The prevalence of needle stick injury among healthcare personnel in a tertiary care hospital in Kolkata

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Abstract

Backdrop: Globally, NSIs are the most common source of occupational exposures to blood and the primary cause of blood-borne infections of HCWs. The greatest threats are hepatitis B and C viruses followed by HIV. Studies from India have reported a high rate of NSI amongst resident doctors and nurses. The objective of this study was to find out the incidence of NSI and their predictive factors amongst Health care workers in a tertiary care hospital in Kolkata.

Methods: This study was carried out among the HCWs (both males and females) of the IPGMER & SSKM Hospital, Kolkata, a tertiary care, teaching hospital in West Bengal, India. The study was carried out over a span of three months from November 2014 to January 2015 with the help of a questionnaire designed to identify the rates and predictive factors associated with needle stick injury.

Results: A total of 283/374 (75.7%) HCWs gave the history of a Needle Stick Injury (NSI) in the past one year. The highest rates of NSI were found amongst the junior residents (73.4%) and nurses (71.6%) followed by interns (70.1%). NSI reported amongst senior residents, laboratory technicians and undergraduate students were 63.2%, 66.7% and 54.2% respectively. The most common activities causing NSI were found to be recapping the needles and blood sampling across all groups of HCWs. The practice of recapping needles was seen in 48.9% of HCWs and bending the needles after use was confirmed by 28.7% of HCWs. Amongst the HCWs, 63 per cent held themselves responsible, 16 per cent held the patient responsible, while 21 percent held the poor working conditions/long working hours responsible for the NSI.

Conclusion: A lot needs to be done to improve the situation including institution of safety protocols, mandatory reporting of NSI and diligent record maintenance. Authorities should direct the efforts towards training of HCWs, use of safety engineered devices (SED) and decreasing patient load per HCW as these steps are most likely to benefit the existing situation.

Introduction

The occupational health of the healthcare workforce worldwide which represents around 12% of the working population, has long been neglected both organizationally and by governments. HIV, HBV, HCV are the most common and life threatening blood infections amongst a plethora of others transmitted by needle stick injuries.[1,2] WHO reported that of the 35 million health-care workers, 2 million experience percutaneous exposure to infectious diseases each year. It further noted that 37.6% of Hepatitis B, 39% of Hepatitis C and 4.4% of HIV/AIDS in health-care workers around the world are due to needle stick injuries.[3] The projected 2 million NSIs is however probably a low estimate because of the lack of surveillance systems and underreporting of injuries.

Globally, NSIs are the most common source of occupational exposures to blood and the primary cause of blood-borne infections of HCWs. The two most common causes of NSIs are two handed recapping and the unsafe collection and disposal of sharps waste. The greatest threat are hepatitis B and C viruses followed by HIV with average percutaneous rates being 1 in 3 for HBV (6-33%), 1 in 30 for HCV (1-10%), 1 in 300 for HIV (0.04-0.3%).[4,5] Increased risk factors include exposure to the following: device visibly contaminated with the patient’s blood, a procedure involving a needle being placed directly in a vein or artery, a deep puncture, a hollow-bore needle, high viral load titer of source patient.

To safeguard the health of the health care workers, there should be a clear-cut, written policy existing in every hospital regarding the reporting and protocols to be followed in case of a needle stick injury. This is crucial for starting the post exposure prophylaxis.

Studies from India have reported a high rate of NSI amongst resident doctors and nurses.[6] The objective of this study was to find out the incidence of NSI and their predictive factors amongst Health care workers in a tertiary care hospital in Kolkata.
Methods

Study design and subjects

This study was carried out among the HCWs (both males and females) of the IPGMER & SSKM Hospital, Kolkata, a tertiary care, teaching hospital in West Bengal, India. The study group consisted of 374 HCWs including senior and junior resident doctors, interns, undergraduate medical students, senior nursing staff, nursing students and the laboratory technician staff. The study was carried out over a span of three months from November 2014 to January 2015 with the help of a questionnaire designed to identify the rates and predictive factors associated with needle stick injury. Questions relating to awareness regarding preventive measures including immunization and post exposure prophylaxis protocol in the event of a NSI from an unknown source, were included in the questionnaire.

Case definition of NSI:

Injuries caused by sharps such as hypodermic needles, blood collection needles, iv cannulas, suture needles, winged needle iv sets and needles used to connect parts of the iv delivery systems.

Statistical analysis

Analysis of the data was done using SPSS software version 22.0. Data was described in terms of percentage amongst various categories. Illustration was done using pie charts and bar graphs.

Ethical considerations

Subjects were fully informed about the design and purpose of the study and a written informed consent was obtained. Approval from the institutional ethics committee was obtained for the study.

Results

A total of 374 Health care workers participated in the study which consisted of 201(53.7%) males and 173(46.3%) females. The study population was made up of 83(22%) Junior residents, 49(13%) Senior residents, 67(18%) Interns, 59(16%) Undergraduate students, 74(20%) Nurses and 42(11%) Laboratory technicians [Figure 1].

A total of 283/374(75.7%) HCWs gave the history of a Needle Stick Injury (NSI) in the past one year. The highest rates of NSI were found amongst the junior residents (73.4%) and nurses(71.6%) followed by interns(70.1%). NSI reported amongst senior residents, laboratory technicians and undergraduate students were 63.2%, 66.7% and 54.2% respectively.

The use of Personal protective equipment (rubber gloves) at the time of NSI was reported in eighty one percent of HCWs with highest rates amongst senior and junior residents (85.6% and 875 respectively) and lowest rates amongst nurses (69%). Equipment Involved during NSI involved suturing needles (41%), Intravenous cannulas (19%), Injection needles (37%) and others like CSF/pleural fluid withdrawal(3%). The procedures being performed at the time of NSI included phlebotomy (53%), Intravenous injection (12%), intramuscular injection (21%), suturing (11%) and specimen handling (3%).

The most common activities causing NSI were found to be recapping the needles and blood sampling across all groups of HCWs [Figure 3]. The practice of recapping needles was seen in 48.9% of HCWs and bending the needles after use was confirmed by 28.7% of HCWs.

Action was taken by HCWs after NSI in 82% of the cases which included washing the site with soap and water (53.5%), applying alcohol/betadine/antiseptics (41%) , expressing blood from NSI site (1.5%), applying pressure (2%), tying the part (2%) or doing nothing(1%). Whereas 85% HCW were aware that NSI could lead to transfusion transmitted viral infections namely HIV, HBV and HCV, only 43% of the HCWs knew about the post exposure prophylaxis (PEP) to be taken after NSI and only 62% reported the incident to senior staff and sought advice on NSI protocol (testing for HIV/HBV/HCV and PEP).

Eighty eight per cent of HCWs stated that they would wash the area in case of an NSI. When questioned about the steps to be taken after NSI, 65.5 per cent felt that washing the area with soap and water is sufficient while 34 per cent felt that a shot of tetanus toxoid was also necessary. Around 5 per cent felt that taking analgesics was important.

When the HCWs were questioned about the factors responsible for NSI, 63 per cent held themselves responsible, 16 per cent held the patient responsible, while 21 percent held the poor working conditions/long working hours responsible for the NSI.

Discussion

The results of the present study highlight the current situation of NSI and awareness regarding the protocols in a tertiary care hospital in West Bengal. As most of the HCWs experienced an NSI at least once in their lives and around 75% experienced it in the past
one year, clearly the roaring figures demand attention of the authorities.

Among the HCWs, junior residents, nurses and Interns were most prone to NSI, with more than 70 per cent of them having experienced it in the preceding one year. These figures are much higher than the published figures of Exposure Prevention Information Network (Epinet) data[7]. The possible explanation for this might be patient overload and long working hours in addition to poor working conditions of the hospital. Several other studies from India and other countries have also reported high rates of NSI among HCWs[8-12].

In the present study, most common activities causing NSI included manipulation of needles (blood sampling and recapping the needles). The findings correspond to the findings of the EPInet study[7], stating that 38 per cent NSI occurred during needle use, while 42 per cent occurred after use of needle and before its disposal. The practice of recapping needles was seen in 48.9% of HCWs and bending the needles after use was confirmed by 28.7% of HCWs. This points towards an existing gap in adequate training of HCWs or following of correct procedures by HCWs. The practice of recapping needles has been reported and condemned in published studies along with remedial measures being suggested[13-15].

Among the HCWs studied, 81 per cent were using gloves at the time of NSI, which is not as good as reported from other places [16]. About 43 per cent HCWs were aware of the availability of PEP services in the hospital which was higher than the figures in a study from India[17] but still remains far from ideal. Awareness about Transfusion transmitted viral infections (HIV, HBV&HCV) was high but continued medical education on NSI is important as very few (21%) were aware of the average risk of HIV/AIDS after NSI and only about 30 per cent were in a habit of reading books/articles regarding NSI.

In accordance with the CDC report which stated that use of safety engineered devices would reduce NSIs by 76 per cent[18], the HCWs in the present study also opined that decreased working hours, less patient load and better safety devices can prove helpful in preventing NSI.

There is a much felt need for improvement in the working conditions and safety protocols for HCWs for reducing the high burden of occupational injuries (NSI) existing in Indian hospitals. As suggested in published literature [19-20], seeking alternatives to use of needles, use of newer devices with safety features, adequate training of HCWs in safe use and disposal of needles might be of great help if followed sincerely. Continued medical education of the HCWs about protocols of reporting any NSI, Dos and Donts in case of an NSI, PEP where necessary, vaccination(Hepatitis B) might decrease the NSI and the rate of transmission related infections. Hospitals should have a strict maintenance of records where the NSI cases are registered and the PEP along with the follow up is recorded. More studies should be conducted to document if educating HCWs improved the situation.

In conclusion, NSIs remains a major health hazard even in today’s day and age in Indian hospitals especially the ones which deal with high patient load. A lot needs to be done to improve the situation including institution of safety protocols, mandatory reporting of NSI and diligent record maintenance. Authorities should direct the efforts towards training of HCWs, use of safety engineered devices (SED) and decreasing patient load per HCW as these steps are most likely to benefit the existing situation.

References


Illustrations

Illustration 1

Figure 1: Various groups of HCWs participating in the study

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- Junior residents: 0%
- Senior residents: 20%
- Interns: 29%
- Undergraduate students: 11%
- Nurses: 28%
Illustration 2

Figure 2: Needle stick injury amongst various groups of healthcare workers

![Figure 2: Needle stick injury amongst various groups of healthcare workers](image)
Illustration 3

Figure 3: The activities causing NSI in Health care workers