

Awareness of needle-stick injuries among health-care workers in a tertiary health-care center

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Abstract

Context: Needle-stick injuries (NSIs) pose a great occupational risk of blood-borne disease transmission in health-care workers (HCWs). Diseases of primary significance include hepatitis B, hepatitis C, and human immunodeficiency virus infection. **Aims:** This study aimed to check the awareness regarding the health hazards associated with NSIs and awareness regarding postexposure prophylaxis (PEP) and hepatitis B vaccination in HCWs. **Settings and Design:** This is a cross-sectional study conducted in a tertiary care government hospital. **Subjects and Methods:** A sample size of 100 HCWs, which consisted of 20 residents, 20 interns, 20 lab assistants, 20 nurses, and 20 Class IV workers, was taken. A predefined questionnaire was used and answers were documented. **Statistical Analysis Used:** Chi-square test was used for statistical analysis. **Results:** Out of the 100 HCWs enrolled in the study, 45% had a history of NSI during their career, the highest count was seen in Class IV workers i.e. 14 [70%]. Only 21% of the HCWs knew about the diseases transmitted by NSI. Only 30% of Class IV workers were aware of hepatitis B vaccination and none of them were vaccinated. Quite a good number of HCWs were aware regarding the first step to be undertaken in case of NSI. However, their knowledge regarding PEP was not up to the mark. **Conclusions:** NSIs were seen in all the categories of HCWs, but the awareness regarding health hazards due to NSI was inadequate. Except Class IV workers, rest of the HCWs were overall aware regarding hepatitis B vaccination. There is a need to give emphasis as regards to awareness of PEP in case of a NSI.

Key words: Awareness, health-care workers, needle-stick injuries

INTRODUCTION

Established within the Centers for Disease Control and Prevention, the National Surveillance System for Healthcare Workers defines a percutaneous injury, or needle-stick injury (NSI), as penetration of skin resulting from a needle or other sharp object, which prior to the exposure was in contact with blood, tissue, or other body fluid.^[1]

There are more than twenty blood-borne diseases, but those of primary significance to health-care workers (HCWs) are due to hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV).^[2] A HCW is placed at a risk of such infections by percutaneous injuries or contact of mucous membrane or nonintact skin with contaminated fluids. The causes include

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various factors such as type and design of needle, recapping activity, handling/transferring specimens, collision between HCWs or sharps, during clean-up, manipulating needles in patient line-related work, passing/handling devices, or failure to dispose the needle in puncture-proof containers.^[3] The World Health Organization has estimated that exposure to sharps in the workplace accounts for 40% of infections with HBV and HCV and 2%–3% of HIV infections among HCWs.^[4] While the infectiousness of HIV and HCV decreases within a couple of hours, HBV remains stable during desiccation and infectious for more than a week.^[5] Diseases such as HCV and HIV have no prophylactic immunization and the only way to prevent them is by avoiding contact. Unlike them, HBV has a prophylactic vaccine and all the HCWs should be immunized against it to prevent its transmission. Postexposure prophylaxis (PEP) is recommended when the risk is significant after a careful risk assessment, in both occupational and nonoccupational settings.^[6] The practice of PEP has helped in reducing the occurrences of these infections and it lessens the burden of treatment.

Awareness regarding the health hazards of NSIs and the available measures of prophylaxis will help to prevent the transmission of these diseases. Hence, this study was undertaken to assess and explore the awareness of the HCWs regarding NSI and hepatitis B vaccination at a tertiary care center, who come in contact with sharps. This study will help and enable the respective authorities to take the necessary measures regarding awareness.

SUBJECTS AND METHODS

A sample size of 100 HCWs, which consisted of 20 residents, 20 interns, 20 lab assistants, 20 nurses, and 20 Class IV workers, was taken. Proper informed consent was taken and anonymity was maintained. A predefined questionnaire was used and the answers were documented using Microsoft Excel sheet and percentages were statistically analyzed using the IBM SPSS Version 20 software (IBM, Armonk, NY, USA). $P < 0.05$ was taken to be significant at 95% confidence using the Chi-square test.

RESULTS

A total of 100 HCWs participated in the study, in which 71 were females and 29 were males, and the range of the age group was 22–65 years. Out of the 100 HCWs, 20 were resident doctors, 20 were interns, 20 were lab assistants, 20 were staff nurses, and 20 were Class IV workers. They were informed that this study was being done to know about their awareness regarding NSIs.

Out of these, 45% of HCWs had a history of NSI during their career; the highest count was seen in Class IV workers, followed by interns and resident doctors. The count was significantly low in nurses and lab assistants. By using the Chi-square test, the P value was found < 0.05 , hence indicating a significant association between the incidence of NSI and the designation [Table 1]. Out of the injured, majority except a few Class IV workers reported to a doctor.

Twenty-one percent of the HCWs knew about the diseases transmitted by NSI; out of the given options, namely HIV, hepatitis A, HBV, and HCV, the highest count was seen in resident doctors, followed by interns. The count was low in lab assistants and nurses. None of the Class IV workers answered correctly. There was a significant association ($P < 0.05$) between awareness regarding diseases transmitted by NSI and the designation [Table 2].

When asked about prophylactic hepatitis B vaccination, the count of those who have taken the vaccine was significantly high (more than 80%) in resident doctors, nurses, interns, and lab assistants. Only 30% of the Class IV workers knew about the hepatitis B vaccine, and none of the 20 had been vaccinated [Table 3]. Eighteen resident doctors, 16 nurses, 15 interns, and 12 lab assistants knew that HBV is the most common virus transmitted by NSI. Only one Class IV worker was aware of this fact.

When asked about the first step to be undertaken after a NSI, majority (more than 60%) of the HCWs chose the option of holding the finger under water. The Chi-square test revealed $P > 0.05$. Hence, the first step undertaken after NSI was not significantly associated with the designation [Table 4].

Resident doctors, interns, and nurses knew whom to contact (casualty medical officer) in case of an NSI. The count was low in lab assistants and none of the Class IV workers knew the correct answer [Table 5].

Seventy percent of the HCWs answered that treatment in the form of PEP is necessary for each and every NSI, the highest count seen in lab assistants (19), followed by nurses and Class IV workers (18 each). Fourteen resident doctors and 11 interns were of the opinion that not every NSI needs a treatment in the form of PEP. In case of an NSI, more than two-third of the lab assistants and resident doctors knew that a person is supposed to contact an anti-retroviral therapy (ART) center as soon as possible, i.e., within 2 h. This

Table 1: Incidence of needle-stick injuries

Designation	Yes (%)	No (%)	Total (%)
Residents	12 (60)	8 (40)	20 (100)
Interns	13 (65)	7 (35)	20 (100)
Lab assistants	4 (20)	16 (80)	20 (100)
Nurses	2 (10)	18 (90)	20 (100)
Class IV workers	14 (70)	6 (30)	20 (100)
Total	45	55	100
<i>P, χ^2</i>	<0.05, 25.051		

Table 2: Awareness regarding diseases transmitted by needle-stick injuries

Designation	HIV, hepatitis B, hepatitis C, Yes (%)	HIV, hepatitis B, hepatitis C, No (%)	Total (%)
Residents	9 (45)	11 (55)	20 (100)
Interns	7 (35)	13 (65)	20 (100)
Lab assistants	3 (15)	17 (85)	20 (100)
Nurses	2 (10)	18 (90)	20 (100)
Class IV workers	0	20 (100)	20 (100)
Total	21	79	100
<i>P, χ^2</i>	0.002, 16.516		

HIV=Human immunodeficiency virus

Table 3: Hepatitis B vaccination

Designation	Yes (%)	No (%)	Total (%)
Residents	19 (95)	1 (5)	20 (100)
Interns	17 (85)	3 (15)	20 (100)
Lab assistants	16 (80)	4 (20)	20 (100)
Nurses	18 (90)	2 (10)	20 (100)
Class IV workers	0	20 (100)	20 (100)
Total	70	30	100

Table 4: First step to be undertaken after needle-stick injuries

Designation	Hold under water (%)	Other options (%)	Total (%)
Residents	16 (80)	4 (20)	20 (100)
Interns	15 (75)	5 (25)	20 (100)
Lab assistants	15 (75)	5 (25)	20 (100)
Nurses	14 (70)	6 (30)	20 (100)
Class IV workers	12 (60)	8 (40)	20 (100)
Total	72	28	100
<i>P, χ^2</i>	0.684, 2.282		

Table 5: Whom to contact in case of needle-stick injuries

Designation	Casualty medical officer (%)	Other options (%)	Total (%)
Residents	14 (70)	6 (30)	20 (100)
Interns	10 (50)	10 (50)	20 (100)
Lab assistants	7 (34)	13 (65)	20 (100)
Nurses	10 (50)	10 (50)	20 (100)
Class IV workers	0	20 (100)	20 (100)
Total	41	59	100

number was low in Class IV workers, nurses, and interns [Table 6].

DISCUSSION

The present study addressed certain aspects of NSI in a tertiary care center which showed some equivocal and some contrasting results. Overall, 45% of the HCWs had a history of NSI, which is almost half as compared to a study done in Safdarjung Hospital, New Delhi, in 2009, where 80% of the HCWs had a history of NSI.^[7] Out of the injured, almost 90% reported to a doctor. The number of Class IV workers who suffered an NSI was the highest among the other HCWs; however, the number of those who reported it was the lowest. This may be attributed to the lack of awareness of the Class IV workers regarding NSI and this study corroborates this statement. The knowledge that each and every NSI should be reported is necessary among HCWs to reduce the underreporting and the possible repercussions.

Almost all HCWs were aware that HIV and HBV are transmitted by NSI, but very few were aware that HCV is also transmitted by NSI. Many of the Class IV workers had heard of only HIV and did not know about the other diseases. Seventy percent of HCWs had taken a complete course of the prophylactic hepatitis B vaccine. This count was low as compared to a study done in Fortis Escorts Heart Institute (FEHI), Okhla, New Delhi, India, where 91.5% of the HCWs were vaccinated.^[8] This can be attributed to the fact that none of the Class IV workers were vaccinated. This emphasizes the need of a vaccination program for the Class IV workers in the hospital. One hundred percent of immunizations should be aimed as HBV is the most common virus transmitted by NSI and its transmission can be prevented by the vaccine.

The need for teaching and following a specific protocol is felt, as in our study, around 30% of the HCWs were not aware that holding the finger under water is the first simple step to be undertaken after an NSI and chose other ineffective options such as applying pressure to the finger or squeezing out blood. Almost 60% of the HCWs did not know that they had to contact a casualty medical officer after an NSI. In spite of lack of awareness, a significant number of Class IV workers were aware that they were supposed to report to an ART center as early as possible, within 2 h. Moreover, a contrast finding was seen in interns, 95% of whom answered otherwise.

Table 6: When to contact an antiretroviral therapy center in case of needle-stick injuries

Designation	<2 h (%)	Other options (%)	Total (%)
Residents	13 (65)	7 (35)	20 (100)
Interns	1 (5)	19 (95)	20 (100)
Lab assistants	14 (70)	6 (30)	20 (100)
Nurses	4 (20)	16 (80)	20 (100)
Class IV workers	8 (40)	12 (60)	20 (100)
Total	40	60	100

Majority of the resident doctors and interns knew that every NSI does not need treatment in the form of PEP. This was a favorable finding, as careful risk assessment is important to avoid unnecessary use of drugs and associated psychological stress. However, this knowledge was not present in nurses, lab assistants, and Class IV workers.

Some institutions in India have a staff–student health service facility in place, which maintains records and registers the incidence of NSI and has protocols for management and follow-up of NSI cases.^[9] There is much room for improvement in protecting the HCWs from NSI, which can be accomplished through a combination of comprehensive programs, including stress on institutional behavior and device-related factors, that contribute to the occurrence of these injuries, seeking alternatives to the use of needles wherever possible, using newer devices with safety features, ensuring adequate training in safe use and disposal of needles, putting in place a culture of accident reporting, especially sharps related, and following preventive practices such as vaccinations for HBV, as also stressed by several others.^[10-12] Considering the lack of awareness in the Class IV workers and the fact that they are at an increased risk of coming in contact with sharps, the above measures should be mainly focused in this group of HCWs.

CONCLUSION

The diseases transmitted by NSI are major health hazards and at times may be life-threatening. They are also difficult to treat and may require lifelong treatment. Hence, it is important to include the knowledge of health hazards of NSI, PEP, and a specific protocol in case of an NSI in the teaching curriculum of HCWs.

Hospitals should therefore focus on policies for reducing transmission and should create awareness among both staff and students about the safety precautions by conducting seminars, sessions, and training programs from time to time.^[13]

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Conflicts of interest

There are no conflicts of interest.

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