

ASSESSMENT OF KNOWLEDGE AMONG HEALTH CARE PROVIDERS REGARDING INTRAMUSCULAR INJECTION ADMINISTRATION

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ABSTRACT

Objectives: The aim was to assess the existing knowledge of intramuscular (IM) injection administration technique among health care providers in teaching hospital.

Methods: A cross-sectional study was conducted among medical interns, final year nursing students, and MBBS Phase-II students (health care providers) of Mandya Institute of Medical Sciences, Mandya. A total of 257 health care providers participated in this study and were asked to narrate the steps of IM injection technique. The correctness of technique was graded using a standard checklist of 10 steps. Knowledge was assessed by number of steps answered correctly by them.

Results: Out of 257 participants, all the steps of IM injection technique were correctly answered by 18.8% of nursing students, and 17% of medical interns. Knowledge of site selection and sterilization of site for IM injection was good among all the groups (97.7%). Steps involving angle of insertion of needle into the muscle, checking whether needle is correctly inserted into muscle, proper disposal of syringe and sanitization of hand after the procedure was answered correctly by 89.1%, 72.3%, 42.8% and 45.5% of participants respectively.

Conclusion: Nursing students and medical interns had better knowledge regarding technique of IM injection when compared to MBBS Phase-II students. However, the knowledge concerning the disposal of syringe and sanitization in the hand was better among nursing students than the other two groups. Even though, medical interns and nursing students have responded well, still there is a scope for further improvement in the procedure.

Keywords: Health care providers, Intramuscular injection, Knowledge.

INTRODUCTION

Injections are one of the most common health care procedures worldwide [1,2]. 16,000 million injections are administered every year in developing and transitional countries [3,4]. More than 90% are given for therapeutic purposes whereas 5-10% is given for preventive purposes [5,6].

Intramuscular (IM) injection is one of the common methods of drug administration technique [7]. Administering an IM injection is a complex psychomotor task that requires skill and knowledge on the part of the healthcare professional who is performing the procedure [8].

In clinical practice, health care professionals should be able to perform IM injection to introduce a number of drugs [9]. Preferred angle of insertion for IM injections is 72-90° to ensure that the needle reaches the muscle [10]. Most common preferred sites of administration of IM medication is into the deltoid and/or gluteal muscle [11].

World Health Organization has estimated that out of 12 billion injections administered worldwide annually, 50% are unsafe, and 75% are unnecessary [12].

There may be increased risk of injury to patient that can lead to pain, nerve injury, bleeding, accidental intravenous administration and sterile abscesses due to inappropriate selection of site and poor technique of IM injection [13].

Serious but preventable complication of IM injection is nerve injury that occurs more frequently than originally thought [14]. There are likely chances of nerves in the vicinity of chosen injection site to get damaged. Sciatic, radial and axillary nerves are usually injured by IM injection [14]. Neurological sequels can range from minor transient sensory disturbance to severe sensory disturbance and paralysis with poor recovery [15].

IM injections are prescribed by majority of doctors and health professionals should have concern regarding safe injection practices [16].

Knowledge of safe and proper IM injection technique is vital for health care providers, and it is important that nursing students, medical students, and interns are trained correctly in this procedure.

The aim of our study was to assess the existing knowledge of nursing students, medical students and interns regarding the IM injection administration technique.

METHODS

This was a cross-sectional observational study, conducted at teaching hospital, Mandya Institute of Medical Sciences, Mandya. Approval from Institutional Ethics Committee was obtained for the study. Medical Interns, MBBS Phase-II students, and final year nursing students were enrolled in the study after the purpose of the study was explained and after obtaining written informed consent. A standardized checklist of 10 steps regarding IM technique was used to assess the knowledge. Participants were asked to narrate the steps of IM technique. Steps that were answered correctly by them were marked "YES" and steps not answered/wrongly answered were marked as "NO." In the end, knowledge was assessed by the number of steps they had answered correctly and was compared with the other groups. Results were expressed as counts and percentages. Statistical analysis was done using Chi-square test. $p < 0.05$ was considered as statistically significant.

RESULTS

A total of 257 health care providers were recruited for the study. Participants were assessed for the level of knowledge regarding IM injection technique. Among them 69 participants were final year

nursing students, who constituted 26.8% of total study population, 94 participants were medical interns and 94 were Phase-II MBBS students, each constituting 36.5% of the total study population (Table 1). Out of 257 participants, 161 (62.6%) were females and 96 participants (37.35%) were males.

All the steps (Table 2) of IM injection were answered correctly by 18.8% of nursing students, 17.0% of medical interns, but MBBS students were unable to answer all the steps correctly (Fig. 1).

Step 1 (S1) was answered correctly by 97.7% (251) participants, indicating that all the three groups had adequate knowledge regarding the appropriate site selection and sterilization of the site before giving IM injection (Table 1).

Step 2 (S2) that is holding the syringe like a pen between index and thumb fingers was answered correctly by 68.4% (176) participants correctly. Most of the nursing students and medical interns answered better when compared with MBBS students ($p < 0.001$).

Step 3 (S3) which includes knowledge regarding the angle of insertion of syringe into the muscle was answered correctly by 96.8% of interns and 95.6% of nursing students in comparison to 76.5% of MBBS students.

Majority of participants answered that, they would check for proper insertion of needle into the muscle and would pull back the plunger of

syringe to look for injured blood vessel which was included in the Steps 4, 5 and 6 (S4, S5, S6). The total response rate was 72.3%, 70% and 78.2% respectively. The knowledge was better among medical interns when compared to other two groups and response was poor among MBBS students ($p < 0.001$) (Table1).

Only 31.9% of total participants knew Step 7 (S7) correctly, indicating that the majority of health professionals didn't know that the syringe has to be removed at the same angle of insertion.

Step 8 (S8) which includes sterilization of injection site and applying pressure to stop bleeding was answered better by medical interns and nursing students than MBBS students ($p < 0.001$).

However, the knowledge regarding some aspects of IM injection safety was poor. Steps 9 and 10 (S9, S10) which includes proper disposal of syringe and sanitization of the hand after the procedure was answered by 42.8% and 45.5% respectively. A response rate of 6.3% (S9) and 7.4% (S10) was seen among MBBS students ($p < 0.001$). The performance by other two groups was better in the above two steps.

DISCUSSION

The study was conducted in tertiary care teaching hospital to assess the knowledge regarding IM injection technique among health care providers, as the majority of them were practically involved in the administration of the injection. It is a basic procedure to be known by all health care providers. Our study revealed that nursing students and medical interns had better knowledge regarding IM injection technique than MBBS Phase-II students. The correct response to the majority of steps was poor among MBBS students.

The present study revealed that all the three groups had better knowledge regarding the appropriate site selection and sterilization of the site before giving IM injection. Compared to this, a similar study conducted by Valliani *et al.* showed that majority of the participants had selected the appropriate site for IM injection according to the volume of medication that has to be administered [17]. Another study conducted by Qamar *et al.* revealed that doctors were having a moderate level of knowledge, pharmacists having good knowledge and nurses having poor knowledge regarding the skin preparation [18]. Cornwall in his study showed that 66.7% of the students selecting outer upper quadrant of gluteal region as the site of IM injection and had justified their chosen site [9].

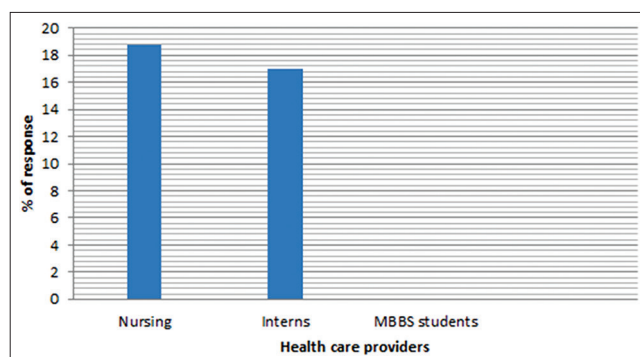


Fig. 1: Percentage of participants in each group answering all the steps correctly

Table 1: Participants response to each steps of IM injection technique

Steps	Response	Nursing students N=69 (%)	Medical interns N=94 (%)	MBBS students N=94 (%)	Total=257 (%)	p value
S1	Yes	68 (98.5)	94 (100)	89 (94.6)	251 (97.7)	0.046
	No	1	0	5	06 (2.3)	
S2	Yes	68 (98.5)	85 (90.4)	23 (24.4)	176 (68.4)	<0.001
	No	1	9	71	81 (31.5)	
S3	Yes	66 (95.6)	91 (96.8)	72 (76.5)	229 (89.1)	<0.001
	No	03	03	22	28 (29.7)	
S4	Yes	60 (86.9)	92 (97.8)	34 (36.1)	186 (72.3)	<0.001
	No	09	02	60	71 (27.6)	
S5	Yes	60 (86.9)	92 (97.8)	28 (29.7)	180 (70)	<0.001
	No	09	02	66	77 (29.9)	
S6	Yes	63 (91.3)	90 (95.7)	48 (51.0)	201 (78.2)	<0.001
	No	06	04	46	56 (21.8)	
S7	Yes	18 (26.0)	43 (45.7)	21 (22.3)	82 (31.9)	<0.001
	No	51	51	73	175 (68.1)	
S8	Yes	68 (98.5)	93 (98.9)	71 (75.5)	232 (90.2)	<0.001
	No	01	01	23	25 (9.7)	
S9	Yes	62 (89.8)	42 (44.6)	06 (06.3)	110 (42.8)	<0.001
	No	07	52	88	147 (57.2)	
S10	Yes	58 (84.0)	52 (55.3)	07 (07.4)	117 (45.5)	<0.001
	No	11	42	87	140 (54.5)	

IM: Intramuscular

Table 2: Steps of IM injection administration technique

S. No.	Steps	Observation Y/N
1.	Wipe the injection site with swab soaked in spirit	
2.	Hold the syringe between thumb and index finger	
3.	Hold the muscle firmly and insert the needle into the muscle at a 90° angle	
4.	Pull back the plunger to make sure the blood vessel is not injured	
5.	Take back the syringe if blood vessel is punctured (if blood appears in the syringe)	
6.	If not, push down the plunger to inject the medicine	
7.	Remove the needle at the same angle	
8.	Cover the injection site with a piece of spirited gauze and apply pressure until it stops bleeding	
9.	Discard the syringe in proper biohazard container (puncture proof container)	
10.	Sanitize the hand	

IM: Intramuscular

In our study, overall 68.4% preferred holding the syringe like pen, which are consistent with a similar study done by Valliani *et al.* This step was answered poorly by medical students in our study.

In this study, 96.8% interns, 95.6% nursing students and 76.5% of MBBS students responded correctly regarding angle of insertion of the needle that was statistically significant ($p < 0.001$). Interns and nursing students had better knowledge regarding angle of insertion. Similar results were seen in nursing students in a study conducted by Sakic *et al.* [19].

Checking whether the needle was in blood vessel instead of muscle step was answered better by nursing and medical interns when compared to medical students.

The nursing students had better knowledge regarding proper disposal of syringe and sanitization of hand after the procedure when compared to other two groups. The results in our study were better when compared to previous studies done by Valliani *et al.* [17].

As our study shows that knowledge of IM injection was better among majority of medical interns and nursing students, probably this may be due to practical application of theoretical knowledge in these groups. Poor performance among MBBS students may be because theoretical knowledge being not put into practice. MBBS students are still in the process of learning, and it would be better if they are given practical training and guidance regarding the procedure. There is a need for a standard protocol for implementing the technique of IM injection in all hospitals, in order to carry out these procedures uniformly and to prevent adverse effects. As there is over prescription of injections in developing countries [20], correct technique of administration of injections is needed to reduce morbidity and mortality. Knowledge can be improved by many ways [21] such as by issuing booklets regarding Injection techniques, and by regular update on evidence-based practices.

Limitations of our study were, smaller sample size, study including only few healthcare professionals within hospital and study being a cross-sectional study the results represent participant's knowledge up to a particular point in time and it need not reflect the future outcome.

CONCLUSION

Our study concludes that nurses and medical interns have better knowledge regarding technique of IM injection when compared to medical students. The knowledge regarding the disposal of syringe and

sanitization of the hand was better among nursing students than other two groups. Medical interns and medical students have to be trained well regarding proper disposal and sanitization procedures. It would be better for health care providers to have better knowledge regarding the procedure of IM injection before they are involved in clinical practice. Even though medical interns and nursing students have responded well, still there is a scope for further improvement. Periodic supervision and mentoring by senior healthcare professionals is needed to perform correct IM injection technique.

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