



NEEDLE STICK INJURY AND POST EXPOSURE PROPHYLAXIS FOR HIV AND HBV – A KAP STUDY AMONG HEALTH CARE WORKERS

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ABSTRACT

Needle stick injuries (NSI) are occupational injuries in Health Care Workers (HCWs) on using sharps. Though there are more than 20 pathogens transmitted through NSI, human immune deficiency virus (HIV), hepatitis B & C virus (HBV&HCV)[1] are of significance due to grave complications and minimum available preventive measures. According to WHO, nearly 40% of HBV and 2.5% of HIV infections among HCWs is attributed to NSI[2]. The occurrence of NSI can be reduced if Standard Work Precautions are strictly adhered by all HCWs at all times and also by taking Post Exposure Prophylaxis for HIV & HBV within the golden period of 2 hour. This study is done to assess the knowledge, attitude and practice of HCWs of various categories on NSI and PEP. A Self structured questionnaire was administered to the study population (n=307) including Post graduates, Interns, Staff nurses, Nursing students, Lab technicians, Lab technical students. There was 10 questions under three sections. 1) KNOWLEDGE 2) ATTITUDE 3) PRACTICE. This study revealed that knowledge regarding transmission of all three viruses (HIV, HBV, HCV) was less among paramedics compared to medics, but the practice of HBV vaccination is the same. 53.1% of HCWs had NSI in our study. Majority incurred NSI during recapping needles. Attitude of HCW after being exposed to report NSI is very low (30.7%). Though 37.5% of the respondents not aware of golden hour of PEP, most of them aware of initiating PEP within 72 hours of exposure. Applying disinfectants/pressure over exposed area (38.9%) & recapping (31.6%) is still prevalent among study population. And 20% of the HCWs were not vaccinated against Hepatitis B yet.

KEYWORDS : Needle Stick injury, Post Exposure Prophylaxis, HCW

INTRODUCTION

Needle stick injuries (NSI) are occupational injuries occurring in Health Care Workers (HCWs) on using sharps either to draw blood or to inject medicines or while suturing. Though there are more than 20 blood borne pathogens that can be transmitted through NSI, infections due to human immune deficiency virus (HIV), hepatitis B virus (HBV) and hepatitis C virus (HCV)^[1] are of prime significance due to the grave complications caused by them and the minimum available preventive measures. According to WHO, nearly 40% of HBV and 2.5% of HIV infections among HCWs is attributed to NSI^[2]. Though the authenticated Indian statistics are scarce, it is reported that, out of 3-6 billion injections administered a year, 2/3 rd are practiced in unsafe (69.2%) manner^[3]. Also the seroconversion rate resulting in infection is comparatively lower for HIV than that for HBV, at a rate of 0.31% (for HIV) against 6%-33% (for HBV)^[4].

The incidence of occurrence of NSI can generally be reduced if Standard Work Precautions are strictly adhered by all categories of HCWs at all times. Also it is to be noted that acquiring HIV and HBV infections can further be brought down by taking Post Exposure Prophylaxis (Antiretroviral drugs for HIV, vaccination and immunoglobulin administration for HBV) within the golden period of 2 hour

Hence to assess the knowledge of HCWs of various categories on NSI and PEP, we plan to do a KAP study in our Government Medical College Hospital. Also we aim at insisting upon the importance of compliance to Standard Work Precautions (SWP), complete vaccination for HBV for various categories of HCWs, formulation of standard protocol which has to be followed in case of any occupational exposure and initiation PEP within the golden period. Therefore the final goal of our KAP study is to reduce the incidence of NSIs and to create awareness on PEP among various categories of HCWs.

AIMS AND OBJECTIVES:

- ❖ To study the knowledge of HCWs of various categories regarding NSI and PEP for HIV and HBV.
- ❖ To evaluate the attitude and practice of HCWs on standard work measures.
- ❖ To create awareness regarding the availability of PEP not only for HIV but also for HBV.
- ❖ To make all categories of HCW to adopt safe work practices and to seek PEP within golden period.

MATERIALS AND METHODS:

This observational study was conducted through Institute of Microbiology in Government Rajaji hospital, Madurai, Tamil Nadu for a duration of 2 months (August and September 2016). The sample size was 307 questionnaires. This project was conducted after obtaining ethical clearance from our institution. The proforma including name, age, sex and address of these participants were recorded. Informed and written consents were obtained from the Health Care workers. Confidentiality maintained regarding personal identity and their answers to the given questionnaire.

A Self structured questionnaire was administered to the study population including Post graduates, Interns, Staff nurses, Nursing students, Lab technicians, Lab technical students. The subject will be given an opportunity to suggest ways to improve their compliance to Standard Work Precautions and adopt PEP at times of need.

The questionnaire apart from demographic data will contain questions under three sections.

- 1) KNOWLEDGE
- 2) ATTITUDE
- 3) PRACTICE

The questionnaire as the total contains 30 questions of which knowledge section has 10 questions (q.no 1 to 10), attitude section has 10 questions (q.no 11 to 20) and practice has 10

questions(q.no 21 to 26; q.no 21 has 4 sub questions). Knowledge section helps us to assess the basic ideas of HCWs about Needle Stick Injuries and PEP Attitude and practice sections reveal their views and approach towards NSIs.

OBSERVATION AND RESULTS

A total of 307 health care workers including Post graduates, Interns, staff and student nurses, staff and student lab technicians who are willing participated in the study. The Age and Sex distribution of the study population is given in the Table-1.

Table – 1 Age And Sex Distribution Of Study Population

AGE	SEX DETAILS OF PARTICIPANTS		
	Male(n=71)	Female(n=236)	Total(n=307)
15 - 25	58(18.9%)	137(44.6%)	196 (63.8%)
26 – 35	10(3.25%)	68(22.1%)	78 (25.4%)
36 – 45	3(0.9%)	26(8.47%)	28 (9.1%)
46 - 55	0	5(1.62%)	5 (1.6%)

Majority of our study population belong to the age group 15-25 yrs and nearly 75% are females.

Out of 307 participants, PGs and nursing students constitute the major proportion of study population. The awareness of study population to the viruses (HIV, HBV and HCV) transmitted through Needle stick injury is given in the table – 2.

Table – 2 Awareness Of Viral Transmission Through Nsi

Designation	Awareness about transmission of all three viruses	Awareness about Transmission of 1 Or 2 viruses
Post graduates	60(74.07%)	21(25.93%)
Interns	49(81.66%)	11(18.34%)
Staff Nurses	6(14.55%)	26(85.45%)
Nursing students	10(12.8%)	68(87.2%)
Lab technicians	2(22.2%)	7(77.8%)
Technical students	10(21.3%)	37(78.7%)
Total(n=307)	137(44.6%)	170(55.4%)

Majority of PGs(74.07%) and Interns(81.66%) were aware of transmission of viruses such as HIV, HBV and HCV through needle stick injury. Though everybody is aware of HIV transmission, nearly 77% to 87% of nurses and lab technicians lack the knowledge about transmission of HBV and HCV through NSI. Of 307 participants, nearly half 143(46.57%) know that rate of acquiring infection is higher for HBV.

The practice of recapping among study population is given in the table-3

Table- 3 Recapping Practice Among Study Population

Designation	Participants practicing recapping
Post graduates	26(32.4%)
Interns	21(35%)
Staff and student nurses	42(38.2%)
Staff and student technicians	8(14.3%)
TOTAL	97(31.6%)

Out of 307 participants, 97(31.6%) of our study population were found to be practicing recapping. This practice is higher among doctors and nurses. Almost everyone of our participants heard about PEP 282(91.9%) and majority of them heard through Training 249(81%) followed by friends 39(12.70%). Also everybody is aware of the followup testing for HIV.

Of the study participants, 115(37.5%) of HCWs were aware of golden hour (2 hours of exposure). Also 105(34.2%) of respondents supported initiation of PEP by 72 hours of

exposure. 119(38.8%) of our study population have responded that they will take PEP only after knowing the HIV status of source.

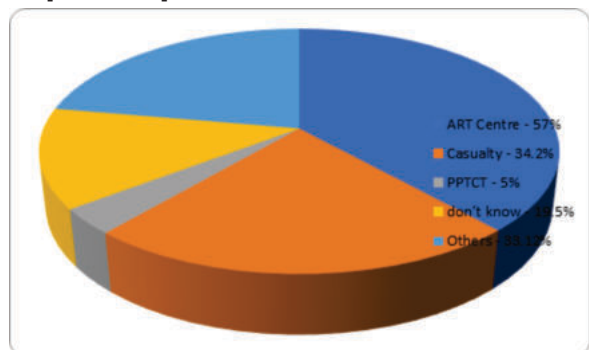
Awareness of the study population to seek PEP after being exposed to NSI is depicted in the table-4

Table – 4 Awareness Of The Participants To Seek Pep After Being Exposed To nsi

Conditions	Response of study population
For any needle stick injury in work place	194(63.2%)
Only when the patient is known to be HIV positive	76(24.2%)
Only when the status of the source is unknown	25(8.1%)
Only when the patient has risky behavior	12(3.9%)

Out of 307 participants, only half 63.2% of the participants were aware that PEP is indicated for all needle stick injuries in work place; The remaining 36.8% of HCWs had responded to take PEP only if the source is HIV positive / HIV status of source is unknown / patient has risky behavior.

Knowledge regarding the places of availability of PEP drugs is represented by Piechart-1.



Pie Chart-1 Responses Regarding The Places Of Pep Availability

Out of 307 participants, 178(57%) know that PEP drugs are available in ART centre; but 24 hours availability of PEP drugs in casualty and PPTCT is known to only 105(34.2%) and 60(19.5%) respectively. 60(19.5%) do not know the places of availability of PEP drugs in our hospital.

Out of 307 participants, 178(58.0%) know the correct total duration of PEP.

Responses of study population regarding the measures taken after NSI is given in the table – 5.

Table-5 Responses Of Study Population Regarding Measures After Nsi

Measures	Response
Wash the exposed area with alcohol and running water	206(67.1%)
Apply disinfectants over exposed site	56(18.2%)
Squeeze/apply pressure over exposed site	45(14.7%)

Out of 307 participants, 206(67.1%) were aware of washing the injured area with soap and running water immediately after needle stick injury. But still applying disinfectants such as alcohol/betadine is prevalent among 56(18.2%) participants; Squeeze and app

Out of 307 participants, 247(80.5%) agree with the statement “ NSI is dangerous to life”; 267(87.0%) had the knowledge of reporting and recording of occupational exposures; 286(93.2%) were aware of the necessity of pre and post test counseling after NSI; 267(87.0%) know that exposed has to undergo baseline blood investigations before taking PEP; 275(89.6%) know that adopting standard work precaution guidelines decreases the risk of NSI; 295(96.1%) were aware of the disposal of biomedical wastes in improper way can result in NSI;

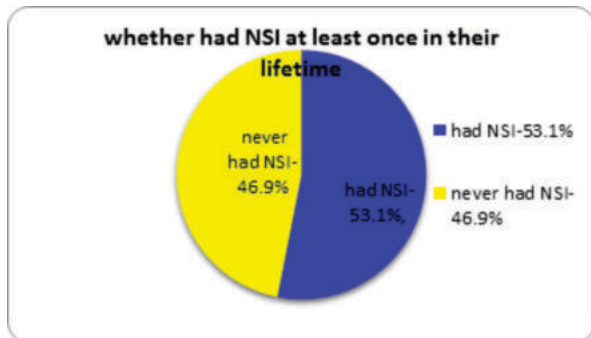
The responses of study population regarding the conditions when Standard Work Precautions(SWP) is adopted is given in the table – 6.

Table-6 Responses Of Study Population Regarding The Conditions When Swp Should Be Adopted

Conditions	Responses
While handling sharp items only	59(19.2%)
While handling blood and body fluids of HIV positive patients only	32 (10.4%)
While managing blood spills only	10 (3.3%)
While handling blood and body fluids of all patients	206 (67.1%)

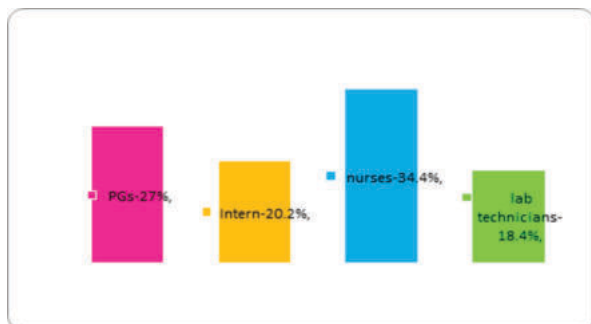
Only 206(67.1%) of respondents have responded to adopt standard work precautions(SWP) while handling blood and body fluids of all patients. Remaining 101(32.9%) responded that they would adopt SWP in specific conditions like while handling sharp items while handling blood and body fluids of HIV positive patients while managing blood spills only (19.2%), (10.4%), (3.3%) respectively.

The prevalence of NSI and its distribution among various categories of study population is represented in the pie chart-2 and bar chart-3.



Pie chart –2 PREVALENCE OF NSI

Out of 307 participants, more than half of study population 163(53.1%) had incurred needle stick injury atleast once in their life time.



Bar Chart – 1 Distribution Of Nsi Among Various Categories Of Study Population

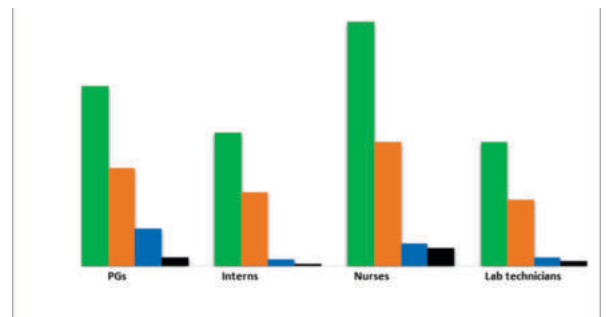
From this bar chart, it is evident that Nurses(34.4%) had higher incidence of NSI when compared to doctors and technicians. The procedure in which our study population had NSI is given in the table-7.

Table-7 Various Procedures Resulting In Nsi Vs Its Prevalence

Procedures	Prevalence
Recapping needles	85(52.14%)
Administering injections	32(19.63%)
Iv line insertion	29(17.79%)
Suturing	19(11.66%)
Blood withdrawal	28(17.17%)
Others	11(6.74%)

Out of 163 HCWs who had NSI , majority 85(52.14%) encountered needle stick injury while recapping needles followed by injection administration 32(19.63%).

The cumulative results of incurring , reporting of NSI and PEP activities after NSI among study population is depicted in the bar chart-4.



Bar Chart-2 Incurring And Reporting Of Nsi And Pep Among Various Categories Of Study Population

Though 44(27%) of PGs included in our study had NSI in past , only 17(38.3%) of them had reported and started with PEP and out of reported persons only 4(23.2%) had finished full course of PEP. Of 33(20.2%) of Interns who had NSI in past, only 3(9.09%) had reported and started PEP. Out of them, only 1 person had finished his full PEP course. Of 56(34.4%) of Nurses who had NSI in past, only 10(17.9%) had reported and initiated PEP. Out of reported population, only eight of them finished the full course PEP. In the similar way, Of 30(18.4%) of lab technicians who had NSI, 4 of them reported and initiated PEP and out of reported population, only 2 finished the full course PEP.

Nurses had the highest incidence of NSI among the study population. Interns had reported less when compare to other participants.

Designation	No. of participants vaccinated
Post graduates	76(24.8%)
Interns	55(17.9%)
Nurses	73(23.8%)
Lab technicians	44(14.3%)
Total	247(80.5%)

Out of total 307 participants, 247(80.5%) are vaccinated against hepatitis-B ; remaining are not vaccinated.

DISCUSSION

Blood is an important vehicle of transmission of infective microorganisms in health care setting, these organisms especially viruses pose a major threat as the HCWs can contact them through occupational exposures.

Percutaneous injuries are substantial source of infections with blood borne pathogens among HCWs account for 39%,37% and 4.4% of HCV, HBV and HIV infections in HCWs

respectively.

In our present study, nearly 99% HCWs were aware that HIV and HBV can be acquired through NSI and only 45.2% know about the transmission of HCV, which is in accordance to the study conducted by Bayapa et al. Though knowledge regarding transmission of all three viruses (HIV, HBV and HCV) through NSI is lower among Paramedics (13-22%) compared to Medicos (73-82%), the practice of vaccination for HBV is the same (80.1%). This may be due to HBV vaccination before joining any of the medical/ paramedical courses. The remaining 20% of the HCWs include partially vaccinated individuals and some aware individuals.

In our study, 53.1% participants had NSI atleast once in their life time which is similar to the study conducted by Anupriya et al and Adiba Sulthana et al. Of the participants who had incurred NSI, 52.14% of respondents encountered it during recapping of needles which is in accordance to the study conducted by Anupriya et al (60.9%). Also we found that prevalence of NSI is higher among Nurses 34.4% which coincides with the study conducted by Sumathi muralidhar et al (2010) and Anupriya et al (2014). Our hospital being a Tertiary Care Centre, high patient load for a health care worker and attitude of Nurses regarding SWP increases the risk of NSI in nurses. Though 87% of respondent know that NSI has to be notified, only 30.7% of HCWs had reported. This gross difference between the knowledge and practice has to be narrowed down. This can be achieved by changing the indifferent attitude of HCWs by various means like health education on occupational safety, SWP importance of PEP and vaccination. 38.9% of HCWs responded that they would apply disinfectants / apply pressure over exposed site which is not to be strictly done. This may be because of the misconception that application of disinfectant may have a better protective role. All the HCWs hence have to be enlightened with the fact (first aid measures do's and don'ts) that any pressure/ irritant application over the exposed site will actually favour the spread of infection. And we have conducted a health awareness class on this fact for paramedical personnels (dialysis technicians, theatre technicians and workers in intensive care units)

31.6% of study population were found to be practicing recapping needles which is less when compared to the study conducted by Sumathi Muralidhar et al (2010) (66.3%). This infers as that recapping practices are decreasing among HCWs due to increased awareness programs, training on Standard Work Precautions and bio medical waste management.

Out of 163 exposed HCWs, 112 (68.71%) did not take PEP; 51 (31%) of respondents reported and initiated PEP after 24 hours. The delay in the initiation of PEP by 24 hours was found to be due to the anxiety in knowing the source HIV status, ignorance of 24 hours availability of PEP drugs at Casualty. Only 30 (18.4%) finished the full course of PEP, remaining HCWs discontinued. The major reasons for discontinuation include intolerance to PEP, source then found to be HIV negative.

Nearly everyone responded that adoption of SWP decreases the risk of NSI, but only 206 (67.1%) responded that they would adopt SWP for all needle stick injuries. Remaining 101 (32.9%) responded that they would adopt SWP in specific conditions like while handling sharp items while handling blood and body fluids of HIV positive patients while managing blood spills only (19.2%), (10.4%), (3.3%) respectively. So training regarding SWPs should be given to HCWs.

CONCLUSION

Operation exposure to blood borne pathogens especially through NSI though avoidable is observed among all

categories of health care workers. Proportionate training of all HCWs on occupational safety is not being every year held in our setup. The NSI occurrence can be brought down by devising various preventive strategies like educating all HCWs categories including hospital workers on the importance of adopting SWP and biomedical waste management. Reporting of NSI to be made mandatory. Complete vaccination HBV (with three doses) and post vaccination analysis for seroconversion status. All HCWs should be enlightened with correct protocol to be followed after occupational exposure. Adoption to newer safety engineered devices, if possible in near future.

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