



## AN OVERVIEW OF POST EXPOSURE PROPHYLAXIS FOR HIV IN HEALTH CARE PERSONALS: ANDHRA PRADESH AND TELANGANA STATES SCENARIO

### Medicine

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### ABSTRACT

Risk of acquiring HIV infection after a percutaneous exposure to HIV infected blood is 0.3%. Post exposure prophylaxis (PEP) for HIV refers to a set of comprehensive services to prevent HIV infection in exposed individuals where the exposure can be occupational/ non occupational and a provision of short term (28 days) antiretroviral drugs (TLE) under National AIDS Control Programme (NACP-IV) is given depending on the risk assessment along with counseling and relevant investigations as a follow-up to detect the adverse events after taking informed consent of the exposed person. PEP inhibits the replication of the initial inoculum of virus and thereby prevents establishment of chronic HIV infection, and PEP is the best effective if initiated within two hrs and certainly within 72 hrs. Present communication deals with the registry of 104 cases (6 months of study period) of PEP from Andhra Pradesh and Telangana in terms of various determinants, their status and the outcome in terms of HIV seropositivity.

### KEYWORDS:

Post exposure prophylaxis, HIV, health care personals, antiretroviral drugs,

### INTRODUCTION

Occupational exposure refers to exposure to potential blood borne infections (HIV, HBV, HCV) that occurs during performance of job duties. Occupational exposure to blood or any other body fluids in the health care settings constitute a small but significant risk of transmission of HIV and other blood borne pathogens. In addition such exposures can cause tremendous anxiety, fear and stress among health care personnel (HCP) and this can have a negative impact not only on the HCP but also on families and colleagues. Each day, health care personnel (HCP) in India experience accidental exposure to blood and other body fluids or tissues while performing their work duties. The potential for work place accidents that may expose workers to HIV infected blood and other body fluids is increasing. Several factors contribute to the increased risk of occupational HIV exposure. HIV transmission is significantly associated with deep injury, visible blood on sharp instrument, procedures involving a needle placed in the source patient's blood vessel and terminal illness in the source patient.

Post exposure prophylaxis (PEP) is a medical response to prevent transmission of pathogens after potential exposure and refers to comprehensive management instituted to minimize the risk of infection following potential exposure to blood borne pathogens (HIV, HBV, HCV). It includes first-aid, counseling, risk assessment, relevant laboratory investigations based on the informed consent of the exposed person and source and depending on the risk assessment, the provision of short term (28days) of antiretroviral drugs, along with follow-up evaluation. Healthcare personals (HCP) are defined as person paid/ unpaid working in healthcare settings and are potentially exposed to infectious materials such as blood, tissue, specific body fluids, medical supplies/equipment or environmental surfaces contaminated with these substances are constantly exposed to occupational hazards through exposure of percutaneous injury (Needle stick or cut with sharps, contact with the mucus membrane of eyes or mouth of an infected person, contact with non-intact skin(particularly when exposed skin is chapped, abraded, or afflicted with dermatitis or contact with blood or other potentially infectious body fluids).One of the most common yet dreaded hazards in healthcare facilities is the needle stick injury. The World Health Organization (WHO) estimates that 3 million percutaneous exposures occur annually among 35 million health care workers globally, with

over 90% occurring in resource constrained countries. As a consequence of this exposure an estimated 66,000 cases of hepatitis B, 16,000 hepatitis C and up to 1,000 HIV infections occur each year.

Globally, 1 million healthcare workers annually suffer from needle stick injuries. Of these, 100are infected with diseases such as hepatitis B, hepatitis C, and HIV. Centre for Disease Control (CDC) and National AIDS Control Organization (NACO) recommend PEP for workers with needle stick injuries. PEP for HIV exposure is best when started within 2 hours and there is little benefit after 72 hours. The prophylaxis needs to be continued for 28 days.

### PEP guidance under NACP

1. Wherever PEP is indicated and source is ART naive or unknown: recommended regimen is Tenofovir 300 mg + Lamivudine 300 mg + Efavirenz 600 mg once daily for 28 days.
  - a. Wherever available, single pill containing these formulations should be used.
  - b. Dual drug regimen should not be used any longer in any situation for PEP
2. The first dose of PEP regular should be administered as soon as possible, preferably within 2 hours of exposure and the subsequently dose should be given at bed time with clear instruction to take it 2-3 hours after dinner & to avoid fatty food in dinner

### MATERIALS AND METHODS

#### Inclusion criteria:

Any Health care personnel (HCP) in government/ private sector in occupational settings having directly/ indirectly exposed to needle stick injuries of a known/unknown source.

**Type of study:** Prospective observational study. PEP record registry as per the NACO guidelines is maintained at all ARTCs, which is coordinated by Andhra Pradesh State AIDS Control Society in the prescribed format. Present study includes data from all ARTCs linked to Gandhi COE.

**Study settings:** COE Gandhi and attached ART Centres.

**Sample population:** To conduct a prospective observational study of PEP in Occupational exposure to health care workers attending the antiretroviral treatment centres under catchment of COE Gandhi Hospital, in Andhra Pradesh and Telangana.

**Protocol for PEP in HCPs who experience occupational exposure:** Any HCP experiencing contamination of damaged skin or eye via needle stick, cut injury or flush with HIV contaminated or non contaminated instrument or fluid as a first aid the wound or the exposed area should be flushed intensively with water and soap and if eyes are involved than flushed with normal saline. The next step should be to report to the ART centre for Post exposure prophylaxis. The guidelines from NACO will be followed for evaluation of the exposure and source code and to decide on the PEP requirement.

**Duration of the study:** 1 April 2015 to 31 September 2015.

**RESULTS**

A total of 104 cases in HCP at various towns in undivided Andhra Pradesh were analyzed and out of them, 53 (51%) were males and 51 (49%) females with male to female ratio of almost 1:1. Unlike some other studies where females outnumbered the males. (1)

HCP comprised of medical officers and resident doctors 34(32.7%) followed with nursing students 25 (24%). Because these are the two groups of HCP who actually are involved in giving treatment to the patients. Majority of exposed HCPs 58(55.8%) came within 2 hours followed by 26(25%) within 24 hrs and 99(95.2%) came well within 72 hrs. Needle stick injury was the commonest injury accounting for 78(75%) of cases, with majority of them exposed to hollow bore needle 57 (58.8%) [Table 1].

**Table 1: Demographic profile of healthcare personals**

Variables	No	(%)
Age group in years (N = 104)		
15 – 24	44	(42.3)
25 – 34	38	(36.5)
35 – 44	15	(14.4)
45 – 58	7	(6.7)
Gender (N = 104)		
Males	53	(51.0)
Females	51	(49.0)
Occupation (N=104)		
Cadre 1: Faculties - Consultant physicians, teaching faculties)	17	(16.3)
Cadre 2: Medical officers, resident doctors	34	(32.7)
Cadre 3: UG students/ Interns	4	(3.8)
Cadre 4: Staff nurse	2	(1.9)
Cadre 5: Nursing students	25	(24.0)
Cadre 6: Laboratory technicians	11	(10.6)
Cadre 7: Helpers, servants and class IV Workers	11	(10.6)
Time in hours since exposure (N =104)		
Less than 2 hours	58	(55.8)
2 - 24 hours	26	(25.0)
24 – 72 hrs	15	(14.4)
72 hours or above	5	(4.8)
Type of contact (N =104)		
Breach of skin	78	(75.0)
Muco-cutaneous	2	(1.9)
Mucosal	3	(2.9)
Intact skin	4	(3.8)
Eyes Splash	1	(1.0)
Non Specified	16	(15.4)
Needle stick injury- breach of skin (N =78)		
Hollow needle	57	(58.8)
Solid bore needle (suture needle)	11	(30.5)
Not specified	8	(10.7)
Status of Hepatitis B vaccination (N = 104)		
Yes	79	(76.0)
No	23	(22.1)
Not specified	2	(1.9)

Correct information regarding the type of contact was elicited in 88 (84.2%) cases. Of these, 71(68.3%) had contact with blood, followed by pleural fluid 3 cases (2.9%) and 1(1%) case of vaginal secretion, in 29 cases (27.9%) specific source of exposure could not be elucidated. (Table2). Exposure wise 59(63.4%) had mild exposure followed by moderate 37(39.8%) and severe 8(8.6%). This shows majority of them mild exposure.

Regarding first aid steps taken after exposure, most common response was application of sprit/ alcohol/ antiseptics 48 (46.2%) followed with washing with water 28 (26.9%), wash with soap and water 16 (15.4%), persons tried to squeeze the affected site 2 (1.9%) and 10 (9.6%) have not taken any first aid steps.

**Baseline HIV status:** Out of 104 HCP, baseline HIV test was done in 78 (75.0%), and all were HIV Non reactive (NR). Remaining 26 did not turn up for HIV testing as per NACO guidelines, HIV testing is also done at 3 months, but in the study only 71 (91.1%) out of 78 due for 3 months testing turned out and all were non reactive. Confirmatory HIV test at 6 months could be done in 74 (94.9%) out of 78 cases due for 6 monthly testing. 4 cases which didn't turn-up for follow-up at 3 months have reported for testing at 6 months. Rest 26 (15%) cases did not turn up for follow-up at 6 months. All 74 cases were non reactive. There is less likely chance of any case reporting positive as the follow-up done covered the window period of 6 months from the last reported case during the study period. [Table 3].

**DISCUSSION**

Percutaneous inoculation (by needle or other instrument that pierces the skin) carries a low risk of HIV transmission of around 0.3% (95% CI 0.2 to 0.5);[10] In our study 2 orthopedic surgeons reported percutaneous inoculation by thick non absorbable suture material which pierced through the glove and breached the skin. In this study male and female were equal in ratio (1:1) who suffered occupational injuries compared to earlier studies which has shown female vulnerability.<sup>[1]</sup> In our study MO residents, and nursing students, who sustained the occupational injury were more compared to other HCP (technicians, and helpers) as these HCP are actually involved in giving the treatment in the healthcare settings. They all being highly vulnerable for increased risk for acquiring blood borne HIV exposures in care settings in India.<sup>[9,11]</sup>

PEP is the cost-effective measurements in low and middle income countries in HIV care settings for HCP getting exposed to infectious materials.<sup>[11]</sup> All the cases were followed for 6 month covering the window period none were reactive. This may be due to the timely institution of effective PEP and follow-up. This may not be true for 26 cases who have not been followed up. We are unsure whether they took it for required 28 days or not. The fact that 26(25%) out of 104 do not come for repeat testing is a worrying aspect.

**Table 2: Status of source**

Blood	71	(68.3)
Saliva	0	(0.0)
Vaginal	1	(1.0)
Pleural Fluid	3	(2.9)
Not specified	29	(27.9)
HIV status of source (N = 104)		
Reactive	60	(57.7)
Non Reactive	5	(4.8)
Unknown	29	(37.5)
Treatment status of reactive source (N = 60)		
Whether on ART	30	(50.0)
Not on ART	11	(18.3)
Status not available	19	(31.7)
Status of last CD4 count in source (N = 60)		
Less than 250	11	(18.3)
250 – 300	8	(13.3)
300 – 350	2	(3.3)
>350	10	(16.7)
CD4 not available	29	(48.3)

All healthcare units should ensure to have adequate staff counseling

and education about risk of infection after occupational exposure. Policies and procedures should be in place and the staff should be aware about the actions to be taken in the event of occupational exposure.

However, one encouraging fact was that most of the HCP 78(75%) exposed to occupational exposure had their baseline HIV test done, all being HIV non reactive. It is important that once PEP started, it should be taken for full duration of 28 days. More than 76(73.08%) respondents who were prescribed the PEP and were studied for full 6 months. Adverse effects due to PEP should be treated with core concern to continue PEP. One person in our study had to be put on TL+Lpv/Rtv after 8 days on developing severe drug rash to Efavirenz only to complete the full duration of 28 days as the person had severe exposure from low CD4 count case. Detailed counseling is required in such cases for better mental preparation for post PEP outcome as well.

HCPs should be educated to report occupational exposures immediately after the occurrence, particularly because hepatitis B vaccine and HIV - PEP is most effective if administered soon after the exposure. Exposed HCP of all cadres must be aware of the standard instructions for access to urgent advice of occupational exposure and the fact that HIV testing should be done at the baseline level and after the completion of the PEP at interval of 3 and 6 months to confirm the HIV status of exposed HCP.<sup>[3]</sup>

**Table 3: Steps taken and outcome in the exposed healthcare personals**

**First aid steps taken by HCP (N = 104)**

Washed with soap and water			16	(15.4)
Washed with water			28	(26.9)
Applied alcohol/ spirit/ antiseptics				(46.2)
Squeezed the affected site			2	(1.9)
No first aid steps taken			10	(9.6)
Grades of exposure (N = 104)				
Mild			59	(63.4)
Moderate			37	(39.8)
Severe			08	(8.6)
PEP prescribed (N = 104)				
Recommended PEP				104
Type of PEP recommended in HCP (N =104)				
Basic regimen (TDF+3TC+EFV)			104	(100%)
Duration of PEP taken (N = 104)				
28 days			76	(73.08)
Less than 28 days			1	(0.96)
Not specified			27	(25.96)
Side effects observed (N =78)				
Nausea/Vomiting			22	(28.2)
Myalgia			11	(14.1)
Headache			11	(14.1)
Fever			1	(1.3)
Vivid dreams			1	(1.3)
Skin rash			3	(3.8)
No side effects			45	(57.7)
Outcome of PEP				
Time interval of HIV testing	(N = 104)	HIV –NR	HIV status	Not available
At Baseline	104	78 (75.0)	26	(15.0)
At 3 months	78	71 (91.1)	7	(8.9)
At 6 months	78	74 (94.9)	4	(5.1)

Equally important for the HCP is to know how to minimize the injuries and about the round the clock availability of PEP, expected adverse events, and the strategies for managing them. It must be noted that PEP is not cent percent effective in preventing HIV seroconversion,[12] Therefore, PEP cannot be considered to replace the universal precautions and avoiding occupational injuries. Persons who take PEP

and are under follow up for 6 months should abstain from any high risk behavior activity and not donate blood.[13] Although preventing blood exposures is the primary means of preventing occupationally acquired blood borne diseases, appropriate post-exposure management is an important element of workplace safety. The study highlights the need of standardized protocols for management of exposure to blood borne pathogens. It also reflects the need for safe working environment in all hospitals. There is a need to report, investigate and follow-up needle stick injuries. Drugs for PEP for HIV should be available 24 hours readily in hospitals for immediate use by HCPs.

This study indicates the need to reinforce knowledge regarding various aspects of occupational PEP to health care personals especially those associated with nursing (staff nurse, nursing students), Resident doctors and Laboratory technicians. Another study from Ahmadabad [14] has shown that by regular sensitization and universal precaution workshops increase the awareness among HCPs for reducing HIV infection risk and transmission and prevention through PEP.

Success of entire program depends up on (1) making PEP drugs available everywhere, (2) making the staff informed about avoiding injuries,(3) Regular sensitization programs and following universal precautions and preparing them to take PEP as and when indicated with its all associated procedures.

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