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A study on knowledge and practice of standard precautions and awareness regarding post exposure prophylaxis for HIV among interns and residents of RIMS Teaching Hospital, Raichur

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Abstract

Background: Exposure to blood and body fluids from infected patients poses high risk of infection with hepatitis B, C or HIV for healthcare staff (mostly interns and junior residents). Adopting standard precautions by these health care staff while providing medical care can prevent most of these highly infectious diseases.

Objective: To assess knowledge and practice of standard precautions (SP) and to assess the awareness regarding post exposure prophylaxis (PEP) for HIV among interns and residents of RIMS teaching hospital.

Methods: A cross-sectional study in interns and residents working in clinical departments of RIMS over a period of two months conducted by interviewing 103 participants.

Results: Less than 50% of the interns had correct knowledge about hand hygiene measures, safe handling of used needles, use of PPE (personal protective equipments) except use of gloves. Poor adherence to standard precautions like hand hygiene measures, use of PPE, safe handling and disposal of sharps were reported by both interns and residents, even among those who reported correct knowledge. Ideal time and maximum time for PEP initiation was reported by 45.5% and 29.5% of interns and 93.3% and 73.3% of residents respectively. 18.2% interns and 33.3% residents reported needle stick injury in the past 3 months.

Conclusion: Residents had good knowledge of SP compared to interns. However there was considerable gap between knowledge and practice of SP in both interns and residents. Awareness regarding PEP for HIV was also poor among interns compared to residents emphasizing the need for training of interns.

Keywords: Standard precautions, Personal Protective Equipments, Post Exposure Prophylaxis, HIV.

Introduction

'Standard Precautions' include a group of infection prevention practices that apply to all patients, regardless of suspected or confirmed infection status, in any setting in which healthcare is delivered. These include hand hygiene, use of gloves, gown, mask, eye protection, or face shield depending on the anticipated exposure and safe injection practices.(1) Human immunodeficiency virus (HIV), hepatitis B virus (HBV), and hepatitis C virus (HCV) are three of the most common blood borne pathogens from which health care workers are at risk.(2) Health care workers are potentially exposed to these diseases in one of the two ways:

1. A percutaneous injury in which a health care worker is injured by sharp instruments, or
2. Contact of mucous membrane or non-intact skin with blood, tissue, or other potentially infectious bodily fluids.

Worldwide, the estimated risk of HIV infection from injury by sharps in health care workers is about 0.3% (1 in 300), HCV is 1.8% (3-10 in 100) and HBV (6-30 in 100).(3)

Interns and junior residents working in Out Patient and In Patient departments of the teaching hospitals are the health care workers, who come in maximum contact with the patients while providing them the medical care, hence they are at higher risk of exposure to infectious pathogens especially HIV and HBV and may also transmit the infections to other patients. Hence it becomes necessary that each and every intern and resident working in hospital has adequate knowledge regarding SP and also practices them on a regular basis while providing health care in order to reduce exposure to these infectious diseases. This study was thus conducted with the objective to assess their knowledge and practice of standard precautions and to assess their knowledge regarding PEP for HIV.

Methodology

This study was a cross sectional study conducted over a period of two months (March 2016 to April 2016), undertaken in the interns and residents working in clinical departments of RIMS Teaching Hospital, Raichur, Karnataka.

Inclusion criteria:

a. All interns of 2015-16 batch, who have completed at least 3 months of internship (includes one major posting of 2 months).
b. All the junior residents who were working in clinical departments during the study period.

Informed written consent to participate in this study was taken from all the participants. Study proposal was approved from the Institutional Ethics Committee, RIMS, Raichur before starting the study. The details regarding their knowledge and practice of

SP and PEP for HIV was collected using a pretested, semi structured, self administered questionnaire. The questionnaire was prepared using CDC Guidelines for Isolation Precautions, 2007[(1)] and WHO Guidelines on PEP for HIV, 2014.[(4)] They were also asked if they had a needle stick injury in the past 3 months and to list out action taken at that time. A total of 103 study participants (88 interns and 15 junior residents) were interviewed.

Statistical Analysis: Data entry and analysis was done using Microsoft Office Excel, 2007. Results were expressed in simple proportions and percentages and presented in suitable tabular forms.

Results

1. Knowledge of standard precautions: When asked to enumerate the diseases transmitted by blood and body fluids (Table 1), HIV was mentioned by 96.6% interns, Hepatitis B by 90.9% and Hepatitis C by 19.3%. Among 15 residents interviewed, HIV and Hepatitis B was mentioned by all of them, while Hepatitis C by only 40% residents. Other diseases listed out included malaria, Infectious mononucleosis, CMV and venereal diseases like syphilis.

Table 2 shows that correct knowledge regarding SP related to use of gloves, hepatitis B vaccination for health care staff, its schedule and disposal of sharps was good among interns while their knowledge of hand hygiene measures, use of gowns/ face mask/ goggles was found to be poor and only 4.5% interns knew that used needles should never be bent, recapped or removed from syringes by bare hands.

Overall residents had good knowledge compared to interns; all of them (100%) gave correct response when asked about use of gloves, hepatitis B vaccination for health care staff and disposal of sharps. Most of them also had correct knowledge of other aspects of SP. Knowledge that Hepatitis B carries the highest risk of transmission of infection through needle stick injury was almost same in both interns and residents.

Table 1: Diseases transmitted by blood and body fluids as listed by study participants

Diseases transmitted through blood and body fluids	Number of study participants	
	Interns (%) (n=88)	Residents(%) (n=15)
HIV	85(96.6)	15(100)
Hepatitis B	80(90.9)	15(100)
Hepatitis C	17(19.3)	6(40)

1. **2. Practice of standard precautions:** Among the components for which correct knowledge was expressed, practice of hand washing was reported by only 53.6% of interns, practice of always using gloves, gowns/face mask or goggles was reported by 75.8% and 41.9% interns [Table 3(a)].

Table 2: Knowledge of study participants on standard precautions

Knowledge (correct) on standard precautions	Response by Interns (n=88)		Response by residents (n=15)	
	Correct (%)	Incorrect (%)	Correct (%)	Incorrect (%)
SP applied to all body fluids	79(89.8)	9(10.2)	15(100)	0
Hand should be washed before and after any direct contact with patient/ body fluids and immediately after removing gloves	28(31.8)	60(68.2)	8(53.3)	7(46.7)
Gloves should be used for all patients when contact with blood, mucous membrane, non intact skin or other potentially infectious materials is anticipated	66(75)	22(25)	15(100)	0
Gowns/face mask/goggles should be used for all patients during procedures likely to generate splashes of blood or body fluids	43(48.9)	45(51.1)	10(66.7)	5(33.3)
Hepatitis B vaccination is necessary for all health care staff	88(100)	0	15(100)	0
Hepatitis B vaccine schedule for adults (IM, 3 doses of 1 ml at 0, 1 month and 6 months)	66(75)	22(25)	13(86.7)	2(13.3)
Hepatitis B carries highest risk of transmission of infection through needle stick injury	76(86.4)	12(13.6)	13(86.7)	2(13.3)
Used needles should never be recapped/ bent/removed from the syringes by hands	4(4.5)	84(95.5)	12(80)	3(20)
Needles or sharps should always be disposed in a puncture proof container	86(97.7)	2(2.3)	15(100)	0

Out of 4.5% interns who knew that used needles should never be recapped/ bent/removed from the syringes by hands, only 25% practiced it always. 34.9% of interns with correct knowledge of disposal of sharps practiced it always. 87(98.9%) interns were immunized against Hepatitis B [Table 3(a)].

Table 3(b) shows among Residents, correct hand washing measures were actually practiced by only 50%. Use of gloves and gowns was also not practiced regularly. Out of 80% of residents who reported that used needles should never be recapped/ bent/removed from the syringes by hands, only 41.7% practiced it. Though all residents knew the disposal method for sharps, only 33.3% practiced it. All the residents were found to be vaccinated for Hepatitis B.

Table 3(a): Practice of standard precautions by Interns with reasons for non adherence

Correct knowledge on standard precautions	Interns (n=88)		
	Always practiced (%)	Not Always practiced (%)	Reasons for non adherence
Hand should be washed before and after any direct contact with patient/ body fluids and immediately after removing gloves (n=28)	15 (53.6)	13(46.4)	No time, Non availability of water and soap at the patients care areas
Gloves should be used for all patients when contact with blood, mucous membrane, non intact skin or other potentially infectious materials is anticipated (n=66)	50(75.8)	16(24.2)	Non availability of gloves
Gowns/ face mask/goggles should be used for all patients during procedures likely to generate splashes of blood or body fluids(n=43)	18(41.9)	25(58.1)	Non availability of gowns /face masks/ goggles. Presumption that the patient is non infectious
Used needles should never be recapped/ bent/removed from the syringes by hands (n=4)	1(25)	3(75)	Non availability of measures to dispose needles correctly
Needles or sharps should always be disposed in a puncture proof container (n=86)	30(34.9)	56(65.1)	Non availability of puncture proof containers Time constraints

Table 3(b): Practice of standard precautions by Residents with reasons for non adherence

Correct knowledge on standard precautions	Residents (n=15)		
	Always practiced (%)	Not Always practiced (%)	Reasons for non adherence
Hand should be washed before and after any direct contact with patient/ body fluids and immediately after removing gloves (n=8)	4(50)	4(50)	No time Tend to forget due to time constraints
Gloves should be used for all patients when contact with blood, mucous membrane, non intact skin or other potentially infectious materials is anticipated (n=15)	10(66.7)	5(33.3)	Non availability of gloves
Gowns/ face mask/goggles should be used for all patients during procedures likely to generate splashes of blood or body fluids(n=10)	5(50)	5(50)	Non availability of gowns/face masks/ goggles
Used needles should never be recapped/ bent/removed from the syringes by hands (n=12)	5(41.7)	7(58.3)	Non availability of measures to dispose needles correctly
Needles or sharps should always be disposed in a puncture proof container (n=15)	5(33.3)	10(66.7)	Non availability of puncture proof containers Time constraints

3. Knowledge of post exposure prophylaxis for HIV: Regarding knowledge of PEP for HIV [Table 4], only 51.1% interns and 53.3% residents had knowledge about body fluids which are considered infectious. Awareness that after injury, washing with soap and water is better over using antiseptics to minimize the risk of transmission was more in residents (73.3%) compared to interns (52.3%). Ideal time and maximum time for initiation of PEP was reported by 45.5% and 29.5% interns, while majority i.e. 93.3% and 73.3% of residents could correctly report the ideal time and maximum time for PEP initiation respectively. Residents and interns conveyed almost comparable level of knowledge about the PEP duration. Only 48.9% interns compared to 80% residents knew the drugs used in PEP regime.

4. Practice/Action taken of post exposure prophylaxis for HIV: Table 5 shows 16(18.2%) interns and 5(33.3%) residents reported needle stick injury in the past 3 months. All of them had immediate hand wash. Among interns with needle stick injury, 25% squeezed the wound to let it bleed, 43.8% consulted physician, 25% started ART and 12.5% checked patient's status. 40% of residents consulted physician and started ART while all of them checked patient's status and none of them squeezed the wound, which is known to increase the risk of infection.

Table 4: Knowledge of study participants regarding PEP for HIV

Knowledge (correct) on PEP for HIV	Response by Interns (n=88)		Response by residents (n=15)	
	Correct (%)	Incorrect (%)	Correct (%)	Incorrect (%)
All Body fluids are infectious (for HIV) except tears, non stained saliva, urine and sweat	45(51.1)	43(48.9)	8(53.3)	7(46.7)
Following injury, exposed area should be washed with soap and water to minimize the risk of transmission	46(52.3)	42(47.7)	11(73.3)	4(26.7)
Ideal time to start PEP is as early as possible or within 2 hours	40(45.5)	48(54.5)	14(93.3)	1(6.7)
Maximum time to start PEP following exposure is 72 hours	26(29.5)	62(70.5)	11(73.3)	4(26.7)
Drugs used in PEP* (Tenofovir + Lamivudine (or emtricitabine) are backbone. + Lopinavir with ritonavir or Atazanavir with ritonavir as preferred 3rd drug)	43(48.9)	45(51.1)	12(80)	3(20)
Duration of PEP is 28 days	67(76.1)	21(23.9)	12(80)	3(20)

* Response is taken as correct, if atleast one drug used for PEP is named rightly.

Table 5: List of actions taken after needle stick injury by study participants

Action taken	Interns (%) (n=16)	Residents(%) (n=5)
Immediate hand wash	16(100)	5 (100)
Squeezed the wound to let it bleed	4(25)	0
consulted physician	7(43.8)	2(40)
started ART	4 (25)	2(40)
checked patient's status	2 (12.5)	5(100)

Discussion

The present study was undertaken to assess the knowledge of interns and residents regarding SP and PEP for HIV and to assess how far it is brought into practice by them.

Interns and residents very well knew that HIV and Hepatitis B are the diseases transmitted through blood and body fluids. The study revealed that residents had good knowledge of SP compared to interns. It was observed that less than 50% of the interns had correct knowledge about hand hygiene measures, safe handling of used needles and use of PPE except for use of gloves. Khapre et al[5] also reported that number of adequately aware interns and residents were only around 43.6% and 44.68% respectively. Very similar findings were also observed in other studies,[6] while it was low compared to other studies[7,8] that reported better awareness. Exposure to training during Under Graduation might have resulted in better awareness.

It is seen that there lies considerable gap between knowledge and practice of SP in both interns and residents in our study. Poor adherence to important component of standard precautions like hand hygiene measures, use of PPE, safe handling and disposal of sharps was reported by both interns and residents, even among those who reported correct knowledge. Similar findings of lower compliance with universal precautions among interns except for correct use of gloves (90%) was observed in a study carried out in Delhi.[9] Gupta et al[10] also noted PPE use of only 55.1% among interns in Pune.

Significantly poor compliance in interns was reported in a study by Mohan et al.[7] However in our study, compliance to SP was found almost equal in

residents and interns as reported even in a study by Helfgott et al.[11]

Major reasons reported by study participants for non adherence included no time, non availability of water and soap at the patient's care areas, non availability of gloves, gowns or face mask, goggles, non availability of safe handling measures for sharps and their disposal. Few also reported reasons like presumption that the patient is non infectious, tendency to forget because of heavy work load. Similar reasons were quoted by participants of other studies.[7,8,12] Few other reasons reported in other studies[5] include colleagues do not use them and discomfort in PPE use.

Baheti et al[13] in their study reported that majority of interns were vaccinated for HBV. Similarly in our study, 98.9% of interns and all the residents were vaccinated against HBV. This is slightly more compared to only 76% interns in a study done in Bangalore.[14]

In our study, approximately more than half of the study participants knew the high risk body fluids compared to a study conducted by Mohan et al[7], in which only one third of the interns could identify high risk body fluids.

73.3% residents and 52.3% interns knew that after injury, washing with soap and water is better over using antiseptics to minimize the risk of transmission. Mukherjee et al[8] found that, though majority (84.6%) of the interns in their study were aware of washing the site of injury with soap and water, around one-third of interns were unaware of the fact that the application of antiseptic could cause more damage to the already injured tissues.

In terms of knowledge of PEP regimens, Mukherjee et al[8] found that, the best time of initiation of the drugs and the duration of the regimens was known by 68.5% and 46.9% interns respectively. On contrary, in our study, interns had better knowledge of duration of PEP(76.1%) while they knew far lower than satisfactory about time of initiation of PEP (45.5%). Residents compared to interns had better knowledge of timing for initiation of PEP and drugs used in PEP regime and most of the study participants could report correct duration for PEP. A study by Banu et al[14] reported that only 34% were aware that it has to be taken immediately and within 72 hours and that very few of them (14%) were aware about PEP drugs, however in our study better awareness of PEP drugs was observed.

Residents had higher incidence of needle stick injury compared to interns in present study. This could be due to their stressed and tight schedule which makes them more prone for accidental injuries. All had immediate hand wash after injury. Less than 50% consulted physician while patient's status was checked by only 12.5% interns compared to 100% residents. None of the residents squeezed the wound, which is known to increase the risk of infection but among interns, 25% squeezed the wound to let it bleed showing that there is lack of adequate knowledge of measures to be taken following exposure among interns compared to residents. These findings are well supported by observations of another study.[5]

Limitations

Number of residents interviewed were too less hence the inference made on their knowledge and practices based on observations of this study cannot be extrapolated to all the residents. Questionnaire was self administered hence there are chances of actual practice being even lower than observed because of self reported adherence.

Conclusion

Residents had good knowledge of SP compared to interns. However there was considerable gap between knowledge and practice of SP in both interns and residents. Awareness regarding PEP for HIV was also poor among interns compared to residents emphasizing the need for planning a sensitization and training programs on SP and PEP for interns before the start of internship using powerful teaching and learning tools and also emphasizes that there is need for hospital authorities to make provision of these PPE at all the health care providing areas in hospital in order to prevent occupational exposure to infections in health care staff.

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Conflict of Interest: None

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