

## ADEQUACY OF NURSING STUDENTS' KNOWLEDGE AND SKILLS ABOUT INTRAMUSCULAR INJECTION

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### Abstract:

**Background** For the last two decades, there have been concerns about the adequacy of clinical skills education of nursing students in terms of content and competency. Intramuscular injection (IM) is one of the common methods of drug administration technique. Administering an IM injection is a complex psychomotor task that requires skill and knowledge on the part of the healthcare professional that is performing the procedure. **The aim** of the present study is to assess adequacy of nursing students' knowledge, and skills about intramuscular injection. The study was conducted at Faculty of Nursing at Benha University. **Descriptive** design was used. Two tools were filled by 80 nursing students from first year from the above mentioned setting. (1) Knowledge questionnaire contains 23 questions and (2) Observation checklist contain 27 items about intramuscular injection. **Results** revealed that high percent (80%&70%) of nursing students have adequate skills and knowledge about intramuscular. There is positive significant correlation between nursing students' skills and knowledge about intramuscular injection at  $P < 0.0001$ . It can be **concluded** that nursing students from first year at Faculty of Nursing at Benha University have adequate knowledge, and skills of intramuscular injection. So, it was **recommended** that prime importance for nursing educators pays further attention to nursing students' training about intramuscular injection.

**Key word:** Adequacy, Nursing students, Knowledge, Skills, Intramuscular injection.

### Introduction:

For the last two decades, there have been concerns about the adequacy of clinical skills education of nursing students in terms of content and competency<sup>(1)</sup>. Competence of nurses and nursing students plays a highly important role in the safety of patients<sup>(2)</sup>. It is the integration of fundamental knowledge, clinical ability, performance, and attitude in the context of a nursing situation. The concept of adequacy in nursing relates directly to the skills and competencies of individuals who undertake the nursing role. Also, it relate to the state of being

adequate; the condition of being proportionate or sufficient: as, the adequacy of knowledge, skills and attitude about intramuscular injection<sup>(3-5)</sup>. The nursing education programs have the responsibility to prepare efficient and competent graduates to manage the patients' medication effectively<sup>(2)</sup>.

Medication can be administered to patients by a variety of routes, including oral, topical, and parenteral. Within the category of parenteral medications are intramuscular (IM) injections in which the skin is punctured with a

needle and syringe and the medication is administered deep into a large muscle of the body for prophylactic or curative purposes. Although there are relatively few medications that must be administered by the IM route, there are a large number of medications that may be given this way, thus it is a function with which nurses must be familiar. Intra muscular injection route provides faster drug absorption than the subcutaneous route because the muscles have greater vascularity<sup>(4)</sup>.

Injections are among the most frequently used medical procedures, with an estimated 12 billion administered throughout the world on an annual basis. Of these, 5% or less are for immunization and more than 95% of injections are given for curative purposes, many of which have been judged to be unnecessary. Giving an IM injection is not a benign procedure; there are numerous reports in the literature of patient complications related to improperly administered IMs<sup>(6)</sup>. Common complications include skeletal muscle fibrosis and contracture abscesses at the injection site, gangrene and nerve injury. Internationally, unsafe injection practices result in millions of infections that lead to serious morbidity and mortality, particularly blood borne transmission of hepatitis B and C and human immunodeficiency

virus. In the developing world, it is believed that more than 50% of injections given in health care settings are unsafe<sup>(3)</sup>.

### **Significance**

Patient safety concerns and busy clinical environments limit the opportunities for nursing students within actual patient care areas<sup>(7)</sup>. Therefore, the challenge for nurse educators is to promote nursing students' competence before graduation to ensure the students' competence levels of intramuscular injection prior to their first entry into practice<sup>(3)</sup>. The task of the universities of applied sciences is to enable and ensure nurses' have adequate competence of intramuscular injection, in an increasingly more demanding working environment within social and healthcare services<sup>(8)</sup>. It is the faculty teacher's responsibility to assist students with such preparation as well as to assess its adequacy before students enter the clinical area. Ensuring adequate competency prior to students being introduced to the clinical setting may improve patient safety and health outcomes<sup>(9)</sup>. So, the aim of the present study is to assess adequacy of nursing students' knowledge, and skills about intramuscular injection at Faculty of Nursing at Benha University.

### **Aim of the study**

The aim of the present is to assess adequacy of nursing

students' knowledge and skills about intramuscular injection at Faculty of Nursing at Benha University.

**Research question**

Does the student nurse have the adequacy of knowledge and skills about intramuscular injection?

**Subjects and methods**

**Design:** descriptive design was used.

**Setting:** the study was conducted at Faculty of Nursing at Benha University.

**Subjects:**

Study subjects consisted of (N=80) nursing students from first year who are willing to participate in this study.

**Tools for data collection:** To achieve the aim of the present study the following tools were used.

**Tool I: Knowledge Questionnaire** developed by the researchers guided by **Kye (2014)**<sup>(6)</sup> and recent related literatures<sup>(10-13)</sup> to assess nursing students' knowledge about intramuscular injection. The questions were constructed in one form of multiple choices. The tool consists of two parts as follows:

**Part one**

The first part for data pertaining characteristics of the study subjects such as name and group.

**Part two**

The second part of the tool contained 23 questions were grouped under six headings as follow: definition of IM

injection(1questions), precautions for IM injection (8 questions), sites for administering IM injection (4 questions), knowledge related to IM needle (3 question),technique of administering IM injection (4question) and complications of IM injection( 2 question)

**Scoring system**

The question scores by one for each correct answer and zero for incorrect answer the total score is 23 grades. These Scores were converted into percent score .Knowledge was considered adequate if the percent score was 65%or more and inadequate knowledge if less than <65%.

**Tool II: Observation checklist:** This tool was developed by the researchers guided by **Perry (2014)**<sup>(14)</sup> & **Zimmermann (2010)**<sup>(15)</sup> and recent literature<sup>(10-13)</sup> for the purpose of assessing the studied group intramuscular injection skills. It includes 27 items divided into three phases: first phase, preparation (10 items), second phase procedure (14 items) and finally documentation phase (3 items).

Scoring system for the observation checklists was a scored 1 to perform completely and a zero for not performed or not done steps. These Scores were converted into percent score .Skills was considered adequate if the percent score was 65%or more and inadequate skills if less than <65%.

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**Method**

- 1-An official permission to carry out the study was obtained from responsible authorities at Faculty of Nursing at Benha University.
- 2-The purpose of the study was explained and made clear to the educators of study setting to get their co-operation and acceptance.
- 3- The purpose and procedures of the study was explained to nursing students and their consent to participate was received and those who were willing to participate were given a questionnaire to complete and they have the right to withdrawal from the study at any time of the study.
- 4- Content validity of the tool was performed by five experts in the field of nursing administration and medical surgical nursing.
- 5- Pilot study was conducted on 10% from nursing students to identify the obstacles and problems that may be encountered in data collection.
- 6- Reliability of the tool was tested by using Cronbach Alpha test for 2 tools were 0.788.
- 7-The knowledge questionnaire was distributed to nursing students in clinical Lab. Each student took 15 minutes to complete it, and then collected by the researcher
- 9- Observation was done in the laboratory setting, along two days by using observation checklist of intramuscular injection and time of observation was 20 m.

**Statistical analysis:**

Data were revised, coded and fed to statistical software SPSS version 21. All statistical analysis tests were done using two tailed tests and alpha error of 0.05. *P* value less than 0.05 was considered to be significant. Frequency and percentage were used to describe the categorical data.

**Results:**

Table (1): Represents nursing students' knowledge about intramuscular injection. It was observed that high percent (70%) of nursing students have adequate knowledge about intramuscular injection. The majority ( 91.25%) of nursing students have adequate knowledge of definition of IM injection followed by 71.25%, 65%, 70%, 67.5% and 55% of them have adequate knowledge of sites for administering, IM needle ,precautions, technique of administering and complications of IM injection respectively.

Table (2): Describes nursing students' skills about intramuscular injection. As noticed in the table high percent (80%) of nursing students have adequate skills about intramuscular injection. While, high percent (85 .82% 77.37% &76.25%) of nursing students have adequate skills in documentation, intervention and preparation phase respectively.

Table (3): Displays correlation between nursing students' skill and

knowledge about intramuscular injection and shows that there is positive significant correlation nursing students' skill and knowledge about intramuscular injection at  $P < 0.0001$ .

**Table (1)** Nursing Students' knowledge about Intramuscular Injection

Knowledge Items	Nursing Students (80)				
	Adequate		Inadequate		
	No	%	No	%	
1	Definition of IM injection	73	91.25	7	8.75
2	Precautions for IM injection.	57	71.25	23	28.75
3	Sites for administering IM injection:	52	65	28	35
4	Intramuscular needle	56	70	24	30
5	Technique of administering IM injection	54	67.5	26	32.5
6	Complications of IM injection	44	55	36	45
Total		56	70	24	30

**Table (2)** Nursing Students' Skills about Intramuscular Injection

Skills Items	Nursing Students (80)				
	Adequate		Inadequate		
	No	%	No	%	
1	Preparation phase	61	76.25	19	23.75
2	Intervention phase	62	77.37	18	22.62
3	Documentation phase	69	85.82	11	14.17
Total		64	80	16	20

**Table (3):** Correlation between nursing students' skill and knowledge about intramuscular injection.

Correlation (r).	0.505 (positive correlation)
95% confidence interval	4.055 to 6.770
R square	0.2820
<b>Two tailed t-test</b>	
p-value (two-tailed)	<0.0001
P value summary	****
Significant? (alpha = 0.05)	yes
t-value	7.877
Number of XY Pairs	80

### Discussion

Intramuscular injection is a common place nursing procedure. Although considered a basic technique and an activity perceived as fundamental to patient care <sup>(16)</sup>. Annually, numerous injections are administered worldwide. Delivering medications through IM injections is a daily duty of nurses <sup>(16)</sup>. IM injection is a complex psychomotor skill requiring knowledge, problem-solving, and clinical skill on the part of the clinician who is performing the procedure. Incorrect administration of IM injections can result in serious complications such as sciatic nerve injury muscle atrophy. A primary goal for nursing education is to produce safe, competent graduate nurses <sup>(7)</sup>. According Bright et al (2015) <sup>(17)</sup> nursing students require extensive preparation and training to attain competency in intramuscular injection. Therefore, the aim of the present study is to assess adequacy of nursing students' knowledge, and skills about intramuscular injection

at Faculty of Nursing at Benha University.

Results of present study showed that high percent of nursing students have adequate knowledge about intramuscular injection. This may be due to nursing educators provide students with adequate opportunities to acquire knowledge as well as practical application of theoretical knowledge. They also create an environment that is conducive to learning that facilitate acquire required knowledge of the practice area, they knowledgeable of how to teach and possess teaching skills that maximize student learning. In addition they provide guidance and feedback to the students. These result is consistent with Srividya et al (2015) <sup>(18)</sup> who found that knowledge of IM injection was better among majority of medical interns and nursing students. On contrary, Adejumoand &Dada (2013) <sup>(19)</sup> revealed that respondents' knowledge about injection is poor .As well, Askarian and Malekmakan(2006) <sup>(20)</sup> stated that health care personnel including nurses have a background of insufficient knowledge about injection safety.

Results of the present study revealed that the majority of nursing students have adequate knowledge of definition about IM injection, sites for administering, IM needle, precautions, and

technique of administering as well as complications of IM injection respectively. This may be due to as aforementioned .These consistent with Srividya et al (2015) <sup>(18)</sup> who revealed that all the respondents have better knowledge regarding the appropriate site selection and sterilization of the site before giving IM injection. Also, found that 95.6% nursing students and correctly regarding angle of insertion of the needle. Interns and nursing students had better knowledge regarding angle of insertion. 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 have better knowledge regarding proper disposal of syringe and sanitization of hand after the procedure when compared to other two groups. Similarly, findings of Hauri, Armstrong& Hutin (2003) <sup>(21)</sup> who shows that nurses possess high knowledge about injection steps.

Psychomotor skills are a vital component of nursing care. Nurses must be competent in basic psychomotor skills to ensure safe and effective care <sup>(7)</sup>. The theoretical knowledge given is turned into practical skills through models used in the practice laboratories <sup>(22)</sup>. In this aspect Nogueira et al (1997) <sup>(23)</sup> found that the students of the control group

showed ordinary performance (42.9%), good performance (48.9%) and very good performance (8.5%) whereas those of the experimental group showed ordinary performance (5.7%), good performance (60%) and very good performance (34.3%). Moreover, the results of many studies show that newly graduated nurses lack clinical skills, even though they have sufficient theoretical knowledge<sup>(24)</sup>.

Observation data of present study revealed that high percent of nursing students have adequate skills about intramuscular injection (Table 2). This may be due to nursing students have sufficient theoretical knowledge and opportunities to practice intramuscular injection. This result is contradicted to Meskel (2011)<sup>(25)</sup> who found that all the basic clinical competencies of the nursing students inadequately. Among the six clinical competencies assessed, managing 3rd stage of labor, clean wound dressing, managing airway obstruction and administering IM injection were poorly performed. Also Findings of Adejumo and Dada (2013)<sup>(19)</sup> who revealed that more than half of the respondents were inadequate related to injection performance.

Administering intramuscular (IM) injections includes preparing injections, confirming the identity of the patient and the medication to

be given. It is also important to select an appropriate site according to the volume to be given. Positioning of the patient followed by disinfecting the injection site are also important features<sup>(17)</sup>. Results of present study indicated that more than seventy of nursing students have adequate skills in documentation, intervention and preparation phase respectively. This may be due to laboratory training provide students adequate practice of intramuscular injection. In addition to clinical teacher provide opportunity to students to practice intramuscular injection skill at their own rate. Further, nowadays a well equipped skills laboratory formed to formally train nursing students.

In this regard Hoseini *et al* (2009)<sup>(26)</sup> showed that the students' practice of following skills during traineeships is sufficient according to the faculty members' and graduates' viewpoints: intramuscular injection.

The study finding indicated that there is positive significant correlation between nursing students' skills and knowledge about intramuscular injection at  $P < 0.0001$ . This means that improvement in the knowledge leads to improvement in the skills. According to Bloom's taxonomy (2010)<sup>(27)</sup> practice is influenced by knowledge. A previous study shows that nurses' knowledge was

influenced by professional education and training. Theoretically the Knowledge could be acquired through basic and continuing education, training, personal experience, or in-service training<sup>(28)</sup>. The foregoing result was congruent with what found by Akel (1997)<sup>(29)</sup>, Mohamed (2000)<sup>(30)</sup>, Ahmed (2001)<sup>(31)</sup>, and Zakeria (2001)<sup>(32)</sup> whom their work revealed that the relation between knowledge on communication and performance of it was positive.

### Conclusion

It can be concluded that nursing students at Faculty of Nursing at Benha University have adequate knowledge and skills. There is positive significant correlation between nursing students' skills and knowledge about intramuscular injection.

### Recommendation

1. Prime importance for nursing educators pays further attention nursing students' training of intramuscular injection.
2. Nursing educators must increase support to nursing laboratory with adequate and modern equipments as video, television, good models, films, cotton, bandages, and sufficient instruments for students training
3. Nursing educators must use several teaching strategies to allow students experience situations similar to clinical settings in order to gain a deep

understanding of intramuscular injection skills.

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