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Original Research Article

A cross-sectional observational study to assess the awareness regarding needle prick injuries among health care providers of a tertiary care teaching hospital in Madhya Pradesh, India

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ABSTRACT

Background: Health care workers (HCW) are at risk of an occupational exposure to blood borne diseases like HIV and Hepatitis B through accidental needle stick injuries. This study was conducted to assess the awareness regarding needle prick injuries among health care providers and their exposure to NSIs in a tertiary care medical college hospital with 750 bed capacity.
Methods: This cross sectional observational study was conducted on 300 voluntarily participated HCWs out of total 650 HCWs. A semi structured questionnaire was used to assess their knowledge about exposure to blood and body fluids, needle stick injuries and associated risks and post exposure prophylaxis. Details of previous exposures to NSIs in last one year (2017-18) were also asked and their opinion about role and responsibilities of hospital administration for management of NSI was also recorded.
Results: More than 90% HCWs were aware of exposure to blood and body fluids, 80.7% were aware of needle stick injuries, all 100% were aware of transmission of HIV and Hepatitis B from NSis and 78% were aware of post exposure prophylaxis. 97 cases of NSIs occurred in last one year which was higher than estimated EPInet data. Injection needle was most commonly (93.8%) involved in causing accidental NSIs.
Conclusions: Practice of universal precautions and standard injection procedures by HCWs should be followed and education, training, and group insurance should be provided by hospital administration for prevention of NSIs.

Keywords: Awareness, Injuries, Prophylaxis

INTRODUCTION

Health care workers (HCW) are often at risk of various hospital acquired infections.[1] Needle stick injuries are wounds caused by needles that accidentally puncture the skin. Percutaneous injury with an infected sharp device can lead to exposure of the HCW to various blood borne pathogens like hepatitis B virus (HBV), hepatitis C virus (HCV) and human immunodeficiency virus (HIV). The World Health Report 2002 estimates that 2.5% of HIV, 40% of HBV and HCV cases among HCWs worldwide are the result of occupational exposures. The absence of appropriate post exposure prophylaxis (PEP) in such exposures is associated with enhanced risk of infection with these pathogens. The emotional impact of a needle stick injury can result in considerable psychological trauma for the HCW.[2] The risk of accidental needle stick injuries are more during invasive procedure such as giving injection (nerve blocks) and recapping the needle after use. When not disposed of properly, needles can become concealed in linen or garbage and injure other workers who encounter them unexpectedly. Data from

developing countries show that adherence to 'universal precautions' and documentation of exposures are suboptimal and also that awareness about PEP among HCWs is poor.[2,3] There are very few studies in India documenting the frequency, PEP protocols followed and consequences of needle stick injuries.[4-6] EPInet data for 2003 reports a rate of approximately 27 needle stick injuries (NSIs) per 100 beds in teaching hospitals.[7] There are few reports on NSIs from India and with limited data, it is not possible to estimate an annual incidence.[5,7-10]

This study was undertaken to assess the awareness regarding needle prick injuries and to determine the risk factors and the population at risk in a tertiary care teaching hospital, which has staff and trainees of varying levels of experience.

METHODS

This cross sectional observational study was conducted in months of February -March 2019. The study hospital is a 750 bed tertiary care hospital in Bundelkhand region of Madhya Pradesh, India that serves as the teaching hospital for colleges of medicine and nursing. There is no separate register and protocols for management and follow-up of NSIs. There are 650 health care providers including teaching faculties, resident doctors, nurses and other paramedical staff. Excluding the teaching faculties all 500 HCW were included in the study and finally only 300 were able to be interviewed. a structured questionnaire was used to interview the HCW after they consent for interview. A semi-open self-administered questionnaire with questions pertaining to knowledge, attitude and practice of risk of HIV, hep B and other pathogenic transmission after needle stick injury was used and the results were subjected to statistical analysis using Chi-square test using SPSS 20.0 version software. To compare the knowledge, attitude and practice among students $p<0.05$ was set as statistical significance.

RESULTS

300 health care providers were included in the study, in which 194 (64.7%) were females and 104 (37.3%) were males. The mean age of the HCWs was 27.54±5.5 years and range of 18 to 59 years. The maximum health care workers who participated in the study were staff nurses 109 (36.3%) followed by training nurses 72 (24%) and MBBS intern students 49 (16.3%), the other HCW participated were junior resident doctors 48 (16%) lab technicians 22 (7.3%). The average work experience of HCWs was 4.73±3.6 years with range of 1 to 22 years. Regarding awareness of exposure to human blood and body fluids 273 (91%) of HCWs know that it is the contact of potentially infected blood and 230 (76%) know that it is exposure of blood and body fluids to any mucous membrane of the body.

242 (80.7%) HCWs were able to explain the correct meaning of needle prick injuries ie Accidental prick/ cut to the health provider by contaminated needle or sharp objects during health intervention. Awareness was more common in interns and Junior Residents compared to nurses but the difference was found insignificant (Pearson Chi-Square 9.163 degree of freedom 5, p=0.1.3) (Table 1).

Table 1: Distribution of HCWs as per awareness of NSIs.

HCWs category	Aware of NSIs	Not aware of NSIs	Total
Internship	43	6	49
Junior resident	44	4	48
Lab technician	18	4	22
Staff nurse	85	24	109
Training nurse	52	20	72
Total	242	58	300

Pearson Chi-square 9.163 degree of freedom 5, p value =0.1.3.

Table 2: Distribution of HCWs as per awareness of PEP (post exposure prophylaxis).

HCWs category	Aware of PEP	Not aware of PEP	Total
Internship	47	2	49
Junior resident	45	3	48
Lab technician	18	4	22
Staff nurse	65	44	109
Training nurse	59	13	72
Total	234	66	300

Pearson Chi-square 38.38 degree of freedom 5, p<0.001.

All 300 (100%) were aware that transmission of HIV and hepatitis B is the major risk associated with NSIs (needle stick injuries). In spite of awareness of Hepatitis B risk associated with NSIs, only 203 (67.7%) of HCWs were vaccinated against Hepatitis B. only 234 (78%) of HCWs were aware of PEP and most of the staff nurses were unaware of PEP while interns, junior residents and lab technician were mostly aware, the difference of PEP awareness was found significant (Pearson Chi-Square 38.38 degree of freedom 5, p<0.001) (Table 2).

The study revealed that 97 (32.3%) met with accidental NSIs in last one year. Nearly 33% of the HCWs of all categories interns, junior residents, staff nurses, trainee nurses and lab technicians met accidental NSIs and the difference among different categories was found insignificant (Pearson Chi-Square 0.812 degree of freedom 5, p=0.976) (Table 3). The most common surgical instrument was needle used for injection (93.8%), other instruments are suturing needle and surgical blades, ampoules of injectable drugs etc. table 4 among all 97 cases of NSIs 70 cases were with sterile needle and ampoules and 27 cases were with non sterile needles. The accidental NSIs occurred while doing different procedures like injecting medication (57 NSIs), blood specimen collection (8 NSIs), loading injection

(NSIs), opening of packing (3 NSIs), capping of needle (1 NSIs), during dressing (3 NSIs), cannulation, anesthesia administration and during surgery assistance. Out of 97 cases of NSIs 66 were reported to immediate senior and hospital administration, 61 were aware of status of patient/infectious material for hepatitis b and HIV. In 51 cases of NSIs none of the screening test were done, and 47 were tested for Hepatitis B (HBsAg) and HIV, but found to be negative and nonreactive respectively. Only 4 NSIs cases consumed some drugs after NSIs but they didn't remind the drug name.

Table 3: Distribution of HCWs who got accidental needle stick injuries.

HCWs category	Number of NSIs met	Free from NSIs in last one year	Total
Internship	16	33	49
Junior resident	14	34	48
Lab technician	7	15	22
Staff nurse	35	74	109
Training nurse	25	47	72
Total	97	203	300

Pearson Chi-square 0.812 degree of freedom 5, p=0.976.

Table 4: Type of needle/ surgical instrument involved in NSIs.

Type of needle/ surgical instrument	Number of accidental NSIs	%	Sterile	Non sterile
Injection ampule	01	1.03	01	0
Injection needle	91	93.8	69	27
Suturing needle and surgical blade	03	3.09	0	0
Surgical blade	01	1.03	0	0
Suturing needle	01	1.03	0	0

Most of the health workers were aware of measures to prevent needle prick injuries, like wearing gloves, mask and gowns 84%, emptying the sharp waste containers on regular basis 54.3%, not to recap needles but to cut it in needle shredder 29% and to immediately discard used needle and blades 96.7%. 86.7% HCWs got advice and instruction from their seniors, teaching faculties for prevention against accidental NSIs but almost all of them 98.7% feel need of training regarding NSIs and PEP, 98.3% wish to group insurance and medical claim facilities for this occupational hazard.

DISCUSSION

As per EPInet data for 2003 reports a rate of approximately 27 needle stick injuries (NSIs) per 100 beds in teaching hospitals. [6] This leads to around 202 cases of annual incidence of NSIs, and 81 cases of NSIs in a sample of 300 HCWs. Here in this study 97 cases of NSIs are in clear excess of EPInet estimates.

Needle stick injuries transmit infectious diseases, especially blood-borne viruses. The risk of transmission of from patient to the healthcare worker is as follows: hepatitis C (3%), hepatitis B (30%), and HIV (0.3%), which depends on the viral load of the patient (Suparna, 2016).[11] All the health care workers were aware of transmission of these viral diseases through NSIs. There are few misconceptions about the risk of transmission through infected needles that need to be corrected and unawareness of proper PEP (post exposure prophylaxis). The accidental NSIs that occurred while doing different procedures like injecting medication (57 NSIs), blood specimen collection (8 NSIs), loading injection (NSIs) and recapping may be reduced following universal precautions and WHO (world health organization) standard guidelines. As per WHO recommendations, needles should not be recapped, bent, broken, removed from disposable syringes or otherwise manipulated by hand as these procedure increase the risk of needle stick injuries.[12] in this study nearly one third population of the HCWs in each category (interns, junior residents, staff nurses, trainee nurses and lab technicians) met accidental NSIs. In a similar study by Kishore et al, the interns were most common recipients of accidental NSIs.[13] studies by other authors found higher incidence of NSIs among nurses.[1,14]

The present study found injection needle as most common (93.8%) surgical instrument and giving injectable medication as most common procedure (56%) involved in causing accidental NSIs. In a study by Murlidhar et al in >50 per cent NSI cases, withdrawal of blood was most common activity involving manipulation of needle in patient. In the EPInet study 10, 38 per cent NSI occurred during needle use, while 42 per cent occurred after use of needle and before its disposal.[15] In our study only 51 cases out of 98 were screened for hepatitis B and HIV. This was due to absence of systemic reporting system and protocol for reporting and management of NSIs in the hospital. The hospital also do not had separate NSI register. Many HCWs (22%) were also unaware of PEP so they didn't made a proper approach to inform hospital authorities. But the awareness of PEP was higher (78%) in our study compared to other studies by Muralidhar (50%) and Chacko and Isaac (31.6%).[15,16]

CONCLUSION

Needle stick injuries are an important and continuing cause of exposure to serious and fatal diseases HIV and Hepatitis B among health care workers. Understanding the epidemiology of NSI's is very important to implementing control measures. NSIs were observed in all categories of HCWs. Preventive strategies should be devised and reporting of NSI need to be made mandatory. Regular training to health care workers atleast on annual

basis should be organized. PEP protocol may be displayed at injection room, waiting area near Operation theatre may be displayed. Group insurance and medical claim facility should be availed to the HCWs. Hospital administration should have a NSI register for reporting, management and outcome of every NSIs. Atlast HCWs should take due precautions, adhere to standard injection and operating procedure and wear personal protective gloves, gown etc to remain safe from accidental NSIs.

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