

Rohini S Kulkarni<sup>1\*</sup>, Purushottam A Giri<sup>2</sup> and Pankaj R Gangwal<sup>2</sup>

<sup>1</sup>Noor Hospital and IIMSR Medical College, Badnapur, Jalna, Maharashtra, India

<sup>2</sup>Department of Community Medicine, IIMSR Medical College, Badnapur, Jalna, Maharashtra, India

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**\*Corresponding author:** Mrs. Rohini S Kulkarni, Nursing Superintendent, Noor Hospital and IIMSR Medical College, Badnapur, Jalna, Maharashtra, India, E-mail: rohinikulkarni71113@gmail.com

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## Research Article

# Injection Safety: Knowledge and Practices among Nursing Personnel in Tertiary Care Teaching Hospital of Marathwada Region of Maharashtra, India

### Abstract

**Background:** Unsafe injection practices put patients and healthcare providers at risk of infectious and non-infectious adverse events, sound knowledge and skillful practices of nurses are vital to breaks the chain of blood borne diseases transmission caused by unsafe injection practices.

**Objectives:** To assess the knowledge and practices amongst nurses regarding injection safety in tertiary care teaching Hospital of Marathwada Region of Maharashtra, India.

**Methods:** A cross section study was carried out from April to May 2016 in tertiary care teaching hospital of Marathwada region of Maharashtra, India. A total of 70 nurses were enrolled in this study. A pre-designed questionnaire which assessed knowledge and practices regarding injection safety tool was used to collect data. Results were analyzed using frequency, means, and percentage whenever appropriate.

**Results:** In this study, majority 82.86% were females and 52.86% had less than 5 years working experience, and 91.4% of the respondents had good knowledge of HIV, hepatitis B and C transmission through unsafe injection. Majority 92.85% nurses knew that sharp waste should be discarded in blue container but while practicing only 40% of nurse's segregate sharp waste and 81.43% of the nurses didn't wear protective gloves while giving injection.

**Conclusion:** The present study concluded that there was average level of knowledge and poor practices on injection safety amongst nurses; therefore there is need for regular training session and close supervision of the nurses. These will greatly enhance the knowledge and practice of injection safety among nurses.

## Introduction

Injections are invasive procedures and done frequently in each nurse duty time; therefore, good knowledge and safe practice play important role in avoiding transmission of disease or injuries. Injections can be given intravenously, intramuscularly, intradermally, or subcutaneously. Injections are among the most frequently used medical procedures, with an estimated 20 billion injections administered each year world-wide. Majority (more than 90%) of these injections are administered for curative purpose [1]. Unsafe injection is important cause of transmitting blood-borne diseases such as Hepatitis B (HBV), human Immuno-deficiency virus (HIV), hepatitis C (HCV). These diseases put the patient, health workers at great risk which causes reduced the life expectancy, productivity and also create burden on communities and health-care systems with avoidable high treatment costs. In 2003, WHO published the burden of diseases from NSIs in HCWs which showed that there were 3 million accidental needle-stick injuries leading to 37% of all new HBV, 39% of new HCV cases and around 5.5% of new HIV cases in HCWs [2]. WHO estimates that annually 16 billion injections are given in developing and transitional countries, with an annual mean

of 1.5 injections per person per year [3]. The burden of unsafe injection practices is borne by the injection providers (health care workers), the patients, and the community at large. Injection providers are exposed to hazards of needle stick injuries from inadequate supply of appropriate sharp containers, unsafe practices such as recapping of needles, manipulating used sharps (bending, braking, or cutting hypodermic needles), passing of sharps from one health care worker to another, sharps carelessly left in unexpected places [4]. Unsafe injections also carry socio-economic and psychological consequences on the individual and the health system of a country. Each year, the annual global burden of indirect medical cost due to HBV, HCV, and HIV/AIDS is estimated to be US\$535 million [5]. The WHO estimates that 501,000 deaths have occurred because of unsafe injection practices [6]. These deaths could have been prevented by injection safety practices which include reduction of injections, ensuring safe injection practices using the "nine rights," availability of appropriate injection devices and proper disposal of sharps and other healthcare wastes. The "nine rights" of injection safety ensures that the right patient is given the right drug in the right dosage and right formulation using the right injection equipment at the right time

and right route with right storage and the right method of disposal [7,8]. Safe injection practices are expensive than unsafe injection practices, but it will actually reduce a great burden on health system by breaking the chain of transmitting blood borne diseases and their consequences [5]. When providing health services, it is important to prevent the transmission of diseases every time at all level. Hence the present study was carried out to assess the knowledge and practices amongst nurses regarding injection safety in tertiary care teaching hospital of Marathwada region of Maharashtra, India.

## Material and Methods

A cross-sectional study was carried out amongst 70 nursing personnel in Noor Hospital of Indian Institute of Medical Science & Research, Badnapur, Jalna, Maharashtra, which is tertiary care teaching hospital of Marathwada region of Maharashtra during the period of April 2016 to May 2016. Out of 152 nurses, 70 nurses were enrolled for the study by convenient sampling method. The informed consent was obtained from each participant, and anonymity of the participants was maintained throughout the study. Ethical approval was obtained from the institutional ethics committee prior to the study. The data were collected on a predesigned, pre-structured questionnaire distributed among these nurses, and they were asked to fill the questionnaire. The questionnaire comprised questions on knowledge and practices related to the injection safety. The language of the questionnaire was English and contained 9 questions of each. All the questions were objective and multiple-choice type. Demographic details such as age, sex, qualification, years on of service, training on injection safety while in service, immunization status against hepatitis B and accidental needle stick injury in last 6 months of the respondents were also recorded. Results were analyzed in the form of frequency, mean, percentage whenever appropriate.

## Results

The demographic characteristic of the study is shown in **Table 1**. Out of total 70 participants, majority 58(82.86%) were females, 26(37.14%) were in the age of 25-29 years, 37(52.86%) had attended injection safety classes, 37(52.86%) had less than 5 years working experience, 24 (34.29%) didn't take hepatitis B vaccination, and 57(81.43%) didn't have needle stick injury in the last six months.

Response of nurses regarding their knowledge towards injection safety is tabulated in **Table 2**. Majority of 91.4% of the respondents were aware of HIV, hepatitis B and C transmission through unsafe injection and 92.85% nurses knew that sharp waste should be discarded in blue container; however 75.7% of the nurses were not aware of the meaning of safe injection. 71.42% of the nurses were not able to answer what immediate measure they have to take after accidental needle stick injury. Only 40% nurses didn't aware about who are at the risk of unsafe injection and 85.71% nurses had knowledge about how to protect themselves when there is cut or injury on hand. About 65.71% of respondents had correctly mentioned about the complications caused by unsafe injections and 68.57% nurses had knowledge about the types of syringe available for administering injections.

**Table 1:** Socio-demographic characteristics of the study population (n=70).

Socio-demographic characteristics	Number	Percentage
<b>Age ( 28.04±5.347 )</b>		
20-24	18	25.71
25-29	26	37.14
30-34	15	21.43
>35	11	15.71
<b>Gender</b>		
Male	12	17.14
Female	58	82.86
<b>Education</b>		
B.Sc. Nursing & PG	8	11.43
ANM	20	28.57
GNM	42	60.00
<b>Training on injection safety in last two year</b>		
Yes	37	52.86
No	33	47.14
<b>Work Experience (In Years)</b>		
<1	12	17.14
1-5	37	52.86
6-10	11	15.71
>10	10	14.29
<b>Immunization against Hepatitis B</b>		
Yes	46	65.71
No	24	34.29
<b>Needle stick injury in last 6 months</b>		
Once	13	18.57
None	57	81.43

**Table 2:** Knowledge regarding injection safety amongst study population (n=70).

Sr No	Questions on Knowledge	Correct respondent	Incorrect respondent
1	Did you aware about safe injection	17 (24.2%)	53 (75.7%)
2	How many types of syringe available for administering injection?	48 (68.57%)	22 (31.4%)
3	Diseases can transmitted by unsafe injection practices	64 (91.4%)	6 (8.5%)
4	Which color bag was used to dispose injection related sharp waste?	65 (92.85%)	5 (7.1%)
5	Who can be at risk of unsafe injection?	42 (60%)	28 (40%)
6	What you will do, if there is cut or injury on your hand?	60 (85.71%)	10 (14.28%)
7	What can be the likely complications of unsafe injection?	46 (65.71%)	24 (34.28%)
8	What can be the first important measure that you have to take in case of accidental needle stick injury?	20 (28.57%)	50 (71.42%)
9	What you will do, if there is accidental contamination of needle before administering injection?	62 (88.5%)	8 (11.4%)

Response of nurses regarding their practice towards injection safety is tabulated in Table 3. Only 34.29% of respondents discard syringes in single use, and 61.42% didn't cut needle after completion of their procedure, while only 40% of nurses segregate sharp waste, 81.43% nurse didn't wear gloves while giving injection, and 84.28% were given wrong answer about rubbing site after injection is correct practice, instead of that pressing site with single used sterile swab is correct practice, while 70% were answered recapping with both hand is correct practice, actually its incorrect practice as there is chance of needle stick injury increases. Less than 50% of respondents didn't wash their hand before and after administrating injection.

## Discussion

In this present study, majority 75.7% participants were not aware about safe injection practices, in contrast a study done by Onyemochi et al. [9], revealed that 65.2% participants knew about correct definition of safe injection.

In this study, 52.86% participants were having less than 5 years of service experience and more than half of them attended training of injection safety, this may be cause of having average knowledge and poor practices, similar findings were observed in a study done by Onyemochi et al. [9], showed where large proportion (34.8%) of participants had 6 yrs of experience, but only 14.5% had attended training, in spite of that their knowledge score was good.

In our study, majority 91.4% of respondents given correct answer about HIV/AIDS, Hepatitis B, & C could be transmitted through unsafe infections. Similar study finding were seen in Omorogbe et al. [4], study where the respondent's knowledge of the specific hazards and infections associated with unsafe injection practices showed 81(86.2%) HIV/AIDS, 52(55.3%) HBV, and 36(38.3%) HCV. In another study done by Onyemochi et al. [9], there were 65.9% respondents knew HIV/AIDS, Hepatitis B, & C could be transmitted through unsafe infections, One more study by Paul et al. [10], also mentioned that 81.3% knew that HIV/AIDS and 71.3% knew that Hepatitis B could be transmitted through unsafe injections.

More than 50% of nurses didn't practicing regular hand washing with water and soap before and after administering injection. In contrast to a study done by Omorogbe et al. [4], which showed that 78.7% of participants practicing regular hand washing with water and soap, this finding was consistent with Onyemochi et al. [9], study, where 79.7% and 86.2% of respondents do not wash their hands before and after administrating injection, another study by Paul et al. [10], where only 12.5% participants were practicing hand washing with soap and water.

However, it is worrisome to find that only 10% of them use hand gloves regularly when administering injections. This finding is consistent with study done by Omorogbe et al. [4], where only 4 (3.3%) of participants use gloves regularly. In study by Onyemochi et al. [9], showed that only 7.2% respondents wear single use glove before administering injection.

In our study, it is alarming that 70% of the respondents still recap needles all the time after use. This finding was contradictory with Onyemochi et al. [9], study, where 69.6% of participant do not recap needle after use. Another study done by Paul et al. [10], where only 42.5% participant recapping needle. A similar situation was also observed in a study done by Oladimeji et al. [11], showed that 86.7% respondent doing recapping of needle after use. This practice of recapping and detaching of needles increase the risk of needle stick injuries among the nurses.

On the knowledge regarding types of syringes available for administrating injections, 68.57% respondents knew that disposable and autodestruct syringes are available, similarly in a study done by Kolade Ernest [12], showed that majority 91.4% of respondents knew only disposable syringes are available and 8.6% knew about auto destruct syringes are also available.

In our study, majority 92.85% respondents gave correctly answer about color code for sharp waste disposal, this finding was contradicted with the study carried out by Garapati S [13], showed that only 27.7% having knowledge about correct disposal of sharps.

In Garapati S [13], revealed that 41.7% of the providers received hepatitis B vaccination, on contrary in our study, 65.71% has been received three doses hepatitis B vaccination and other 34.29% still not vaccinated.

In this study regarding opinion on contamination of needle, 88.5% respondent correctly answered that needle should be discarded or used after sterilization, this finding is similar with Paul et al. [10], shows that 98.8% correctly mentioned needle should be discarded or used after sterilization.

In study done by Paul et al. [10], 87.5% nurses knew to protect themselves in case cut or injury on hands, similarly in present study, 85.71% nurses had correctly answered that band aid and glove should be wear while there was cut of injury on their hands.

In our study, only 15.72% nurses correctly pressed injection site with single sterile swab after administering IM injection, this finding is similar with Paul et al. [10], study where 37.3% correctly pressed injection site with single sterile swab.

**Table 3:** Practices regarding injection safety amongst study population (n=70).

Sr No	Practices regarding injection safety	Yes	No
1	Do you discard syringe after giving injection.	24 (34.29%)	46 (65.71%)
2	Do you cut used needle immediately after procedure with hub cutter.	27 (38.57%)	43 (61.42%)
3	Are you doing recapping of used needle with both hands?	49 (70%)	21 (30%)
4	Do you segregate sharps waste?	28 (40%)	42 (60%)
5	Do you wash your hands before administering injection?	33 (47.14%)	37 (52.85%)
6	Do you wash your hands after administering injection?	34 (48.57%)	36 (51.42%)
7	Do you perform skin preparation with alcohol- based solution before administrating injection?	56 (80%)	14 (20%)
8	Do you wear gloves before administering injection?	7 (10 %)	63 (90%)
9	Do you rub injection site after giving IM injection.	59 (84.28%)	11 (15.72%)



In present study, 80% of nurses perform skin preparation with alcohol based solution before administering IM injection, this finding is similar with Paul et al. [10], study where 94.9% nurses performed skin preparation before administering IM injection,

In our study, 60% of nurses knew who are at the risk of unsafe injection, similar finding seen in Onyemocho et al. [9], study where 75.4% health care workers knew that the patient, health care workers and community are at the risk of unsafe injection.

## Conclusion

The study revealed that the participants had average level of knowledge about injection safety but there is gap on their practices, most of participant's service experience was less than 5 years, which may be the one of the cause for poor practices. Need of regular training and close supervision are the main determinants for improve the knowledge and practices of nurses.

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