be calm, building trust with the patient, and appropriate injection technique [(8,10-12)].

It should be ensured to be reviewed the previously used techniques and developed new methods with high evidence level if necessary, in order to be able to identify the appropriate injection technique and to use it in the management of injection pain. For this purpose; Nurse Joanne KiefferHelfer used HSTT, which is self-named in order to reduce the injection pain, and determined that this technique is effective in reducing the injection pain [(13)]. However, studies that have investigated the effect of HSTT on reducing IM injection pain are limited. Therefore, this study was done to determine the effect of HSTT on the reducing of pain that develops depending on IM injection.

Hypothesis:

There will be no statistically significant difference in pain level during IM injection between the experimental and control groups at 0.05 level.

METHODS

Design:

The study was a randomized controlled trial desing to assess the effectiveness of HSTT on pain during IM injection among adults.

Setting and Sample:

The study was done between the date of September 18 and December 9, 2017 on Saturday and Sunday at 08:00-16:00 hours in the injection polyclinic of public hospital in Turkey's Central Anatolia Region. The sample of the research was calculated by the GPower 3.1 program. The minimum sample size was determined as 27 patients in the experimental group and 27 patients in the control group, in order to reach 80% confidence. Research was completed with totally 100 patients, 50 of them in the experimental group and 50 of them in the control group, which meet the

inclusion criteria of the study. Adults meeting the inclusion criteria were assigned to the experimental and control groups by a computer-based random number generator. The numbers in set 1 were taken to the experimental group and the numbers in set 2 to the control group by lot method.

Inclusion criteria:

Patients who were 18 years age and over, volunteers for participating in the study, able to speak and understand Turkish, to whom Diclofenac (Dikloron) 75 mg/3 ml was applied and drugs will be given through IM, who did not receive chemotherapy and have neuropathy, were included in the study.

Instruments of Measurement:

As data collection tool; the descriptive feature form including age, gender, occupation, marital status, educational status, presence of chronic disease and Body Mass Index (BMI) was used, and Visual Analogue Scale was used in order to identify the severity of pain.

Visual Analogue Scale (VAS):

The visual analogue scale requires patient to rate pain on a line scale of 0-10, which 0 represents no pain, 1-3 indicating minor pain, 4-6 moderate pain, 7-9 severe pain, and 10 worst possible pain. The straight line shows a continuum of intensity. A patient indicates pain by marking the appropriate point on the VAS. This scale gives the patient total freedom to identify pain severity [(14)].

Procedure:

IM injections were administered to both the experimental group and the control group in the ventrogluteal site. Additionally, IM injections were applied HSST in the experimental group, standard technique in control group. The purpose of the research was explained firstly to the experimental and control group. Then, the descriptive feature form was filled by means of face-to-face interview method. After IM injection application within 1 minutes, pain depending on IM injection was evaluated by VAS.

Experimental group HSTT IM injection procedure:

1. Position the patient into side-lying position by holding the knees in the flexor in order to inject into the ventrogluteal site.
2. After determining the injection site, hit to the skin (about 15 strokes) for about five seconds by using the tips of the dominant hand fingers in order to soften the muscles.
3. After cleaning the skin with alcohol, take off the cover of the syringe on the dominant hand. Make the non-dominant hand be V-shaped, and hit to the skin three times.
4. During the third stroke, prick the syringe which has 23 gauge needle of 2.5cm length into the muscle at 90 degrees angle at the same time.
5. Continue to hit to the skin with the tips of the non-dominant hand fingers after the aspiration, and at the same time inject the drug by using dominant hand at a rate of 1 ml / 10 seconds.
6. After the drug is injected, making the non-dominant hand be V-shaped and hitting to the skin three times, and taking the syringe needle out at the same time during the third stroke [(13)].

Control group Standard IM injection procedure

1. Position the patient into side-lying position by holding the knees in the flexor in order to inject into the ventrogluteal site.
2. After determining the injection site, prepare the skin with alcohol.
3. Stretch the skin with thumb and index finger of the non-dominant hand and pricking syringe which has 23 gauge needle of 2.5cm length into the muscle at 90 degree angle.
4. After making the aspiration, inject the drug with the dominant hand at the rate of 1 ml / 10 seconds.
5. Take the syringe needle out 10 seconds after the drug is consumed [(15)].

Data analysis:

Statistical analysis of the data was done by using the IBM SPSS Statistics Version 20.0 package program. Numbers and percentage were used for categorical measurements, and mean and standard deviation for numerical measurements. The t test was used for independent groups showing normal distribution in the comparison of numerical measurements between two groups, and the homogeneity of the experimental and control groups was evaluated by bi-directional Chi-square test. The results were interpreted at the $p < 0.05$ significance level.

Ethical Considerations:

Permission to conduct this study was received from the NevşehirHacıBektaşVeli University ethics committee (number 84902927-604.01-E.5293) and the institution where the study was done (number 69586531-772.02). All participants signed an informed consent document in this study. The rights of adults were rigorously protected, including the right to decide whether to participate in the study and the right to withdraw from the research study without providing a reason at any time and without negative consequences.

RESULTS

When the descriptive features of the experimental and control groups were compared (Table 1), it was found that there was no significant difference between the groups, and groups were homogeneous in terms of these properties ($p > 0.05$).

Table 1: Comparison of descriptive features in experiment and control group (N:100)

Descriptive Features	**Experimental group(n:50) M±SD**	**Control group(n:50) M±SD**	**t**	**p**
The average age	39.64±16.69	39.84 ±13.59	-0.271	0.787
The average age BMI	25.26±3.31	27.11±5.74	-1.963	0.053
	n %	**n %**	**X^2**	**p**
Gender				
Female	26 52.0	28 56.0	0.161	0.688
Male	24 48.0	22 44.0		
Marital status				
Married	34 68.0	33 66.0	0.045	0.832
Single	16 32.0	17 34.0		
Education				
Illiterate	2 4.0	4 8.0		

Literate	10 20.0	10 20.0	4.867	0.301
Primary school	8 16.0	10 20.0		
High school	20 40.0	23 46.0		
Graduate	10 20.0	3 6.0		
Chronic Disease				
Yes	11 22.0	10 20.0	0.060	0.806
No	39 78.0	40 80.0		

M=Mean; **SD**=Standard Deviation, **t**=t test, **X^2**= Chi-Square test, **p**= p value

When the VAS score of control and experimental groups compared, it was determined that the mean VAS score of patients during IM injection done with HSTT (0.18±0.39) was lower in comparison with the mean VAS score during IM injection done with the standard technique (2.88±1.02). The difference between the groups was statistically significant ($p < 0.05$) (Table 2).

Table 2: Comparison of the average VAS scores between the control and experimental groups (N:100)

	Control group(n:50) M±SD	**Experimental group(n:50) M±SD**	**t**	**p**
VAS scores	2.88±1.02	0.18±0.39	-17.449	0.000

VAS=Visual Analogue Scale; **M**=Mean; **SD**=Standard Deviation, **t**=test, **p**=p value

DISCUSSION

IM injection application is one of the most commonly used in the parenteral drug administrations. It has been reported that a proper injection technique helps the patient feel less pain and prevent complications.16 When studies that were done with HSTT is examined, HSTT and IM drug applications are seen to be beneficial for pain control [15,17-19].

The effect of IM injection application into the ventrogluteal site with HSTT on pain was examined by comparing the groups in this research that was conducted with reference to literature and related studies.

HSTT is a pain control technique that helps the mechanical stimulus against to skin to alter the balance between small-diameter fibers transmitting the pain to brain and large-diameter fibers not transmitting the pain to brain, and is non-pharmacological [20]. It was determined in the research that the mean pain intensity score of patients during IM injection done with HSTT (0.18±0.39) was lower in comparison with the mean pain intensity score during IM injection done with the standard technique (2.88±1.02) ($p<0.05$) (Table 2). According to the statistically significant result of this research, IM injection with HSTT reduces pain in patients. Therese and Devi determined that patients felt less pain during IM injection with HSTT in the study in which they compared the routine technique with the IM injection with HSTT [19]. It was found in another study that pain perception of patients was significantly higher in comparison with HSTT [18]. In the study of Sivapriya and Kumari in which the effect of HSTT on injection pain in newborns was examined; it was determined that 86% of newborns of the control group to whom IM injection was applied using conventional technique had severe pain and only 14% of them had moderate pain, whereas 86% of the newborns of the experimental group to whom HSTT was applied had mild pain and 14% of them had severe pain during the IM injection [21]. These results show that nurses will be able to use HSTT in the management of pain occurred by IM injection application. In this context, that the application of different injection methods, such as HSTT in particular in the management of pain depending on IM injection, adds an important dimension in providing and maintaining of a qualified nursing intervention. Additionally, it is considered that HSTT can be taken place among the nursing interventions in IM injection applications since it is a simple, cost-effective and reliable method.

CONCLUSION

That the IM injection application with HSTT, which was found to reduce pain depending on IM injection application, takes its place among the injection application methods, maintaining of the related studies to strengthen the evidence value of the results, and doing scientific studies comparing HSTT with different injection application techniques, can be suggested.

There were some limitations of this study. First, the pain responses of the participants were evaluated by the researcher. This phase of the study was not blind. Pain assessment can be performed by a nurse who is not involved in the study. The second limitation is the generalization of the results of this study to adults. There was no racial or ethnic diversity in our sample. The racial and ethnic difference may affect the effectiveness of HSTT due to pain sensitivity. The study should be conducted with different racial and ethnic groups.The third limitation is that this study was conducted with patientsreceiving Diclofenac (Dikloron) 75 mg/3 ml drugs. The pain after IM injection may varydepending on the content of the drug. Therefore, the study should be carried out with different drug groups. The fourth limitation is that the patients marked the severity of pain on the VAS within 1 minutes after the injection procedure. Long-term effects of pain caused by IM injection can also be examined.

ACKNOWLEDGEMENTS

The authors thank to all the adults who agreed to participate in the study.

Funding Sources: No

Conflict of Interest

There is no conflict of interest in our article.

Author Contributions

Ş.D.G., G.K.Ç., and P.C. conceived and designed the experiments;

Ş.D.G performed the experiments;

Ş.D.G. and G.K.Ç. analyzed and interpreted the data;

Ş.D.G., G.K.Ç., and P.C. contributed reagents, materials, analysis tools or data; Ş.D.G., G.K.Ç., and P.C. wrote the paper.

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