



Knowledge, attitude, and practice among clinical staff, cleaners, and phlebotomists' toward occupational HIV exposure risk and postexposure prophylaxis at St. Paul's Hospital Millenium Medical College

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Addis Ababa, Ethiopia
March, 2024



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A thesis submitted to the Department of Paediatrics and Child Health for the partial fulfilment of a specialty certificate in Paediatrics and Child Health, St. Paul Hospital Millennium Medical College.

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March, 2024

Acknowledgments

First and foremost, I would like to express my gratitude to the Almighty God for giving me, the grace to accomplish this task . I also want to thank Dr. Solomie Jebessa for her support and insightful comments. Additionally, I would like to convey my gratitude to the Department of Paediatrics and Child Health, of Saint Paul Hospital Millennium Medical College, for providing and giving me this learning experience.

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List Of Abbreviations

AIDS	Acquired immune deficiency syndrome
ART	Antiretroviral therapy
HIV	Human immunodeficiency syndrome
HCW	Health care workers
KAP	Knowledge attitude and practice
N	Source population
PEP	Post-exposure prophylaxis
SPHMMC	Saint Paul Hospital Medical Millennium College
SPSS	Statistical Package for Social Science
WHO	World Health Organization

Abstract

Background: HIV/AIDS is considered as one of the major occupational health hazard among healthcare personnel. Although avoiding contact with infected blood is one of the primary strategies for preventing the acquisition of HIV through occupational exposure, timely post-exposure prophylaxis can reduce the rate of HIV transmission significantly.

Objective: To assess the knowledge, attitude, and practice towards occupational HIV exposure risk and post exposure prophylaxis among Saint Paul Hospital Millennium Medical College clinical staff, cleaners, and phlebotomists.

Method: A cross-sectional descriptive and analytic study was conducted from September to October 2023. The sample size was calculated using single proportional formula was 220. stratified random sampling technique was used at different departments in the hospital. A Structured questionnaire was used to collect data and then exported to SPSS Version 25 for analysis. A chi-square test was used to see the association between dependent and independent variable.

Result: Among 220 participants, 55.9% (123) were female, and 62.3% (137) were in the age group of 31- 40 years. More than half (54.5%) have a poor knowledge regarding occupational HIV exposure and similarly 50.9% of them had poor knowledge of PEP. Most staff (66.4%) did not receive any post-exposure prophylaxis training .

Additionally 54.5% had negative attitude toward PEP and out of 51 respondents who exposed only 29.4% (15) took PEP. Phlebotomists were found to be 2.7 times (AOR=2.7, 95% CI (0.212- 5.5)) likely had knowledge about occupational HIV exposure risk compared to respondents of other professions. Surgery staff had 1.5 times higher chances, of having a positive attitude towards PEP for HIV.

Conclusion: More than half of the staff have poor knowledge on occupational HIV exposure risk and postexposure prophylaxis against HIV/AIDS. The result revealed that a significant number of individuals had a negative attitude and poor practice about PEP. Formal training is needed to improve the knowledge of proper use of personal protective equipment and HIV PEP to both clinicians and non-clinical hospital staff.

Keywords: Occupational HIV exposure, Occupational exposure risk ,Post-exposure prophylaxis(PEP).

1. Introduction

1.1 Background

HIV is the most serious public health problem costing many people's lives, particularly in sub-Saharan Africa where healthcare workers are at great risk.(1)

Occupational exposure of HIV occurs is when someone who works in a healthcare setting is potentially exposed to material infected with HIV.(2)

This occur following sharp needle injuries and contact with body fluid especially in mucous membranes and non-intact skin. Procedures such as gynaecological exams, spinal taps, labour and delivery, surgery and line placement, and others can place the health worker at risk. The risk could vary depending on the viral load in the source patient.

Occupational HIV transmission is influenced by several factors including volume of blood, type of procedure, type of injury, or percutaneous penetration. The risk of HIV transmission after needle stick injury is about 0.3% and after cut exposures are estimated to be more than 0.3%, and after blood splashes into the mucous membrane is estimated to be 0.1%.compared to HBV(30%) and HCV(1.8%), the percutaneous risk of HIV transmission is the smallest, estimated to be 0.3%. but there is still no cure for HIV once acquired(3) (4)

Post-exposure prophylaxis (PEP)is an emergency intervention and the setup should be organized to provide the drugs (preferably within the first 2 hours, if not at least within the first 72 hours) .PEP should be started immediately after exposure until the test result confirms the HIV status of the victim. If the health worker is positive for HIV antibodies, from previous occupational or non-occupational exposure ,such individual should be directed to ART services.(5)

Post-exposure prophylaxis works by blocking viral replication: once percutaneous or mucosal exposure to HIV occurs, local replication of the virus occurs in tissue macrophages or dendritic cells. However, if the infection cannot be contained at this stage, it will be followed within 48 to 72 hours by the replication of HIV in regional lymph nodes. Viremia then follows within 72 to 120 hours of inoculation of the HIV virus. The importance of taking PEP should be given

considerable attention among healthcare workers, conversely, it is possible to avoid high-risk exposures by following good clinical practice(6).

1.2. Statement of the Problem

Each day thousands of healthcare workers worldwide suffer accidental occupational exposures to bloodborne pathogens.

In 2020, the national HIV incidence rate in the adult population is estimated at 0.9% with an estimated 15,000 new infections. In the presence of a high HIV/AIDS prevalence environment, HCWs and other employees are at risk of contracting HIV while performing their daily routine activities (7).

The average risk of HIV acquisition in a healthcare setting is 0.3% following hollow bore needle injury from an HIV-positive source and 0.1% following mucous membrane exposure.(8)

Cleaners working in the health care setting are highly exposed. however, they have relatively lower levels of knowledge and exposure to the means of infection prevention(9). Ethiopia has the relevant guidelines, however, it is necessary to assess its application to cleaners and phlebotomists.

Preventing HIV infection resulting from such accidental injuries at the workplace and the use of HIV Post-exposure prophylaxis is recommended by WHO. Provision of PEP to the exposed people may be insufficient, but additionally, initiation time, type of recommended regimen, completeness, and follow-up are determinant factors and crucial for PEP effectiveness. If started soon after exposure, PEP can reduce the risk of HIV infection by over 80%(10).

Although multiple types of research have been done on the assessment of knowledge, attitude, and practice of health workers toward PEP, almost none of them included phlebotomists in their research. It is usually about physicians and nursing staff. So this research will bring about an information that has not been previously provided and will additionally asses if there is any change in the clinicians' knowledge, attitude and practice after the country has been implementing PEP for several years.

In general awareness creation receives less attention in developing nations; hence the burden of endangering health professionals' lives as well as human power loss is high. And additionally this study will lay the groundwork for future research with a larger group of people.

2. Literature Review

A cross-sectional study done in Punjab, Pakistan in 2021 showed adequate knowledge among respondents; however, there was a gap between the knowledge and its practical application. Despite many of the healthcare workers having experienced risky occupational HIV exposure, a lack of reporting was noted in the study participants (11).

Among sub-Saharan Africa, the prevalence of occupational exposure is highest in Ethiopia, where the prevalence of HIV infection is also very high. (12)

A cross-sectional study was done among healthcare workers at Aba South local government, Nigeria in 2021. Most (86.6%) of respondents knew HIV PEP, 95.5% had positive attitudes toward PEP, and 83.2% had a poor practice of taking PEP. In this study, although knowledge of HIV PEP co-related significantly with their attitude, their PEP practice was significantly poor. Nearly 50% of them cited administrative issues as the reason for not taking PEP, while 35% claimed there was no specific reason. A small percentage (9.4%) of individuals reported the unavailability of PEP service in the hospital, around 5.1% of them believed it was unnecessary, while some (3.4%) were unaware of the necessity of taking PEP after exposure. (13).

A study done in Tanzania showed that 50.6% of healthcare workers who participated in the study experienced harmful occupational exposure(14). Studies conducted in Ethiopia revealed that the overall prevalence of blood/body fluid exposure and sharp injury was 78.3%(15)

An institutional-based cross-sectional study was done among healthcare workers at Mertule Mariam hospital and health center in 2021. 92.7% of respondents heard about PEP against HIV, 52.8% had negative attitude towards PEP. And there was delayed initiation of PEP and low use of PEP against HIV and primary reasons being absence of proper guidance, and reluctance.(16)

Another similar cross-sectional study was done in the Harari region, Ethiopia in 2019. This study showed that 35% of the participants had inadequate knowledge of PEP and 32.26% had an negative attitude toward PEP. Of the 57.1% exposed respondents, 68.4% tried to get PEP

service and 90.7% started to use PEP, however, only, 48.1% of respondents started PEP within 6 to 24 hours after exposure. The major reason for low practice of using PEP was fear of adverse effects of the drugs.(17)

In another cross-sectional survey conducted at Hiwot Fana Specialized Hospital in 2019, all the respondents had heard about PEP for HIV, and,83% of the participants had adequate knowledge of PEP for HIV and 87.5% of the study participants knew the preferable time to initiate PEP. However, a significant number (43.4%)of the workers had an unfavourable attitude toward PEP. In this study among 53 workers with potential exposure to HIV, 71.7% took PEP and only 44.8% completed the PEP correctly. The primary reason for PEP discontinuation was apprehension of its adverse effects and suspicion about its effectiveness.(18)

Another cross-sectional study from Debre Markos in 2017, revealed that 36.1% had inadequate knowledge of PEP against HIV and about 30.2% had an unfavourable attitude toward PEP and among 33.2% of occupationally exposed respondents only,43.3% took PEP and only 53.2% of health professionals started PEP within 1 hour of exposure. (19)

The study aimed to determine the knowledge, attitude and practice on occupational HIV exposure risk and PEP status of physician, nurse, midwife, phlebotomists and cleaners at SPHMMC.

3. Objectives

3.1. General Objective:

To assess the knowledge, attitude, and practice toward occupational HIV exposure risk and post-exposure prophylaxis among SPHMMC clinical staff, phlebotomists, and cleaners.

3.2. Specific objectives

- To assess the knowledge of occupational HIV exposure risk among clinical staff, phlebotomists, and cleaners.
- To assess the knowledge of PEP among clinical staff, phlebotomists, and cleaners.

- To assess the attitude of PEP among clinical staff, phlebotomists, and cleaners.
- To assess the practice of PEP among clinical staff, phlebotomists, and cleaners who have been exposed.
- To assess the associated factors with knowledge, attitude, and practice on occupational HIV exposure and PEP.

4. Methodology

4.1 Study Setting

St. Paul's Hospital Millennium Medical College is located in Addis Ababa, Ethiopia. It is highly specialised tertiary hospitals in Ethiopia, and it has a bed capacity of 700 inpatients and manages more than 2000 outpatients. The college has 1892 clinical staff and 730 cleaners. There are 5 professors, 42 Associate professors, 371 Assistant professors, 124 general practitioners, 115 Midwives, 1095 nurses, 88 medical lab staff and 52 phlebotomists.

This research was done in paediatrics, internal medicine, gynaecology, surgery, laboratory, renal transplant unit, psychiatry, ENT, and ophthalmology units.

4.2 Study Design and Period

An institutional-based cross-sectional study was conducted and the study period was from September 1, 2023 to October 1, 2023.

4.3 Eligibility Criteria

Inclusion Criteria

All clinical staff, phlebotomists, and cleaners working at SPHMMC.

Exclusion Criteria

Staff on leave during the study period.

4.4 Sample Size and Sampling Procedure

The sample size was determined by using the following formula.

$$n = \frac{[z^2 * p(1-p)] / e^2}{1 + [z^2 * p(1-p)] / e^2 * N}$$

n-the desirable calculated sample size

p = 83% (from a study done at Hiwot Fana Hospital in 2019, 83% had adequate knowledge of postexposure prophylaxis for HIV).

z-is the value of the standard normal value

(1.96)

At α level of 95 % confidence

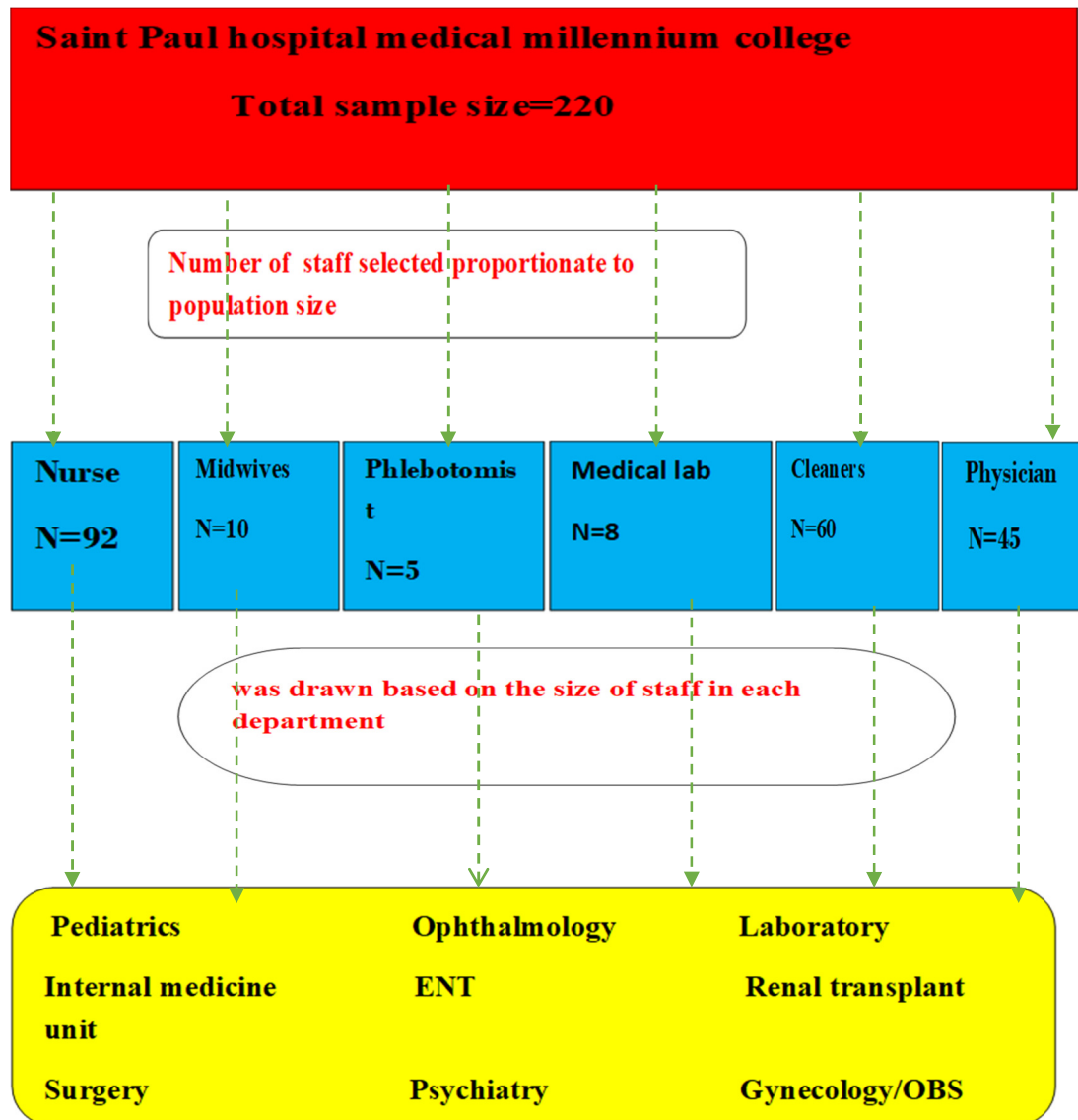
e-margin of error = 0.05

N....total source of the population is 2622

Based on this, the sample size is = 220 (adding, a 10% non - respondent rate).

4.5 Sampling techniques; stratified random sampling technique was used

Figure 1 Proportional allocation of study subjects to each department on occupational exposure of HIV and post exposure prophylaxis, n=220, October 2023.



4.6. Measurement

4.6.1. Study Variables:

Independent Variable:

- Age, sex, marital status, profession, level of education ,work experience ,department, and training on HIV risk of transmission and Post-exposure prophylaxis.

Dependent Variable:

- Knowledge of occupational HIV exposure risk,

Knowledge, attitude, and practice toward HIV post-exposure prophylaxis.

Associated factors with knowledge, attitude, and practice in occupational HIV exposure and PEP.

4.7. Data Collection and Procedures:

A structured questionnaire was used to assess knowledge, attitude, and practice. It was adapted from two previous studies and was modified for the current study.

Demographic variables followed by questions assessing knowledge of occupational HIV exposure risk and HIV PEP, respondents' attitudes toward HIV post-exposure prophylaxis and practice of PEP was collected.

4.8. Data Quality Control and Management

The questionnaire was pretested in 5 % of the projected sample size to check its feasibility and look what should have been left/needs to be added. The findings of the pre-testing weren't included in the main study. The primary investigator supervised data collection and the data was checked for accuracy and completeness until it is finalized.

4.9.Data Analysis and Procedures:

Each data set was coded to Microsoft Excel, and then exported to SPSS Version 25, for descriptive and analytic process. The results were presented in tables, charts, and narratives. A chi-square test was used to assess the association between dependent and independent variables.

A confidence level of 95% and a p-value of less than 0.05 was taken as Statistically significant.

4.10 Operational definitions (20)

Occupational HIV exposure risk:

Refers to the likelihood or probability of HIV transmission occurring to individuals who working in health care setting in which exposure to blood, bodily fluids or other potentially infectious materials is a common occurrence.

HIV/AIDS PEP: This is a short-term antiretroviral treatment to reduce the likelihood of HIV infection after potential exposure.

Good knowledge: Respondents who score $\geq 70\%$ on the knowledge questions. (20)

Poor knowledge: Respondents who score $< 70\%$ on knowledge questions

Favourable attitude: Respondents who score $\geq 70\%$ on the attitude questions. (20)

Non-favourable attitude: Respondents who score $< 70\%$ on the attitude questions.

Similarly, the practices were evaluated based on correct responses stipulated by guidelines.

4.11. Ethical Consideration

Ethical clearance was provided by the Institutional Review Board (IRB) of Saint Paul Hospital Millennium Medical College. The study's aim was well described, and each respondent gave written formal consent. Data confidentiality was protected by using codes, no personal identifiers were recorded .

4.12. Dissemination of Results

The findings of the study will be reported to the SPHMMC Department of Paediatrics and Child Health. It will also additionally it will be presented at professional society meetings.

The final write up of the manuscript will be submitted for publication on a peer-reviewed journal.

5. Results

5.1. Sociodemographic Characteristics.

A total of 220 staff were involved, of which 123 (55.9%) were female. Most of the respondents, 137(62.3%), were in the age group of 31 to 40 years.

The majority of the participants were nurses 92(41.8%), followed by cleaners 60(27.3%), physician 45(20.5%), midwives 10(4.5%), medical lab 8(3.6%) and 5(2.3%) were phlebotomists.

Also majority of the participants were working in paediatrics department 55(25.0%), followed by gyn/obs 46(20.9%), internal medicine 43(19.5%), Ophthalmology 9(4.1%) and laboratory 8(3.6%).

From the participants 54.1% had 1 to 3 years of work experience and 16(7.3%) had more than 5 years as shown in Table 1.

Table 1: Socio-demographic characteristics of health care providers, n=220, Addis Ababa, October, 2023

Variables	Category	Frequency
Age	21-30	63(28.6)
	31-40	137(62.3)
	41-50	20(9.1)
Gender	Male	97(44.1)
	Female	123(55.9)
Marital status	Married	92(41.8)
	Single	115(52.3)
	Divorced	13(5.9)
Profession	Physician	45(20.5)
	Nurse	92(41.8)
	Cleaner	60(27.3)
	Phlebotomist	5(2.3)
	Medical lab	8(3.6)
	Midwives	10(4.5)
Specialty	Pediatrician	6(13.3)
	Internist	13(28.9)
	Surgeon	12(26.7)
	Gynecologist	5(11.1)
	Psychiatrist	6(13.3)
	Ophthalmologist	2(4.4)
	Not specialized yet	1(2.2)
Currently working Department	Gyn obs	46(20.9)
	Internal Medicine	43(19.5)
	Surgery	22(10.0)
	Pediatrics	55(25.0)
	laboratory	8(3.6)
	Ent	11(5.0)
	Psychiatry	11(5.0)
	Renal transplant	15(6.8)
	Ophthalmology	9(4.1)
Experience in years	<1	25(11.4)
	1-3	119(54.1)
	4-5	60(27.3)
	>5	16(7.3)
Educational level	Diploma	20(9.1)
	BSC	90(40.9)
	MD	1(0.5)
	MSC	10(4.5)
	Certificate	55(25.0)
	Specialty certificate	44(20.0)

5.2 Knowledge of occupational HIV exposure risk

Most of the participants, 210(95.5%) had information about how HIV can be transmitted in the workplace. However overall occupational HIV exposure risk knowledge was poor which was 54.5%.

Out of the 74 participants who received training, 6 individuals (8%) were uncertain about how to prevent occupational HIV exposure in the workplace.

Out of the participants who provided the correct response regarding the immediate measures to be taken after occupational exposure, a total of 75% (165 individuals) indicated that irrigating with clean water or saline and washing the wound with soap and water are the recommended actions

However, 25.0 % (55) of staff answered as squeezing and washing with alcohol or disinfectant the exposed area which is not recommended(table 2).

Table 2: Knowledge of occupational HIV exposure risk characteristics of SPHMMC staffs, n=220, Addis Ababa, October, 2023

Items	Category	Frequency	Percent
Do you know how HIV can be transmitted in the workplace	Yes	210	95.5
	No	10	4.5
*Means of transmission	Blood splash	44	20.0
	Needle injury	56	25.5
	During the surgical procedure	19	8.6
	direct contact with the patient	12	5.5
	1,2 and 3	79	35.9
Rate of transmission from HIV-positive sources?	0.1% from cut exposure	45	20.5
	0.3% from needle stick injury	89	40.5
	0.3% from blood splash to mucous membrane	68	30.9
	I'm not sure	18	8.2
Confer high-risk HIV transmission?	Visible blood on the device	38	17.3
	Injury with a hollow needle	72	32.7
	Exposure to the small volume of blood	14	6.4
	Injury with a solid needle	19	8.6
	1 and 2	77	35.0
Initial action taken immediately after exposure?	Wash the wound with soap and water	43	19.5
	Irrigate with clean water or saline	75	34.1
	Squeeze and wash with alcohol or	55	25.0

	disinfectant		
	1 and 2	47	21.4
Trained on how to prevent occupational HIV exposure?	yes	74	33.6
	no	146	66.4
* Prevention of occupational HIV exposure?	Wearing gloves during body fluid/blood sample-taking	28	38
	Proper disposal of sharp immediately	18	24
	washing hands after patient contact	13	18
	wearing goggles during procedure	6	8
	wearing apron during attending delivery	3	4
	I'm not sure	6	8
Overall knowledge of occupational HIV exposure risk	Poor Knowledge	120	54.5
	Good Knowledge	100	45.5

***if yes**

5.3.Knowledge of the staff about PEP for HIV

Majority , 90.5% (199) of staff have ever heard about PEP and a significant percentage 80.9% (178) of them know the meaning of PEP. About 45.5% (100) of the respondents were aware of the best time to begin a PEP following exposure. The majority 74.1% (163) of the participants know the availability of protocol in the institution. However only ,32.3% of the participants correctly answered the effectiveness of PEP. Only 45.5% respondents answered correctly about the preferable time to start PEP.

The results of the study show that 50.9% (112) of the respondents have poor knowledge of PEP for HIV.

Table 3: Knowledge of PEP for HIV among, SPHMMC staff, n =220, Addis Ababa, October, 2023

Items	Category	Frequency
Heard about PEP	yes	199(90.5)
	no	21(9.5)
Meaning of PEP	know	178(80.9)
	don't know	42(19.1)
PEP indicated	When the source patient is negative for HIV	12((5.5)
	When the source patient is known to be HIV positive	130(59.1)
	when the HIV status of the source is unknown	47(21.4)
	For any needle stick injury in the workplace	31(14.1)
Preferable time to start PEP	Within 1 to 2 hours	100(45.5)

	Within 6 hours	68(30.9)
	Within 72 hours	41(18.6)
	After 72 hours	11(5.0)
Duration of PEP	For 28 days	107(48.6)
	For 40 days	67(30.5)
	For 6 months	41(18.6)
	For Lifetime	5(2.3)
Is PEP available in your institution	yes	163(74.1)
	no	57(25.9)
Effectiveness of PEP	100%	34(15.5)
	80%	71(32.3)
	60-70%	31(14.1)
	30-50%	28(12.7)
	I'm not sure	56(25.5)
Overall Knowledge of HIV PEP	Poor knowledge	112(50.9)
	Good Knowledge	108(49.1)

5.4. Attitude of staff on post-exposure prophylaxis for HIV

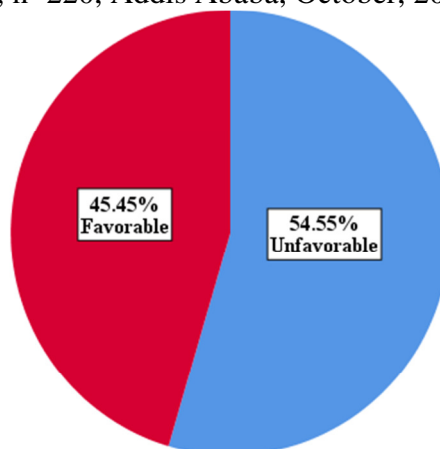
The majority of the respondents, 71.82% (158) know the availability of PEP guidelines in their workplace. Overall 54.55% (120) of the study participants did not agree on the usefulness of PEP of HIV. 26 of participants had negative attitude toward PEP use. Reason for negative attitude toward PEP was fear of side effect in 38.5%(10) ,no specific reason in 38.5 %(10) and 6 of them because of uncertain about whether a drug is effective or not from those thinking PEP is not important.

Table 4: Attitude of SPHMMC Staff toward post-exposure prophylaxis for HIV, n=220, Addis Ababa, October, 2023

Items	Category	Percent
Is PEP Important	Agree	176(80%)
	Disagree	26(11.82%)
	I'm not sure	18(8.18%)
** Reason for negative attitude toward PEP	Fear of side effects	10(38.46%)
	Uncertain about whether a drug is effective or not	6(3.08%)
	No specific reason	10(38.46%)
PEP guidelines should be available in the work area	Agree	158(71.82%)
	Disagree	62(28.18%)
PEP can reduce the likelihood of becoming an HIV positive	Agree	121(55.00%)
	Disagree	67(30.45%)
	I'm not sure	32(14.55%)
Is PEP indicated for any type of sharp injury?	Agree	64(29.09%)
	Disagree	132(60.00%)
	I'm not sure	24(10.91%)
PEP is indicated only if the source is a known HIV-positive patient?	Agree	59(26.82%)
	Disagree	136(61.82%)
	Not sure	25(11.36%)

** If disagree

Figure 2 Attitude of Staff on post-exposure prophylaxis for HIV among health care providers , n=220, Addis Ababa, October, 2023



5.5.Practice of PEP for HIV

Among all of the respondents, 23.2% (51) were exposed to HIV/AIDS risky conditions and 36(70.5%) didn't take PEP. The major reasons why these respondents didn't receive PEP following their exposure, were fear of adverse effects 27.78% (10) and 33.33% (12) because of HIV test result negative of patient . The major reason for receiving PEP was exposure to blood from a known HIV-positive patient 46.7 % (7) and 40% was due to exposure to blood from whose HIV status is unknown . Out of 15 respondents who took PEP 6 of them took TDF+3TC+DTG regimen and 5 respondents didn't remember the regimen (2 was nurse and 2 was cleaners). Among the 15 respondents who took PEP, 11 had completed the prescribed PEP and the rest four people discontinued . 2 were discontinued because of misassumption that the drug was not effective and the other 2 because of fear of adverse effects and assuming that it was enough.

Table 5: PEP usage among SPHMMC staff who have been exposed for potential HIV infected bloody/body fluids , n=51, Addis Ababa, October, 2023

Items	Responses	Percent
Have you ever been exposed to HIV risky conditions?	Yes	51(23.2)
	No	169(76.8)
*Have you taken PEP after occupational exposure	Yes	15(29.4)
	No	36(70.5)
** The reason for not taking PEP drugs	The source patient was HIV negative	12(33.33)
	Fear of adverse effects	10(27.78)
	Unavailability of PEP	2(5.56)
	Splash on intact skin	4(11.11)
	Unaware of PEP	4(11.11)
	Negligence	4(11.11)
* The Reason for receiving PEP	Exposure to blood from a known HIV-positive patient	7(46.67)
	Exposure to blood from whose HIV status is unknown	6(40.00)
	Injury from a sharp object	2(13.33)
After how many hours of exposure PEP initiated	Within 2 hours	1(6.7)

	Within 2-6 hours	4(26.7)
	Within 6-72 hours	10(66.7)
What regimen did you take	TDF + 3TC	2(13.33)
	TDF+3TC+DTG	6(40.00)
	TDF+3TC+EFV	2(13.33)
	I don't remember	5(33.33)
Have you completed the prescribed PEP	Yes	11(73.33)
	No	4(26.67)
**Reason for discontinuation of the PEP	Fear of adverse effects	1(25)
	Assuming that it was enough	1(25)
	Assuming that the drug was not effective	2(50)

* If yes

** If no

5.6. Factor associated with Knowledge of occupational HIV exposure risk

The relationship between staff knowledge (defined as score $\geq 70\%$) of occupational HIV exposure risk and their profession was found to be significant in our study. Additionally, no significant differences in knowledge of occupational HIV exposure risk were observed among different departments and years of work experience.

In our study, the majority of individuals with only certificates (those who didn't attend higher education) had poor knowledge, while the overall level of education did not show any significant impact on the value (Table 6).

Table 6: Factors associated with Knowledge of occupational HIV exposure risk among health care providers, n=220, Addis Ababa, October, 2023

Variable	Category	Knowledge of HIV		Chi-square	DF	P-value
		Poor, n(%)	Good, n(%)			
Age in years	21-30	28(23.3)	35(35.0)	4.835	2	0.089
	31-40	78(65.0)	59(59.0)			
	41-50	14(11.7)	6(6.0)			
Gender	Male	47(39.2)	50(50.0)	2.597	1	0.107
	Female	73(60.8)	50(50.0)			
Marital status	Married	47(39.2)	45(45.0)	1.631	2	0.442
	Single	64(53.3)	51(51.0)			

	Divorced	9(7.5)	4(4.0)			
Profession	Physician	17(14.2)	28(28.0)	6.415	1	0.011
	Non-physician	103(85.8)	72(72.0)			
Department	Pediatrics	30(25.0)	25(25.0)	9.495	4	0.050
	Internal Medicine	23(19.2)	20(20.0)			
	Surgery	17(14.2)	5(5.0)			
	Gyn/obs	18(15.0)	28(28.0)			
	Others	32(26.7)	22(22.0)			
Education	Certificate	37(30.8)	18(18.0)	5.049	2	0.080
	Diploma	9(7.5)	11(11.0)			
	Degree and above	74(61.7)	71(71.0)			
Work experience in years	<1	14(11.7)	11(11.0)	2.84	3	0.417
	1-3	60(50.0)	59(59.0)			
	4-5	38(31.7)	22(22.0)			
	>5	8(6.7)	8(8.0)			

A binary logistic regression analysis was performed to calculate adjusted odds ratios, which quantify the strength of the relationship between the independent variables and the outcome. Phlebotomists were found 2.7 (AOR=2.7, 95% CI (0.212-5.5) times knowledgeable than other professional with respect to the knowledge about occupational HIV exposure risk. (table 6.1)

Table 6.1: Factors associated with Knowledge of occupational HIV exposure risk among health care providers, n=220, Addis Ababa, October, 2023

Profession		Sig.	OR	95% CI for Exp(B)	
				lower	upper
	Physician	0.449	0.583	0.145	0.852
	Nurse	0.213	0.429	0.113	0.625
	Cleaner	0.034	0.222	0.055	0.895
	Phlebotomist	0.447	2.667	1.212	5.486
	Medical lab	0.347	0.400	0.059	0.702
	Midwife	0.23	0.343	0.23	0.442

5.7. Factor associated with knowledge of PEP for HIV

The knowledge of staff about post-exposure prophylaxis is significantly related to their gender, marital status, profession, working department, and educational level (Table 7).

Nearly two third (57.4 %) of male participant's had good knowledge on PEP for HIV. Out of all study participants 25% of gyn/obs staff had good knowledge on PEP for HIV and 32% of paediatrics staff had poor knowledge on PEP for HIV.

Table 7: Factors associated with knowledge of PEP for HIV among respondent at SPHMMC, n=220, Addis Ababa, October, 2023

Variable	Category	Knowledge of PEP		Chi-square	DF	P-value
		Poor, n(%)	Good, n(%)			
Age in years	21-30	32(28.6)	31(28.7)	0.326	2	0.850
	31-40	71(63.4)	66(61.1)			
	41-50	9(8.0)	11(10.2)			
Gender	Male	35(31.3)	62(57.4)	15.261	1	0.000
	Female	77(68.8)	46(42.6)			
Marital status	Married	37(33.0)	55(50.9)	7.363	2	0.025
	Single	68(60.8)	47(43.5)			
	Divorced	7(6.3)	6(5.6)			
Profession	Physician	4(3.6)	41(38.0)	39.968	1	0.000
	Non-physician	108(96.4)	67(62.0)			
Department	Pediatrics	36(32.1)	19(17.6)	14.037	4	0.007
	Internal Medicine	17(15.2)	26(24.1)			
	Surgery	7(6.3)	15(13.9)			
	Gyn/obs	19(17.0)	27(25.0)			
	Others	33(29.5)	21(19.4)			
Work experience in years	<1	13(11.6)	12(11.1)	0.56	3	0.906
	1-3	58(51.8)	61(56.5)			
	4-5	32(28.6)	28(25.9)			
	>5	9(8.0)	7(6.5)			
Education level	Certificate	38(33.9)	17(15.7)	13.398	2	0.001
	Diploma	13(11.6)	7(6.5)			
	Degree and above	61(54.5)	84(77.8)			

Binary logistic regression was conducted to generate adjusted odds ratios that measure the degree of association for those significant p value and the result showed physicians and phlebotomists had twice the level of knowledge on HIV PEP compared to other staff members . Male staff members had 2.3 times the level of knowledge on HIV PEP compared to female staff members.

Specialists with a certificate and medical doctors were found to have three and two times more knowledge on HIV PEP, respectively, compared to individuals with other educational levels..

Table 7.1: Factors associated with knowledge of PEP for HIV among respondents, n=220, Addis Ababa, October, 2023

		Sig.	AOR	95% C.I.	
				Lower	Upper
Profession	Physician	0.324	2.061	1.490	8.665
	Nurse	0.084	0.307	0.080	1.171
	Cleaner	0.004	0.118	0.028	0.502
	Phlebotomist	0.447	2.23	0.212	3.486
	Medical lab	0.347	0.400	0.059	2.702
	Midwives	0.530	1.500		
Sex	Male	0.003	2.314	1.329	4.027
	Female	0.000	0.424	0.01	0.855
Educational level	Diploma	0.000	0.077	0.018	0.321
	BSC	0.000	0.184	0.083	0.404
	MD	0.003	2.000	1.000	4.00
	MSC	0.007	0.095	0.017	0.528
	Certificate	0.000	0.076	0.027	0.213
	Speciality	0.002	3.000	1.00	2.23
	Certificate				

5.8. Factor associated with Attitude regarding PEP for HIV

The attitude of respondents towards post-exposure prophylaxis is significantly related to their profession and working department (Table 8).

There was no significant difference on attitude of respondents towards PEP for HIV with their work experience.

Table 8: Factors associated with Attitude regarding PEP for HIV among respondents, n=220, Addis Ababa, October, 2023

Variables	Category	Attitude		Chi-square	DF	P-value
		Unfavorable, (%)	Favorable, (%)			
Age in years	21-30	32(26.7)	31(31.0)	0.84	2	0.657
	31-40	78(65.0)	59(59.0)			
	41-50	10(8.3)	10(10.0)			
Gender	Male	50(41.7)	47(47.0)	0.629	1	0.428
	Female	70(58.3)	53(53.0)			
Marital status	Married	46(38.3)	46(46.0)	1.399	2	0.497
	Single	66(55.0)	49(49.0)			
	Divorced	8(6.7)	5(5.0)			
Profession	Physician	14(11.7)	31(31.0)	12.53	1	0.000
	Non-physician	106(88.3)	69(69.0)			
Department	Pediatrics	40(33.3)	15(15.0)	15.2	4	0.004
	Internal Medicine	27(22.5)	16(16.0)			
	Surgery	8(6.7)	14(14.0)			
	Gyn/obs	20(16.7)	26(26.0)			
	Others	25(20.8)	29(29.0)			
Work experience in years	<1	11(9.2)	14(14.0)	7.17	3	0.067
	1-3	72(60.0)	47(47.0)			
	4-5	26(21.7)	34(34.0)			
	>5	11(9.2)	5(5.0)			
Education	Certificate	35(29.2)	20(20.0)	3.105	2	0.212
	Diploma	12(10.0)	8(8.0)			
	Degree and above	73(60.8)	72(72.0)			

The binary logistic regression showed that the surgery staff had 1.5 times likelihood of having a positive attitude towards PEP for HIV than the respondents in other departments .

Table 8.1: Factors associated with Attitude regarding PEP for HIV among respondents , n=220, Addis Ababa, October, 2023

Department	Sig.	OR	95% C.I.	
			Lower	Upper
Paediatrics	0.006	0.323	0.145	0.719
medicine	0.107	0.511	0.226	0.157
Surgery	0.430	1.509	1.544	4.184
Gyn	0.778	1.121	1.508	2.472
Others	0.587	1.160	1.12	2.33

5.9. Factor associated with the practice regarding PEP for HIV among staff .

No any significant association between practice with age, gender, marital status, profession, department and educational level.

Table 9: Factors associated with practice regarding PEP for HIV among health care providers, n=220, Addis Ababa, October, 2023

Variables	Category	Practice		chi-square	DF	P-value
		Yes, n(%)	No, n(%)			
Age in years	21-30	15(29.4)	48(28.4)	0.075	2	0.963
	31-40	31(60.8)	106(62.7)			
	41-50	5(9.8)	15(8.9)			
Gender	Male	23(45.1)	74(43.8)	0.027	1	0.869
	Female	28(54.9)	95(56.2)			
Marital status	Married	21(41.2)	71(42.0)	0.538	2	0.764
	Single	28(54.9)	87(51.5)			
	Divorced	2(3.9)	11(6.5)			
Profession	Physician	10(19.6)	35(20.7)	0.029	1	0.864
	Non-physician	41(80.4)	134(79.3)			
Department	Pediatrics	17(33.3)	38(22.5)	5.571	4	0.234
	Internal Medicine	9(17.6)	34(20.1)			
	surgery	4(7.8)	18(10.7)			
	Gyn/obs	6(11.8)	40(23.7)			
	Others	15(29.4)	39(23.1)			
Education	Certificate	15(29.4)	40(23.7)	0.731	2	0.694
	Diploma	4(7.8)	16(9.5)			
	Degree and above	32(62.7)	113(66.9)			

6. Discussion

In this study, 54.5% of staff had poor knowledge of occupational HIV exposure risk, higher when compared to the study done in Tanzania in which one-third of healthcare workers did not have comprehensive knowledge of the causes of occupational HIV transmission risk(21).

In this study, 90.9% of participants have heard about PEP for HIV which is almost comparable to studies done in different governmental hospitals in Addis Ababa(91.3%)(22) but lower than the study done at Debreworkos (100.0%)(23). In this study, 49.1% had good knowledge of post-exposure prophylaxis, which is lower than similar studies from Hiwot Fana (83%)(18) and Gondar University Hospital (63.1%)(24). The reason may be due to different participants including cleaners in our study.

However, in our study knowledge about PEP was higher compared to the study in Cameroon in which 26.3% of the participants had good knowledge about PEP for HIV(25).

In this study, 45.5% of respondents had positive attitude. This is low compared to the study conducted in Uttarakhand, India 80.9% (26) and the study done in Addis Ababa 54.2%(27).

Also lower compared to the study done in a health center in Harari region 67.74%(17).

Above half 121(55%) of the participants in our study strongly believed that PEP can reduce the likelihood of acquiring HIV after being exposed. Also lower compared to done in Hiwot Fana Hospital 70.4% (18).

In this study, 51(23.2%) of the participants were exposed to HIV infected blood /body fluids and 15(29.4%) took PEP and only 11(73.33%) completed, whereas study done in Northern Nigeria of 76 health workers who had accidental exposure to HIV only 13% received PEP(28).

Study in the University of Botswana 107(53.7%) respondents had been occupationally exposed for HIV and among those 74.8% took PEP and 58 (72.5%) completed (1).

Study conducted in the Jimma, Ethiopia 174 (68.9%) HCWs had been exposed to HIV occupationally and majority 142 (81.6%) did not use PEP (29).

A study conducted in Gonder City, Ethiopia revealed that the major reason for individuals who didn't receive PEP following their exposure was negligence (49.6%) and negative HIV test result of patient (31.4%)(24). But in our study, the major reasons who didn't receive PEP were

because of the patient HIV test result was negative 12(33.33%) and fear of adverse effects 10(27.78%).

In the current study, the findings indicated that phlebotomists were found to be 2.7 times (AOR=2.7, 95% CI (0.212-5.5)) likely had knowledge about occupational HIV exposure risk compared to respondents of other professions but no study to compare with other . Surgery department staff had 1.5 times higher chances, of having a positive attitude towards PEP for HIV. The study in Asella shows an association between young age, female gender, low educational status, and low work experience with knowledge regarding PEP(30).

7. Limitation and strength of the Study

The study was a cross-sectional study conducted in a single institution in Ethiopia and the results of our findings may not be generalizable all over Ethiopia, however it will give you better perspective to referral centres regarding phlebotomists and cleaner.

8. Conclusion and Recommendation

More than half of the staff had poor knowledge of occupational HIV exposure risk and almost half of the staff had poor knowledge on postexposure prophylaxis against HIV/AIDS. The result shows that a significant number of individuals had a negative attitude and poor practice about postexposure prophylaxis. Therefore, formal training is needed to improve the knowledge of infection prevention and control including HIV PEP to the clinical as well as non-clinical hospital staff. We recommend future investigators conduct a prospective multi-center study for better generalization and outcome.

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Annex I: Questionnaire

Participants' information sheet and informed volunteer consent form for participants selected for the study

My name is_____ I am working as a data collector for the study being conducted as an assessment of knowledge, attitude, and practice toward occupational HIV exposure risk and post-exposure prophylaxis among SPHMMC clinical, cleaners, and phlebotomists' staff; I kindly request you to lend me your attention to explain you about the stud

Study title-: Assessment of knowledge, attitude, and practice toward occupational HIV exposure risk and post-exposure prophylaxis among SPHMMC clinical, cleaners, and phlebotomist staff.

Purpose of study: will be helpful to assess the knowledge, attitude, and practice toward occupational HIV exposure risk and post-exposure prophylaxis among clinical staff, phlebotomists, and cleaners of SPHMMC.

Procedure and duration: there are about 36 questions that will be answered and I will fill out the questionnaire by interviewing you. the interview will take around 30 minutes.

Risks and Benefits: The risk of participating in this study is very minimal, except taking some minutes, for the interview, there is no other risk that you will face. By participating in this study you will get knowledge on HIV exposure risk and PEP use indirectly the outcome of this study also will be a useful tool for the hospital management team to create awareness among staff.

Confidentiality: The information, which you provide us, will be confidential. There will be no information that will identify you. The finding of the study will be general for the study population. The questionnaire will be coded to exclude showing names; no references will be made in oral or written reports that could link participants to the research.

Right: Participation in this study is voluntary, you have the right to declare not to participate in this study.

Contact address: If you have any questions about the study or the procedures, please contact and communicate with the principal investigator at the following address: Dr. Derese Bekele, 0977329037, bekelederese87@gmail.com.

This questionnaire is designed for the assessment of knowledge attitudes and practice toward occupational HIV exposure risk and post-exposure prophylaxis among SPHMMC clinical, cleaners, and phlebotomists' staff.

100, Socio-demographic

101. Age (years)

A, < 20 B,21-30 C,31-40 D, 41-50 E,>50

102. Gender A, Male B, Female

103, Marital status A, Married B, Single C divorced

104, What is your profession?

A, physician B, Nurse C ,Cleaners, D, Phlebotomists

E, Medical Laboratory F, Midwives

105. If physician, what is your specialty?

A, Pediatrician B, Internist C, Surgeon D, Gynecologist

E, psychiatrist F, Ophthalmologist G, not specialized yet

106, In which department are you working currently ?

A, Pediatrics B, Internal Medicine C, Surgery

D, Gynecology E, Laboratory F, ENT

G, Psychiatry H, Renal transplant unit I, ophthalmology

107, Work experience in years

A, <1 B,1-3 C,4-5 D,>5

108, Educational level

A, Diploma B, BSC C, MD D, MA E, Certificate F, Specialty Certificate

200, Knowledge of occupational HIV exposure risk

Instructions: Please circle the possible answer more than one is possible in some questions

201, Do you know how HIV can be transmitted in the workplace? **A, yes** B, NO

202, If yes, what means of transmission do you know?

A, Blood splash C, During the surgical procedure

B Needle injury D, Direct contact with the patient E,A,B and C

203, What is the rate of transmission from HIV-positive sources?

A, Estimated to 0.1% from cut exposure during surgery

B, 0.3% from needle stick injury

C, Estimated to 0.3% from blood splash to mucous membrane D, I'm not sure

204, which one of the following exposure risk confers high HIV transmission?

A ,Visible blood on the device

B, Injury with a hollow needle

C, Exposure to the small volume of blood D, Injury with a solid needle E,A and B

205, What initial action should be taken immediately after exposure?

A ,Wash the wound with soap and water,

B, Irrigate copiously with clean water or saline

C, Squeeze and wash with alcohol or disinfectant D, A and B

206, Have you received training on how to prevent occupational HIV exposure?

A, Yes B, No

207, If yes, how can prevent occupational HIV exposure?

A, Wearing gloves during sample taking B, Proper disposal of sharp immediately

C, washing hands after patient contact D, wearing goggles during procedure

E, wearing apron during attending delivery F, I'm not sure

300, Questions on knowledge of HIV PEP

301, Have you ever heard about PEP A, Yes B, No

302, Do you know the meaning of PEP? A, Yes B, No

303, When does PEP indicated?

A, When the source patient is negative for HIV

B, When the source patient is known to be HIV positive

C, when the HIV Status of the source is unknown.

D, For any needle stick injury in the workplace

304, Preferable time to start PEP

- A, Within 1 to 2 an hour B, Within 6 hours C, Within 12 hours
D, After 72 hours

305, Duration of ART intake for PEP

- A, For 28 days B, For 40 days C, For 6 months D, For Lifetime

306, Is protocol on PEP available in your institution A, Yes B, No

307, Effectiveness of PEP

- A, 100% B, 80% C, 60-70% D, 30-50% E, I'm not sure

400 Attitudes toward HIV PEP

401, Is PEP important? A, Agree B, C, I'm not sure

402, If your answer is Disagree for previous Q401, why?

- A, Fear of side effects
B, Uncertain about whether a drug is effective or not
C, No specific reason

403, PEP guidelines should be available in the work area? A, Agree B, Disagree

404, PEP can reduce the likelihood of becoming an HIV positive

- A, Agree B, Disagree C, I'm not sure

405, How do you see saying that PEP is indicated for any type of sharp injuries

- A, Agree B, Disagree C, I'm not sure

406, What is your opinion on the believe that PEP is indicated only if the source is known

HIV positive patient? A, Agree B, Disagree C, I'm not sure

500, The practice of PEP for HIV

501, Have you ever been exposed to risky condition which might transmit HIV to you?

- A, Yes B, No

***If your answer is YES 501 Proceed to the next questions**

502, Have you taken PEP after occupational exposure

A, yes B, No

If your answer is NO to Q502

503, The reason not taking PEP drugs

A, Source patient was HIV negative B, Fear of adverse effects

C, Unavailability of PEP, D, Splash on intact skin

E, Unaware of PEP F, Negligence

504, If **Q502 YES**, what was the Reason for receiving PEP

A, Exposure to blood from a known HIV-positive patient

B, Exposure to blood from whose HIV status is unknown

C, Injury from a sharp object

505, After how many hours of exposure PEP initiated

A, Within 2 hours B, After 2-6 hours C, After 6-8 hours D, After 72 hours

506, What regimen did you take ?

A, TDF + 3TC C, TDF+3TC+DTG B, AZT + 3TC

D, TDF+3TC+EFV/LPV/r/ AZT/r F, I don't remember

507, Have you completed the prescribed PEP A, Yes B, No

508, **If Q507 NO**, Reason for discontinuation of the ART for PEP

A, Fear of adverse effects B, Assuming that it was enough

C, Assuming that the drug was not effective

Assurance of Investigator

I undersigned resident agrees to accept all responsibilities for the scientific and, ethical conduct of the research project and provision of required progress reports as per terms and conditions of the Research and Publication Directorate and /or Department of Public Health of St. Paul's Hospital Millennium Medical College.

Name of the resident

Signature..... Date...../...../.....

Name of the advisor.....

Signature..... Date...../...../.....