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# Factors associated with safe intramuscular injection practice among nurses of a teaching hospital

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## Abstract

**Introductions**: Injection medication is one of the major responsibilities of a nurse. The principles and techniques of intramuscular (IM) injections are associated with safe nursing practice.

**Methods**: A self-administered questionnaire for knowledge and observational checklist for procedure was used to assess the level of knowledge and practice of IM injection of nurses at Patan Hospital, Patan Academy of Health Sciences (PAHS), Nepal, during August 12 to September 07, 2018. Ethical approval was taken from Institutional Review Committee of PAHS. SPSS 16 was used for statistical analysis.

**Results**: Out of total 78 nurses included, 5 (6.4%) had adequate knowledge, 59 (75.6%) moderate, 14 (17.9%) inadequate knowledge regarding IM injection. Similarly, out of 26 nurses observed for IM injection practices, 10 (38.5%) had good practice, 16 (61.5%) fair, and none had poor practice regarding IM injection. There was significant association of knowledge and practice of IM injection (p=0.03).

**Conclusions**: The study shows three fourth nurses have moderately adequate level of knowledge of IM injection and more than half of them have fair practice.

**Keywords:** intramuscular, IM injection, knowledge, nurses, safe practice

## Introductions

Appropriate intramuscular (IM) injection requires cleaning the chosen site, insertion of needle at an angle of 72° to 90° to ensure it reaches the muscle, maintain steady and slow delivery of medication at about 1 ml/10 seconds to reduce the pain, and allow the muscle to absorb the drug. The needle is withdrawn at the same angle and gentle pressure applied with cotton swab.[1]

The WHO estimates that 3 million needle stick injuries (NSIs) every year with 90% occurring in developing countries. Unsafe injection practice poses the risk for needle stick injuries, and transmission of blood borne diseases.[2]

Inadequate supply of appropriate sharp containers, unsafe practices such as recapping of needles, passing of sharp needles one health care workers (HCWs) to another, carelessly left the needles in unexpected place like dirty linen are the consequences for NSIs.[3]

Unsafe injection practice is reported in 76% in urban area and 39.2% in rural areas[4] and primary health care in Nepal.[5]

This study aims to find out the factor associated with knowledge and practice for safe IM injection among nurses in a teaching hospital.

## Methods

This cross-sectional study was conducted to find out the factors associated with knowledge and practice for safe IM injection among nurses of Patan Hospital, Patan Academy of Health Sciences (PAHS), Kathmandu, Nepal, during August 12 to September 07, 2018. A self-administered questionnaire was used to assess the level of knowledge and an observational checklist for the IM injection procedure.

Among 24 wards of Patan Hospital, only 3 wards- surgery, maternity and emergency wards were selected purposively for the study. Sample size was calculated using Solvin's formula, adding 10% non-response rate, the final sample size was 78. Non-probability, purposive sampling technique was used to include 1/3rd sample each from all three wards. Twenty nurses from surgical ward, 29 from maternity and 29 from emergency ward were included.

Ethical approval was obtained from Institutional Review Committee (IRC) of PAHS. Verbal permission was taken from Nursing Director of Patan Hospital and Sister In-charge of selected wards. Anonymity was maintained by writing code number on questionnaire rather than name.

The data collection proforma had three parts. Part-one, 8-items on demography; part-two, 20-items on knowledge regarding safe IM injection. For correct response "one" score was given for each item. The total score of knowledge was 36. Part-three, 35 items checklist regarding safe IM injection practice on three dimensions, pre- intra- and post procedures steps of IM injection. For correct response "one" score was given for each item, total score of practice was 35.

Level of knowledge was divided into three categories based on score, adequate >75%, moderately adequate 51-75%, inadequate Knowledge 0-50%.[4] Practice was also divided into three categories, good 67-100%, fair 33-66%, poor ≤0-32%.[6]

Face validity was established by consulting with research advisor, subject experts. The pretesting was performed on 10% sample among nurses of the Gynecological ward, Patan Hospital. The nurses who participated in pretesting were excluded from main data collection. According to result of pretesting language comprehension was edited.

Respondents were explained about the objectives of the study. Written consent was obtained by the researcher herself. First the IM procedure was observed, which required 7-10 minutes and then a self-administered

questionnaire distributed during the lunch break. Participating nurses were asked not to discuss with each other while filling questionnaire, instead they were allowed to ask the researcher if there were any queries. The completion of questionnaire took about 20-25 minutes. Field editing was done as soon as the nurses submitted it for avoiding any missed data.

The SPSS was used to analyse data. Inferential statistics, chi-square test was used for the association between demographic variables and level of knowledge/practice, $p<0.05$ was considered statistically significant.

## Results

A total 78 nurses were included in the study, 29 from maternity ward, 20 surgery and 29 emergency. The mean age was 28.9±5.9 years, range 20-48 years. Level of nursing education was Proficiency Certificate Level (PCL) nursing 35 (44.9%), Bachelor Nursing (BN) 30 (38.5%), Bachelor Nursing Science (BNS) 10 (12.8%) and 3 (3.8%) respondents were Bachelor science (BSc) nursing. Sixty-two (79.5%) had less than 10 years' work experiences and 6 (20.5%) had more than 10 years' work experiences, mean 7.6±5.7 years. One (1.3%) respondent did not give IM injection every day, 45 (57.7%) 1-5 times per day, 23 (29.5%) 6-10 times per day, 7 (9%) 11-15 times per day and 2 (2.6%) 16-20 times per day.

Among 78 nurses 59 (75.6%) had moderately adequate knowledge, the mean score of level of knowledge was 21±3, Table 1.

Among 26 nurses 16 (61.5%) had good practice, mean 25±3.5, Table 2.

There was no statistically significant association between level of knowledge and practice with demography (age, level of education, designation and work experiences), but associated with currently working wards.

Spearman Rank Correlation was significant, r = 0.01 level (2-tailed) and $p < 0.05$ (2-tailed). Therefore, there was weak negative correlation and no association between level of knowledge and practice regarding safe IM injection, p 0.187 and r -0.305.

**Table 1. Level of knowledge of nurses regarding safe intramuscular (IM) injection (N=78)**

| Level of knowledge | Score | N (%) |
|---|---|---|
| Inadequate Knowledge | <50% | 14 (17.9%) |
| Moderately Adequate knowledge | 51%-75% | 59 (75.6%) |
| Adequate Knowledge | >75% | 5 (6.4%) |
| Mean score±SD: 20±3 | | |

**Table 2. Level of Practice of nurses regarding safe intramuscular (IM) injection (N= 26)**

| Level of practice | Score | N (%) |
|---|---|---|
| Poor practice | 0-32% | - |
| Fair practice | 33-66% | 16 (61.5%) |
| Good practice | 67-100% | 10 (38.5%) |
| Mean score of practice±SD: 25±3.5 | | |

## Discussions

Regarding the safest method for recapping after IM injection out of 78 nurses, 57 (73.1%) correctly answered one-handed recapping method. This is encouraging findings, compared to the study among 385 nurses in two different health centres i.e. University College Hospital and Adeoyo Maternity Teaching Hospital (UCH and AMTH), Nigeria, where knowledge about injection safety was 13.2% at UCH and 21.2% at AMTH. They

found 55.9% had correct information that two-handed recapping is not a safe injection practice.[7]

Findings of the current study shows, regarding colour bin for immediate segregation of syringe, most of respondents 62 (79.5%) had correctly answered as red colour bin. But a study done in Kashmir, India showed that out of 152 injection providers, only 30.9% had correct knowledge regarding segregation of waste in colour coded bins.[8]

In present study most of respondents, 62 (79.5%) correctly answered that incineration was the method of disposal of used needle, similar to the findings which revealed 8 (80%) HCWs among 10 answered the main waste disposal technique for disposing used injection equipment was incineration (burning) in a pit.[9]

The present study shows that among 26 nurses, only 3 (11.5%) had worn gloves while giving IM injection, 16 (61.5%) had practiced recapping the used needle. More than half 16 (61.5%) washed their hands with soap and water after giving IM injection. In contrast study conducted in Benin city, Nigeria reveals 84 (68.9%) used gloves sometime while giving IM injection whereas just 4 (3.3%) nurses had worn gloves regularly, 54 (44.2%) never recapped the needle after use while 28 (23%) practiced recapping regularly and remaining 28 (23%) sometimes. Similarly, regarding hand washing 96 (78.7%) nurses washed hands with soap and water after giving injection while 25 (20.5%) did not.[10]

Injection safety practice observed through checklist among 32 nurses in Pokhara, Nepal, found only 2 (6.2%) nurses had worn gloves while providing injection, 5 (15.6%) washed hands before while 22 (68.8%) washed hands after injection; 29 (91.6%) practiced recapping after providing injection and 22 (68.8%) disposed the syringe and needle properly in puncture proof container.[11]

During IM injection, 23 (88.5%) cleaned the injection site with a spirit swab and 100% segregated the syringe in appropriate colour bin. An observational study conducted to assess the Injection practices of Health Care Provider in tertiary hospital in 130 patients receiving injections in New Delhi, India, the injection site was cleaned with spirit swab in 117 (90%) cases, segregation of used syringes was correctly done in 99% cases.[2]

The current study reveals that level of practice regarding IM injection, only 10 (38.5%) respondents had good level of practice, 16 (61.5%) fair and none had poor level of practice. On the contrary, results of comparative cross sectional study conducted on knowledge, attitude and practice of injection safety among 300 HCWs in Tripura, India, showed two third i.e. 202 (67.3%) had good practice and 98 (32.7%) poor practice.[12]

The present study revealed that there was no statistical significant relationship between knowledge and practice regarding IM injection with age, level of education, designation and work experiences, however there was significant association between current working unit with levels of knowledge ($p=0.021$) and practice ($p=0.021$) regarding IM injection. In contrast, an epidemiological study conducted on knowledge, attitude and practice of injection safety among health care personnel in a tertiary care hospital of Tripura, India, showed significant association between knowledge with mean age occupation and work experience ($p= 0.001$).[12] Another study among 30 staff nurses in Kerala, India, showed significant association between age and educational status with level of knowledge regarding IM injection.[7]

An analytical study from Panjab, India, revealed no significant association of IM injection with age, educational qualification and work experience.[8]

Some of the limitations of this study include the observation of practice regarding safe IM injection was done after obtaining informed consent which may affect the results towards best practices due to Hawthorne effect. The consent was compulsory during this thesis research work. Similarly during this study, due to resource constrain purposive sampling

technique and limited number of participants were included for observation IM injection practice as prescribed during the study period. Even with these limitations, the findings provide a baseline information for further research and education program for safe IM injection practice among nurses.

## Conclusions

The present study shows that majority of respondents had moderately adequate level of knowledge, few had adequate knowledge, one fourth inadequate knowledge regarding safe IM injection. Similarly more than half of respondents had fair practice and half had good practice and none had poor practice.

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## Conflict of interests

None

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