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## ORIGINAL ARTICLE

# Needlestick Injuries among Healthcare Workers: A Study from a Tertiary Care Hospital, New Delhi

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**ABSTRACT**

*In this study, the prevalence of needlestick injuries (NSIs) among Indian healthcare workers (HCWs) was evaluated using reliable, pre-tested questionnaire based cross-sectional survey from 174 HCWs working in a tertiary care hospital of Delhi during July 2013 to June 2014.Some HCWs encountered more than one NSI incidence during the recall period and of all NSIs incidence (119/221, 53.85%), only 27 (12.22%) were reported to the concerned body. The causal device in 137 (62%) cases was hypodermic needles and procedure was venous sampling or injecting drugs (65, 29.31%). Post exposure prophylaxis (PEP) was provided to only 14 (8.05) cases. Safer needle devices are an effective means of reducing NSIs, however HCWs access to them is low owing to cost constraints. Also, the absence of on-job training compounded the problem of NSIs. More intensive educational programs to increase the awareness of NSIs and compliance with universal precaution (UP) are warranted.*

***Keywords:*** *Needlestick injuries; healthcare workers; blood borne pathogens; NSIs prevalence*

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## INTRODUCTION

Nurses and other healthcare workers (HCWs)are at constant risk of blood-borne infection through occupational exposure to a percutaneous injury. Serious infections of fatal nature can be acquired through needlestick or sharp injuries and subsequent contact of blood-borne pathogens (BBPs) such as Hepatitis B (HBV), Hepatitis C (HCV) and human immunodeficiency virus (HIV) with the exposed skin or contact with blood or other potentially infectious body fluids [25, 26, 1, 2, 3, 4]. Occupational exposure can be broadly categorized into two;*viz.* needlestick exposure (0.3% risk for HIV, 9%-30% for HBV, and 1%-10% for HCV) and mucus membrane exposure (0.09% for HIV) [5].

A needlestick injury (NSI)or percutaneous injury, or percutaneous exposure incident is the penetration of skin causing from a needle or other sharp object, which prior to the exposure was in contact with tissue,

blood, or other body fluid. Most NSIs happen during administration of injections, collection of blood specimen, recapping and disposing needles [6]. The National Institute for Occupational Safety and Health (NIOSH), USA defines NSIs as injuries caused by objects such as hypodermic needles, blood collection needles, intravenous (IV) stylets and needles used to connect parts of IV delivery systems [7]. The risk of pathogen transmission from infected persons to non-immune persons is proportional to the amount of pathogen transmitted largely depending on the nature of exposure and the status of the patient.

Early administration of post-exposure prophylaxis (PEP) is the main key to prevent the transmission of infection. PEP is most effective if provided within 2 h of exposure with prophylaxis continued for 4 weeks. It varies from 75 to more than 90% to prevent HBV infection and also lowers the risk of infection of HIV after sharp injuries. However, PEP effectiveness preventing HCV acquisition post NSI remains to be established [8].

Also, the importance of immediate reporting of NSI exposure to the designated authority cannot be emphasized enough. However, it is largely neglected and severely under reported; nevertheless almost 30 needlesticks per 100 full-time equivalent employees per year are reported by nursing personnel [9].

The incidence of NSIs is considerably higher than the current estimates due to approximately 50% under-reporting [10, 11]. In USA, 600,000-1,000,000 HCWs receive NSIs from conventional needles and sharps every year, while in UK it is 100,000 HCWs per year [12]. If we discuss about incidence of NSIs in India, only scarce authentic data is available. As per the reports around 3-6 billion injections are administered every year and alarmingly, two-third of these injections are considered unsafe [13]. NSIs are estimated at 2.4% (95% CI: 1.8-2.9) with 2.5%; 95% CI: 1.9-3.1 in rural and 1.9%; 95% CI: 1.3-2.6 in urban areas of the total injections given in India. The highest incidence of NSIs was reported in the immunization sector (4.2%;95% CI: 3.4-5.0) [14].

It would not be unsafe to assume that the incidence of occupational exposure is considerably higher than the current estimates in India, and the problem of exposure to contaminated blood among nursing personnel is not completely understood. In view of scanty reports and to estimate the prevalence of NSIs in Indian HCWs, the present study was carried out to determine the incidence of NSIs in HCWs of a tertiary care hospital of Delhi in terms of the number of cases and the frequency of injuries.

## MATERIAL AND METHODS

Across-sectional questionnaire (*viz.* Health Care Worker Injury Prevention Survey) based study was conducted in a tertiary care hospital of Delhi during July 2013 to June 2014. The study included a total of 174 subjects including nurses, physicians, office workers and non-clinical health care workers mainly involved in providing patient care and management of healthcare facilities after having prior informed consent. The study was approved by the institutional biosafety and ethics board.

The survey instrument (a pre-tested questionnaire to ensure practicability, validity and interpretation of the responses) comprised a tick-box format, collected information including the type of devices that caused the NSI, whether the device has been used on a patient prior to the NSI (contaminated devices), and how the injury occurred spanning last 12-month recall period.

In the current study, NSI is defined as percutaneous injury caused by hollow-borne needles, suturing needles, scalpel blades and lancets. The cases comprised of nurses who have had at least one experience of NSI.

## RESULTS

### *Prevalence of NSIs*

The study conducted among 174 HCWs in 134 bed tertiary care hospital of Delhi, India included 74 nurses (42.5%), 47 physicians (27%), 19 office workers (11%) and 34 non-clinical HCWs (19.5%). The respondents consisted of 79females (45%) and 95 males (55%) with 89(51%) under 25 years of age and 85 (49%) over 25 years of age. 138 (67%) of the respondents were employed in the health care service for less than ten years while 78 (45%) were involved in surgery related activities (Table 1).

### *Attitude and behavior towards the sharps injuries*

The safety questionnaire about the attitude and the behavior towards the sharps injuries revealed that 145 (83%) respondents were worried about being exposed to blood/ body fluids at work, 158 (91%) respondents felt that frontline HCWs must be involved in the selection of sharps devices with safety features for their department, 137 (79%) respondents pondered that their hospital will have difficulty with the higher cost of sharps devices with safety features, and 166 (~96%) respondents were concerned about getting a sharps injury because of no change in sharps disposal containers on a regular basis.The respondents' opinion about whether the patient care is more important than the safety of HCWs was

found to be almost evenly divided, as was the view about the immediate reporting of all sharps injuries at work(Table 2).

***Availability of information at work***

One hundred and fifty five (155) (89%) respondents had seen or heard some information regarding sharps injury prevention at work, however 162 (93%) of them had not seen or heard any information about evaluation of sharps devices with safety features within the last six weeks. 120 (69%) and 119 (68%) respondents had not seen or heard anything about sharps disposal procedures and sharps injury reporting at work within the same time period, respectively(Table 3).

***Assessment of basic awareness***

One hundred and forty three (143) (83%) respondents thought that sharps disposal containers should be changed when they are85% or more full, while 96 (55%) believed that 22% of sharps injuries are related to the disposal process.28 (16%) responded that sharps injuries should be reported within first 2 h,and 82 (47%) believed that there is 33% risk of HCV infection after an HCV-contaminated sharps injury(Table3).

***Exposure occurrence and reporting***

In the recall period of last 12 months, 43.4% (119/274) of total blood-borne pathogen exposure at work comprised of NSIs. Only ~ 16% of all exposures i.e.,NSI, splash to eyes, nose, mouth, blood / body fluid contact with open wounds on skin, or cuts with a sharps object were reported(Table 4).

***Prevention of NSIs exposure***

Thirty six (36) (20.69%) HCWs followed universal precaution, while only 39 (22.41%) of them knew about actions to be taken in case of an exposure. PEP was provided to only 14 (8.05) cases, despite 39 (22.41%) knowing about it. Of all the sample HCWs, 57 (32.76%) were aware about the universal precaution, 49 (28.16%) knew the hazards of syringe recapping. 55 (~31%) cases believed that heightened attention to the involved procedure especially blood specimen collection is the major preventive measure with 17 (9.77%) subjects not aware of preventive measures.19 (10.92%) subjects underwent HIV test post NSIs, while 49 (28.16%) were aware of their HIV status (Table 4).

***Actions taken post NSIs***

Majority of NSIs were cleaned with spirit (95; 42.99%) while in 73 (33.03%) and 32 (14.48%) cases it was washed with soap and water or with bleach alone, respectively. In 18 (8.14%) cases NSIs were squeezed and bleeding was encouraged. Antiretroviral therapy (AZT 600 mg/day) for 6 weeks was given in 7 (3.17%) cases of NSIs with HIV contaminated needles. Subsequent 6 months follow-up showed zero seroconversion. No PEP was provided in cases of NSIs with HCV and HBV contaminated needles with no follow-up to detect seroconversion. All HCWs were offered Hepatitis vaccination which was considered as sufficient and rationale behind no PEP in such cases (Table 5).

**Table 1: General characteristics of healthcare workers participated in this study.**

| Characteristics | N= 174 | % |
|---|---|---|
| **Age group (years)** | | |
| <25 | 89 | 51 |
| >25 | 85 | 49 |
| **Gender** | | |
| Male | 95 | 55 |
| Female | 79 | 45 |
| **Occupation** | | |
| Nurse | 74 | 42 |
| Physician | 47 | 27 |
| Non- clinical HCWs | 34 | 19 |
| Office workers | 19 | 11 |
| **Duration of employment** | | |
| <10 years | 138 | 67 |
| >10 years | 56 | 33 |
| **Department** | | |
| Surgery | 78 | 45 |
| Non- surgery | 96 | 55 |

***Location: where and how NSIs occurred***

Highest number of NSIs occurred in patient room (105, 47.70 %) followed by 58 (26.44 %) sustained in emergency room. Almost one- third of all NSIs (65, 29.31 %) were sustained during venous blood specimen collection or intravenous (IV) injections (Table 5).

***Type of needles causing NSIs***

The causal device in 137 (62%) of all NSIs was hypodermic needle followed by suture needle in 42 (19 %) of the cases(Table 5).

***Reasons for not- reporting NSIs and not- wearing double gloves***

A majority (137, 78.74%) of HCWs subjects believed that reporting of NSIs would not influence the outcome of the injury, as 118 (67.82 %) believed that double gloving wouldn't increase protection as one of the reasons for not-wearing double gloves routinely(Table 6).

***Concerns about infection transmission***

More than 96% of the sample HCWs were moderately or extremely concerned about the possibility of contracting HIV infection followed by concerns about HCV and HBV infection of 158 (91 %) and 162 (93 %) respondents, respectively. Of all 221 NSIs, 11 (4.98 %) needles were used on the drug addicts, while in 7 (3.17 %) cases, needles were used on HIV positive patients (Table 6).

**Table 2: Safety questionnaire about the attitude and behavior towards the sharps injuries**

| Expression(s) | Strongly Disagree | % | Disagree | % | Agree | % | Strongly Agree | % |
|---|---|---|---|---|---|---|---|---|
| I worry about being exposed to blood / body fluids at work. | 0 | 0 | 4 | 2.30 | 145 | 83.33 | 25 | 14.37 |
| Frontline health care workers must be involved in the selection of sharps devices with safety features for their department. | 0 | 0 | 11 | 6.32 | 158 | 90.80 | 5 | 2.87 |
| My hospital will have difficulty with the higher cost of sharps devices with safety features. | 3 | 1.72 | 7 | 4.02 | 137 | 78.74 | 27 | 15.52 |
| I am concerned about getting a sharps injury because sharps disposal containers are not changed often enough where I work. | 0 | 0 | 8 | 4.60 | 84 | 48.28 | 82 | 47.13 |
| Patient care is more important than the safety of health care workers. | 0 | 0 | 53 | 30.46 | 87 | 50.00 | 34 | 19.54 |
| All sharps injuries at work should be reported as soon as they happen. | 0 | 0 | 94 | 54.02 | 75 | 43.10 | 5 | 2.87 |

**Table 3: Information and awareness at work**

| Information availability | Yes | % | No | % |
|---|---|---|---|---|
| Sharps injury prevention | 155 | 89.08 | 19 | 10.92 |
| Evaluation of sharps devices with safety features | 12 | 6.90 | 162 | 93.10 |
| Sharps disposal procedures | 54 | 31.03 | 120 | 68.97 |
| Sharps injury reporting | 55 | 31.61 | 119 | 68.39 |

| **Assessment of basic awareness** | | | | | | | |
|---|---|---|---|---|---|---|---|
| According to the Infectious Waste Disposal Policy, sharps disposal containers should be changed when they are …… full? | | | | | | | |
| 67% | | 75% | | 85% | | 100% | |
| 3 | 1.72 % | 28 | 16.09 % | 63 | 36.21 % | 80 | 45.98 % |
| Which percentage of sharps injuries are related to the disposal process? | | | | | | | |
| 3% | | 22% | | 50% | | 68% | |
| 27 | 15.52 % | 96 | 55.17 % | 16 | 9.20 % | 35 | 20.11 % |
| Sharps injuries should be reported to your supervisor within …….. hours? | | | | | | | |
| 2 hours | | 12 hours | | 24 hours | | 48 hours | |
| 28 | 16.09 % | 79 | 45.40 % | 52 | 29.89 % | 15 | 8.62 % |
| What is the risk of hepatitis C (HCV) infection given an HCV-contaminated sharps injury? | | | | | | | |
| 1 in 3 | | 1 in 30 | | 1 in 300 | | 1 in a million | |
| 82 | 47.13 % | 53 | 30.46 % | 17 | 9.77 % | 22 | 12.64 % |

**Table 4: Exposure and prevention**

| How often do you work with sharps devices in your job? | | | | | | | |
|---|---|---|---|---|---|---|---|
| Often | | Sometimes | | Rarely | | Never | |
| 94 | 54.02 | 33 | 18.97 | 26 | 14.94 | 21 | 12.07 |
| | | | | Experienced | | Reported | |
| Needlestick Injury | | | | 119 | 53.85 | 27 | 12.22 |
| Splash to Eyes, Nose, Mouth | | | | 59 | 26.70 | 8 | 3.62 |
| Blood / Body Fluid Contact with Open Wounds on Skin | | | | 28 | 12.67 | 5 | 2.26 |
| Cuts with a Sharps Object | | | | 68 | 30.77 | 4 | 1.81 |
| **Preventive measures** | | | | | | | |
| **Preventive action** | | **N=174** | **%** | | | | |
| Universal precaution followed | | 36 | 20.69 | | | | |
| Post- exposure awareness present | | 39 | 22.41 | | | | |
| PEP given | | 14 | 8.05 | | | | |
| **Awareness about prevention** | | | | | | | |
| Universal precaution | | 57 | 32.76 | | | | |
| Avoid recapping of syringes | | 49 | 28.16 | | | | |
| More attentive | | 27 | 15.52 | | | | |
| Accurate blood collection | | 28 | 16.09 | | | | |
| Do not know | | 17 | 9.77 | | | | |
| **HIV status** | | | | | | | |
| HIV test done post NSI: Yes | | 19 | 10.92 | | | | |
| Aware of HIV status | | 49 | 28.16 | | | | |

**Table 5: What, where and how of NSIs and actions taken post NSIs**

| **Type of needles causing NSIs** | **NSIs (N=221)** | **%** |
|---|---|---|
| Hypodermic needle | 137 | 62 |
| Suture needle | 42 | 19 |
| Intracath | 24 | 11 |
| Scalp vein | 4 | 2 |
| Lancet | 13 | 6 |
| **Locationof NSIs occurrence** | **N** | **%** |
| Patient room | 105 | 47.70 |
| Emergency room | 58 | 26.44 |
| Surgery ward | 28 | 12.64 |
| Operation theatre | 22 | 9.77 |
| Unstated | 8 | 3.45 |
| **Procedure** | **N** | **%** |
| Venous sampling or IV injections | 65 | 29.31 |
| Wound suturing | 55 | 24.71 |
| Arterial puncture | 24 | 10.92 |
| Needles recapping | 47 | 21.26 |
| Local anesthesia injection during dental procedure | 20 | 9.20 |
| | 10 | 4.60 |
| **Action** | **N=221** | **%** |
| Washing with soap and water | 73 | 33.03 |
| Cleaning with 70% alcohol | 95 | 42.99 |
| Washing with bleach | 32 | 14.48 |
| Squeezing the affected part | 18 | 8.14 |
| PEP | 7 | 3.17 |

**Table 6: Reasons and concerns**

| **Reasons for not- reporting NSIs** | **N** | **%** |
|---|---|---|
| Didn't know that all injuries had to be reported | 93 | 53.45 |
| Didn't know to whom injuries should be reported | 102 | 58.62 |
| Believed reporting wouldn't influence the outcome | 137 | 78.74 |
| Other | 18 | 10.34 |
| **Reasons for not- wearing double gloves routinely** | | |
| Inadequate facilities | 95 | 54.60 |
| Inability to manipulate tissues | 64 | 36.78 |
| Decreased hand sensation | 62 | 35.63 |
| Believed that double gloving wouldn't increase protection | 118 | 67.82 |
| **Concerned about infection transmission of** | **N** | **%** |
| HCV | 158 | 90.80 |
| HBV | 162 | 93.10 |
| HIV | 168 | 96.55 |
| **Patients on which needles were used prior to NSIs** | | |
| HCV | 6 | 2.71 |
| HBV | 4 | 1.81 |
| HIV | 7 | 3.17 |
| Drug addicts | 11 | 4.98 |

## DISCUSSION

In India, the annual frequency of injections' usage is nearly 2.9 per person, almost double of that in developed countries owing to the common belief that injections are more efficacious than the oral route. Of the nearly 3.0 billion injections administered annually, an estimated 1.89 billion are unsafe. Unsafe injection practices includes inadequate sterilization, use of faulty techniques, use of reusable glass syringes, contaminated multi-dose vials or saline bags from reinsertions of used needles and syringes, the use of one needle or syringe to administer intravenous medication to multiple patients, the use of one spring loaded finger stick device to monitor blood sugar levels in multiple patients or unsatisfactory waste disposal [15, 16].

Unsafe injection practices are proving to be dangerous for HCWs as they are at increased risk of acquiring infections through needlestick and sharps injuries and an eventual BBP exposure. According to previous report, 31% of patients receiving multiple injections for Kala Azar were found to have HCV infection [17]. Another study has also shown that the prevalence of HCV infection in HCWs ranges from 0% to 4% [18, 19, 20]. So, it is very obvious that NSIs are a significant risk to the health of HCWs. Every day they face the possibility that they may injure themselves on a sharp object such as a needle or scalpel blade. Although many injuries will have no adverse effect the possibility of developing a disease such as hepatitis B, hepatitis C or HIV can cause untold psychological harm.

The present study is the result of a survey conducted among the members of a tertiary care hospital in Delhi to explore the perceived and actual risks of needlestick and sharps injuries. The survey aimed to elucidate a major yet not- fully acknowledged and understood problem in Indian healthcare system [21, 22, 23, 24]. To achieve the above mentioned goal, two approaches, i.e., estimation of NSIs incidence and an understanding of HCWs especially nurses' perceptions of the risk they face whilst also exploring the measures taken to prevent injuries, were adopted.

A heterogeneous group of HCWs was studied in the present study including 74 nurses (42.5%), 47 physicians (27%), 19 office workers (11%) and 34 non- clinical HCWs (19.5%). Majority of the subjects were under 25 years of age (89, 51%) with 138 (67%) being in the healthcare service for less than ten years. The risk of NSIs in this young and inexperienced group is expected to be relatively higher especially in absence of observed lack of training and availability of information.

A clear majority (170, 98%) of subject HCWs were found to be worried about their safety from sharps injuries, nevertheless, almost three-fourth of the subjects considered patient care more important than their own safety, which is not very much surprising considering the Indian belief (socio-cultural) system. The cost factor of the devices with safety features and lack of sharps disposal containers indicative of a low resource setting also dominated the opinion of large majority. A split opinion towards the immediate reporting of sharps injuries was found indicating an absolute lack of fundamental training. Assessment of basic awareness also revealed lack of the same, for example, almost half of the subjects believed that sharps injuries should be reported within 12 h.

PEP was provided to only 14 (8.05%) cases, despite 39 (22.41%) knowing about it. Of all sample HCWs, 57 (32.76%) were aware about the universal precaution (UP), 49 (28.16%) knew the hazards of syringe

recapping. 55 (~31%) cases believed that heightened attention to the involved procedure especially blood specimen collection is the major preventive measure with 17 (9.77%) subjects not aware of preventive measures. 19 (10.92%) subjects underwent HIV test post NSIs while 49 (28.16%) were aware of their HIV status.

Our study showed that 36 (20.69) and 39 (22.41%) HCWs had followed UP guidelines and had information about BBP exposure, respectively, that is lower than the findings of the previous study [23]. Earlier study has shown that HCWs adhering to UP were less likely to sustain NSIs than those who did not adhere to UP recommendations [23].

These data suggest that HCWs need to be provided structured education in UP for the improvement of occupational safety [3,5, 24, 4]. UP adoption has been shown to be inversely related to the episodes of NSIs and their occurrence can be significantly reduced with stringent adherence to UP [17].

Across all respondents,88% of HCWs use needles/sharps in the course of their work. More than half (53.85 %) of all respondents experienced a NSI while almost one-third (30.77%) of them sustained a sharps injury, that can be attributed to lack of experience, lack or insufficient training, work overload and fatigue[6-8].

Of all observed NSIs in the current study, almost 88% (194/221) did not report NSI. The finding is similar to an earlier study conducted in Alexandria reporting that 74.7 % of the respondents did not report the injury to the concerned body[19]. However, our results are higher than the Iowa Medical Organization's finding stating that 34% of the subject HCWs reported their exposure to an employee health service [15].

A hypodermic needle was responsible for majority (62%) of NSIs that is higher than the finding of the United States national surveillance system for health care workers. It identified six devices that are responsible for the majority of NSIs and other sharp related injuries in USA, these are hypodermic needles (32%), suture needle (19%), winged steel needle (12%), scalpel blades, intravenous catheter stylets and phlebotomy needles (3%)[17].

The most common reason for not-reporting was the personnel's belief that reporting would not influence the outcome showing the lack of knowledge of PEP (Table 9). Other two reasons are also based on a background of insufficient training and education. High level of under-reporting observed in our study emphasizes that HCWs need training and education on prevention and reporting all the NSIs and the importance of PEP after exposure to the blood-borne pathogen[9].

As many as,67.82% of the subjects in our study believed that double gloving would not increase protection from NSIs or sharps injuries despite an estimate that in 82% of the cases when the outer glove was perforated, the inner gloves protect the wearer's hand from the contamination.

Location wise, large majority (47.70%) of NSIs occurred in the patient room during venous sampling or IV administration (29.31 %)followed by the ones sustained in ER (26.44%) during wound suturing (~25%) suggesting the room for improvement in basic procedures as well as reduction in the workload and an eventual fatigue.

Another area of improvement to reduce the incidence of NSIs is better understanding of needles recapping. In our study, 21.26% (47/221) of the HCWs sustained NSI, while recapping the needles rather than discarding them in a sharp container. The finding is in agreement with many studies reporting that the most common cause of injuries from needles in nurses was improper handling of syringes and needles after injections (removing a needle from a syringe or placing the needle in a full container for medical waste) [4, 10, 11, 22].

In our study, majority of NSIs were cleaned with spirit (95, 42.99%) while in 73 (33.03%) and 32 (14.48%) cases it was washed with soap and water or with bleach alone, respectively. In 18 (8.14%) cases NSIs were squeezed and bleeding was encouraged. Antiretroviral therapy (AZT 600 mg/day) for 6 weeks was given in 7 (3.17%) cases of NSIs with HIV contaminated needles. Subsequent 6 months follow-up showed zero seroconversion. No PEP was provided in the cases of NSIs with HCV and HBV contaminated needles with no follow-up to detect seroconversion. This finding is not surprising in the light of India CLEN Program Evaluation Network (IPEN) study stating that none of the HCWs who had received NSI got PEP [12, 13].

All HCWs in our study were offered hepatitis vaccination on the onset of their employment which was considered sufficient and rationale behind no PEP in such cases. More than 90% of the subjects HCWs in our study were found to be extremely concerned about BBP especially HCV, HBV and HIV. The findings presenting in this are least surprising, while worldwide unsafe injections cause nearly two million new HCV infections annually and 38% of HCV infections in India may be attributable to unsafe medical injections [14]. Furthermore, the findings of an earlier study reported that NSI events are an important workplace issue for nurses [20]. Given the right training about the occupational procedures and UP education, the abovementioned concern can be utilized to reduce the NSI incidence.

Despite the important findings from our current study, it is important to acknowledge and consider one important limitation of this study. The findings are based on the analysis of self-reported data. Therefore an element of care needs to be observed while interpreting the findings of the study as social desirability and recall bias can lead to information bias.
Finally, legislation may be enacted requiring employers not only to monitor the incidence of NSIs and train their staff in appropriate safety procedures but also to provide safety engineered medical devices and related equipment to protect their staff from needlestick and other "sharps" injuries on the lines of the Needlestick Safety and Prevention Act in USA and Europe.

**CONCLUSION**
HCWs are frequently exposed to blood-borne infection through highly prevalent NSIs. Safer needle devices are an effective means of reducing NSIs. However, our study shows HCWs access to safer needle devices is low owing to cost constraints. Majority of the respondents reported an absence of on-job training from their employer on safe needle use**.** More intensive educational programs should be directed at HCWs to increase their awareness of and compliance with universal precautions.

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**COMPLIANCE WITH ETHICAL STANDARDS**
Yes

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**ETHICAL APPROVAL**
All procedures performed in this study involving human participants were in accordance with the ethical standards of the institutional biosafety and ethics board and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Ethical approval for this study was taken from Institutional Review Board of Rohilkhand Medical College and Hospital, Bareilly (UP), India, and Department of Biosciences, Faculty of Natural Sciences, JamiaMilliaIslamia, New Delhi, India.

**INFORMED CONSENT**
Informed consent was obtained from all individual participants in the study,

**CONFLICT OF INTEREST**
The authors declare no conflict of interest.

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