

Awareness Towards Occupation Exposure Among Health Care Workers of a Tertiary Care Hospital: A KAP Survey

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Abstract

Background and Objectives: Health care workers (HCWs) are under constant exposure to the risk of occupational blood-borne infection, which most of the time can be avoided by observing standard precautions. The aim of this study was to assess the knowledge, attitudes, and practices of HCWs of a sample tertiary care hospital towards occupational exposure to blood-borne pathogens.

Methods: A cross-sectional study was carried out among HCWs of a 2500-bed tertiary care hospital. The study instrument was a structured and pretested questionnaire designed to measure the knowledge, attitude and practices of the participants towards occupational exposure.

Findings: Among the 380 respondents 22.63% gave history of sustaining needle-stick injury (NSI) in the preceding one year. The commonest clinical practice to cause NSI among doctors was blood sampling (37.5%) followed by re-capping of needles (31.3%). While 70.5% of the participants were aware of the immediate actions to be followed after NSI, only 47.36% gave partial correct answer to the questions regarding the number of diseases transmitted by NSI, and 44.2% had the correct knowledge about the post-exposure prophylaxis (PEP) facilities available in the hospital.

Conclusions: The prevention of transmission of blood-borne pathogens among HCWs requires an education-centric approach and a comprehensive infection control protocol along with strict compliance with the practices within the health care system.

Keywords: Health care workers, Needle-stick injuries, Blood-borne infection, Occupational risk.

Background and Objectives

Health care workers (HCWs) as per the definition of World Health Organization (WHO) comprise part of the health system whose primary goal is to improve health of patients and hence are critical to the functioning of the health system. An accurate estimate of such a population is hard to achieve, however, the global health workforce is conservatively estimated by WHO to be just over 59 million making between 14% and 37% of all health service providers in countries with available census data.¹ HCWs are at an alarming risk of infections by blood borne pathogens through dangerous but preventable occupational exposure to potentially infectious blood and body fluids. The types of occupational exposure in order of fre-

quency of occurrences include injury by sharps followed by needle-stick injuries (NSIs) and contact with infectious blood and body fluids of mucous membrane or non-intact skin.^{2,3} Among the many potential blood borne pathogens that are known, hepatitis B virus (HBV), hepatitis C virus (HCV) and human immunodeficiency (HIV) are of utmost concern and are commonly encountered. Approximately 3 million NSIs are reported annually whereas the estimated risk of exposure to HBV, HCV and HIV are 6%-30%, 2 % and 0.3% respectively after documented exposure.^{3,4} 2.5% of HIV and 40% of hepatitis B or C cases consequent to occupational exposure have been reported among HCWs by WHO which amount to an estimated 66000 hepatitis B, 16000 hepatitis C and 1000 HIV infections.⁵ NSIs preventive interventions are also one of the major health concerns in India where almost 50% of HCW involved with injections administration reported one

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or more NSI in the previous one year.⁶

The risk of these occupational exposure occurrences are on the rise in a developing country like India where health care delivery facilities more frequently encounter overcrowding, low doctor to patient ratio, and lack of adequate facilities or uniform guidelines. Most of the preventive interventions like adequate availability of post-exposure prophylaxis (PEP), safe injection practices, adherence to infection control guidelines, timely and appropriate post-exposure management or suitable legislations are rarely practiced all over in a low income country.

Education of HCWs on the prevalence of such incidences and the associated risk factors would go a long way in prevention of these exposures. A basic training programme among the HCWs regarding a comprehensive approach towards the preventive strategies is of paramount importance in any hospital setting. The assessment of the level of knowledge of HCWs towards these aspects will not only reflect the baseline awareness of the general population but also highlight the areas we need to focus while implementing the preventive strategies against these exposures. The aim of the present study was to assess the knowledge, attitude, and practice of HCWs of a tertiary care hospital towards occupational exposure to blood borne pathogens.

Methods

A cross-sectional study was carried out among HCWs of a 2500 bedded tertiary care hospital, Maulana Azad Medical College & Lok Nayak Hospital, New Delhi, India. The target study population were the healthcare workers comprising doctors (residents and interns), nurses (staff and student), and laboratory technicians. All potential study participants were invited to take part in the study. Three hundred eighty HCWs volunteered to participate in the study which was carried out for a period of 3 months undertaken as a part of infection control practices.

A self-designed structured questionnaire based on the assessment of the knowledge, attitude and practices towards needle stick injuries was distributed among the volunteers and a pre-decided appropriate time of 10 minutes was given to fill the questionnaire. The validity and reliability of the questionnaire was pre-tested on a random sample of HCWs. The questionnaire consisted of items under three sections: (1) socio-demographic and professional characteristics, (2) knowledge, attitude and practice towards NSI, and (3) occurrence of NSI in the past. A researcher or a member of the infection control team was present throughout the survey to clarify any doubt raised by the respondents during filling of the questionnaire. After filling the questionnaire, the correct answers were told and

any query related to the topic was resolved by the infection control team.

Ethical Issues

The participants were briefed about the purpose of the study and their informed consents was obtained. The subjects were also ensured that their participations would entirely be anonymous and the information would be kept confidential at all stages of the study.

Results

A total of 380 HCWs participated in the study. Figure 1 shows the distribution of the various categories of participants which indicates that 78% of the study group comprised of the nursing staff or nursing students. The socio-demographic details including the professional or immunization information of the participants are laid down in Table 1. The majority (84.7%) of the HCWs were females and the age varied between 20 years to more than 50 years with almost half belonging to the age group of 20 to 30 years. 33.7% of the HCWs had been serving in the hospital for past 3 to 5 years whereas 31.6% of them had less than one year of experience as a HCW in the hospital. Though 54.2% of HCWs gave a history of complete immunization against HBV, none of them had got their anti-HBs antibody titres done to assess their immunization status.

Out of the total of 380 HCWs recruited in the KAP (knowledge, attitude and practice) study, 86 (22.63%) gave history of sustaining NSI in the preceding 1 year. Table 2 shows the details of those 86 cases who sustained NSI among the population included in the KAP study. The maximum occurrence of NSI was evident in intern (90%) followed by 14 out of 42 (33.3%) residents, more than half of which admitted of sustaining NSI in their one year tenure. Nursing staff and students, however, reported considerably lower occurrence of NSI (17%), though over 70% of the incidences have occurred in the last year. Two of the interns reported NSI to have occurred to them on more

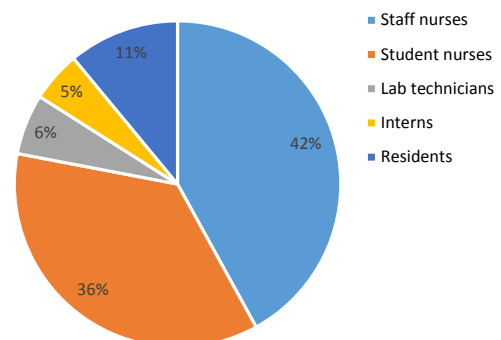


Figure 1. Distribution of the Participants.

Table 1. Socio-Demographic Profile of HCWs Under KAP Survey (n = 380)

Demographic Details	Number (%)
Sex	
Male	58 (15.3)
Female	322 (84.7)
Age (years)	
20-30	188 (49.5)
31-40	160 (42.1)
41-50	21 (5.5)
>50	11 (2.9)
Duration as HCWs in the hospital (years)	
<1	120 (31.6)
1-2	82 (21.6)
3-5	128 (33.7)
>5	50 (13.1)
HBV (Immunization status)	
Partial	104 (27.4)
Complete	206 (54.2)
No vaccination	70 (18.4)
Anti-HBs antibody titres after HBV immunization	None

Abbreviations: HCWs, health care workers; HBV, hepatitis B virus; KAP, knowledge, attitude and practice.

than three occasions within a year. The commonest clinical practice to cause NSI among doctors was blood sampling (37.5%), followed by re-capping of needles (31.3%). Injury

sustained during injections (intravenous, subcutaneous, intramuscular) was the commonest clinical activity among nurses (61.53%). Fifty-two out of 86 (60.46%) HCWs admitted of not wearing gloves while they sustained NSI. Sixty-eight out of 86 (79.06%) cases did not know about the complete follow up protocol in case of any needle stick injury.

Table 3 shows the knowledge, attitude and practice of the respondents towards NSI. One hundred eighty (47.36%) of the participants gave partial correct answer to the question regarding the number of diseases transmitted by NSI. Correct answer for immediate step to be followed after NSI was given by 268 (70.5%) of the participants. Only 44.2% of the study group had the correct knowledge about the PEP for HIV and HBV. While the rest of the surveyed sample were either aware of only HIV PEP or answered none, 62 (16.31%) were unaware that hospital has a protocol for reporting NSI. Most of participants (96.8%) expressed an attitude that training for needle stick injury protocol and management is necessary.

Discussion

The importance of timely identification and prevention of infections among HCWs cannot be overemphasized in a hospital setting where the health of the employee is con-

Table 2. Details of NSI Cases Among the KAP Survey Participants (n = 86)

	Doctor (n = 62)		Technician (n = 22)	Nurses (n = 296)	
	Resident (n = 42)	Intern (n = 20)		Staff (n = 160)	Student (n = 136)
No. of HCW who sustained NSI	14 (33.3%)	18 (90%)	2 (9.1%)	28 (17.5%)	24 (17.6%)
No. of times NSI in last 1 year					
1 time	9 (64.3%)	10 (55.5%)	2 (100%)	20 (71.4%)	18 (75%)
2 times	3 (21.4%)	6 (33.3%)	-	2 (7.1%)	4 (16.7%)
3 times	2 (14.3%)	-	-	4 (14.3%)	2 (8.3%)
> 3 times	-	2 (11.1%)	-	2 (7.2%)	-
Stage of occurrence of NSI					
During injection	2 (14.3%)	-	-	18 (64.3%)	14 (58.3%)
Blood sampling	2(14.3%)	10 (55.5%)	2 (100%)	2 (7.1%)	6 (25%)
Re-capping/Re-bending of needle	2 (14.3%)	8 (44.4%)	-	6 (21.4%)	4 (16.7%)
Major/minor surgical procedures	4 (28.6%)	-	-	2 (7.1%)	-
Others	4 (28.6%)	-	-	-	-
No. of HCW wearing gloves at the time of NSI	4 (28.6%)	12 (66.7%)	2 (100%)	16 (57.1%)	18 (75%)
No. of HCW who took PEP	2 (14.3%)	2 (11.1%)	0	6 (21.4%)	10 (41.7%)
HBV immunization status					
Complete	10 (71.4%)	0	2 (100%)	20 (71.4%)	4 (16.7%)
Partial	2 (14.3%)	10(55.6%)	0	6 (21.4%)	16 (66.6%)
No	2 (14.3%)	8 (44.4%)	0	2 (7.2%)	4 (16.7%)

Abbreviations: HCW, health care worker; HBV, hepatitis B virus; KAP, knowledge, attitude and practice; PEP, post-exposure prophylaxis; NSI, needle-stick injury.

Table 3. Knowledge, Attitude and Practice of HCWs Towards NSI (n = 380)

Questions Based on Knowledge	Options	No. (%)
How many diseases are transmitted by NSI	Correct	132 (34.7)
	Partial correct	180 (47.4)
	Not answered	68 (17.9)
Maximum risk of transmission among viral infections for NSI.	Correct	124 (32.6)
	Incorrect	256 (67.4)
Does our facility have a procedure for reporting NSI?	Yes	318 (83.7)
	No	46 (12.1)
	Don't know	16 (4.2)
Do you know about Standard precautions?	Yes	360 (94.7)
	No	20 (5.3)
What is the immediate step taken after NSI?	Correct	302 (79.5)
	Incorrect	78 (20.5)
PEP after NSI is available for?	Correct	186 (48.9)
	Incorrect	194 (51.1)
In our hospital where ART for PEP HIV is available at?	Correct	170 (44.7)
	Partially correct	194 (51.1)
	Don't know	16 (4.2)
Is it necessary to take consent of source for testing for viral markers?	Yes	274 (72.1)
	No	106 (27.9)
Who would be contacted first soon after NSI?	Correct	116 (30.5)
	Incorrect	264 (69.5)
Is it necessary to take PEP in case of exposure by an unknown source?	Yes	216 (56.9)
	No	164 (43.1)
Questions Based on Attitude		
Whether NSI should be reported?	Yes	358 (94.2)
	No	22 (5.8)
Needle should be re-capped or bent after use?	Yes	76 (20)
	No	304 (80)
Needle should be discarded immediately after use?	Yes	185 (48.7)
	No	195 (51.3)
Do we need to know and practice standard precautions?	Yes	374 (98.4)
	No	6 (1.6)
Do you think training for NSI is necessary?	Yes	368 (96.8)
	No	12 (3.2)
Questions Based on Practice		
Do you practice SP while phlebotomy?	Yes	360 (94.7)
	No	20 (5.3)
Do you bend/recap needle after use?	Yes	114 (30)
	No	266 (70)
Do you use needle destroyer after use?	Yes	374 (98.4)
	No	6 (1.6)
Do you practice follow up procedure for NSI?	Yes	153 (40.3)
	No	227 (59.7)
Do you practice to report the case after NSI?	Yes	162 (42.6)
	No	218 (57.4)

Abbreviations: HCW, health care worker; KAP, knowledge, attitude and practice; PEP, post-exposure prophylaxis; NSI, needle-stick injury; HIV, human immunodeficiency virus; ART, antiretroviral treatment; SP, safety practice.

stantly threatened by numerous infections. WHO reports median ratios of hospital to general population samples of 1.9, 3.4 and 5.9 for HBV, HCV and HIV respectively suggesting that the general prevalence is high for these three viral diseases among hospitalized patients as compared to the general population.⁷ Though a majority of our participants did believe that training for NSI is important for HCWs, a very high proportion of our respondents did not have the basic knowledge about transmission or the risks associated with the important blood borne infections. This could be disastrous as this population is the most vulnerable section for transmission of such infections and are involved with the delivery of health care services to a large community.⁸ Few health care settings have even developed a health education intervention program to assess the knowledge, attitudes and practices of the HCWs after the implementation of the same.⁹ An increase of KAP (knowledge, attitude and practice) score to 94% from 14% by means of an education module was evidenced in a recent Indian study.¹⁰ Uniform adherence to standard infection control practices must be ensured by the health care authorities who should strive not only to provide visible support but also continually educate and motivate the HCWs towards strict compliance.

In our survey approximately 45.8% of the HCWs either received incomplete immunization for hepatitis B or did not receive the vaccine at all. Several studies have reported low rates of HBV vaccination in various categories of HCWs. The most commonly implicated factors reported to be associated with such low rates are the lack of adequate training or awareness among the HCWs due to which the risk associated with this infection has generally been perceived to be low. The cost of the vaccine as well as the absence of any mandatory recommendation for such vaccines in hospitals are other suggested causes for the low coverage.⁹

In the present study 22.63% of HCWs enrolled in the survey sustained NSI of whom 37.2% were doctors and 60.47% were of the nursing category. A recent Indian study reported an episode of NSI in 64% of HCWs which was contributed by 57.5% and 68.3% of doctors and nursing staff respectively.⁶ Another study from a tertiary care hospital from the same locality reports 80% HCWs who sustained NSI at some point among whom nurses were the most vulnerable with 100% of them experiencing it in the last one year.¹¹ In our study the probability of sustaining such an injury among the various HCWs in the preceding one year ranged from 55.5% to 100%, though 11.1% and 7.2% of our interns and nursing staff respectively sustained more than three NSI in the last one year. A study carried out on NSI among HCWs concluded that 60.2% of

the victims of NSI had more than two such accidents in life and majority of these occurred during recapping of needle (26.47%), sharps disposal (23.53%), or blood and body fluid collection (22.06%).¹² In our study, whereas blood sampling and recapping or re-bending of needles were the commonest activities implicated in NSI among the doctors, among the technicians and the nursing staff or students blood sampling and injection practices were the commonest reasons for NSI respectively. This finding was in agreement with a similar Indian KAP study on NSI and assessment of occupational safety in HCWs.^{6,11} The same study witnessed 90% reporting of NSI by HCWs almost similar to the rate in our study, though 69.5% of our HCWs did not actually know whom to approach first after an NSI. Almost 95% of our HCWs knew or at least partially had an idea about a PEP facility availability in our hospital as unlike another study which reports less than 50% of HCWs who knew about these services in their hospital.¹¹ Two handed recapping and unsafe handling of sharps waste are the two most common reported activities associated with NSI as per the WHO.¹³ Almost 40% of the NSI cases among our KAP survey participants did not wear gloves at the time of sustaining the injury which included the highest non-compliance of 50% among the resident doctors and interns. A compliance of 74% has been reported for use of gloves during NSI.¹¹ It has been observed in previous studies that the attitude and practices of HCWs, despite having adequate knowledge of the risk involved, are governed by numerous factors like work culture, hectic schedule, long working hours, inadequate resources, individual beliefs or high patient to HCW ratio. However, few other studies have reported positive correlation of knowledge with practice and attitude and hence suggest that a satisfactory level of knowledge can go a long way in inculcating a positive attitude and correct practice of infection control measures.¹⁴

Conclusions

While a majority of our participants did believe that training for NSI is important for HCWs, a very high proportion of our respondents did not have the basic knowledge about transmission or the risks associated with the important blood borne infections. The prevention of transmission of blood-borne pathogens among HCWs requires an education-centric approach and a comprehensive infection control protocol along with strict compliance with the practices within the health care delivery system.

Abbreviations

(NSIs): needle-stick injuries; (HCWs): health care workers; (PEP): post exposure prophylaxis; (KAP): knowledge, attir

tude and practice; (HBV): hepatitis B virus; (HCV): hepatitis C virus; (HIV): human immunodeficiency virus.

Authors' Contributions

The authors made equal contributions to this study.

Competing Interests

The authors declare no competing interests.

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