

Health care workers contacting needle-stick injury in a tertiary care hospital

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Abstract

Needle-stick injuries (NSI) are common among health care workers (HCW) and can cause in transmission of blood borne pathogens like HIV, HBV and HCV. This study was aimed to estimate the burden of the needle stick injuries among different categories of health care workers and to determine various risk factors contributing to the injury, so that appropriate measures can be undertaken for prevention of NSI in our hospital. HCWs who reported to ICTC from July 2016 to June 2019 were included in the study, where they fill the questionnaire with various information. Nursing staff and students were most involved (27.3%) followed by MBBS interns (18.7%) and junior residents (14.9%). It was most common during blood sampling (22.9%) followed by invasive procedures (17.8%) and recapping of needles (12.4%). Poor compliance to universal precautions like wearing gloves, recapping of needles, and improper disposal of needles are major risk factors for NSI. It is recommended that regular training programs for health care workers regarding universal precautions, infection control, prevention and management of needle stick injuries is necessary for future control of transmission of these infections.

Key Word: Needle-stick injuries, HIV, health care workers, infection con.

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INTRODUCTION

NSI can be caused by sharp items such as hypodermic needles, intravenous cannulas, surgical blade, suturing needle etc. HCWs are more prone for NSI, as they work in the vulnerable environment and injuries can occur at any time. Following NSIs, many pathogens are transferred through blood, however most commonly transferred pathogens are hepatitis B virus (HBV) with transmission rate of 6-36%, followed by HCV (1-9%) and HIV (0.03-0.3%)^{1,2} A study conducted on 2008 showed 35 million HCW exposed to NSIs all around the world of

which 40% suffer from hepatitis B and C virus infection and 2.5% were affected by HIV³. HBV is most commonly transmitted, but an effective vaccine is available for its prevention, while no such vaccine is available for HCV and HIV. With advancement in management of HCV, it is no longer remained as a dreadful disease as newer drugs are available for its treatment which can completely cure the disease. Data of NSI is very limited from India with gross underreporting and surveys assess that more than 50% health care workers do not report NSI^{4,5}. However needle stick injury is preventable, if hospital staff is educated and trained regarding occupational safety and safer work practices are implemented with proper disposal of sharps⁶. An infection control program which also focuses on prevention of NSI among health care workers is required in every hospital or health care facility. This study was aimed to estimate the prevalence of needle stick injuries and mucous membrane exposure among different categories of HCWs and to determine circumstances attributing to the injury, so that appropriate training and education of hospital staff can be done for prevention of NSI in our centre.

MATERIALS AND METHODS

All HCWs exposed to NSI reported to the Integrated Counselling and Testing Centre for further management. HCW who reported from July 2016 to June 2019 were included in the study. All HCWs are provided with the form containing information such as date and time of injury, mode of injury, professional category, first aid taken, post-exposure prophylaxis (PEP) and hepatitis B vaccination status. After taking informed consent from HCW, the serum sample of exposed person and the source were tested for viral markers like HIV, HBV and HCV. HBV or HCV infection results were further confirmed by ELISA. The HCWs were referred to allotted ART center². The HCWs were traced for follow up after 6weeks, 3months and 6months of injury to rule out window period of HIV².

RESULTS

A total of 315 HCWs reported to our department with needle stick injuries. Among them, 53.3% were males and 46.7% were females. Most involved age group was 20-30 years (56.8%) followed by 30- 40 yrs (30.5%) as shown in table 1. Nursing staff and students had maximum (27.3%) NSIs, followed by MBBS interns (18.7%) and junior residents (14.9%) as shown in table 2. Most common incident of injury was seen while collecting blood samples (22.9%) followed by invasive procedures (17.8%) and recapping of needles (12.4%) as shown in table 3. All exposed HCWs and their sources were tested for viral markers. All HCWs were HIV, HBV and HCV non-reactive. Among sources, 6 were HIV reactive, 38 were reactive to HBsAg and 29 were reactive to anti-HCV. The exposed HCW from HIV positive patients were referred to ART centre (Anti-retroviral therapy) for PEP (post-exposure prophylaxis).

Table 1: Age wise and gender wise distribution of HCWs who reported NSI:

Age	Male	Female	Total
<20 years	6 (1.9%)	8 (2.5%)	14 (4.4%)
20-30 years	96 (30.5%)	83 (26.3%)	179 (56.8%)
30-40 years	51 (16.2%)	45 (14.3%)	96 (30.5%)
40-50 years	9 (2.8%)	7 (2.2%)	16 (5.1%)
>50 years	6 (1.9%)	4 (1.3%)	10 (3.2%)
Total	168 (53.3%)	147 (46.7%)	315

Table 2: Categories of HCWs who reported NSI

Occupations	Cases	Percentage
Clinicians	3	0.95%
Senior Residents	17	5.4%
Post- graduate students	36	11.4%
Junior Residents	47	14.9%
Interns (MBBS)	59	18.7%
Nursing staff and students	86	27.3%
Laboratory technicians	9	2.8%
Technicians and Assistants in various surgical procedures	22	7.0%
Interns (Paramedical)	7	2.2%
Group D workers	29	9.2%
Total	315	-

Table 3: Activities during which NSI occurred

Activities	HCW's (total- 315)	Percentage
In blood sampling	72	22.9%
During Invasive procedures (suturing, surgeries, pleural tapping, lumbar puncture, etc.)	56	17.8%
Recapping of needles	39	12.4%
Putting i/v cannula	37	11.7%
During needle destroying	28	8.9%
While giving injections	25	7.9%
While cleaning tables and sharp disposal	19	6.0%
Monitoring glucose levels (by lancet)	14	4.4%
Accidentally by another person	12	3.8%
Transferring sample from syringe to vacutainer	10	3.2%

DISCUSSION

Risk of needle stick injury is highly related to the category of work performed by the HCWs. In our study, nursing staff and students had maximum NSI (27.3%), followed by MBBS interns (18.7%) and junior residents (14.9%). In a study conducted in U.S. and Vietnam, nurses had maximum (66-68%) NSI followed by interns and resident doctors which are in accordance with our study^{7,8}. In another study conducted in India, NSI were more common in interns (47%) followed by resident doctors (27.08%) and nursing staff (10.1%), which is in accordance with our study⁹. Sample collection for various investigations are usually done by nursing staff and students or interns and hence needle stick injury is more common among them. In the present study, most involved age group was 20-30 years (56.8%) followed by 30-40 yrs (30.5%). This is due to the fact that NSI is maximum in nursing students and interns, which mostly belong to age group of 20-30 yrs. The most common procedure leading to needle stick injury among HCW was during venepuncture for collection of blood sample (22.9%) followed by invasive procedures (17.8%) and recapping of needles (12.4%) which is in accordance with other study¹⁰. Recapping of needles after taking blood sample was the third most common cause of NSI which is a serious cause of concern because recapping of needles is strictly prohibited. It is also considered as a major cause responsible for NSI in other studies^{11,12}. However uncapped contaminated needles when carried by HCW to the needle destroyer may lead to injury to the self or accidental inoculation to other persons, which can also account for a proportion of NSI. In our hospital, injury to self while destroying needles is 8.9% and accidental inoculation to other persons is 3.8%. Hence needles/sharps should always be carried in a tray and never be passed directly to other person and all needles should be destroyed properly. Also, in our study 6% of NSI occurred while cleaning of tables and during waste disposal suggesting that waste disposal system is also an important area where such injuries can be encountered. Reinforcement of education programme regarding needle stick injury and infection control is done at regular intervals for various categories of HCWs. Also mandatory hepatitis B vaccination for all categories of HCW should be recommended in every hospital setting. Use of auto-disabled syringes and vacutainers are encouraged as safer practices for sample collection. Gloves protect against blood and body fluid contamination in case of needle stick injury. It is seen that all the cases of NSI are not reported especially by group D workers, because they do not consider NSI as potentially infectious, which is contradictory to the

principles of universal precautions, i.e. all patients should be treated as infectious and appropriate infection control measures to be taken to prevent infection².

CONCLUSION

To conclude, NSIs are a serious threat to HCWs in all categories due to transmission of blood borne pathogens like HIV, HBV and HCV. Poor compliance to universal precautions like wearing gloves, recapping of needles, and improper sharp disposal are major risk factors for NSI. Hence it is recommended that training programs regarding universal precautions, infection control, prevention and management of needle stick injuries on ongoing basis is necessary for future control of NSIs among health care workers.

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