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Research Article

Keywords: post-exposure prophylaxis, Human Immunodeficiency Virus, seropositive material, needle stick injury

Posted Date: July 10th, 2026

DOI: <https://doi.org/10.21203/rs.3.rs-9732999/v1>

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Additional Declarations: No competing interests reported.

Patterns of PEP use amongst Health Professionals in South Eastern Nigeria following exposure to seropositive material

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Abstract

Background: Health professionals (HP) are at heightened occupational risk of exposure to blood-borne pathogens, particularly Human Immunodeficiency

Virus, through needle-stick and sharps injuries. This study aimed to determine and report the prevalence of HIV PEP uptake among healthcare workers who reported lifetime exposure to HIV seropositive material from needle-stick injury in South Eastern Nigeria and to identify independent determinants of uptake. Secondary objectives included assessing knowledge of HIV PEP, timing of initiation following exposure, and completion of the prescribed 28-day regimen.

Methods: This was a cross-sectional, web-based survey conducted among health professionals across the South-Eastern region in Nigeria. Data were collected using a semi-structured, self-administered questionnaire distributed through the regional professional associations. Reliability was assessed using Cronbach's alpha ($\alpha = 0.88$). Associations between categorical variables and outcomes were assessed using Fisher's exact tests, while logistic regression was performed to identify independent predictors of PEP uptake.

Results: Fifty respondents (23.9%) had been exposed to seropositive material from needle stick injury at least once in their careers. Among these individuals, only 40.0% initiated HIV post-exposure prophylaxis. Of those who commenced PEP, almost all did so within the acceptable window period of less than 72 hours, while completion of the PEP regimen was high (90.0%). A seroconversion rate of 2.0% was observed; notably, this did not occur among those who received PEP. Physicians were more likely to use PEP following exposure compared to non-physicians (Adjusted OR = 6.27; 95% CI: 1.36–46.41; $p = 0.033$).

Conclusion: Approximately one in four HPs reported occupational exposure through NSI, yet uptake of HIV PEP remained suboptimal despite universal awareness. Profession was the sole independent predictor of uptake. Improvement in intra-institutional communication of post-exposure policies, timely drug access, and reinforcement of occupational safety protocols may improve uptake and adherence rates.

Keywords: post-exposure prophylaxis, Human Immunodeficiency Virus, seropositive material, needle stick injury

1 Introduction

Healthcare workers (HCWs) are at heightened occupational risk of exposure to blood-borne pathogens, particularly Human Immunodeficiency Virus (HIV), through needle-stick and sharps injuries (NSIs).^[1] In sub-Saharan Africa, where HIV prevalence remains substantial and healthcare systems often operate under resource constraints, occupational exposure constitutes a significant public health and workforce safety concern.^[2] The risk of seroconversion following percutaneous exposure to HIV-infected blood has been estimated at approximately 0.3%, a figure which while miniscule, ought to be non-existent in the medical community, given the long-standing presence of post-exposure prophylaxis.^[3] HIV post-exposure prophylaxis (PEP) is defined as the services provided to prevent transmission of HIV infection when an individual sustains an exposure to an HIV-positive source. The PEP is essentially a five-step process which includes: first aid; counselling; assessment of risk; consent-based laboratory testing of both the source and the exposed personnel; and finally provision

of appropriate treatment with follow-up. [4] It is a proven biomedical intervention that significantly reduces the risk of HIV acquisition when initiated promptly—preferably within hours and no later than 72 hours after exposure—and continued for a 28-day course. National and institutional guidelines in Nigeria recommend immediate reporting, risk assessment, and initiation of a triple antiretroviral regimen following high-risk occupational exposure. [5] However, the existence of guidelines does not guarantee effective uptake at the point of exposure. Evidence from low- and middle-income countries suggests that although awareness of HIV PEP may be high among health professionals, actual uptake following NSI is frequently suboptimal. Reported barriers include inadequate institutional protocols, limited availability of PEP medications, cost implications, stigma, underreporting of exposures, and uncertainty regarding risk assessment. In decentralized health systems where PEP procurement, storage, and distribution may vary across facility levels these structural factors may significantly influence uptake behavior. [6] In Nigeria, PEP services are decentralized across public and private health facilities, and variability in drug availability and institutional enforcement of occupational safety protocols has been reported. While several studies have examined knowledge of HIV PEP among specific professional groups, there is limited multistate evidence evaluating actual uptake following needle-stick injury and the determinants that influence utilization. Importantly, few studies have moved beyond descriptive reporting to analytically examine predictors of PEP uptake while accounting for potential confounding variables. Understanding determinants of PEP uptake is essential because failure to initiate prophylaxis after occupational exposure represents a breakdown in the occupational health response system. [7] Evaluating uptake rather than knowledge alone provides a more meaningful assessment of system performance, institutional preparedness, and behavioral response following exposure. This study therefore aimed to determine the prevalence of HIV PEP uptake among at-risk health professionals who reported lifetime exposure to HIV seropositive material from needle-stick injury in South Eastern Nigeria and to identify independent determinants of uptake using multivariable logistic regression analysis. Secondary objectives included assessing knowledge of HIV PEP, timing of initiation following exposure, and completion of the prescribed 28-day regimen. By adopting this analytical approach we intend to provide evidence relevant to occupational safety policy, decentralized PEP implementation, and healthcare workforce protection in the region.

Study Hypotheses

Primary Hypothesis

Null Hypothesis (H_{01}): There is no association between health professional characteristics (profession, hospital level, and work experience) and uptake of HIV PEP following lifetime exposure to HIV seropositive material from needle-stick injury.

Alternative Hypothesis (H_{11}): Health professionals with greater professional experience, employment in public tertiary facilities, and physician roles will have higher odds of initiating HIV PEP following lifetime exposure to HIV seropositive material from needle-stick injury NSI compared to their counterparts.

Secondary Hypotheses

Among respondents who initiated PEP:

Null Hypothesis (H_0): There is no association between health professional characteristics (profession, years of experience) and completion of the prescribed 28-day PEP regimen. Alternative Hypothesis (H_1): Health professionals employed in higher-level public facilities, and those with greater levels of clinical experience will have greater odds of completing the full 28-day PEP regimen.

Given the anticipated limitation in the number of PEP uptake events observed, the primary hypothesis was designated as the principal inferential focus of the study; all secondary hypotheses are thus exploratory, to be cautiously interpreted.

2 Methods

This was a cross-sectional, web-based survey conducted among health professionals across the South-Eastern region in Nigeria. To be eligible for the study, a health professional had to be a registered, active member of a professional association, with exposure event occurring during the period of practice within the region. A sample size of 209 participants was deemed adequate to detect at least moderate effect sizes for the primary outcome using G*Power 3.1.9.7, assuming $\alpha = 0.05$ and power = 0.80. This sample size also allowed preliminary assessment of associations for secondary outcomes. Data were collected from July, 2025 through February, 2026 using a semi-structured, self-administered questionnaire distributed through the regional professional associations. Participation was voluntary and anonymous, with no collection of personally identifiable information. The questionnaire was self-developed based on literature review and expert input from one infectious disease specialist and two specialist internists. A copy of the study questionnaire can be accessed here: [Study Questionnaire](#). It was pretested and refined prior to administration. Reliability was assessed using Cronbach’s alpha ($\alpha = 0.88$), indicating good internal consistency. The questionnaire captured socio-demographics, NSI history, HIV PEP knowledge, uptake, timeliness, and completion. Retrieved data are securely stored in a protected online database.

The primary study outcome was the uptake of HIV PEP following lifetime exposure to HIV seropositive material from needle-stick injury. Secondary outcomes were the timeliness of PEP initiation (≤ 24 hours vs. > 24 hours), completion of the prescribed 28-day PEP regimen, and determinants of PEP uptake. Data were analyzed using SPSS version 25.0. Summary statistics (frequencies, percentages, means $\pm$ SD) were used to summarize socio-demographic characteristics, and NSI prevalence. Associations between categorical variables and outcomes were assessed using Fisher’s exact tests. Logistic regression was performed to identify independent predictors of PEP uptake. Odds ratios (OR) and 95% confidence intervals (CI) were reported. A $p - value < 0.05$ was considered statistically significant.

3 Results

A total of 904 healthcare workers were contacted for participation, of whom 635 responded, yielding a response rate of 70.2%. Of these respondents, 209 reported lifetime needle-stick injury (NSI), corresponding to a lifetime NSI prevalence of 32.9%.

Table 1 Socio-demographic characteristics of respondents

Characteristics	Frequency (Proportion)
Age (years)	
18–30	146 (69.9%)
31–40	28 (13.4%)
41–50	14 (6.7%)
51–60	14 (6.7%)
>60	7 (3.3%)
Mean age	30.463 ± 11.44
Gender	
Female	113 (54.1%)
Male	96 (45.9%)
Marital status	
Single	156 (74.6%)
Married	50 (23.9%)
Widowed	3 (1.4%)
Profession	
Junior Resident/Medical Officer/Dental Officer	99 (47.4%)
Consultant/Senior Resident	31 (14.8%)
House officer	28 (13.4%)
Nursing officer	21 (10.0%)
Chief Nursing Officer/Senior Nursing Officer	13 (6.2%)
Medical Laboratory Scientist	12 (5.7%)
Nursing intern	5 (2.4%)
Work experience	
1–5 years	121 (57.9%)
<1 year	41 (19.6%)
>10 years	39 (18.7%)
5–10 years	8 (3.8%)
Mean work experience	4.086 ± 3.093
Level of hospital	
Public-Tertiary	98 (46.9%)
Private-Secondary	78 (37.3%)
Public-Secondary	21 (10.0%)
Public-Primary	12 (5.7%)
Pre-exposure HIV status	
Reactive	0
Non-reactive	49
Unknown	1

The study population was predominantly young, with a clear skew toward early-career health professionals, this aligned with the observed pattern of work experience, where the majority had between 1–5 years of professional practice, and the mean work experience was 4.09 ± 3.09 years. Regarding professional composition, physicians formed the largest subgroup; specifically, registrars/medical officers/dental officers alone represented 47.4% of the population. Most respondents were drawn from higher levels of care, particularly tertiary health facilities (see [Table 1](#))

Table 2 Occupational exposure, HIV PEP uptake, and post-exposure outcomes

Variable	Frequency (Proportion)
Exposed to seropositive material from NSI (n = 209)	
Yes	50 (23.9%)
No	159 (76.1%)
Initiated HIV PEP (n = 50)	
Yes	20 (40.0%)
No	30 (60.0%)
Time to initiation of PEP (n = 20)	
Within 6 hours	3 (15.0%)
6–12 hours	2 (10.0%)
12–24 hours	5 (25.0%)
24–48 hours	7 (35.0%)
48–72 hours	0 (0.0%)
3 days–1 week	0 (0.0%)
After 1 week	1 (5.0%)
Duration of PEP regimen (n = 20)	
15–21 days	1 (5.0%)
22–28 days	19 (95.0%)
Completion of PEP course	
Yes	18 (90.0%)
No	2 (10.0%)
Reason for discontinuation (n = 2)	
Side effects	2 (100.0%)
Post-exposure HIV status at 3 months	
Reactive	1 (2.0%)
Non-reactive	47 (94.0%)
Unknown	2 (4.0%)
Post-exposure HIV status at 6 months	
Reactive	1 (2.0%)
Non-reactive	48 (96.0%)
Unknown	1 (2.0%)

Fifty respondents (23.9%) had been exposed to seropositive material from needle stick injury at least once in their careers, representing almost one out of every four health-care workers in the study population. Among these fifty individuals, only 40.0% initiated HIV post-exposure prophylaxis (PEP). Of those who commenced PEP, almost all did so within the acceptable window period of less than 72 hours. However, only 15.0% initiated treatment within six hours of exposure, and 50% within the first 24 hours, indicating that although most presentations were timely, very early initiation remained relatively uncommon. Completion of the PEP regimen was high with only two individuals discontinuing therapy, both on account of side effects. A seroconversion rate of 2.0% was observed; notably, this did not occur among those who received PEP.([Table 2](#))

Table 3 Challenges in Accessing HIV Post-Exposure Prophylaxis Among Respondents Who Initiated PEP (n = 20)

Variable	Frequency (Proportion)
Challenges in Accessing PEP	
None	13 (65.0%)
Regimen complexity	7 (35.0%)
Stressful procurement process	6 (30.0%)
Long waiting times for drug procurement	5 (25.0%)
Incomplete drug dose dispensary	1 (5.0%)
Experienced side effects	
Yes	15 (75.0%)
No	5 (25.0%)

Among respondents who initiated PEP, the majority report no challenges in accessing prophylaxis. However, regimen complexity was reported by 35.0% of participants, while 30.0% described the procurement process as stressful, and 25.0% experienced long waiting times for drug access. Among those who reported delays, most (80%) obtained the drugs within 24 hours, with only one respondent reporting a waiting time greater than 24 hours. A substantial proportion of participants (75.0%) experienced side effects while on PEP, although most were able to endure these effects and complete the regimen, as reflected in the overall completion rate. Importantly, there was no reported stigma from colleagues during PEP use. Among those who experienced side effects (n = 15), nausea was the most commonly reported symptom, affecting 10 individuals. Other reported side effects included malaise (3/15), headache (2/15), loss of appetite (1/15), rash (1/15), and lethargy (1/15). In response to these side effects, most participants adopted watchful waiting (60.0%), while smaller proportions utilized dietary or lifestyle modifications (13.3%) and pharmacological interventions (13.3%). One respondent skipped a dose as a means of coping with side effects (Table 3).

Table 4 Tests of association between selected variables and HIV PEP uptake

Variable	PEP No (n=30)	PEP Yes (n=20)	χ^2 /Fisher	p-value
Profession			3.972	0.026 ^{1*}
Non-Physician	12 (24.0%)	2 (4.0%)		
Physician	18 (36.0%)	18 (36.0%)		
Work Experience			2.229	0.398*
<1 year	5 (10.0%)	2 (4.0%)		
1–10 years	21 (42.0%)	12 (24.0%)		
>10 years	4 (8.0%)	6 (12.0%)		
Hospital Level			0.567	0.388*
Non-Tertiary	18 (36.0%)	9 (18.0%)		
Tertiary	12 (24.0%)	11 (22.0%)		

* Fisher’s exact test.

Analysis of factors associated with PEP uptake showed that profession was the only variable with a statistically significant relationship (Table 4). Physicians were more likely to use PEP following exposure compared to non-physicians (Fisher’s exact test, $p = 0.026$). Contrastingly, work experience and level of hospital were not significantly associated with PEP uptake.

Table 5 Crude and adjusted odds ratios for predictors of HIV PEP uptake

Predictor	Crude OR (95% CI)	p-value	Adjusted OR (95% CI)	p-value
Profession				
Non-Physician	Ref	—	Ref	—
Physician	6.00 (1.38–42.22)	0.026*	6.27 (1.36–46.41)	0.033*
Work Experience				
<1 year	Ref	—	Ref	—
1–10 years	1.43 (0.26–11.05)	0.701	1.97 (0.23–22.30)	0.552
>10 years	3.75 (0.51–36.95)	0.196	3.12 (0.35–35.02)	0.318
Hospital Level				
Non-Tertiary	Ref	—	Ref	—
Tertiary	1.83 (0.59–5.90)	0.388	2.15 (0.43–11.55)	0.352

* Significant at $p < 0.05$.

Before adjustment, physicians were six times more likely to receive PEP than non-physicians. Healthcare workers with greater amounts of professional experience, and those who work in tertiary health facilities showed greater odds of uptake but had wide confidence intervals, due to small sample size. After adjustment, profession remained the only significant predictor of PEP uptake(see [Table 5](#)). Physicians continued to show greater odds of PEP use compared to non-physicians (Adjusted OR = 6.27; 95% CI: 1.36–46.41; $p = 0.033$).

Table 6 Knowledge of HIV Post-Exposure Prophylaxis Among Healthcare Workers

Characteristic	Frequency (Proportion)
Have you heard of HIV PEP?	
Yes	209 (100.0%)
What source did you get your information from?	
Professional training	155 (74.2%)
Mass media	17 (8.1%)
Others	17 (8.1%)
Friends	12 (5.7%)
Journal	8 (3.8%)
Do you know the HIV PEP protocol in your facility?	
Yes	106 (50.7%)
No	103 (49.3%)
When do you think HIV PEP is indicated?	
When the source patient is known to be HIV positive	87 (41.6%)
When the source patient is at high risk of HIV	72 (34.4%)
For any needle stick injury at the hospital	42 (20.1%)
I don't know	8 (3.8%)
What is the maximum delay to take HIV PEP?	
12 hours	13 (6.2%)
24 hours	26 (12.4%)
48 hours	17 (8.1%)
72 hours	124 (59.3%)
I don't know	29 (13.9%)
What is the preferable time to take HIV PEP?	
Within an hour	96 (45.9%)
After 6 hours of exposure	19 (9.1%)
After 12 hours of exposure	15 (7.2%)
After 72 hours of exposure	46 (22.0%)
I don't know	33 (15.8%)
Do you know the HIV PEP regimen?	
Yes	116 (55.5%)
No	93 (44.5%)
What is the correct HIV PEP regimen?	
Tenofovir + Lamivudine + Dolutegravir	95 (45.5%)
Zidovudine + Lamivudine + Dolutegravir	20 (9.6%)
All of the above	33 (15.8%)
I don't know	61 (29.2%)
Is the regimen readily available at your facility?	
Yes	62 (29.7%)
No	47 (22.5%)
I don't know	100 (47.8%)
Is it free at your center?	
Yes	63 (30.1%)
No	22 (10.5%)
I don't know	124 (59.3%)

Analysis of the association between knowledge-related factors and PEP uptake showed that the source of HIV PEP training significantly influenced uptake: almost all respondents who utilized PEP had received professional training, while uptake was considerably lower among those exposed only to non-professional sources of information. Participants with correct knowledge of the acceptable initiation window were also more likely to use PEP following occupational exposure, whereas uptake was markedly lower among those without knowledge regarding maximum prophylaxis delay window([Table 6](#)).

Table 7 Tests of association between knowledge of key PEP facts and uptake of PEP

Variable	PEP No (n=30)	PEP Yes (n=20)	Fisher's p-value
Type of Training			0.037*
Professional training	21 (42.0)	19 (38.0)	
Non-professional training	9 (18.0)	1 (2.0)	
Knowledge of Facility PEP Protocol			0.074
Yes	16 (32.0)	16 (32.0)	
No	14 (28.0)	4 (8.0)	
Knowledge: PEP Indications			0.571
Correct knowledge	20 (40.0)	16 (32.0)	
Incorrect knowledge	8 (16.0)	4 (8.0)	
No knowledge	2 (4.0)	0 (0.0)	
Knowledge: Maximum Delay for PEP			0.011*
Correct knowledge	17 (34.0)	19 (38.0)	
Incorrect knowledge	9 (18.0)	1 (2.0)	
No knowledge	4 (8.0)	0 (0.0)	
Knowledge: Preferable Time for PEP			0.745
Correct knowledge	12 (24.0)	9 (18.0)	
Incorrect knowledge	14 (28.0)	7 (14.0)	
No knowledge	4 (8.0)	4 (8.0)	
Knowledge of PEP Regimen			1.000
Yes	19 (38.0)	13 (26.0)	
No	11 (22.0)	7 (14.0)	
Identification of Correct Regimen			0.275
TDF + 3TC + DTG	15 (30.0)	14 (28.0)	
AZT + 3TC + DTG	4 (8.0)	0 (0.0)	
All of the above	4 (8.0)	1 (2.0)	
I don't know	7 (14.0)	5 (10.0)	
Regimen Availability at Hospital			0.073
Yes	14 (28.0)	15 (30.0)	
No	5 (10.0)	3 (6.0)	
I don't know	11 (22.0)	2 (4.0)	
Is PEP Provided Free of Charge?			0.275
Yes	15 (30.0)	14 (28.0)	
No	1 (2.0)	1 (2.0)	
I don't know	14 (28.0)	5 (10.0)	

* Significant at $p < 0.05$. Analysis of the association between knowledge-related factors and PEP uptake showed that the source of HIV PEP training significantly influenced uptake: almost all respondents who utilized PEP had received professional training, while uptake was considerably lower among those exposed only to non-professional sources of information. Participants with correct knowledge of the acceptable initiation window were also more likely to use PEP following occupational exposure, whereas uptake was markedly lower among those without knowledge regarding maximum prophylaxis delay window([Table 7](#)).

4 Discussion

This study was designed to ascertain the prevalence of HIV post-exposure prophylaxis (PEP) uptake and its determinants among healthcare workers in South Eastern Nigeria with exposure to HIV seropositive material via needle-stick injuries. Approximately one in four HCWs (23.9%) reported lifetime occupational exposure through NSI, a substantial ongoing risk burden. Of those exposed workers, only 40% initiated PEP, a worrying gap given the long-standing availability of this intervention. Among the recipients, adherence was encouraging: 90% completed the full 28-day course. Although all but one recipient initiated within the 72-hour window, only 15% did so within six hours of exposure, this indicating meaningful delays in the post-exposure response pathway. Physician profession was the sole independent predictor of uptake on multivariable analysis (adjusted OR 6.27, 95% CI 1.36–46.41, $p = 0.033$). Despite total population awareness of PEP across all 209 participants, critical operational knowledge gaps were prevalent — uncertainty about institutional protocols, drug availability, and cost. One case of seroconversion (2.0% of the exposed population) was documented.

Needle stick injuries are amongst the commonest occupational injury type experienced by healthcare workers in the dispensing of their duties[8]. They have also been shown to be the commonest means of percutaneous exposure to HIV seropositive material, a body of evidence to which our study positively contributes[9–11]. For example, a thirteen-year retrospective study of healthcare workers in South-Western Nigeria showed that 75% of exposure to seropositive material in the region was from needle stick injuries, with intern doctors at greatest risk of exposure, followed by nurses[12]. This finding is unsurprising as intern doctors and nurses are often times most involved in procedures that involve needle use: greater exposure leading to greater injuries. As demonstrated by Owolabi and colleagues, the circumstances in which most needle stick injuries occur are disproportionately experienced by younger medical professionals, who often experience multiple needle stick injuries in the early years of their careers[13]. HIV PEP has been shown to be very effective at reducing the risk of seroconversion following exposure, with some studies showing risk reduction rates of over 80% amongst exposed healthcare workers.[14–16] All patients within the study population who received HIV PEP showed no evidence of seroconversion in the three months, six months, and nine months post-exposure diagnostics; the one case of seroconversion on record was of a HCW who failed to receive PEP, thus reinforcing the necessity of its use in such cases, as recommended by all publicly available national guidelines[5].

The study population displayed sub-optimal PEP uptake rates, with only 2 out of 5 at-risk workers receiving the prophylactic drugs, contrary to pre-specified national recommendations. However, this is an improvement on previous studies carried out within the region, with uptake rates ranging from 25 - 35% [11, 17]; this suggestive of greater recognition of the utility, safety and necessity of PEP use post-exposure. Better uptake rates have been recorded in the Northern regions of Nigeria, areas historically associated with higher HIV/HBV incidence rates which may explain the greater uptake rates (higher incidence leading to better awareness and consequently, higher rates of uptake)[12, 13]. A cautious extrapolation from the study findings suggests concerning levels of seroconversion amongst healthcare workers who fail to receive post-exposure

prophylaxis, incidences of which are amenable to improved advocacy and education on proper PEP use.

Positively, of those who commenced treatment, almost all commenced treatment within the acceptable window period, and proceeded to complete the recommended regimen, a notable improvement from previous national studies with completion rates ranging from 23.1% (North Central), to 37 – 45% (South West), 60% (South East), and 70% (South South) [11–13, 18, 19]. Consistently, studies show that poor levels of knowledge, ignorance of institutional protocols, and difficulty in access to PEP drugs stifle both uptake, and completion rates [6, 10, 11, 17]. In some settings, healthcare workers worry about stigmatization, a concern that our study population do not appear to share/experience [6, 11]. All interventional programs aimed at improving the aforementioned rates must engage with these barriers, at such levels as to effectively eliminate them from the healthcare settings of interest.

Long waiting times and incomplete dispensing of drug doses may evidence the sub-optimal enforcement of institutional policies, a problem which may be localized to the HIV PEP dispensary arms of these institutions, or symptoms of broader institutional difficulties. Whatever the case, it is imperative that institutions work towards achieving ideal prophylaxis onset times by instituting clear, actionable protocols driven by active, explicit drug delivery systems. While a significant portion of the population experienced unintended drug effects, these effects were not of sufficient severity to warrant premature treatment termination in almost all cases with users opting for watchful waiting and pharmacological interventions in the majority of cases. It is plausible that these healthcare workers may be ignoring significant drug induced distresses in service of the greater good: seroconversion prevention. Further research in the general population will provide illumination into these issues; issues which may require effective interventions if we are to achieve optimal levels of treatment adherence.

Physicians are shown to demonstrate better uptake rates of HIV PEP even after adjusting for years of experience, and institution type. Evidence from the literature indicate that their greater levels of academic and professional exposure to the relevant educational materials plays a significant role in fostering more positive attitudes amongst physicians [6, 13]. We must exercise caution in confidently endorsing such theories; further research will serve to either confirm or disconfirm these.

Analyses of the participants' knowledge of HIV PEP suggest that improvement in intra-institutional communication of post-exposure policies may serve to improve uptake and adherence rates, this via its direct educatory effects, and the consequent pressure it places on stakeholders to ensure drug availability. This may be achieved by clear, institution-wide communication of the cost-free availability of HIV PEP, reinforced at staff meetings and regular in-service trainings. Reinforcement strategies must be designed to target those who experience the greatest risks of occupational exposure, and forgetfulness with key details— routes of exposure, seroconversion rates, window for therapy initiation, institutional policies, etc. that are necessary for proper response following exposure events. The provision of seven-day starter packs within each ward may serve to significantly reduce time-to-initiation thus improving post-exposure outcomes. This may also provide invaluable cushioning effects to the institutional delivery systems, allowing for timely provision of prolonged therapy.

4.1 Strengths and Limitations of the Study

This study provides regional evidence on PEP uptake, an improvement on isolated institutional/state data. By employing multivariable logistic regression analysis to identify independent predictors of uptake, we highlight potential interventional targets relevant across the region. However, several limitations require acknowledgement. Participant recruitment via professional associations may introduce selection bias. Participation was skewed toward younger, physician-heavy, and institutionally affiliated HCWs. The analysis of determinants was conducted on fifty exposed workers, with the resulting findings possessing wide confidence intervals, thus precluding reliable assessment of interaction effects. Cross-sectional design and self-report introduce recall and social desirability bias, particularly for timing of initiation and regimen completion. The binary physician versus non-physician classification obscures within-group heterogeneity. Thus, future studies should employ nationally representative, prospective designs with larger samples to provide precise estimates of predictors and examine temporal trends in uptake. Qualitative and mixed-methods researches are needed to elucidate the mechanisms underpinning the physician–non-physician gap. Health economic modelling of the cost-effectiveness of universal PEP provision versus the current decentralized model would strengthen the case for targeted resource allocation by regional and facility-level decision-makers.

5 Conclusion

In this study, we demonstrate the persisting occupational risk of seroconversion following needle stick injury in South Eastern Nigeria, this from the prevailing exposure to seropositive material, and sub-optimal uptake of HIV PEP following percutaneous exposure. Our findings highlight the need for more effective institutional policy communication protocols, greater drug availability, and more responsive drug delivery systems. By initiating and strengthening existing protocols, occupation related seroconversion may be significantly ameliorated.

Declarations

- **Ethics approval and consent to participate:** This study was carried out in accordance with the Declaration of Helsinki. Ethical approval was obtained from the Health Research Ethics Committee of the University of Nigeria Teaching Hospital (NHREC/05/01/2008B–FWA00002458–IRB00002323). Participation was voluntary, anonymous, and based on informed consent. No personal identifiers were collected. Respondents were particularly reassured of confidentiality to minimize stigma.
- **Consent for publication:** Not applicable
- **Availability of data and materials:** Relevant study data are obtainable from the corresponding author upon reasonable request.
- **Competing interests:** The authors declare that they have no competing interests

- **Funding:** No external funding was received for this study
- **Authors' contributions:**

PC and MA contributed equally to the conception and design of the study, supervised the overall research process, and coordinated project implementation. CA and CO developed the study methodology. CO, SU, and HJ performed the statistical analysis, data visualization, and interpretation. MA prepared the original draft of the manuscript. AO and JM revised and edited the manuscript.

All authors contributed to data acquisition, literature review, manuscript review, and final approval of the submitted version. All authors agree to be accountable for all aspects of the work.

6 List of abbreviations

HIV	Human Immunodeficiency Virus
PEP	Post-Exposure Prophylaxis
NSI	Needle-Stick Injury
HP	Health Professional
AZT	Zidovudine
3TC	Lamivudine
DTG	Dolutegravir
TDF	Tenofovir Disoproxil Fumarate

7 Supplementary information

Study Questionnaire

Acknowledgements. The authors wish to acknowledge Professors Uchenna Ijoma and Ikenna Onwuekwue for their insights and guidance throughout the research protocol design stage.

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