



Success Rate and Determinants of Post-Exposure Prophylaxis (PEP) among HIV Exposers Attending the HIV Counselling and Testing (HCT) Unit at Yobe State Specialist Hospital, Damaturu, Yobe State, Nigeria

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Citation: Ahmed Idriss Jajere, Ibrahim A Saidu, Abdullahi Buba (2025) Success Rate and Determinants of Post-Exposure Prophylaxis (PEP) among HIV Exposers Attending the HIV Counselling and Testing (HCT) Unit at Yobe State Specialist Hospital, Damaturu, Yobe State, Nigeria, J of Preventive Medi, Infec Dis & Therapy 2(3), 01-08. WMJ/JPMIDT-109

Abstract

Background and Objective: The Human Immunodeficiency Virus (HIV) remains a significant global public health concern. Post-Exposure Prophylaxis (PEP) is a critical intervention for preventing HIV seroconversion following potential exposure. This study aimed to assess the success rate and determinants of PEP among HIV exposers attending the HIV Counselling and Testing (HCT) Unit at Yobe State Specialist Hospital (YSSH), Damaturu, Yobe State, Nigeria, between January 2022 and June 2024.

Materials and Methods: This was a cross-sectional review of records from 1,076 clients who received PEP at the HCT Unit of YSSH Damaturu within the specified timeframe. Data were extracted from the National PEP register and individual treatment folders. Variables analyzed included gender, mode of exposure (categorized as occupational or non-occupational), and timing of PEP initiation. HIV seroconversion at baseline, Week 12, and Week 24 post-PEP was used to determine the success rate. Data were analyzed using SPSS version 26.0, with statistical significance set at $p < 0.05$. HIV 1/2 antibodies were detected using the Determine™ HIV-1/2 in vitro diagnostic kit.

Results: Of the 1,076 clients, males constituted 50.93% ($n=548$) and females 49.07% ($n=528$), indicating a near-equal gender distribution. Non-occupational exposures overwhelmingly predominated, accounting for 99.81% ($n=1,074$) of cases, compared to only 0.19% ($n=2$) occupational exposures, both of which were needle stick/sharp injuries. Among non-occupational exposures, consensual sexual intercourse was the most frequent mode (75.79%, $n=814$), followed by forced sexual intercourse (24.21%, $n=260$). Remarkably, all clients (100%, $n=1,076$) initiated PEP within the recommended 72-hour window, with 70.82% ($n=762$) presenting within 24 hours. The study recorded a 100% PEP success rate, with no documented HIV seroconversions at baseline, Week 12, or Week 24 follow-ups for any client.

Conclusion: The PEP program at Yobe State Specialist Hospital, Damaturu, demonstrated exceptional effectiveness with a 100% success rate in preventing HIV seroconversion among clients who initiated PEP. This high success rate is strongly supported by the highly commendable timely presentation of all exposed individuals within the critical 72-hour window. The findings underscore the vital role of accessible PEP services and timely intervention in mitigating HIV transmission, particularly for non-occupational exposures. These results advocate for continued investment in and strengthening of PEP services within the region.

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Submitted: 12.07.2025

Accepted: 16.07.2025

Published: 26.07.2025

Keywords: HIV, Post-Exposure Prophylaxis (PEP), HIV Counselling and Testing (HCT), Seroconversion, Exposure, Nigeria, Yobe State, Damaturu, Success Rate, Determinants

Introduction

Human Immunodeficiency Virus (HIV) persists as a paramount global public health issue. As of late 2019, an estimated 38 million people were living with HIV (PLHIV), with Africa reporting a disproportionately high 67.8% of these cases. Even with established interventions aimed at mitigating the spread and impact of HIV, 2019 recorded 1.7 million new infections and 690,000 HIV-related deaths globally [1].

Despite significant advancements in prevention strategies and treatment modalities, the incidence of new infections remains a concern, with 1.7 million new HIV infections and 690,000 HIV-related deaths reported globally in 2019 alone [1]. This persistent burden underscores the critical need for multifaceted approaches to control the epidemic.

Among the cornerstone strategies in HIV prevention is Post-Exposure Prophylaxis (PEP). PEP involves the short-term administration of antiretroviral drugs to individuals who have experienced a potential exposure to HIV, with the aim of preventing viral replication and subsequent seroconversion [2]. PEP is indicated for both occupational exposures (e.g., healthcare workers exposed to infected blood) and non-occupational exposures (e.g., unprotected sexual contact or sexual assault) [3]. The effectiveness of PEP is highly dependent on timely initiation, ideally within 72 hours of exposure, and adherence to the

complete regimen [4].

Nigeria, being one of the countries with a high HIV burden, has implemented national guidelines to facilitate access to PEP services as a critical component of its HIV response [3]. Despite these efforts, challenges related to awareness, access, and adherence to PEP remain in various settings [5,6]. Understanding the specific dynamics of PEP utilization and outcomes within local contexts is therefore crucial for optimizing prevention strategies and resource allocation.

This study aimed to assess the success rate and identify the determinants of Post-Exposure Prophylaxis (PEP) among HIV exposers attending the HIV Counselling and Testing (HCT) Unit at Yobe State Specialist Hospital, Damaturu, Yobe State, Nigeria, over the period of January 2023 to June 2025. The findings are expected to contribute to the evidence base for strengthening PEP services and informing targeted public health interventions in the region.

Materials And Methods

Study Area

This study was conducted at the HIV Counselling and Testing (HCT) Unit of Yobe State Specialist Hospital (YSSH), Damaturu, Yobe State, Nigeria.

Yobe State is located in the North-Eastern geopolitical zone of Nigeria, sharing borders with Borno State to

the east, Gombe and Bauchi States to the south, and Jigawa and Kano States to the west [7]. It also shares an international border with the Republic of Niger to the north. Damaturu, the state capital, is a significant urban center within Yobe State, serving as its administrative and commercial hub. The state has an estimated population of over 3 million people, with a diverse demographic profile [8].

The healthcare infrastructure in Yobe State, particularly in Damaturu, faces unique challenges, including those related to security concerns in the North-East region and socio-economic factors that can impact health-seeking behaviors and access to services [9]. Yobe State Specialist Hospital, Damaturu, is a prominent tertiary healthcare facility in the state, providing a wide range of medical services to residents of Damaturu and surrounding communities. As a referral hospital, it plays a critical role in the provision of specialized care, including comprehensive HIV prevention, treatment, and care services, which encompass HIV Counselling and Testing (HCT) and Post-Exposure Prophylaxis (PEP) [10]. The HCT unit within YSSH serves a significant number of clients from various demographic backgrounds seeking HIV-related services. Its strategic location in the state capital makes it a key site for evaluating public health interventions such as PEP.

Experimental Design and Population

This study employed a cross-sectional review of records of clients who received Post-Exposure Prophylaxis (PEP) at the HIV Counselling and Testing (HCT) Unit of Yobe State Specialist Hospital, Damaturu, Yobe State, Nigeria. Records of all clients who reported to the unit for PEP services between January 2022 and June 2024 was included in the study. Records with incomplete or missing essential medical data pertinent to PEP initiation, follow-up, or outcome were excluded.

PEP services at Yobe State Specialist Hospital are intended to be available daily, ensuring access for individuals who have experienced an exposure with the potential for HIV transmission, encompassing both occupational and non-occupational exposures. While the National Guidelines on HIV Prevention, Treatment and Care emphasize the importance of prompt management of all exposures, particular attention is

given to high-risk occupational exposures, such as needlestick injuries or mucosal contact. The guideline recommends that exposed healthcare workers (HCWs) avoid squeezing, sucking, or rubbing the injury site, allow free flow of blood or secretion, and thoroughly wash the exposed area immediately with soap and running water or antiseptic solutions before presenting for PEP.

In accordance with the National Guidelines, the recommended PEP regimen for adults and children weighing above 30 kg typically comprises a three-drug Antiretroviral (ARV) regimen, such as Tenofovir combined with either Lamivudine (3TC) or Emtricitabine (FTC), and either Dolutegravir (DTG) or Efavirenz (EFV). For children aged 10 years and below or weighing less than 30 kg, the backbone drugs are Zidovudine (AZT), Lamivudine (3TC), and DTG [11].

Prior to receiving PEP services, exposed clients undergo HIV Counselling and Testing (HCT). The guidelines mandate baseline testing for HIV-1 and 2 antibodies, Hepatitis B Virus (HBV), Hepatitis C Virus (HCV), and other relevant tests including full blood count, liver function tests, and renal function tests. Repeat visits are recommended at two weeks to assess organ functions, and at six weeks, three months, and six months for repeat HIV screening. These follow-up visits are crucial for assessing adherence to ARVs, monitoring for potential side effects, and, critically, for ascertaining the efficacy of PEP in preventing seroconversion among exposed clients. Clients with negative HIV results at baseline are eligible for PEP; otherwise, they are enrolled in Antiretroviral Therapy (ART) services. PEP is not recommended when the risk of HIV transmission is deemed negligible or when clients present more than 72 hours after a significant exposure. Furthermore, in cases of sexual assault, it is recommended that clients receive comprehensive psychosocial, mental, and legal support, and be assessed for sexually transmitted infections (STIs). Emergency contraceptives are provided to female victims where indicated.

Data Collection and Analysis

Data were extracted from the 2016 revised version of the National PEP register and individual treatment folders of all clients who received PEP at the HIV Counselling and Testing (HCT) Unit of Yobe State

Specialist Hospital, Damaturu, from January 2023 to June 2025.

The study assessed the success rate of PEP and identified factors associated with exposure to the virus, with particular reference to gender, mode of exposure, and time of presentation. The mode of exposure was primarily categorized into occupational and non-occupational exposure. Occupational exposures were defined as possible HIV exposures occurring in healthcare settings to blood, genital secretions, or other potentially infectious body fluids that might contain HIV. Non-occupational exposures referred to isolated exposures outside of healthcare settings.

The duration before PEP was provided was categorized into four groups: less than 24 hours, less than 48 hours, less than 72 hours, and more than 72 hours. Recognizing that PEP efficacy is (or was if referring to the guideline's belief at the time of data collection) optimized when initiated within 72 hours after potential exposure, the time of presentation was further dichotomized into early presentation (within 72 hours) and late presentation (after 72 hours).

Determination for Detecting HIV 1/2 Antibodies

The Determine™ HIV-1/2 in vitro diagnostic kit was used to detect human immunodeficiency virus (HIV) antibodies. This test kit, which comes as a strip, is a rapid immunochromatographic technique designed to identify the presence of HIV 1/2 antibodies in human serum or plasma. The experiment was performed at room temperature. Plasma samples were carefully dispensed onto the test strips using a pipette, ensuring the arrows on the pipette pointed towards the samples. The strips were then left undisturbed for 15 minutes to allow the immunological reaction to occur.

Positive samples were identified by the appearance of a red color band in both the test section and the control zone of the strips. In contrast, negative samples only produced a color band in the control region, with no band appearing in the test section [12].

Statistical Analysis

Data collected from the eligible clients were analyzed using the Statistical Package for Social Sciences (SPSS). Descriptive statistics were presented as frequencies, percentages, to summarize the characteristics

of the study population and key variables.

To determine associations between socio-demographic variables and categorical variables, the Pearson Chi-square test of statistical was employed. The level of statistical significance was set at a predetermined p-value of less than 0.05 ($p < 0.05$).

Ethical Clearances

Ethical approval for this study was sought and obtained from the Health Research Ethics Committee of Yobe State Specialist Hospital, Damaturu. All data were anonymized to ensure client confidentiality.

Results

Gender of Exposed Clients that Presented for PEP

Table 3.1 indicates that out of 1,076 clients who presented for PEP, males constituted a slight majority at 548 individuals (50.93%), while females made up 528 individuals (49.07%). This suggests a nearly even distribution of gender among those seeking PEP services in the studied population.

Table 3.1: Gender of Exposed Clients that Presented For PEP

Sex	Frequency (N=1,076)	Percentage
Male	548	50.93
Female	528	49.07

Patterns of Exposure

Table 3.2 systematically presents the various patterns of Human Immunodeficiency Virus (HIV) exposure among the 1,076 clients who received Post-Exposure Prophylaxis (PEP), categorized by the year of exposure, the mode of exposure, and the subsequent timing of PEP initiation. Regarding the year of exposure, the data indicate that the majority of exposures, specifically 73.23% ($n=788$), occurred in 2023. Exposures in 2022 accounted for 15.99% ($n=172$) of the cohort, while 10.78% ($n=116$) were recorded in 2024 within the study's observation period.

An analysis of the mode of exposure reveals a clear predominance of non-occupational incidents. Non-occupational exposures constituted 99.81% ($n=1,074$) of all cases, in stark contrast to occupational exposures, which comprised a minimal 0.19% ($n=2$). Further

disaggregation of the occupational exposures shows that both reported cases were attributed to needle stick or sharp injuries. Within the non-occupational category (n=1,074), consensual sexual intercourse was the most frequently reported mode, accounting for 75.79% (n=814) of exposures. Forced sexual intercourse represented 24.21% (n=260) of non-occupational exposures, with no cases of non-sexual incidents (e.g., accidents, domestic injuries) reported in this cohort.

Crucially, the data on the timing of PEP initiation highlights highly effective timely presentation. A significant proportion of clients, 70.82% (n=762), initiated PEP within 24 hours of exposure. An additional 26.95% (n=290) commenced PEP within 48 hours, and 2.23% (n=24) did so within 72 hours. Notably, all clients presented for PEP within the critical 72-hour window recommended for optimal efficacy, with no presentations occurring beyond this timeframe.

Table 3. 2 Patterns of exposure

Variable	Frequency (N=1,076)	Percentage(%)
Year of Exposure		
2022	172	15.99
2023	788	73.23
2024	116	10.78
Mode of Exposure		
Occupational Exposure	2	0.19
Non-Occupational Exposure	1,074	99.89
Occupational Exposure n=2		
Needle stick/sharp	2	100.00
Exposure to broken skin	0	0.00
Non-Occupational Exposure n=1,074		
Forced sexual intercourse	260	24.21
Consensual sexual intercourse	814	75.79
Non-sexual (accident, domestic injuries)	0	0.00
Timing of PEP n=1,076		
<24 h	762	70.82
<48 h	290	26.95
<72 h	24	2.23
>72 h	0	0.00

PEP Success Rate Among Exposers Attending the HCT unit within YSSH Damaturu

Table 3.3 demonstrates that for all clients who received PEP at YSSH Damaturu from 2023 to 2025, there were no documented cases of re-exposure or HIV seroconversion at baseline, 12 weeks, or 24 weeks post-PEP. This indicates a perfect observed success rate of PEP in preventing HIV infection within this cohort.

Table 3.3: PEP Success Rate Among Exposers Attending the HCT unit within YSSH Damaturu

Year	Exposure Con- tex	No. (%) Re-ex- posed	No.(%) Tested Pos. Week 0	No. (%) Tested Pos. W 12	No. (%) Tested Pos. Week 24
2022	Occupational	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
	Non-occupa- tional	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
2023	Occupational	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
	Non-occupa- tional	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
2024	Occupational	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
	Non-occupa- tional	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)

DISCUSSION AND CONCLUSION

Discussion

The results from Tables 3.1, 3.2, and 3.3 provide a comprehensive overview of the characteristics of HIV exposers, exposure patterns, and the remarkable success rate of Post-Exposure Prophylaxis (PEP) at Yobe State Specialist Hospital (YSSH), Damaturu, from 2023 to 2025. This discussion will contextualize these findings by comparing them with published literature, highlighting both consistencies and divergences.

Table 3.1 reveals a near-equal gender distribution among clients presenting for PEP, with males constituting 50.93% (n=548) and females 49.07% (n=528) of the total cohort (N=1,076). This finding contrasts with studies from some settings that often report a higher proportion of female PEP users, particularly in sub-Saharan Africa, largely due to a higher burden of sexual violence against women and higher HIV prevalence among women [13,14]. For instance, a study in Enugu, Nigeria, found 63.8% of PEP clients were female, while another in Ethiopia reported females making up 68.7% of non-occupational PEP users [13,15]. The relatively balanced gender representation in our study might suggest different exposure dynamics or a more equitable health-seeking behavior in Damaturu, or perhaps specific characteristics of the study's catchment area and awareness campaigns.

Table 3.2 systematically presents the various patterns of Human Immunodeficiency Virus (HIV) exposure among the 1,076 clients who received Post-Exposure Prophylaxis (PEP), categorized by the year of

exposure, the mode of exposure, and the subsequent timing of PEP initiation. Regarding the year of exposure, the data indicate that the majority of exposures, specifically 73.23% (n=788), occurred in 2023. Exposures in 2022 accounted for 15.99% (n=172) of the cohort, while 10.78% (n=116) were recorded in 2024 within the study's observation period.. A striking finding was the overwhelming predominance of non-occupational exposures (99.81%, n=1,074) compared to occupational exposures (0.19%, n=2). This aligns with global trends where non-occupational PEP (nPEP) is increasingly more common than occupational PEP (oPEP) [2,16]. Studies across various settings consistently show nPEP accounting for a larger proportion of PEP initiations due to the broader range of non-occupational risk behaviors [5,17].

Within non-occupational exposures, consensual sexual intercourse was the primary mode (75.79%, n=814), followed by forced sexual intercourse (24.21%, n=260). This distribution is broadly consistent with literature from similar high-burden settings. For example, a study in Cameroon also identified unprotected consensual sex as the leading cause of nPEP initiation, followed by sexual assault [17]. The significant proportion of exposures due to forced sexual intercourse (24.21%) underscores the persistent challenge of sexual violence and the critical role of PEP services in mitigating HIV transmission risks in such traumatic circumstances, a finding echoed in many African contexts [14,18].

A highly commendable finding from Table 3.2 is the exceptional timeliness of PEP initiation in the study cohort. All 1,076 clients presented for PEP within the

critical 72-hour window recommended for optimal efficacy. Furthermore, a substantial majority (70.82%, n=762) presented within 24 hours, and an additional 26.95% (n=290) within 48 hours. This represents a remarkably high rate of early presentation compared to many published studies. For instance, Chime et al. in Enugu reported that only 68.9% of their clients presented within 72 hours [13]. Similarly, studies in Ethiopia and South Africa have often reported lower rates of early presentation, with significant proportions of clients presenting after 72 hours, which compromises PEP effectiveness [6,15]. The outstanding adherence to the 72-hour window in Damaturu suggests highly effective public awareness campaigns, accessible services, or robust referral systems. This early presentation is a key determinant of PEP success.

Perhaps the most significant finding from this study, as presented in Table 3.3, is the observed 100% PEP success rate in preventing HIV seroconversion across all exposure contexts (occupational and non-occupational) and follow-up periods (Week 0, Week 12, and Week 24). This implies that none of the clients who received PEP subsequently tested positive for HIV during the follow-up, after having tested negative at baseline. This exceptional success rate aligns with the established high efficacy of PEP when taken correctly and initiated within the recommended timeframe [2,4].

While a 100% success rate is an ideal outcome, it is generally consistent with evidence that PEP is highly effective. However, some studies do report very low rates of PEP failure (seroconversion despite PEP), typically less than 1%, often linked to factors such as late presentation, poor adherence, or exposure to drug-resistant strains [17,19]. The absence of any seroconversion in our cohort could be attributed to the exemplary timely presentation of all clients, which is a critical predictor of PEP efficacy. It also suggests effective adherence support and possibly a lack of exposure to highly resistant viral strains within this specific population during the study period. This finding underscores the immense public health benefit of accessible and well-managed PEP programs.

Conclusion

In conclusion, the findings from Yobe State Specialist Hospital Damaturu highlight a robust PEP program

characterized by timely initiation, predominantly for non-occupational exposures. The observed 100% success rate reinforces the effectiveness of PEP as a critical HIV prevention tool, particularly when implemented promptly. These results provide valuable local data for advocating for continued investment in and expansion of PEP services in Nigeria.

Significance Statement

The study at Yobe State Specialist Hospital, Damaturu, revealed a remarkable 100% success rate of their Post-Exposure Prophylaxis (PEP) program in preventing HIV seroconversion, directly attributed to all 1,076 clients initiating PEP within the critical 72-hour window, with the vast majority (70.82%) presenting within 24 hours, predominantly due to non-occupational exposures.

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