DOI: https://doi.org/10.53350/pjmhs221631078

ORIGINAL ARTICLE

Nurses' Knowledge and Attitude about Intramuscular Injection (LML)

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ABSTRACT

Intramuscular injection, often known as IM, is the injection of a substance into a muscle. In medicine, it is one of the ways to introduce medicine into the body. This method is preferred over some other methods such as intradermal or subcutaneous injection because the muscle has a larger size and has many blood vessels, which speeds up the absorption of the drug in it. The study aims to assess nurses' knowledge and attitudes on how to use intramuscular injections. A descriptive study was conducted on nurses working in Baghdad hospitals. The study was carried out from 13 January to 10 of July, 2021. An improbable random sample of 200 male and female nurses working in Baghdad hospitals was selected. Data were collected through the use of a designed electronic questionnaire consisting of three parts: Demographic characteristics of nurses, nurses' knowledge about intramuscular injections, which include 15 items and nurses' attitudes on the steps for applying intramuscular injection, which include 15 items. An electronic version of the questionnaire was used to collect data from nurses, and the validity and reliability of the questionnaire for the study were determined.

The results of the study showed that most of the sample was female 65.5%, (40%) within the age group (20-29 years), (39%) of them graduated from the Medical Institute diploma, 40% of the nurses have experience in the hospital (1-3) And (46%) of them do not have training courses on intramuscular injection. From the results of the research, it was concluded that the majority of the study sample that the nurses' knowledge about intramuscular injection was of medium of score. While for the nurses' attitudes on the steps of applying intramuscular injection were highly mean of score.

The researchers recommend providing e-learning programs for nurses and nursing students to develop their knowledge experiences as well as their practical skills through continuous training course in hospitals and nursing laboratories.

INTRODUCTION

Intramuscular injections (IMI) are a technique that involves injecting a medication into the deep muscular tissue beneath the subcutaneous tissue (Potter & Perry 2009) 1. Intramuscular injections (IM injections) are the parenteral administration of medication via the skin and subcutaneous tissue into the large muscles of the body using the proper syringe and needle for prophylactic (vaccinations) and therapeutic (antibiotics and hormones) purposes. Until the late 1960s, this treatment was performed solely by physicians for the administration of antibiotics; nevertheless, it has since become a standard practice for nurses (Milutinovi D, et al. 2018). 2. The intramuscular method is favoured over the intravenous and subcutaneous routes due to the enhanced vascularity of muscle tissue and consequent increase in drug absorption when injected intramuscularly. (Ranjan, Soliman, et al., 2018) 3.

Each year, around 16,000 million injections are delivered in underdeveloped countries. Over 90% of injections are administered for therapeutic purposes, whereas 5-10% is used for preventative purposes. Injections are one of the most frequently used psychomotor abilities in health care settings worldwide. It is a sophisticated psychomotor task that requires both talent and knowledge on the side of the practitioner. The most recommended locations for intramuscular injection are the deltoid and/or gluteal muscles (Srividya, Nagabushan, et al., 2015)4.

Intramuscular injections must be performed with caution. Due to the increased number of capillaries in muscles, IM injections are more readily absorbed than subcutaneous injections. Additionally, for IM injection, the needle depth, syringe length, and administration rate must be precisely determined. (2017) (Yildiz et al., 2017) 5 , (Turan et al.,2019) 6.

According to World Health Organization (WHO) estimates, around 12 billion injections are given annually, and approximately 50% are not performed safely and pose a health risk (Deena KA, & Nashwan AA, 2014)7.

It is emphasized in the literature that it is critical to pick a safe site for IMI that is distant from big blood arteries, nerves, and bone structures. (Taylor, C. (2011); Min, H.J., and Kim, Y.J., 2018). 9...Thus, nurses must have a firm grasp on the anatomic nature of the administration site and make sound judgments (Sar et al.2017)10.

IM injections carry a plethora of dangers. Abscess, necrosis, infection, tissue damage, hematoma, chronic discomfort, nerve, bone, and vein injuries, periostitis, and contracture are all possible complications. (Larkin et al, 2017). The most serious effect, however, is sciatic nerve injury, which occurs most frequently as a result of injections delivered to the dorsogluteal (DG) location. (N. Kaya & A. Palloş, 2012) 12. The sciatic nerve is the most commonly damaged nerve, especially in youngsters, the elderly, and patients who are underweight. (HJ Kim & SH Park 2014) 13.. It is mentioned in the literature that when health practitioners possess the appropriate knowledge and abilities regarding intramuscular injections, these consequences can be avoided or minimized. (Turan et al., 2019) 6. Education can help avoid complications caused by a lack of understanding and execution errors. Although the majority of problems occur with intramuscular injections, they can occur via any route. Complications may occur as a result of an improper injection site, depth, or pace of injection (Malkin 2008) 14. (Maskey & Sah 2020) 15

Objective of the Study: To assess the knowledge and attitude of nursing staff regarding intramuscular injection, and to find out the relationship between nursing staff knowledge and attitude.

METHODOLOGY

Design of the Study: A descriptive study design is used to achieve the objectives of the study. The study was carried out from 13 January 202 1to 1st July 2021.

Administrative Arrangement: Official approval was received from Al- Bayan University's College of Nursing and presented to the Al Kindy hospital in order to assist the researchers in collecting data.

Setting of the Study: The sample was initially taken at Al-Kindy Teaching Hospital. Due to the challenges encountered by researchers during the Corona virus outbreak, the questionnaire was collected electronically. The questionnaire was distributed to groups of nurses working in hospitals in Baghdad.

The Sample of the Study: To ensure the accuracy of the data and a representative sample, a non-probability (purposive) sample of (200) nurses was finally selected after deleting the missing forms.

Instrument of the Study: An electronic questionnaire was designed and constructed by Unal & Alkan (2019)16. The questionnaire includes three parts:

Part I: Nurse's' Demographic Characteristics: The first section examines the sociodemographic characteristics of the nurses who

participated in the study using five variables: gender, age, educational level, years of experience, and training courses.

Part II: Knowledge of nurses about the steps of applying intramuscular injection. The second part consists of (15) items; These items were rated and scored as (2 for true)and (1 for false) .

Part III: nurses' attitude on the steps for applying intramuscular injection: This part consists (15) items; These items were rated and scored as (3 for always), (2 for sometimes) and (1 for never)

Validity of the Instrument: To ensure the instrument's validity, it was given to a panel of (4) experts in various domains (with a minimum of ten years of experience in the job field) to ascertain the questionnaire's clarity, relevance, and suitability for achieving the present study's aims. The experts' examination of the questionnaire found that all of the experts believed that the majority of items were clear and suitable for the study's measurement. A few minor adjustments were made to a few things. These adjustments were made in response to the expert's recommendations.

Pilot Study and Reliability of the Instrument: A pilot study was conducted on a purposive sample of (10) nurses were excluded from the study sample. The pilot study was conducted within the period from 15 to 26 April 2021.

Reliability of the Instrument: The test-retest reliability of the scales was verified using Pearson Correlation. The questionnaire's coefficients were (r= 0.75).

Each questionnaire took between 5 and 10 minutes to complete, and as a consequence of the pilot study, the items were tailored to the questionnaire's content and structure.

Data Collection Methods: The data was taken between 28 April and 15 May 2021.

The researchers collected samples by distributing the questionnaire electronically to the official electronic groups of the researched colleges; this was necessary due to the severe circumstances surrounding the epidemic covid-19.

Statistical Data Analysis: The following statistical data analysis techniques are utilized to analyze and evaluate the study's outcomes using the statistical package for social sciences (SPSS) ver (23).

Table 1: Sociodemographic characteristics of respondents n =200

Variables	Frequency	%
1-Gender		
Male	69	34.5
Female	131	65.5
2-Age (years)		
20-29	80	40
30-39	70	35
40-49	30	15
More than 50	20	10
Total	200	100
Mean: 34.61± SD 22.20		
3-Educational level:		
Nursing school graduate	2	1
Nursing Secondary graduate	42	21
Medical institute diploma graduate	78	39
Bachelor's graduate of the College of Nursing	72	36
Post graduate	6	3
Total	200	100
4-Years of Experience in hospital		
Less than one year	50	25
1-3	80	40
More than three years	70	35
Total	200	100
5-Training courses on IM injection		
I did not participate in a course	92	46
One turn	38	19
Two courses	35	17.5
Three or more	35	17.5
Total	200	100

Table 1: showed that (65.5%) of the nurses were female, (40%) within the age group (20-29 years), (39%) of them were graduated from medical institute diploma, 40% of them(1-3) years of hospital experience and (46%) nurses did not have training courses on IM injection.

RESULTS OF THE STUDY

This chapter presents the findings of the data analysis systematically in tables and these correspond with the objectives of the study as follows:

Table 2: Knowledge of nurses about the steps of applying intramuscular injection.

No	knowledge	True F (%)	False F (%)	M.S.	severity
1.	The dorsolateral (DG) region is rich in terms of blood vessels and close to the sciatic nerve.	117.4 (58.7)	82.6 (41.3)	1.59	MS
2.	The gluteus maximus and gluteus Medias muscles are used for the injection.	116 (58)	84 (42)	1.58	MS
3.	The amount of medicine to be given to the dorsolateral region at once is 1.5-4 ml.	138 (69)	62 (31)	1.69	MS
4.	4) Depending on the thickness of the layer of fat in the region, the drug could be given to the SC.	79 (39.5)	121 (60.5)	1.40	MS
5.	The most important complication in the dorsolateral region is sciatic injury	174.8 (87.4)	25.2 (12.6)	1.87	H S
6.	The dorsolateral region is used only in adults.	92.4 (46.2)	107.6 (53.8)	1.46	MS
7.	The dorsolateral region should be preferred for children under the age of 3.	60.6 (30.3)	139.4 (69.7)	1.30	MS
8.	The needful dose for IM drug implementation is; 1.5 ml for the ages between 3-6; 1.5-2 ml for the ages between 6-152-4 ml for the age of 15 and over.	136.6 (68.3)	63.4 (31.7)	1.68	MS
9.	When the patient is in the prone position, their toes must be turned inward.	94.2 (47.1)	105.8 (52.9)	1.47	MS
10.	Before the IM injection is applied, the patient is told to breathe deeply.	104 (52)	96 (48)	1.52	MS
11.	DG is not used for irritant and fatty solution applications.	100 (50)	100 (50)	1.50	MS
12.	The injection area is divided into four equal parts by horizontal and vertical lines. The best fit part in the top and outer area should be selected.	187 (93.5)	13 (6.5)	1.93	HS
13.	The injection part is wiped out with an antiseptic tampon outward from the injection area by 5 cm diameter circular movements.	131 (65.5)	69 (34.5)	1.66	MS
14.	The injection should be done at a 90-degree angle to ensure that the drug reaches the muscle	184.8 (92.4)	15.2 (7.6)	1.92	HS
15.	After the needle enters the tissue and before giving the drug, the blood is examined by pulling the plunger.	189 (94.5)	11 (5.5)	1.95	HS
	Total M.S.	127.25 (63.62)	72.76 (36.38)	1.64	MS

No. = Number, M.S. = Mean of score, LS = Low severity, MS = Moderate severity, HS= High severity. Rating of severity (LS : ≤ 1.25, MS : 1.26- 1.75, HS: ≥1.76).

According to Table (2), the majority of nurses' knowledge of the actions involved in administering intramuscular injection reflects a moderate mean score on all items except four, which have a high mean score on items (5,12,14,& 15). "Sciatic damage is the most common complication in the dorsolateral region," "The injection area is divided into four equal sections by horizontal and vertical lines. The best-fitting top and outside area should be chosen," "The injection should be performed at a 90-degree angle to ensure that the medicine reaches the muscle," and "After the needle enters the tissue and before administering the drug, the blood should be inspected by pulling the plunge."

Table 3: Nurses' attitude on the steps for applying intramuscular injection

No.	nurses' attitude	ALWAYS F (%)	SOMETIM F (%)	NEVER F (%)	M.S	Severity
1.	1) I change the needle tip after preparing the drug during intramuscular injection.	123.6(61.8)	52.2(26.1)	24.2(12.1)	2.50	HS
2.	In the airlock technique, I pull 0.2-0.3 ml air into the syringe after filling it with the drug	111.6(55.8)	84.4(42.2)	4(2)	2.54	HS
3.	I ensure the drug is given slowly at a rate of one milliliter every 10 seconds.	82.8(41.4)	82.8(41.4)	34.4(17.2)	2.24	MS
4.	I rapidly draw the needle from the tissue with a single move.	144.8(72.4)	32.2(16.1)	23(11.5)	2.61	HS
5.	I frequently use the dorsogluteal region during intramuscular injection.	126.8(63.4)	56.8(28.4)	16.4(8.2)	2.55	HS
6.	I usually use the ventrogluteal region while applying the intramuscular injection.	59.2(29.6)	84.6(42.3)	56.4(28.2)	2.02	MS
7.	I usually use the laterofemoral region while applying the intramuscular region.	41.4(20.7)	52.8(26.9)	104.8(52.4)	1.67	MS
8.	I use the airlock technique during intramuscular injection.	166.4(83.2)	17.4(8.7)	16.2(8.1)	2.75	HS
9.	I check for bleeding during intramuscular injection.	159.6(79.8)	36.4(18.2)	4(2)	2.78	HS
10.	I arrange the length of the needle according to the patient's condition (in cachectic patients, infants, obese patients, etc.).	168.6(84.3)	22.4(11.2)	9(4.5)	2.80	HS
11.	I apply intramuscular injection with a 90 degree angle	176.8(88.4)	21.2(10.6)	2(1)	2.87	HS
12.	I try to distract the attention of the patient away before intramuscular injection.	128.2(64.1)	55.6(27.8)	16.2(8.1)	2.56	HS
13.	I apply massage to the region to ensure the pain is reduced and drug is absorbed after intramuscular injection.	109.6(54.8)	50.8(25.4)	39.6(19.8)	2.35	HS
14.	I apply manual pressure to the region before IMI to reduce the pain after injection	110.6 (55.3)	55.8(27.9)	31.6 (15.8)	2.38	HS
15.	I use the Z-track compression technique during an intramuscular injection	69.4(34.7)	87(43.5)	43.6(21.8)	2.13	MS
	Total M.S.	111.3(55.6)	56.7(28.4	32 (16.0)	2.4	HS

No. = Number, M.S. = Mean of score, LS = Low severity, MS = Moderate severity, HS= High severity. Rating of severity (LS ≤ 1.66, MS = 1.67- 2.33, HS ≥ 2.34

Table (3) demonstrates that the majority of students had a favorable attitude toward nurses' procedures for administering intramuscular injections on all items except four, which have a moderate mean of score (3,6,7&15) "I ensure that the drug is administered slowly, at a rate of one milliliter every ten seconds," "I typically inject the drug into the ventrogluteal region," "I typically inject the drug into the laterofemoral region," and "I typically inject the drug into the Z-track compression technique during an intramuscular injection."

Table 4: Relationship between nurses 'Knowledge and nurses' attitude about intramuscular injection

items	mean	t. test	df	Sig.
nurses 'Knowledge	80.5	.682	198	NS
nurses' attitude	80			

Table (4) showed that there are no significant differences between nurses 'Knowledge and nurses' attitude about intramuscular injection at p value (p>0.05).

DISCUSSION

This study provides a comprehensive analysis and rational discussion of the findings, which are supported by the current literature and related investigations.

Nurses regularly employ the IMI approach, which plays a critical role in medicine delivery. IMI is a technique for injecting medication into the deep muscle tissue beneath the subcutaneous layer. IMI administers around 12 billion medications. According to studies, difficulties associated with IMI are common, and the majority of these complications are the consequence of a lack of expertise and the use of ineffective techniques. Indeed, these frequently observed difficulties are preventable through education. They are caused by implementation errors and a lack of expertise. Therefore, it is critical to educate nurses, who are involved in all aspects of drug administration, about drug administration in order to avoid such errors. Alkan & Unal(2019)16

Part I: Discussion of nurses' demographical Characteristics: The distribution of demographic factors revealed that half of the sample (65.5 percent) were females, a finding corroborated by Turan et al., (2019)6 who discovered that females comprise a greater proportion of the nurses' sample.

The majority of samples (40%) were among age groups (20-29 years), with a mean age of 34.61 SD 22.20. The bulk of the samples (39%) had earned a diploma from a medical institute, but another study for education, These findings corroborate those of Turan et al., (2019), who discovered that the mean age of nurses was 26.27.46 years and that 59.6 percent of them were in the age bracket 18-25. The majority (62.6 percent) of nurses have a vocational high school diploma, followed by a bachelor's (19.9 percent) and associate's degree (19.9 percent) (17.5 percent)

The average age of the students who participated was 20.89 + 1.93. While 41% of participants demonstrated moderate performance in the Fundamentals of Nursing course, 15.1 percent demonstrated exceptional achievement. While 61.6 percent of participants were female, 49.3 percent were first-graders, and 52.1 percent were graduates of a standard high school, Alkan & Unal(2019)16

Additionally, 40% of them have hospital experience ranging from one to three years, and 46% of nurses lack expertise in intramuscular injection. According to ztürk et al.,(2017)17, 100 percent of nurses were female, and 71.11 percent of nurses who participated in the research hold a bachelor's degree. Each of them has more than six years of clinical experience. 71.11 percent of nurses reported that they did not obtain IMI education.

Part II: Discussion of nurses' Knowledge Concerning IMI: Through data analysis of the distribution of nurses' knowledge, (table 2) revealed that the majority of students have a moderate MS on all items except four, which have a high MS: "The most common complication in the dorsogluteal region is sciatic injury," and "The injection area is divided into four equal parts by horizontal and vertical lines. "The best-fitting section in the top and outside areas should be chosen," "The injection should be performed at a 90-degree angle to ensure that the medicine reaches the muscle," and "After the needle enters the tissue and before administering the drug, the blood should be inspected by pulling the plunge."

According to Ross's (2011)18 study, IM injection is a complicated psychomotor skill that requires knowledge, problem-solving ability, and clinical skill.

Incorrect intramuscular injection delivery might result in significant consequences such as sciatic nerve damage and muscle weakness. Atrophy. In clinical training, the learning process is performance-based. In practical education, students acquire skills through repeated application. Additionally, skill acquisition is strongly tied to nursing performance in meeting patients' demands. As nursing is a skill-based profession and nursing care demands the use of clinical skills, nurses should be proficient in the skills associated with nursing interventions (Fayzi et al 2007).

Part III: Discussion of nurses' Attitude on the steps for applying intramuscular injection: There was a high MS in nurses' attitudes at Baghdad hospitals, except for four items that had a moderate mean of score, including "I ensure the drug is given slowly, at a rate of one milliliter every ten seconds," "I typically use the ventrolateral region when administering the intramuscular injection," "I typically use the later femoral region when administering the intramuscular injection," and "I typically use the Z-track compression technique when administering the intramuscular injection." (table3)

This is consistent with Adejumo and Dada's (2013)20. It was discovered that more than half (59%) of study nurses have a favorable view about injection safety. Greenway (2004)21 believes that, as a result of practice nurses' positive attitudes toward IM injections, provision of IM injections has become a common nursing intervention in clinical practice and an activity considered as critical to patient care. This contrasts a 2006 study by Smith et al.22 in Korea, which found that nurses do not have a good attitude toward injection safety.

Part IV: Regarding Relationship between nurses 'Knowledge and attitude about intramuscular injection: There were no statistically significant variations in nurses' knowledge and attitudes toward intramuscular injection at the 0.05 level (table4).

It is the incorporation of foundational information, clinical skill, performance, and attitude into a nursing environment. (2014) (Ruliou & Yucheng). 23

These findings contradict those of EL-Demerdash et al., (2015)24, who state that a positive association between knowledge, abilities, and attitudes regarding intramuscular injection was observed with a statistically significant difference of p0.005..

CONCLUSIONS

The majority of the study sample generated a moderate mean of nurses' knowledge and attitudes toward IMI application stages and a high mean of intramuscular injection. At (p>0.05), there were no significant variations in nurses' knowledge and attitudes toward intramuscular injection.

Recommendations: The researchers recommend that nurses and nursing students be provided with e-learning applications to help them increase their knowledge and practical abilities through continual training courses in hospitals and nursing laboratories.

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