ADDIS ABABA UNIVERSITY
COLLEGE OF MEDICINE AND HEALTH SCIENCES

Utilization of Post Exposure Prophylaxis among HIV Exposed Health care workers and Nonoccupational exposure at TikurAnbessa Specialized Hospital, Addis Ababa, Ethiopia, 2017-2021: Aretrospective cross-sectional study

By:
Rediet Teshome, MD
Internal Medicine year III Resident department of internal medicine
College of Health Sciences, Addis Ababa University, Addis Ababa, Ethiopia

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By: Rediet Teshome, MD

Internal Medicine year III Resident department of internal medicine

College of Heath Sciences, Addis Ababa University, Addis Ababa, Ethiopia

Phone No. +251 913 09 42 36 Email: teshomerediet59@gmail.com

ADVISOR

Wondowssen Amogne, MD., PhD.

Associate professor of Internal medicine

Department of Internal medicine, College of Health Sciences

Addis Ababa University, Addis Ababa, Ethiopia

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DECLARATION

I, **Rediet Teshome,** declare that the thesis entitled, " **Utilization of Post Exposure Prophylaxis among HIV exposed health care workers and Nonoccupational exposure at Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia, 2017- 2021G.C** " is the result of my original work with guidance and supervision from my advisor which is detailed in the acknowledgement part. All the data collection and data analysis were undertaken by me; and I am responsible for this study's summary, conclusions and recommendations. I seriously declare that this thesis has not been submitted for the award of any academic degree or diploma in any university.

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Signature: _____

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Place: Addis Abeba University: Addis Abeba, Ethiopia

Approval of thesis submission

I hereby certify that I have read this thesis prepared under my direction and recommend that it can be accepted as fulfilling the thesis requirement.

Name of Thesis Advisor	Signature	Date
_____	_____	_____

Name of Department Head	Signature	Date
_____	_____	_____

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ABSTRACT

Background: -HIV is a major global public health issue, having claimed 38 million lives so far.Ethiopia is one of the most seriously affected countries in sub-Saharan Africa, with many people living with HIV/AIDS. HIV infection in health care facilities has become a significant health problem, especially in resource-poor settings.Health care workers are at risk of many diseases in health setups. There is a small but definite occupational risk of HIV transmission to health care workers. PEP is recommended to prevent the transmission of pathogens after potential exposure and further development of infection.If started soon after exposure, PEP can reduce the risk of HIV infection by over 80%.Although studies have found that awareness of PEP, no publication assesses utilization practice and subsequent follow-up in our institution.

Objective: -To evaluate post-exposure prophylaxis (PEP) utilization among HIV-exposed health care workers and nonoccupational exposures at Tikur Anbessa Specialized Hospital (TASH)Antiretroviral Treatment (ART) clinic from January 1, 2017- July 30, 2021.

Methods: -We conducted a retrospective cross-sectional study by reviewing the PEP registry book from January 1, 2017- to July 30, 2021, and follow-up data is collected by interviewing the exposed case. Data were entered using SPSS version 26, and descriptive analysis was done.

Result: -A total of 353 cases of occupational and nonoccupational exposure were reported to the ARTclinic; PEP was prescribed for 352 subjects with an average of 77 subjects/year. The mean age of the study participant was 27.3 ±7., the majority (57.2%) was male, Most (86.7%) of the exposure was occupational, 27% of occupational exposure was reported by residents, followed by nurses 26.1%. Of the occupational exposure, 30.4% were from different wards, followed by emergency, OPD (17.1%), andoperatingtheater (7. 2%). Of nonoccupational exposure, 48.9% of cases were due to sexual assault. Most (42.7%) of the exposure risk type was EC2 code type followed by EC3 code type (37.6%). The source patient HIV status was unknown in 65.9% for nonoccupational and 30% for occupational exposure. Two drugs (TDF/3TC) regimen was prescribed for 87.8% of cases. Over 90% of the exposures were reported within 24hrs of the incident, and 45.2% of the exposed cases had an adverse reaction. No seroconversions were reported.

Conclusion

In TASH,the ART clinic risk assessment, PEP initiation followed the national occupational and nonoccupational exposures guideline. The type of regimen selected was a case-by-case analysis, and there was more PEP request among the occupational exposure during the months between July to December.

Recommendation

We recommend providers should follow the exposed individuals within 48 hours, and ongoing follow-up, either by telephone call or, if possible, in person, to assess PEP tolerability and adherence.

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List of Abbrevations

AIDS-Acquired immunodeficiency syndrome

ART- Anti retroviral therapy

AZT- Zidovudine

CDC- Centers for disease control

DTG -Dolutegravir

FTC-Emtricitabine

EFV-Efavirenz

HCW-Health care worker

HIV- Human immunodeficiency virus

HCV- Hepatitis C Virus

HBV- Hepatitis B Virus

3TC-Lamivudine

PEP- Post exposure prophylaxis

PPE- Personal protective equipment

TASH- TikurAnbesa Specialized Hospital

TDF - Tenofovir

WHO - World Health Organization

Chapter: 1 Introduction

1.1 Background

Human immunodeficiency virus (HIV) is an infection that attacks the body's immune system, specifically the white blood cells called CD4 cells. HIV continues to be a significant global public health issue, in 2019, an estimated 38 million people were living with HIV, with a global HIV prevalence of 0.7% among adults. Most people living with HIV are located in low and middle income countries. Of the 4,500 people who contract HIV every day globally, 59% live in sub-Saharan Africa[1] Ethiopia is one of the countries long known for having a generalized HIV epidemic caused by unprotected sexual intercourse, similar to many East African countries.[2] Current adult HIV prevalence of 1.55%.[3]

HIV is transmitted primarily via unprotected sexual intercourse, contaminated blood transmission, hypodermic needles, skin contact with potentially infectious body fluids, and from mother to child. Health care workers (HCWs) are at risk of many infections in health setups[i][4], such as exposures to human blood and body fluids, placing them at risk for numerous bloodborne diseases, including human immunodeficiency virus (HIV).There is a small but definite occupational risk of HIV transmission to health care workers. The average risk of HIV transmission after percutaneous exposure to HIV-infected blood is approximately 0.3%, mucocutaneous exposures, 0.09% if the injured and/or exposed person is not treated within 24 h with antiretroviral drugs. [5]

According to the World Health Organization (WHO), it is estimated that about 3 million HCWs are exposed to bloodborne pathogens each year—occupational exposure causes approximately 170,000 HIV infections[6]. The global number of HIV infections among health care workers attributable to sharps injuries has been estimated to be 1000 cases (range, 200–5000) per year[7]. Prevention of virus transmission through the appropriate utilization of post-exposure prophylaxis is one of the effective strategies.

Animal models show that HIV replicates within dendritic cells of the skin and mucosa after initial exposure before spreading through lymphatic vessels and developing into a systemic infection [7]. This delay in systemic spread leaves a "window of opportunity" for post- exposure prophylaxis (PEP) using antiretroviral drugs designed to block replication of HIV [7]. PEP aims to inhibit the replication of the initial inoculums of the virus and thereby prevent the establishment of chronic HIV infection.[8]. Post-exposure prophylaxis (PEP) uses short-term antiretroviral therapy (ART) to reduce the risk of acquiring HIV infection following accidental occupational or nonoccupational exposure.[9]

1.2 Statement of the problem

The average risk of HIV transmission in a healthcare setting is 0.3% through percutaneous exposure to the blood of a source with HIV[10] and 0.09% after a mucous membrane exposure [11].The risk of sexual transmission depends on various factors like sexual exposure, viral load, stage of the infection, mucosal damage, and genital tract infection.[9] PEP is the only proven way of reducing HIV acquisition after occupational and nonoccupational injuries.

Both occupational exposure (accidental percutaneous exposure, mucocutaneous exposure or exposure to body fluids) and nonoccupational exposure (needle sharing among injection drug users, needle stick injury in the community, bite wounds, consensual sexual exposure after condom breakage and rape) cases request PEP drugs from ART clinic. [12]

Post-exposure prophylaxis (PEP) is of considerable interest. The Joint United Nations Program declaration on HIV and AIDS in 2011 confirms that HIV prevention must remain the cornerstone of the HIV response [13].When indicated, occupational exposures to HIV should be regarded as urgent medical concerns; chemoprophylaxis should be started as soon as possible (i.e., within a few hours) no later than 72 hours after exposure. [14]This evidence is mainly from animal studies that demonstrate the time-dependent efficacy of PEP within 72 hours of exposure [15]andfrom a few case-control studies.[10]Beginning the basic or expanded regimen until additional information is available is the best course of action, rather than delaying the start of treatment.[14]

If started soon after exposure, PEP can reduce the risk of HIV infection by over 80%.[16] PEP is not 100% effective. Various factors influence PEP effectiveness like time to start PEP, adherence, Source virus, and penetration of drugs into tissue compartments. [9]. Adherence to an entire 28-day course of ARVs is critical to the effectiveness of the intervention. Awareness of PEP and its availability for clinicians and those eligible to receive it is crucial to ensure that PEP is used to its full potential in any HIV prevention strategy.[9].

Clinicians should follow the exposed individual within 48 hours and ongoing follow-up to assess PEP tolerability, adherence. After obtaining a baseline HIV test within 72 hours of exposure, clinicians should obtain sequential confidential HIV testing of the exposed individual at sixweeks, 12 weeks, and six months post-exposure using rapid antibody testing [16].Different standard national guidelines set, indication, initiation time, type of regimen to be used, and subsequent follow-up. Still, there is no publication on the experience of PEP utilization in our institution.

1.3 Significance of the study

Each day thousands of healthcare workers (HCWs) worldwide suffer accidental occupational exposures to bloodborne pathogens. Ethiopia is one of the hardest-hit countries by the HIV/AIDS epidemic, with a national HIV prevalence of 1.55% in adults. [17] In the presence of a high HIV/AIDS prevalence environment, HCWs and other employees are at risk of contracting HIV during their duties and managing these patients' potentially infectious sources.

Preventing HIV infection resulting from such accidental injuries at the workplace and the use of HIV Post-exposure prophylaxis (PEP) is recommended by WHO/ILO[4]. Only providing PEP to these exposed people is insufficient because initiation time, type of recommended regimen, completeness, and follow-up are determinant factors and crucial for PEP effectiveness. The main aim of this study is to evaluate these determinant factors against the national protocol and WHO standards.

Evaluating the practice of PEP utilization is also helpful to provide relevant information on PEP, improve awareness among exposed victims, avoid unnecessary PEP use, and improve the practice of health care providers. After assessing the utilization practice of PEP, the hospital can be involved in giving training on the appropriate use of PEP in collaboration with this group.

Chapter: 2 Literature review

Human immune deficiency virus (HIV) is an infection that attacks the body's immune system, specifically the white blood cells called CD4 cells. [18]

Health care providers who have occupational exposure to blood are at risk for HIV infection. Through safer practices, barrier precautions, safer needle devices, and other innovations, the prevention of blood exposure is the best way to prevent infection with HIV and other bloodborne pathogens.[19-20]

The World Health Organization estimates the global burden of HIV infection from occupational exposure to be 2.5% among HCPs [17[20]]. It is estimated that 90% of these occupational exposures occur in the developing world due to a general lack of awareness, education, and structured training regarding prevention and measures to be taken in case of accidental exposure to HIV infection .18[21]

Surveillance of HIV Exposure and Post-exposure Prophylaxis Among Health Care Workers in Greece done Between January 1996 and June 2005, 188 cases of significant incidents of occupational exposure to HIV for which PEP was administered were reported. Most exposures involved physicians, who accounted for 37.8% of reports, followed by nursing personnel (18.6%).[22]

A cross-sectional study was conducted at Tygerberg hospital. Of the 160 participants who took part in the survey, 17 reported occupational exposure to HIV, and of the 17 exposed, 10(58.8%) reported needlestick injuries. Of those exposed, only 10 (58.8%) reported the incidents and went on post-exposure prophylaxis. However, only 6 out of the 10 completed their treatment. Half (50%) of the participants had inadequate knowledge of HIV post-exposure prophylaxis, 83.3% had good attitudes towards HIV, and 75% had good infection control practices [5, 24].

A descriptive study of all PEP cases following non-sexual exposure to HIV in Denmark from 1999–2012 shows a total of 411 cases of PEP were described. In total, 87.6% were occupationally exposed, while 12.4% were unrelated to the person's occupation, e.g., injury caused by discarded needles in public areas. Most occupationally acquired nurses, doctors and dentists suffered injuries.Most PEP indications were percutaneous exposures to blood from a hollow bore needle, most often an injection needle.

Overall, 67.2% of the source patients were known to be HIV-infected at the initiation of PEP. The percentage of source patients known to be HIV-infected was higher in occupational exposure cases than nonoccupational exposures, 69.3% vs. 53.1%.

The time from exposure to initiation of PEP was reported in 384 cases. Of these, 70.8% started within 12 h, and 95.3% started PEP within 24 h after the exposure. The overall median time to initiation was three h (0.15–37.0). The median time to initiation was shorter in cases with a known HIV-infected source than unknown HIV-status 2.5 h (0.25–37.0) vs. 3.5 h (0.15–36.5). The fastest time to initiation of PEP was found among cases with occupational exposure to a known HIV-infected source, at 2.0 h (0.25–28.5) [7, 25].

Demographic and clinical data on occupational exposures and their management were prospectively done at India shows of 1955 HCW, 557 exposures were reported. House staff, particularly interns, reported the greatest number of exposures. Personal protective equipment (PPE) was used in only 55.1% of these exposures. The incidence of high-risk exposures was 6.8/100 PY (n = 339); 49.1% occurred during a procedure or disposing of equipment and 265 (80.0%) received a stat dose of PEP. After excluding cases in which the source tested HIV negative, 48.4% of high-risk cases began an extended PEP regimen, of which only 49.5% completed it. There was no HIV seroconversion identified. (6)[23]

Retrospective review on registry data regarding occupational HIV exposures, the PEP regimens used, and the adverse events associated with PEP was performed at Thai University Hospital for five year-period, 820 episodes with occupational blood or body fluid exposures were reported, Nurses (27%) were the largest group at risk. The most common type of exposure was percutaneous injuries (82%). Only 125 (15%) HCWs had occupational exposures to HIV, 64 HCWs were prescribed HIV PEP, and 32 (50%) HCWs did not complete the PEP regimen as initially prescribed. [24]

A retrospective review of occupational exposure to HIV and subsequent postexposure prophylaxis among HCWs in King Chulalongkorn Memorial Hospital, Bangkok, Thailand, done From January 2002 to December 2004. There were 315 reported episodes of occupational exposure among 306 HCWs. Nurses (34.0%) were the HCWs most frequently exposed, and percutaneous injury (91.4%) was the most common type of exposure. One-third of the source patients tested were infected with HIV. PEP was initiated following 200 (63.5%) of the 315 exposures and was started within 24 h in >95% of cases. Fifty-six percent of HCWs given PEP completed a four-week course. Still, the remainder discontinued PEP prematurely due to side effects, or after negative results from the source, or following informed risk reassessment or from their own accord. No exposed HCW acquired HIV during the study period. [25]

A meta-analysis of 65 studies from 21 African countries published between January 2000 and August 2017 estimated pooled lifetime and 12-month prevalence of occupational exposure to body fluids were 65.7% (95% confidence interval, CI: 59.7-71.6) and 48.0% (95% CI: 40.7-55.3), respectively. The risk of exposure was higher

among healthcare workers with no training on infection prevention and those who worked more than 40 hours per week.[26]

A descriptive cross-sectional study done at Dodoma in central Tanzania shows that 27.1% of the HCWs had experienced exposure to blood and body fluids, of which 71.7% had needle stick injuries. Medical attendants were more frequently exposed, followed by nurses. Of the exposed HCWs, 11.7% reported the use of HIV PEP[27].

Another study was done at Singida Region, Tanzania, out of 239 participants, 50.6% experienced occupational exposure. Two leading types of exposure were blood splash, 47.1%, and needle stick injuries, 37.2%. 68.6 % of the participants reported the exposure incident, 75.2% had an HIV test, 26.4% started HIV PEP after testing, 23.1% completed HIV PEP, and 53.7% had a follow-up HIV test. About two-thirds of participants reported that HIV PEP services were available when the study was conducted, and 20.5% reported daily access to HIV PEP services. [28].

A self-administered questionnaire was given to 224 participants (including 98 HCWs and 126 students) in Mbarara Hospital, Uganda. Of the 224 participants surveyed, 19.2% reported having sustained injection needle stick injuries in the previous year, of which 4.46% occurred with HIV-infected blood. Other reported injuries were cannula needle stick injury (0.89%), suture needle stick injuries (3.13%), scalpel cut injuries (0.45%), and mucocutaneous contamination (10.27%). The most affected groups were nurses-midwives for scalpel injuries and students for stick injuries. The predisposing factors reported included lack of protective devices and recapping of needles. Exposures were under-reported. The uptake of PEP was also low. [29]

In an institutional-based cross-sectional study done in Gondar town from January 20 to February 30, 2018, on the prevalence of occupational exposure to blood and body fluids, 241 (87%) study participants were exposed to blood and other bodies fluids in their lifetime.Among those exposed, almost half, 90 (49.7%), were exposed two or three times per year.Factors associated with occupational exposure to blood and body Fluidsshowed the lack of readily available/shortage of personal protective equipment, lack of training on infection prevention, and Khat chewing, and profession/being a medical doctor were significantly associated risk factors with occupational exposure to blood and other body fluids.[30]

A descriptive cross-sectional institution-based study was conducted in selected four health institutions in Debre Berhan town. This shows the overall prevalence of occupational exposure of the health care workers was 88.6% in the 12 months. Contact to potentially infectious body fluids accounts for the largest proportion (56.7%), followed by needle stick injury (31.5%) and glove breakage (28.8%)[31]

A retrospective study evaluated Post-Exposure Prophylaxis Utilization Among Human Immunodeficiency Virus Exposed Victims at the University of Gondar. A total of 309 patients PEP was prescribed during the study period, of whom 239 (77.34%) were occupational victims, and 55 (17.8%) were rape victims. Blood and blood product splashes exposed occupational victims, and nurses and physicians were exposed almost equally, 14.24% and 13.92%, respectively.In this study, 285 (92.23%) subjects received prescriptions containing three-drug regimens, tenofovir + lamivudine + efavirenz, followed by nine victims (2.91%) with two-drug regimens; zidovudine + lamivudine[32]

Chapter 3. Objective of Study

3.1 Objectives

3.1.2 General objective

The objective of this study is to Evaluate Utilization practice of post-exposure prophylaxis among Occupational and Nonoccupational exposure at TikurAnbessaSpecialized Hospital

3.1.2 Specific Objective

1. To evaluate utilization practice of post-exposure prophylaxis among occupational exposure at TASH ART clinic
2. To evaluate utilization practice of post-exposure prophylaxis among nonoccupational exposure atTASH ART clinic
3. To assess the pattern of PEP requests among the health care worker the at TASH ART clinic

Chapter: 4 Methods and Materials

4.1 Study area

This study was conducted in TASH, situated in Addis Ababa, Ethiopia's capital and largest city.This main government-owned tertiary hospital offers comprehensive health care service for more than half a million patients per year through specialty clinics and inpatient service departments. The study was conducted in ART Clinic at TASH, where exposed subjects seek PEP.

4.2 Study design and period

A hospital-based retrospective cross-sectional registry review conducted at ART clinic in TASH, all registered victims from January 1, 2017-July 30, 2021,included

4.4 Source Population

All HCW were exposed to potentially infectious sources of HIV, and all people visited the ART clinic at TASH who came to seek PEP.

4.4 Study Population

All victims who were potentially exposed to infectious sources and who started PEP from January 1, 2017-, July 30, 2021, at the TASH ART clinic

4.5. Eligibility Criteria

4.5.1 Inclusion criteria

- All occupational exposure reported to TASH ART clinic and requested PEP from January 1, 2017- July 30, 2021
- All nonoccupational exposure reported to TASH ART and whorequest PEP from January 1, 2017- July 30, 2021

4.6 Sampling

All occupational and nonoccupational HIV exposure recorded on registry book from January 1, 2017-July 30, 2021, is included using convenient sampling

4.7 Variables

4.7.1 Independent Variables

- Age, Sociodemographic characteristics, Gender
- Occupation of the exposed HCW
- Ward
- HIV status of the source

4.7.2Dependent Variables

- Type of exposure
- ARV drugs initiation time
- ARV regimen
- Duration of ARV drugs
- Adverse events and outcome

4.8. Data Collection Method and Tool

After getting an approval letter from the ethical Review Board (IRB) of the College of Health Sciences, the PEP registry review was done using the data abstraction form. Follow-up data were collected by interviewing the exposed cases.

4.9 Data analysis technique

After checking the collected data for completeness,data were analyzed using SPSS version 26, comparison b/n groups for the categorical variablewere analyzed using Chi-Square, and frequency was done. The result was presented as graphs, tables, and figures.

4.10Operational Definitions

Occupational Exposure

Procedures that expose the HCWs and other occupational accidentally to risks of infection during their work

Nonoccupational Exposure

Conditions that expose people other than HCWs to a risk of infection

Healthcare Workers

Health professionals working in healthcare settings who have the potential risk for exposure to infectious materials or conditions

Exposure to HIV Risk Conditions

HCWs and other occupational exposure to HIV risk sources, such as blood, patients'/clients' body fluids, needle prick/sharps injury at their workplace.

Post-Exposure Prophylaxis

PEP is an emergency medical response that can protect individuals exposed to HIV and short-term ART drugs to reduce the likelihood of HIV infection after potential exposure, either occupational or through sexual intercourse. It consists of counseling, laboratory tests and/or medication.

Regimen

This is the prescribed course of medical treatment, diet, or exercise to promote or restore health.

Ward

Adivision in a hospital, which is a large room in a hospital with a number of patients often requiring similar treatment.

4.11Ethical Consideration

After obtaining ethical approval from the department's research and ethics committee, the study was conducted..Data were checked from the registry book using the patient card number. The names not included, on data abstraction format again coded with different numbers, and for the follow-up data first,the purposes and importance of the study were explained. Willing patients participated after getting oral consent.

4.12 Result dissemination plan

The final result from the study will be submitted to the Addis Ababa University School of Medicine Internal medicine department's research committee, and the result will be used for a future training plan, practice change, quality of care improvement. It will be published.

Chapter: 5 Result

5.1 Sociodemographic characteristics and pattern of PEP prescription

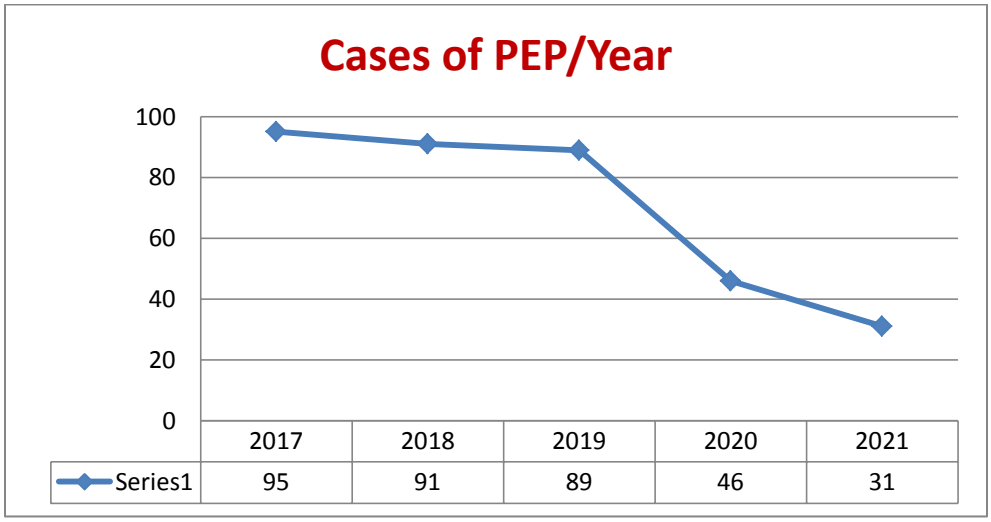
In this study,353 cases of occupational and nonoccupational exposure to possible HIV infection were reported to the ART clinic during the 55-month study period from January 2017 to July 2021. PEP ARV drug was prescribed for 352 cases, for a mean of 76.8 subjects per year with decreasing pattern 91case/yr in 2017 to 31 subjects in 2021(7months) (Graph1). The mean ±SD age of the study participants was 27.3 ±7. The majority of 202 (57.2%) was male, 150 (42.6%) was female, and most (86.7) of the exposure was occupational(Table1).

Table 1 : Socio demographic characteristics

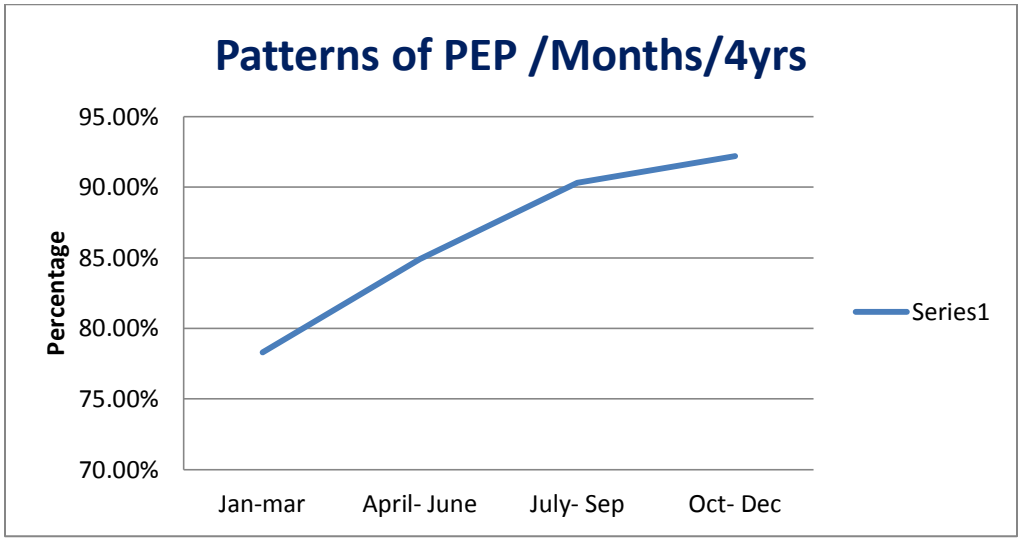
		Count	Percentage %
Sex	Male	202	57.2%
	Female	151	42.8%
Age_categorized	11-25	160	45.3%
	26-40	172	48.7%
	>40	21	5.9%
Cause of exposure	Occupational	306	86.7%
	Non occupational	47	13.3%

The year 2021 was not included because it was difficult to see the PEP pattern before submitting the thesis.Of the total exposures within the 48 months, by dividing the 4ys yr into four seasons(season1-65(78.3%) – January –march/4yrs,season 2- 73(84.3%) April- June, /4yrs season 3 -80(90.9%) July – September/4yrs, season 4-59(92.2%)October- December/4yrs) was occupational cases, with an increasing pattern of occupational cases seen in season 3 and season 4, with ($P<0.05$)Graph 2.

Graph 1: Case of PEP /YEAR



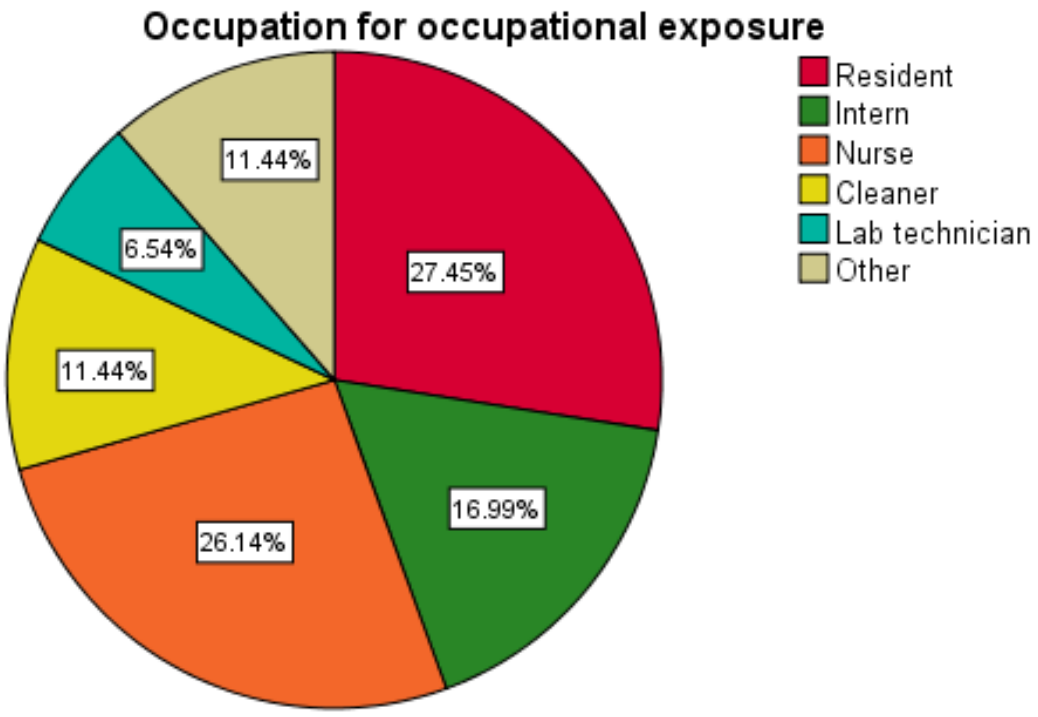
Graph:2 Patterns of PEP cases /Months/4yrs



Of the occupational exposure, 84(27.45 %) were Residents by profession, 80(26.1%) were nurses, 52 (17 %) were Intern, 35(11.4%) were cleaners, 20(6.5%) were lab technicians, 8(2.3 %) were midwives and others (11.4%). (**Figure: 1).**Of 47 nonoccupational exposures, 23(48.9%) cases were rape, and 24 (51.1%) cases were other types of nonoccupational exposure. Among the residents 26(31.1%) were surgery residents, 13(15.5) were internal medicine resident, 11(13.1%) were orthopedics residents, 10 (11.9%) Emergency medicine residents8(9.5%) Gyn/OBS, 7(8.3%) were pediatrics resident andothers (11%)

92 (30.1%) of occupational exposure occurred at different wards, 70 (22.9%) occurred at Emergency OPD, 52 (17%) occurred at the operating theater, 22 (7.5%) occurred at laboratory case team, 21(6%) OPD and other case teams (15.7%).

Figure 1: Occupation for occupational exposure



5.2: Type of exposure and source status

Most (n: 150, 42.7%) of the exposure risk type was a major mucocutaneous exposure to a large volume of blood for longer duration or Mild percutaneous exposure, (EC2) code type according to the national compressive HIV guideline definition, Severe percutaneous exposure (EC3) accounted (n; 132, 37.6%) of cases and Mucocutaneous Exposure to small volume, (EC1) type occurred in (n: 42, (12.2%) of cases, 23 (6.6%)was rape case (Table 2).

Of 47 nonoccupational exposures,the majority 31(65.9%), the source HIV status was unknown, and 16 (34%) were positive for HIV. For occupational exposure, 109(35.6%), the source patient's HIV status

was positive with good immune status, 104 (33.9%) was HIV Positive with advanced disease, 92 (30 %.) of the source HIV status was unknown and one source tested negative for HIV. (Table 2)Baseline HIV test was negative in 339 (96%) cases, and there was no documentation for 14 (4%) cases.

Table 2 : Source patient HIV status * Type of Exposure

Count							
		Type of Exposure					
		EC1	EC2	EC3	Rape	other	Total
Source patient HIV status	HIV positive good immune status(SC1)	23	61	34	2	0	120
	HIV positive advanced disease(SC2)	5	42	61	0	0	108
	Unknown	14	47	37	21	4	123
Total		42	150	132	23	4	351

5.3: Type of PEP regimen

Two drug regimen (TDF/3TC) was prescribed for most 310 (87.8 %) cases, three-drug regimen TDF/3TC/EFV and TDF/ 3TC/ DTG used in 19(5.4%) and 21(5.9%) of cases, respectively.Another regimen (TDF/3TC, TDF/FTC) was prescribed for 2 cases, and one cases deferred PEP after the source patient tested negative. Table 3.

Table 3: PEP regimen

Type of Regimen		Number	Percent (%)
Valid	TDF/ 3TC	310	87.8
	TDF/3TC/EFV	19	5.4
	TDF/ 3TC/ DTG	21	5.9
	AZT/3TC	1	.3
	TDF/FTC	1	.3
	Not given	1	.3
	Total	353	100.0

5.4 Time initiation of PEP and follow up

The precise time from exposure to initiation of PEP was not documented on the registry book, but after interviewing the exposed person through telephone, could access 182 cases and of this 167 /182(91.7%) visit ART clinic within 24 hr, 14 /182 (7.6%) visit within 24 - 48hr, one case presented after 72hr, the other 171/353 come within 72 hr but no documentation on the precise time of PEP initiation.

Of 189 cases available data from the registry and telephone, 174(92%) took the entire course 28 days of PEP, 15(7.9%) didn't complete the entire course.

Follow-up HIV test was documented on registry book only for 34(9.6%)/352 of cases at 6week, 3month and six months (n; 22, 9, 3) respectively. All tested were negative for HIV after completing the PEP course. Totally from the registry book and interviewing the exposed cases 174 cases tested at one time and the HIV test post-exposure was negative,178/352(50.5 %) cases, there is no documentation, and couldn't access their serostatus after the PEP was given.

Documentation also not available on adverse reaction but from the exposed cases interviewed, 95 / 182 (52.1%) reported adverse reaction, 87/182 (47.8%) said no adverse reaction, for 170 /352 (48.2%) data couldn't access.

5.5 Discussion

PEP is provided at TASH ART Clinic free of charge for five days per week and 8hr/day, and a starter packis available at each case team for emergency exposure. According to the National consolidated guidelines for compressive HIV prevention care and treatment, PEP is recommended for exposure code type (SC1-EC1,SC1-EC2,SC1-EC3), (SC2-EC1, SC2- EC2, SC2-EC3) within 72 hr of exposure for both occupational and nonoccupational exposure.[16] Two or three-drug regimen is recommended according to the severity of risk exposure and background drug resistance at the population level.

This study evaluated the utilization of PEP among occupational and nonoccupational victim who visited the TASH ART clinic from 2017- 2021GC, and 353 victims was reported to art clinic mean of 76.8 PEP cases /year. A decrement pattern of PEP use in 2020 could be associated with Covid -19 pandemic in which fewer patient admission and elective procedure were observed,which could decrease exposure.This result is relatively higher than that of Denmark's research; the PEP case was29.4/yr. The higher PEP cases in our study could be due to the relatively higher prevalence of HIV, 0.9%[2] compared to the prevalence in Denmark, 0.1%[33]. Lack of protective equipment and high workload could increase exposure risk.[34]

The PEP request pattern is relatively increasingduring July-December among occupational exposure.The majority of occupationally acquired injuries were reported by Physicians (residents and intern doctors), nurses, and cleaners with the mean age of 27, which could be due to less years of experience.

Most of the exposures were determined to be high risk according to the national comprehensive HIV treatment guideline. Major mucocutaneous exposure to a large volume of blood for a longer duration or mild percutaneous exposure (EC2) accounted for 42.7%. Severe percutaneous exposure (EC3) is 13.2%, which needs a case-by-case decision by a clinician to select an ARV regimen. The need for strict adherence and early initiation of PEP was comparable to a study done at Tanzania that revealed blood splash and needle stick injury 47.1% and 37.2%, respectively.[28],difficult to compare to other studies due to documentation in this study registry book being labeled risk type.

The initiation of post-exposure prophylaxis should not be delayed by the availability of the source HIV test results in the settings with generalized HIV epidemics; it is reasonable to assume that all sources of unknown HIV status may pose a risk of infection. Therefore, PEP should be provided, and efforts should be made to ensure the early test of a source patientwith an unknown status to ensure that PEP is stopped,

following the negative test of the source patient. [35] Our study from all types of exposure found that 64.9 % of the source patients were HIV positive, and the source patient HIV statuses were unknown in 34.8 % of cases. PEP was offered for both groups and deferred for one case after the source tasted negative for HIV, according to the national guideline.

This result is comparable to the Danish registry review study where 67.2% of the sources were known-HIV-positive[33]. However, a similar study done at Gondar, 56.63% of the source weren't tested for HIV [32]. PEP was offered for 4% of exposed persons without knowing baseline serostatus, which isn't recommended by the national HIV guideline.

Two ARV drugs containing TDF/3TC (FTC) is effective and recommended by recent WHO HIV PEP guideline (Ref).[36] The National comprehensive HIV treatment guidelines for PEP recommend a three-drug regimen adding the newer drug dolutegravir (DTG) as the third drug. It is preferred in a high risk of ARV drug resistance, high-risk exposure, and when the source patient's HIV status is positive and advanced disease.[36][16] In this study, the two-drug regimen TDF/3TC was prescribed for 87.8 % of cases, and three-drug regimens TDF/3TC/EFV/ , TDF/3TC /DTG were prescribed for 5.4 and 5.9 % of cases, respectively. DTG containing a three-drug regimen was prescribed in recent exposure that occurred after 2019. Other studies in Brazil and the US military trauma hospital in Afghanistan show that two-drug regimens were prescribed 72% and 95 % of cases, respectively.[37][38]

But a study was done in Gondar university hospital [32] shows three (TDF/3TC/EFV) ARV regimens were prescribed in 85.2%, which is quite different from our study result. [39] Since most of the exposure in our study is high-risk, three-drug regimens could be preferred, and the clinician needs case-by-case analysis.

PEP should be initiated as early as possible (within 1-2hr) and not considered after 72hr of exposure to prevent transmission after potential exposure. The precise time from exposure to initiation of PEP was not documented on the registry book, interviewing from available data 91.7% of subjects initiated with 24hr. one case presented after 72hr and offered PEP because she insisted, But after72hr HIV infection may be established.

If PEP is prescribed then discontinued after 28 days, the risk of viral rebound with that inadvertent interruption in ART is significant. The associated risk of developing resistance to ART is also not

recommended by the guidelines.From Brazil studies, 52% of the HCWs started PEP within two hr of the exposure, and in another study at Gondar, 79.3% of exposed cases started PEP with 24.

In this study, follow-up documentation on HIV status after PEP is prescribed is poor; only 34 cases have documentation at six weeks, three months, and six months. However, there is a small but definitive risk of HIV transmission after occupational exposure;PEP is not 100% effective. Various factors influence PEP effectiveness like time starting of PEP after exposure, adherence, Source virus, and penetration of drugs into tissue compartments. [9] Adherence to an entire 28-day course of ARVs is critical to the effectiveness of the intervention and should be initiated as early as possible, ideally within 72 hr.[16]Adherence to 28 days of the entire PEP course was higher than Ghana study. Only 17.9 % were adhering among health care workers.[41], few datais available on adverse effectsof PEP among occupationaland nonoccupational exposure with the most commonly used drug TDF/3TC. In our study,52% of the study participant had an adverse reaction.

5.7: Limitation

This study has several limitations because of the retrospective record quality and couldn't access the follow-up status for all participants,which is one of the essential components of the PEP package.

5.6: Conclusion

In TASH ART clinic risk assessment, PEP initiation followed the national occupational and nonoccupational exposure guidelines. The type of regimen selected was a case-by-case analysis, and there is more PEP request from July- December.

5:7 Recommendation

We recommend clinicians should follow-up exposed individuals within 48 hours and ongoing follow-up, either by telephone call or if possible in person, to assess PEP tolerability and adherence.

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Annex: 1

Data abstraction format

1) Code of the chart ----------
2) Date of art clinic reporting / Date/ month/ yrs ----------
3) Age of the victim----------
4) Sex -

   A. Male 2. Female

5) Cause of exposure

   A. Occupational

   B. Non occupational

6) If Non occupational

   A. Sexual assault

   B. Other (Specify)

7) If occupational which profession

   A. Resident

   B. Intern

   C. Nurse

   D. Midwife

   E. Cleaner

   F. Lab technician

   G. Porter

   H. Health officer

   I. GP

   J. Student

   K. Other (specify)

8) IF Resident which department

   A. Ortho resident

   B. Surgical resident

   C. IM

   D. Pediatrics

   E. Emergency

   F. Gyn/obs

   G. Other (specify)

9) For occupational exposure which case team

A. Operating room

B. Ward

C. Labor ward

D. Emergency

E. Laboratory

F. OPD

G. Icu

H. Others (specify)

10) Type of Exposure

A. Mucocutaneous Exposure small volume, Mild percutaneous exposure (EC1)

B. Large volume mucocutaneous Exposure(EC20

C. Severe percutaneous Exposure (large bore hollow needle, deep puncture) (EC3)

D. Rape

E. Other

11) Source patient HIV status

A. Hiv positive good immune status (SC1)

B. Hiv positive advanced disease (SC2)

C. Hiv status unknown

D. Negative

12) Type of PEP regimen

A.TDF/ 3TC

B. TDF/3TC/EFV

C. TDF/ 3TC/ DTG

D. AZT/3TC

E. Other

13. Treatment completed

A. Yes

B. No

C. Unknown

14. Exposure to clinic visit time

15. Hiv status of exposed person at baseline

A. Negative

B. Positive

C. Unknown

16. Hiv status of exposed person after 3 month

A. Negative

B. Positive

C. Unknown

17. Any Adverse reaction

A. Yes B. No C. Unknown

18. If yes specify

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