Original Article

Knowledge, Attitude, and Practices about Needle Prick Injury and Postexposure Prophylaxis in Health Workers: A Tertiary Center Experience

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Abstract

Aims: This study was carried out to understand the awareness, attitude, and practices about needle prick injuries and postexposure prophylaxis (PEP) against human immunodeficiency virus, hepatitis B (surface antigen), and hepatitis C virus among health-care workers (HCWs) of the tertiary care center. **Materials and Methods:** This was a descriptive hospital-based, cross-sectional study carried out over a period of 1½ year. After informed consent and ethical clearance from the institutional ethics committee, patients were interviewed; previous records about needle prick injuries and PEP were analyzed. HCWs from Queen Mary's Hospital and Trauma Center of King Georges Medical University, Lucknow, India, were evaluated for needle prick injuries and PEP. During the study period, 140 hospital staffs including 74 resident doctors, 40 nurses, and 26 fourth-class employees were interviewed. Data were obtained from predetermined questionnaire regarding knowledge, attitude, and practices about needle prick injury types, precautions, reporting to the nodal officer, and delay in PEP if accidentally needle pricked. **Results:** Out of 140 participants, 105 (75%) were aware about PEP and 93 (66.42%) HCWs had positive attitude toward PEP. A total of 34 (24.28%) patients were injured, including 10 doctors, 16 nurses, and 8 fourth-class employees. 100% doctors, 50% nurses, and 42.3% fourth-class employees had knowledge about PEP. Out of 13 deep penetrating needlestick injuries, 4 injuries occurred during injection administration, 4 of them during suturing, and 5 during recapping. After exposure, all 13 cases had received PEP and all were seronegative after 6 months of follow-up. **Conclusion:** Needlestick injuries and sharp object injuries represent a major health problem to HCWs. Prevention should be based on immunization, education of HCWs, and proper training about biomedical waste management.

Keywords: Accidental injuries, health-care workers, hepatitis B surface antigen, hepatitis C virus, human immunodeficiency virus, postexposure prophylaxis

Introduction

Health-care workers (HCWs) are at higher risk of exposure to blood and bloodborne pathogens. Primary way to prevent transmission of hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV) is to avoid exposure among HCWs.[1] Health-care personnel are exposed to different bloodborne pathogen through needle prick injuries, cuts, and blood splashes to eyes. According to the WHO, 2.5% of HIV-positive and 40% of hepatitis B- and HCV-positive cases are present worldwide, and the main reason behind this is occupational exposure among HCWs.[2] However, hepatitis B immunization and postexposure prophylaxis are not only an integral component of any complete program to prevent infection following bloodborne pathogen inoculation but also is an important element of workplace safety.[2] There are very few studies in India documenting the frequency of needlestick injuries, postexposure prophylaxis (PEP) protocols, and consequences of these needlestick injuries.[3-5] Postexposure prophylaxis means taking medications as soon as exposure of bloodborne infection occurs.

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Materials and Methods

This was a descriptive hospital-based cross-sectional study, carried out over a period of 1½ year from January 2016 to July 2017 in the Department of Obstetrics and Gynecology at King George Medical University, Lucknow, Uttar Pradesh, India. During this study period, a written questionnaire was given to all doctors, nurses, and other employees of the department. A total of 140 patients were inquired about source of exposure, type of exposure and administration of any form of PEP, immediate reporting or delayed reporting to health-care system, type of injury, degree of exposure, type of device such as disposable needle prick, surgical needle, splash to eyes, or cut by any instrument. Furthermore, details of the present and past status of hepatitis B immunization were considered.

The questionnaire form included, immediate reporting or delayed reporting to health-care system, also to know about their knowledge, attitude toward PEP.

The aim of this study was to estimate the incidence of needlestick injuries and exposure to body fluids among HCW's and to assess their knowledge and attitude about PEP after any kind of occupational exposure.

All the residents, nursing staff, and other hospital employees of ward and labor room were included in the study and those who were injured outside the hospital were excluded from the study.

Written guideline was distributed in all wards and labor room for exposure to blood product, after an accidental exposure if the skin was breached by needlestick or sharp instrument, the first step was to immediately wash the wound and surrounding skin with water and soap and rinse thoroughly. Do not Scrub, do not use antiseptics, or skin washes (bleach, chlorine, alcohol, and betadine).

For unbroken skin: The first step was to wash the area immediately and avoid the use of antiseptics. For splash to eyes, recommendation was to irrigate the exposed eye with plane water or saline. Avoid using soap or disinfectant on the eye. If exposure occurs to the mouth, then spit fluid out immediately. Mouth was rinsed thoroughly using water or saline and spit again. Avoid using soap or disinfectant in the mouth. Consultants who were appointed for management of occupational injury were informed about the incidence, sequence of events, assessment of risk, he advised for PEP immediately and follow-up. If the exposure occurred from a known source, the source's blood was collected for hepatitis B surface antigen (HBsAg), anti-HIV antibody, and anti-HCV antibody testing.

All sera were initially tested for HBsAg, anti-HIV antibody, and anti-HCV antibody by enzyme-linked immune-sorbent assay (ELISA) test. Positive sera were confirmed by repeat ELISA. Simultaneously, blood samples from HCW's were also collected. If the source blood taste was negative, the HCW's blood was not tested further. If the source blood was positive for HBsAg, anti-HIV antibody, or anti-HCV antibody, then the HCW's blood was also tested for baseline serostatus. The tests were repeated after a period of 3 and 6 months in all exposed HCWs.

In a vaccinated individual when the source of infection was HBsAg positive, the postvaccination anti-HBs level was estimated. If anti-HBs level estimated was <10 mIU/ml, a full course of vaccination was given. If anti-HBs level was between 10 and 100 mIU/mL, a booster dose was given and if anti-HBs level was more than 100 mIU/mL, the HCWs was reassured.

If the postvaccination anti-HBs level was not sufficient or a postvaccination result was not available, Hepatitis B immunoglobulin (HBIG) was given followed by a booster dose of Hepatitis B vaccine. In an unvaccinated individual, one dose of HBIG was given within 72 h of exposure (0.06 ml/kg body wt. I. M) and active immunization was started 2 weeks later.

If the source of infection was HIV positive, then HCW recruited immediately for antiretroviral therapy, which involves taking zidovudine (ZDV), for 28 days. In addition to ZDV, lamivudine, and indinavir (protease inhibitor) were also offered. Characteristics of the exposure and the source patient were taken into consideration when recommending PEP. Tests for anti-HCV antibodies and liver function test were done at the time of exposure.

Results

A total of 140 health-care personnel were included in the study, out of these 140 patients, doctors, nurses, and fourth-class employees were 74, 40, and 26, respectively. 30 participants had needlestick injuries and 2 had cuts during surgery 2 were exposed to blood product splashes. Thus, total HCWs were exposed of 34 in number [Table 1]. Out of 34 injured patients were of 10 doctors, 16 nurses, and 8 fourth-class employees. All doctors (74 [100%]) and only 50% (20) nurses had knowledge about PEP. The fourth-class employees had least knowledge.

90.54% doctors, 50% nurses, and 23.07% fourth-class employees had positive attitude about PEP, rest participants were not interested about PEP [Table 2]. 61.76% (21) HCWs had superficial injury and 38.24% (13) had deep penetrating injuries [Table 3]. Nurses were the most affected 16 (47.05%).

Out of 13 deep penetrating injuries, maximum needlestick injuries occurred among nursing staff (46.155) followed by

Table 1: Distribution of Subjects (Health Care Worker's)

	Health Care workers	*n*=140	%
Subjects	Doctors	74	52.86%
	Nurses	40	28.57%
	4th class employees	26	18.57%
		n=34	%
Type of Injuries	Needle stick	30	88.24%
	Surgical knife	2	5.88%
	Splash to eyes	2	5.88%

Table 2: Knowledge, Attitude about post-exposure prophylaxis

Subjects	Knowledge about PEP (n=105) (%)	No Knowledge about PEP (n=35) (%)	Positive Attitude towards PEP (n=93) (%)	Negative attitude towards PEP (n=47)
Doctors	74 (100.0%)	0 (0.0%)	67 (90.54%)	7 (9.45%)
Nurses	20 (50.0%)	20 (50.0%)	20 (50.0%)	20 (50.0%)
4th Employees	11 (42.3%)	15 (57.69%)	6 (23.07%)	20 (76.92%)

Table 3: Type of exposure

Type of injury	n=34 (%)
Superficial injury	21 (61.76%)
Deep penetration	13 (38.24%)

Table 4: Practices regarding Post-Exposure Prophylaxis at tertiary centre

Subjects	Superficial injury n=21 (%)	Deep penetrating injury n=13 (%)	PEP received
Doctors	6 (28.57%)	4 (30.77%)	30.77%
Nurses	10 (47.61%)	6 (46.15%)	46.15%
4th employees	5 (23.80%)	3 (23.08%)	23.08%

doctors (30.77) and fourth-class employees (23.08%) and all these HCWs reported to their concerned nodal officer and received PEP [Table 4].

From known sources, 13 cases from whom deep penetrating injuries occurred in HCWs were seropositive, out of them 7 for HIV, 3 for HCV, and 3 for HBV. Out of these 13 sustained needlestick injuries, 4 injuries occurred during injection administration, 4 of them during suturing, and 5 during recapping.

HIV-exposed HCWs received triple drug combinations and were followed up after 3 months and after 6 months. When repeated ELISA was negative, the patient was considered as no seroconversion or seronegative. All seven HCWs received PEP for a duration of 3 months.

Prophylaxis was started within 24 h of exposure. Among HCWs who were exposed to HBsAg, immunoglobulin for passive immunization and active immunization with hepatitis B vaccine was administered. No seroconversion occurred for HIV, HBV, or HCV in our study. The test was repeated after a period of 3 months and again after 6 months for all the exposed HCWs. So far, no cases of seroconversion as a result of needlestick injuries or exposures were reported at our center.

Discussion

Infection due to bloodborne pathogens can be greatly reduced by strictly practicing infection control guidelines. These include handwashing, use of personal protective equipment, training of the staff, having a check on the proper disposal of waste, and good surveillance system on hospital-acquired infections. Many studies have shown that risk assessment may not be possible in patients with massive bleeding, severe trauma, and cardiac or central nervous system emergencies presenting to casualty.[6] Hence, it becomes important for all the HCWs to practice standard precautions at all times for all patients. There is no justification for taking any discriminatory measures of safety precautions based on the serostatus of the individual, as some patients may be in the window period of infection and may be nonreactive for HIV and HCV antibodies but can transmit the disease.

Our study emphasizes the need for stringent practice of standard precautions irrespective of the HIV status, by all HCW's at all levels. According to the WHO, nurses are the group most at risk in any health-care setup which was in concordance with our study too.[7] Out of 34 injuries, 30 accidental needlestick injuries reported in our study, 12 were due to recapping of needles.

Hence, to avoid needle prick injuries, better to cut needle from the hub via needle cutter immediately after its use, or if cutter not available syringe should be placed on the surface of the table and then recap or newer devices should be designed so that HCW's could be protected up to certain extent from needle prick injuries.

Underreporting of cases was found in many studies which has been not observed in our study.[5,8,9] This study has analyzed different categories of HCW's perception of risk of occupational exposure to bloodborne infections. Many students (both medical and nursing) felt that it was not important to report. Regular training of the health-care workers is absolutely essential at all levels of occupation groups for reducing the incidence of needle prick injuries and exposure to blood and body fluids. Incidence of occupational exposure is inversely related to training.[10] Hospitals should, therefore, focus on policies for reducing transmission and should create awareness among both staff and doctors about the safety precautions by conducting seminars, sessions, and training programs from time to time. The risk of transmission of HCV is 1.8%.[11] If the source of infection is HCV positive, since no postexposure prophylaxis is available, thus follow-up is important. Although failures of ZDV PEP have occurred, ZDV PEP is associated with a decrease of approximately 79% the risk for HIV seroconversion after percutaneous exposure to HIV-infected blood. The risk increased for exposure to blood from source patients with terminal illness, probably reflecting the higher titer of HIV in blood late in the course of AIDS. If the exposure involved a larger quantity of blood, indicated by a device visibly contaminated with the patient's blood, a procedure that involved a needle placed directly in a vein

or artery, or a deep injury, then there is an increased risk of transmission of virus.[12,13] An anti-HBs level >10 mIU/ml is known to be protective. In such instances, either no action may be taken or a booster dose of vaccine may be given.

Most injuries occurred accidentally after drug administration and recapping in ward, or cut through surgical knife, in few cases, splashing of blood in eyes was found in our study.

Conclusion

In our study, only nurses had the least knowledge about needle prick injury. Maximum needle injury occurred in doctors and deep penetrating injuries found in 38.24% HCWs. All HCWs received PEP. Those who received PEP were negative for seroconversion. To prevent occupational exposure from bloodborne pathogens, there is a need to educate health-care personnel for quick reporting, health-care professionals should follow a definite written protocol about PEP.

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Conflicts of interest

There are no conflicts of interest.

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