

Practices of Health Care Personnel Regarding Occupational Exposure

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ABSTRACT

Introduction: With advancing health care sciences, the prevalence of Accidental Exposure to Patient's Blood (AEBP) amongst Health Care Personnel (HCP) is bound to increase. The only means of preventing such accidental exposure is safe working practices. It is the responsibility of the teachers to inculcate these practices amongst their students.

Aim: To evaluate the knowledge, practice and attitude regarding Post Exposure Prophylaxis (PEP) and Hepatitis-B Virus (HBV) immunization amongst faculty and undergraduate students and to assess the frequency of these occupational exposure with the objective of inculcating safe working practices in the teaching curriculum.

Materials and Methods: The present study is a descriptive analytical cross-sectional study done from May 2012 to August 2012 in a newly established ESIC dental college at Rohini, Delhi. A 36-item survey questionnaire was distributed to 50 faculty and 115 dental undergraduate students. The survey included questions on demographic details of the respondents, the prevalence of AEBP, the knowledge regarding PEP and HBV

immunization and the status of the respondents. The data was analysed using SPSS 12.0 software using various statistical tests such as frequency analysis, Chi-square test and others.

Results: The mean age of the study group was 23.3±6.3 years. The prevalence of such accidental exposure was high being 49.7% in our study group. More than half of these respondents did not report the injury. The knowledge regarding the transmissibility of blood borne pathogens and the post exposure prophylaxis was suboptimal amongst the students and even teachers. Almost 20% of the study group was not immunized for HBV.

Conclusion: Managing AEBP in HCP is a challenging issue. They are highly prevalent, largely underreported and poorly managed because of the unawareness regarding the hospital's protocols for reporting and PEP as is seen in the present study. Besides the administrative measures, orientation and reinforcement training of all the staff including faculty is desirable to maintain high level of knowledge and effectively handle such occupational exposure.

Keywords: Blood borne pathogens, Hepatitis-B, Immunization, Post exposure prophylaxis

INTRODUCTION

Accidental Exposure to Patient's Blood (AEBP) is defined as any exposure whether in the form of percutaneous injury or contact of mucous membrane/ non intact skin with patient's blood, tissue or any Other Potentially Infectious Material (OPIM) [1,2]. Such AEPB pose a serious risk to the Health Care Personnel (HCP) for acquiring blood borne pathogens, especially Hepatitis-B Virus (HBV), Hepatitis-C Virus (HCV) and Human Immunodeficiency Virus (HIV) [1,2].

Injuries with needle stick and other sharps remain the most common mode of AEPB [3,4]. In developing country like India almost 40-65% of HBV and HCV infections in health care professionals can be attributed to percutaneous occupational exposure [5]. Prompt reporting of such injuries ensures an effective Post Exposure Prophylaxis (PEP) including evaluation, treatment and follow-up. However, unfortunately most of these events remain unreported [1,6,7].

Episodes of such accidental exposure are largely preventable by adhering to safe work practices including standard precautions. This is possible in a teaching facility only if the faculty and the students are aware and committed towards safe work practices. As the students follow practices learned during their under graduation, it is of paramount importance to inculcate these practices right from the beginning.

The present study was planned to evaluate the awareness and practice of faculty and undergraduate students regarding Needle

Stick Injuries (NSI), PEP and HBV vaccination with the purpose of formulating protocols for inculcating safe working practices in the undergraduate students and other members of the college.

MATERIALS AND METHODS

A non-interventional, descriptive, analytical cross-sectional study was conducted. The college and hospitals ethical committee approved the study design. The study population included "all the available cases" during May 2012 to August 2012 in a newly established Dental College at Rohini, Delhi. An informed consent was taken from all the participants. The study group comprised of undergraduate students pursuing the course of Bachelor of Dental sciences (BDS), BDS first year 45 students, BDS second year 40 students, BDS third year 30 students and 50 faculty members.

A 36-item voluntary anonymous survey questionnaire was distributed to all the respondents and collected the same day. The questionnaire was designed specifically for this study. The respondents had to either fill the blank or tick the correct answer from the multiple choices given. The questionnaire included demographic details of the respondents (4 items), questions related to AEPB/NSI (21 questions), PEP (7 questions) and regarding HBV vaccination (4 questions).

The questions related to AEPB/NSI included their awareness regarding the protocols of the hospital and the number of episodes of AEPB they had encountered in the last 5 years. The type of procedure they were doing at the time of such episode (whether recapping needle, doing venipuncture, administering anesthetic agent, conducting a surgical procedure, suturing wound, performing

biopsy and aspiration or any other), the mode of injury (needle, surgical blade, scalpels, instruments, broken ampoules, surgical wires or any other). The questions also included the steps the respondents took after any AEPB, whether the injury was reported, if yes to whom and if not the reasons for non reporting. They were asked to identify the pathogens transmitted by blood and the risk of contracting these pathogens.

The questions on PEP included:

1. The definition of PEP,
2. Whether adequate PEP is available against HIV, HBV and HCV,
3. Was PEP available in their facility at the time of need,
4. By what time should PEP be started following AEPB to be effective and
5. What are the first aid measures that they took/should take after AEPB and after these measures what was done subsequently.

The questions on HBV vaccination included their awareness regarding the HBV vaccination, whether they had taken it, if yes when was the last dose taken and if not, the reasons for not taking HBV vaccination.

The data was entered and processed using SPSS 12.0 software. The statistical tests used were, frequency analysis, mean and Chi square test for significance, p-value < 0.05 was taken as statistically significant.

RESULTS

There were 46 males and 119 females in the study group with the age range between 19–53 years [Table/Fig-1].

Overall 49.7% (82/165) of the respondents had encountered AEPB and mean number of exposure per respondent was 1.97 ± 0.938 (range 1-5). Almost 53.6% (44/82) did not report the injuries. Of all the respondents who reported the injuries, 52.6% (20/38) discussed it amongst their colleagues but did not report it further. Another 39.5% (15/38) reported it to their seniors and only 7.9% (3/38) reported it to the officer in charge.

The most common type of AEPB was in the form of a percutaneous injury with a sharp object such as needle (79.3%), surgical blade (9.6%) or with surgical instrument or broken ampoule/glassware. The most common type of procedure, which resulted in a needle stick injury, was recapping of needle accounting for almost 68.3% cases [Table/Fig-2].

The occupational exposure was not reported in almost 53.6% cases. The practice of reporting an event of AEPB was significantly higher in first year students (54%) as compared to second year (26%) and third year students (13%). The most common reason for not reporting was unawareness regarding the reporting practice (31.8%). The most common reason for non reporting amongst undergraduate students was lack of time to report in almost 37.9% (11/29) cases [Table/Fig-3]. All the respondents could identify that they are at risk of HIV transmission following any AEPB. Only 41.8% (69/165) could identify that HCV is also transmissible because of AEPB. All of the first year students answered that HIV is the most infectious and overall 59.4% (98/165) felt that HIV was most infectious [Table/Fig-4].

Only 16.5% (14/85) undergraduate students of the first and second year could correctly define PEP. Only 76% of the faculty and 45.5% of all the respondents knew that effective and safe PEP in the form of anti retroviral therapy is available to prevent HIV transmission following any potential exposure. The awareness for HBV was even worse and only 64% (32/50) of the faculty and 36.4% (60/165) of all the respondents were aware regarding PEP for HBV [Table/Fig-5].

Knowledge regarding HBV vaccination was good and 89.7% (148/165) respondents were aware about it. However, the vaccination coverage was merely 79.4% (131/165) amongst all the respondents and even worse in the first and second year undergraduate students

	I st year Students n=45 (%)	II nd year Students n=40 (%)	III rd year Students n=30 (%)	Faculty n=50 (%)	p-value*
Mean age	19.11±0.68	19.73±0.68	20.23±1.14	34.85±5.27	
Sex (Male: Female)	1:4	11:29	7:23	19:31	
Mean years of experience	0.3	1.1	2.1	7.56±5.67	
No. of respondents familiar with hospital protocol (percentage)	0 (0)	2 (5)	6 (20)	14 (28)	< 0.001
No. of respondents having encountered AEPB (percentage)	11 (24.4)	19 (47.5)	14 (46.7)	38 (76)	< 0.001
Average no. of AEPB	0.96±0.32	1.15±0.7	1.75±1.1	2.16±0.92	0.023
No. of respondents having reported AEPB (percentage)	6 (13.3)	5 (12.5)	4 (13.3)	23 (46)	0.023

[Table/Fig-1]: Demographic details and prevalence of AEPB amongst respondents
*p-value < 0.05 was taken as statistically significant.

	I st year Students (n=11)	II nd year Students (n=19)	III rd year Students (n=14)	Faculty (n=38)	Total n=82 (%)
Mode of injury					
Needle prick	10	14	10	31	65
Surgical blade	0	2	3	2	8
Operating instrument	0	0	0	4	4
Broken ampoule/ test tube	1	2	1	1	6
Non sharp/splash	0	1	0	0	1
Type of procedure					
Recapping needle	10	14	10	22	56
Conducting surgery*	1	5	4	8	18
Wound suturing	0	0	0	3	3
Performing biopsy	0	0	0	3	3
Administering local anesthetic agent	0	0	0	2	2
Other	0	0	0	0	0

[Table/Fig-2]: The type of procedures and the mode of AEPB.
* conducting practical work in case of students.

	I st year Students, n= 5	II nd year Students, n= 14	III rd year Students, n=10	Faculty, n=15	Total, n=44 (%)
Not aware that this needs to be reported	4	3	2	5	14 (31.8)
Didn't know to whom I should report	0	0	0	7	7 (15.9)
Had no time to report	1	6	4	1	12 (27.3)
Feared that I would be blamed by my seniors	0	4	2	0	6(13.6)
It is not important to report	0	1	2	2	5 (11.4)

[Table/Fig-3]: Reasons for non-reporting of AEPB.

(63.5%). Most common reason in the non-vaccinated group was unawareness regarding the same [Table/Fig-6].

DISCUSSION

With the advancement in health care sector in the form of increasing number of diagnostic tests and management procedures available to the patients, events of accidental exposure to patient's blood

	I st year Students, n= 45 (%)	II nd year Students, n= 40 (%)	III rd year Students, n=30 (%)	Faculty, n=50 (%)	Total, n=165 (%)	p-value
Correctly identify that HIV could be transmitted through AEPB(%)	45(100)	40(100)	30 (100)	50(100)	165 (100)	>0.5
Correctly identify that HBV could be transmitted through AEPB (%)	9 (20)	38 (95)	29 (96.7)	50 (100)	126 (47.5)	<0.001
Correctly identify that HCV could be transmitted through AEPB (%)	1 (2.2)	4 (10)	28 (93.3)	36 (72)	69 (41.8)	<0.001
Correctly identify that HBV is the most infectious (%)	0	14 (35)	26 (86.7)	27 (54)	67 (40.6)	<0.001
Correctly identify that HIV is the least infectious (%)	0	6 (15)	25 (83.3)	22 (44)	53 (32.1)	<0.001
Correctly identify the infectivity of HCV (%)	0	4 (10)	20(66.7)	24(48)	48 (29.1)	<0.001

[Table/Fig-4]: Knowledge regarding transmissibility and infectivity of BBP.

	I st year Students, n= 45 (%)	II nd year Students, n= 40 (%)	III rd year Students, n=30 (%)	Faculty, n=50 (%)	Total, n=165 (%)	p-value
Correctly define PEP	6(13.3)	8 (20)	29(96.7)	50 (100)	93 (56.4)	<0.001
Correctly identify the period of starting PEP (%)	5(11.1)	8(20)	26(86.7)	42 (84)	81 (49)	<0.001
Correctly identify that effective PEP is available for HIV(%)	4(8.9)	6 (15)	27(90)	38 (76)	75 (45.5)	<0.001
Correctly identify that effective PEP is available for HBV (%)	1(2.2)	1 (2.5)	26 (86.7)	32 (64)	60 (36.4)	<0.001
Correctly identify the first aid measures to be taken after AEBP (%)	24(53.3)	30(75)	28(93.3)	43(86)	125 (75.8)	0.002

[Table/Fig-5]: Knowledge regarding PEP.

	I st year Students, n= 45 (%)	II nd year Students, n= 40 (%)	III rd year Students, n=30 (%)	Faculty, n=50 (%)	Total, n=165 (%)	p-value
Knowledge regarding HBV vaccination (%)	32 (71.1)	36 (90)	30 (100)	50(100)	148 (89.7)	<0.001
Vaccinated for HBV (%)	28 (62.2)	26 (65)	30 (100)	47 (94)	131 (79.4)	<0.001
If yes, the mean duration of the last dose	3.48±3.9	8.19±5.3	7.18±2.7	5.38±4.2	5.8±4.3	
Reasons for not taking HBV vaccination (n= 34)						
Not aware regarding it	9	10	0	0	19	
Not easily available	1	1	0	0	2	
Not important	6	3	0	3	12	
Non affordable	1	0	0	0	1	

[Table/Fig-6]: Knowledge and status of HBV vaccination in respondents.

are bound to increase in the coming years. These blood borne pathogens are highly prevalent and their prevalence continue to increase in the general population [8]. Health care professionals despite being at a high risk largely seem to ignore such an exposure [1,7].

In the present study, AEPB was quiet common amongst the respondents. Almost 50% of all the respondents and 76% of the

faculty had experienced such an occupational exposure putting them at a potential risk of transmission of blood borne pathogens. The most common mode of AEPB was percutaneous injury seen in almost 99% cases. Other observers have also noticed that the most common mode of AEPB was because of sharps [4,6,9]. Recapping needle accounted for over 68% cases of AEBP. In the undergraduate students, it accounted for 77.3% (34/44) of AEBP. Many other studies have also noticed recapping of the needle to be very frequent amongst the HCP [4,6,7,9]. The incidence of recapping needle was significantly higher in the undergraduate students. In the present study, students had used the needles on either themselves or on their colleagues hence largely they were not at risk of transmission of Blood Borne Pathogens (BBP). However, this highlights the gaps in knowledge of students regarding needle-recapping practices. These gaps need to be filled at the stage of under graduation itself and reinforced later in their career. This will strengthen their basic attitude towards correct disposal of sharps and safe working practices.

Timely reporting of such an AEBP is important not only for efficient management of the exposure but also for the identification of workplace hazards and evaluation of preventive measures. Unfortunately, non-reporting of such AEBP episodes is very frequent [4,6]. In the present study also more than 50% of the respondents did not report the injury. Another 52.6% (20/38) discussed it with their colleagues but did not report it any further. So effectively, 78% (64/ 82) did not report the injury. The fact that the practice of reporting decreased from 54% in first year student to 13% in the third year student is a cause of concern. Either this decline could have been due to the inadequate measures taken at the institute or the students became complacent.

Different studies have highlighted various reasons for non-reporting such as unawareness about the reporting protocols, lack of time, fear of getting reprimanded or even carelessness on the part of the HCP [5-7,10]. The most common reason for non-reporting in our study was unawareness that such an exposure needs to be reported. About 86.7% of the respondents were not even aware regarding the hospital protocol for AEBP. Faculty was significantly more knowledgeable regarding the hospital protocols as compared to students, which is self-explanatory. This knowledge needs to be disseminated to students at every possible opportunity to help them form a strong base in their undergraduate days.

The next common reason for non-reporting was unawareness regarding the person in charge to whom it should be reported. This lapse in the system can be improved with strenuous attempts at the level of the organization by making hospital policies and displaying them at all accessible sites. This constant reinforcement would go a long way in increasing the awareness.

Amongst the students most common reason for non-reporting was the fear of being blamed by seniors or they had no time to report the injury. The episodes were more common during the examination as the students were anxious. Though the reasons for non-reporting are varied, we feel teaching done in more conducive environment would increase the reporting amongst the undergraduate students.

There was a lack of uniformity regarding awareness of BBP and their infectivity. All the respondents could identify that HIV is transmissible by such an exposure. But the knowledge regarding the other BBP such as HBV and HCV was suboptimal both in the faculty and the students. This is again a cause of concern as this point toward the need to educate even the faculty members by their reinforcement trainings besides the routine educational activities done.

As per WHO, effective and timely PEP can significantly reduce the disease burden of HIV and HBV amongst HCP [5]. In our study the knowledge regarding PEP was grossly inadequate and almost 50% of the study group failed to identify that effective PEP is available for these BBP. Inadequate awareness regarding PEP has been seen ranging from 38% in one of the study to as high as 73.7% in the

other study [7,10]. It would be worthwhile to educate the students and also the faculty regarding the risks associated with AEPB, methods of preventing such an exposure and the post exposure prophylaxis in case of such an exposure.

There was a deficiency in the knowledge regarding HBV vaccination and almost one-fifth of the respondents were not even vaccinated for HBV. The non-vaccinated respondents were mainly first and second year undergraduate students. In spite of the fact that effective and safe vaccination is available the vaccine coverage is still inadequate. Studies from India and other regions have also noticed inadequate vaccine coverage ranging from 18.5% to almost 44.6% amongst the HCP despite the fact that they are at a continuous risk for it [7,9,11]. The reasons for underutilization of vaccination facilities were unawareness or non-availability of the vaccination. Almost 36% (12/34) of the non-vaccinated respondents felt that HBV vaccination is not important to them. This emphasizes the need for bringing a change in the attitude of HCP regarding vaccination. Implementation of effective vaccination strategies or even making it mandatory would definitely increase the vaccination coverage. It is our hospital's policy to allow the undergraduate students clinical postings only after they have been vaccinated for HBV. This led to 100% vaccine coverage of the third year undergraduate students. The findings of the present study were taken into consideration and seminars and lectures were taken for all faculties and all students including first and second year students regarding safe working practices. A manual regarding the "Management of needle stick injury and other occupational exposure" was made for use by the faculty and students. A nodal officer was appointed to whom the occupational exposure had to be reported and stock of PEP was made available around the clock in the casualty in the event of such an exposure.

LIMITATION

The study has few limitations like the questionnaire was based on the recall ability of the respondents and it is possible that the study group might have missed information on events such as number of times they encountered AEBP, type of procedure that resulted in these AEBP. Some of the respondents also might have forgotten the real reasons for non reporting at the time of the event.

CONCLUSION

The study has highlighted the gaps in knowledge of the undergraduate students and some of the faculty regarding AEPB and the post exposure management. All the HCP should be

educated and trained regarding the risks associated with AEPB, methods to minimize AEPB, the principles of post exposure management including the first aid measures and the follow-up procedures in case of any occupational exposure to patient's blood. This educational training should begin from the undergraduate level itself and reinforced regularly for inculcating safe working practices.

Supporting estimates in the form of prevalence of AEBP is required to formulate and implement strategies to prevent and manage AEBP. This can be achieved when health care facilities have written policies and protocols for prompt reporting of AEBP and post exposure management plans are clearly displayed at easily accessible sites.

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