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RESEARCH ARTICLE

Knowledge and attitude to human immunodeficiency virus post-exposure prophylaxis among pharmacy, nursing, and medical students in a tertiary institution in southeastern, Nigeria

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ABSTRACT

Background: Health-care workers are at great risk of being exposed to body fluids at the workplace. This has posed a great risk for transmitting infections like the Human immunodeficiency virus. Initiating post-exposure prophylaxis (PEP) immediately after body fluid exposure is therefore of utmost importance in the healthcare setting. **Aim:** This study assessed the knowledge and attitude of medical, pharmacy, and nursing students toward HIV PEP. **Methods**: A cross-sectional study was carried out among 200, 300, 400, and 500 level pharmacy, medical and nursing students. Data collation was done using pretested, structured questionnaire self-administered to 396 respondents. Data were summarized using a frequency, mean, standard deviation. The statistical difference in the means of the knowledge and attitude of the students was compared using ANOVA. $P < 0.05$ was considered statistically significant. **Results:** There was poor knowledge but a favorable attitude to HIV PEP among the students. The result revealed that 44.63% of nursing, 38.34% medical, and 34.11% pharmacy students had knowledge of HIV PEP while 72.80% medical, 72.60% nursing, and 60.42 pharmacy students had good attitude toward HIV PEP. Only 18% of the respondents were aware of the existence of HIV PEP while 8% attended training on HIV PEP. About 4% of the respondent had knowledge of the time PEP should be initiated while 91% of the respondents believed that reporting needle stick injury was important. **Conclusion:** The study revealed poor knowledge but favorable attitude toward HIV PEP. Well-designed educational programs should be instituted to improve students' knowledge and attitude of students of HIV PEP.

Keywords: Knowledge, Post-exposure prophylaxis, Attitude, Nursing students, Pharmacy students, Medical students

INTRODUCTION

Acquired Immune Deficiency Syndrome (AIDs), one of the world's most serious health challenges, is caused by Human Immunodeficiency Syndrome (HIV) but a serious global commitment is now in place to stop new HIV infections and ensure that everyone living with HIV has access to HIV treatment. About 36.9 million people worldwide are currently living with HIV/AIDs and 1.8 million are children below the age of 15 years according to the Joint United Nations Program on HIV/AIDs (UNAIDS). Most of these children get infected by their mothers who are HIV positive during pregnancy, childbirth, or breastfeeding. The most critically affected region is the African region with about 1 in every 25 (4.1%) adults living with HIV and they account for almost two-thirds of the people living

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with HIV worldwide.[1] According to the National strategic framework on HIV and AIDS (2017–2021), Nigeria has the second highest epidemics of HIV in the world, with a population size of 1.8 million people living with HIV in 2019. Data from UNAIDS AIDS info (2017) estimated that about two-thirds of new HIV infection in West and Central Africa in the year 2019 occurred in Nigeria hence Nigeria together with South Africa and Uganda account for half of all HIV infection in the sub-Saharan every year.

AIDS is a life-threatening public health problem that has affected the lives of many people, especially in sub-Saharan Africa where health-care workers (HCWs) are at greater risk due to workplace exposure.[2,3] Exposure to blood and other body fluids which happen at the workplace is a major concern for HCWs and usually presents a great avenue for transmitting infections.

Health-care workers are faced with great risk of exposure through various routes such as percutaneous injuries, for example, prick of a needle or other sharp objects, infections with human blood or other body fluids, or other contacts at the workplace, especially those practicing in establishments with marked infections and where resources are limited.[4.5] About 3 million percutaneous workplace exposures to blood or other bodily fluids occur in healthcare settings, a higher percentage occurring in Sub-Sahara Africa and other developing countries according to the WHO reports of 2005.[6,7] Antiretroviral (ARV) therapy recommended as standard PEP for workplace exposures to HIV includes emtricitabine, tenofovir, and protease inhibitors or lamivudine, zidovudine, and protease inhibitors as an alternative regimen.[8] Post Exposure Prophylaxis (PEP), according to a report by the WHO, is a short-term ARV treatment administered to minimize the possibility of HIV infection after potential exposure, either through sexual intercourse or occupationally.[9] PEP is recommended to commence immediately or as soon as possible for all persons with an exposure that has the potential for HIV infection, but preferably it should commence within 72 h.[10]. Initiating PEP within 72 h after exposure can minimize the risk of HIV transmission by over 80%.[10] However, for the effectiveness of the intervention, adherence to the entire 28-day course of ARVs is essential.[10] PEP should be made available as part of a comprehensive universal precaution package in the health sector to minimize the hazards, especially transmissible hazards health professionals are being exposed in their place of work. PEP normally consists of three ARV drugs from two different classes. The recent UK guideline recommends using Truvada which is a fixed-dose tablet comprising emtricitabine, tenofovir, and raltegravir (Isentress) from the integrase inhibitor class.[11] Follow-up appointment should commence 72 h after being exposed to HIV. This should incorporate HIV testing, counseling the patient, and monitoring for drug toxicity.

Several studies have been carried out on knowledge and awareness of HIV PEP among healthcare professionals.[8,12-16] These studies show that there is a knowledge gap on HIV PEP in the healthcare sector.[8,13,17] A study[17] on knowledge and practice of HIV PEP among healthcare professionals in a southeastern Nigerian tertiary hospital reported poor knowledge but positive attitude to HIV PEP. Studies around the world indicated knowledge gap in HIV treatment among students.[14,15,18-20] Evidence from studies also shows that healthcare students are at great risk of workplace exposure.[8,12,13,15] It is therefore of utmost importance that healthcare students should have adequate knowledge and awareness of HIV treatments due to the rising number of newly infected patients.[18] This study, therefore, assessed the knowledge and attitude of medical, pharmacy, and nursing students toward HIV PEP in a Nigerian tertiary institution.

METHODS

Research design

This study is a cross-sectional study on the knowledge and attitude of the medical, nursing, and pharmacy students on PEP. The study was carried out among 200, 300, 400, and 500 level pharmacy, medical and nursing students of Nnamdi Azikiwe University, Awka.

Study area

The study was carried out at 200, 300, 400, and 500 level classes of medicine, pharmacy, and nursing

departments of Nnamdi Azikiwe University, Awka, Anambra State (i.e. 2nd year, 3rd year, 4th year, and 5th year, respectively) of each of the departments.

Sampling technique and sample size calculation

With a total population (N) of 1632 students (based on the summation of individual class records of pharmacy, medical and nursing students in 200 level to 500 level) an online sample calculator (https://www.surveysystem.com/sscalc.htm) was used to calculate the sample size assuming a confidence level of 95% with a confidence interval of ±4.56, a sample size of 360 students was estimated to be adequate for the survey. To account for possible attrition, 10% of the sample size was added to 360 to get a sample size (n) of 396 students. A stratified sampling technique was employed to select students from the different departments and levels [Table 1].

Ethical consideration

Ethical approval for the study was obtained before the commencement of the study from the ethics committee of Nnamdi Azikiwe University Teaching Hospital, Nnewi with Reference no: NAUTH/CS/66/VOL.13/015/2019/106. Informed consent was also obtained from the participants before the study. Each participant's data was handled confidentially.

Table 1: Summary of sample size calculation

Departments and Levels	Population size (N)	Calculations	Sample size (n)
Pharmacy 200 level (n_1)	270	270/1632*396	66
Pharmacy 300 level (n_2)	150	150/1632*396	36
Pharmacy 400 level (n_3)	120	120/1632*396	29
Pharmacy 500 level (n_4)	120	120/1632*396	29
Nursing 200 level (n_5)	88	88/1632*396	21
Nursing 300 level (n_6)	79	79/1632*396	19
Nursing 400 level (n_7)	77	77/1632*396	19
Nursing 500 level (n_8)	58	58/1632*396	14
Medical 200 level (n_9)	200	200/1632*396	49
Medical 300 level (n_{10})	150	150/1632*396	36
Medical 400 level (n_{11})	120	120/1632*396	29
Medical 500 level (n_{12})	200	120/1632*396	49
Total	1632		396

Study criteria

Inclusion Criteria include medical, pharmacy, and nursing students of Nnamdi Azikiwe University, Awka, students in 200, 300, 400, and 500 levels, and the students who gave their consent to participate in the study. One hundred (100) level students of medicine, pharmacy, and nursing department of Nnamdi Azikiwe University, Awka, and students who did not give their consent to participate in the study were excluded from the study.

Instrument validity

The adapted instrument was subjected to face and content validation by experts in the field. The reliability of the instrument was obtained by calculating the internal consistency using Cronbach's Alpha test. The reliability estimates obtained was >0.7 (>0.7) and therefore were considered acceptable.[21]

Pilot study

A pilot study was carried out to assess the feasibility of the research instrument. This was implemented by sending the questionnaires to 39 students across the targeted population (via convenient sampling). The selected students were excluded from the main study. Ambiguous and unsuitable questions were modified and or excluded after the pre-test was concluded.

The Instrument and data collection

A structured questionnaire developed in English according to the WHO PEP guidelines and other published articles was adapted using the framework by[8] as a study instrument. The questionnaire comprised 23 item questions divided into three sections namely the demographic characteristic of the respondents, knowledge, and attitude to PEP. The first section of the questionnaire provided information on the participants' demography (gender, age, marital status, faculty, and level.). This comprised five questions with multiple choice answers. The second section provided information on knowledge of PEP. This section had twelve questions that elicited "Yes" "No" and Not sure" answers. Section three contained six questions that

elicited "Yes" "No" and "Not sure" answers on attitude of the students to HIV PEP.

Stratified sampling technique was employed to select students from the different departments and levels. The questionnaire was distributed to the 396 students that met the inclusion criteria with detailed instruction on how to answer the questions. Distribution was by face-to-face contact with the students. Participation in the research was purely voluntary and confidentiality of the respondents was maintained throughout the study. Every participant had the right to withdraw at any point in the course of the research if they so desired. The questionnaire was collected accordingly, sorted, and properly arranged for analysis. Data distribution and collection were between May to August 2020.

Data analysis

Data were summarized with descriptive statistics: mean, standard deviation, proportion, and frequency. The significant difference in the mean of the knowledge and attitude of the students was compared using ANOVA and independent t-test. Tukey HSD showed the means that were significantly different from each other. All significant statistics were accepted at $P < 0.05$

RESULTS

A total number of 396 participants took part in the study which comprised 163(41.2%) medical; 160 (40.4%) pharmacy and 73 (18.4%) nursing students. The response rate was 100%. Adequate instruction was given to the students on how to fill the questionnaires. The reliability of the entire questionnaire was 0.89.

About110 (27.8%) male and 286 (72.2%) female students took part in the study. 351 (88.6%)of the participants were single while 45 (11.4%)were married. Details of the demographic characteristics of the respondents are shown in Table 2.

Knowledge of HIV PEP by the healthcare students

Figure 1 revealed the students pattern of response to questions on the knowledge of HIV PEP. The mean score of each of the facets shows the average score of all the respondents to that facet. Every wrong answer was rated 0 while every correct answer was rated 1. Figure 1 showed that about 4% of the respondents had knowledge on when PEP should be initiated (mean score =0.04) while only 8% of students have attended training on HIV PEP (mean score= 0.08). Details of the analysis are shown in Figure 1.

Attitude of the healthcare students to HIV PEP

Figure 2 revealed the pattern of response to questions on the students' attitude to HIV PEP. The mean score of each of the facets shows the average score of all the respondents to that facet. Every wrong answer was rated 0 while every correct answer was rated 1. About 60% of the respondents believe strongly that HIV PEP works (mean score = 0.60), whereas 61% of the students believed that training on HIV PEP is very important for positive behavioral changes toward HIV PEP (mean score = 0.61), a detail of the analysis is shown in Figure 2.

Knowledge and attitude of the healthcare students to HIV PEP

Result of the analysis revealed that nursing students had more knowledge on HIV PEP than medical

Table 2: Demographic characteristics of respondents *(n*=396)

Variable	Classification	*n*	%
Age of respondents	20 years or below	64	16.2
	21–24 years	223	56.3
	25–29 years	74	18.7
	30 years and above	35	8.8
Gender of respondents	Male	110	27.8
	Female	286	72.2
Marital status	Single	351	88.6
	Married	45	11.4
Professional school	Pharmacy	160	40.4
	Medicine	163	41.2
	Nursing	73	18.4
Current level	200 level	137	34.6
	300 level	91	23.0
	400 level	77	19.4
	500 level	91	23.0

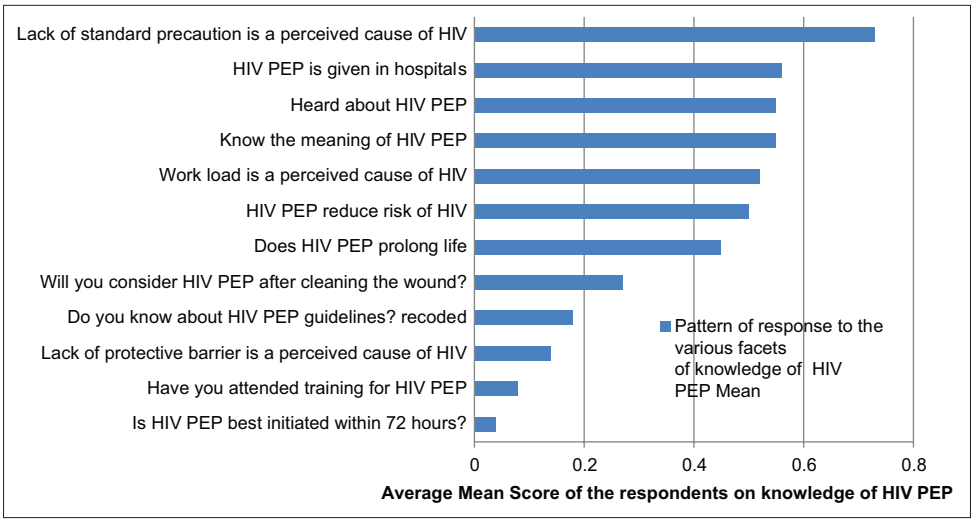

Figure 1: Response to different facets of knowledge to HIV PEP

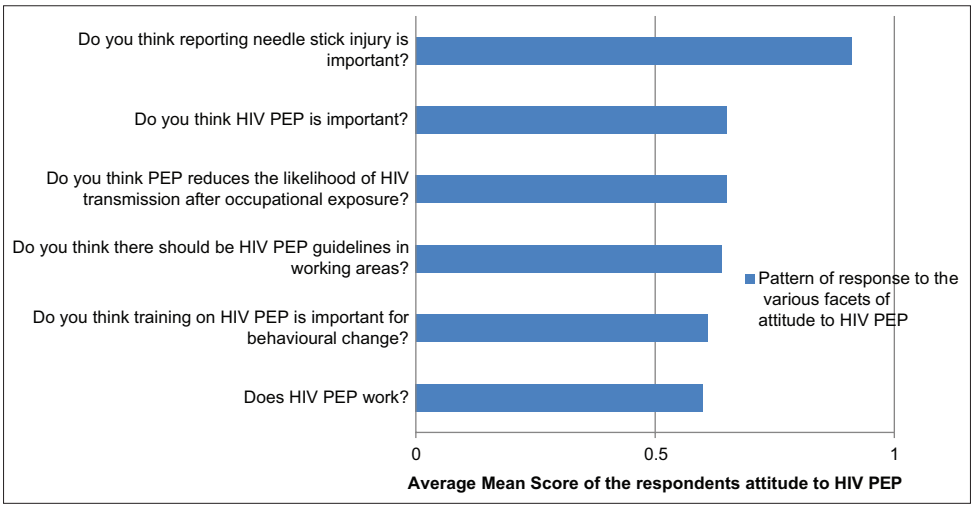

Figure 2: Response to different facets of attitude to HIV PEP

and pharmacy students. On the other hand, this study also shows that medical students had a better attitude to HIV PEP than the other student. The analysis is shown in Table 3.

Relationship between the health-care students age and their knowledge and attitude of HIV PEP

This study revealed that age had no statistically significant impact on the student's knowledge of HIV PEP (P value = 0.10). On the other hand, age had a significant impact on the students' attitude to HIV PEP. Students within the age range of 21–24 had better attitude to HIV PEP than the other age groups (P value= 0.00). The detail of the analysis is shown in Table 4.

Table 3: One-way ANOVA on Knowledge and attitude score of the healthcare students to HIV PEP

	M	SD	df	F	*P*	Tukey HSD
Knowledge score (%)						
Pharmacy	34.11	23.71	2, 393	5.77	0.00*	1<3
Medicine	38.34	21.29				
Nursing	44.63	20.05				
Attitude score (%)						
Pharmacy	60.42	32.90	2, 393	7.24	0.00*	1<2 < 3
Medicine	72.80	30.82				
Nursing	72.60	30.602				

*Mean difference significant at the 0.05 level

Relationship between the students gender and their knowledge and attitude to HIV PEP

The result of this study revealed that gender had statistically significant impact on the students'

Table 4: One-way ANOVA on Knowledge and Attitude scores of respondents versus age of respondents.

	M	SD	df	F	*P*	Tukey HSD
Knowledge score (%)						-
20 years or below	34.51	20.08	3, 392	2.12	0.10	
21–24 years	39.35	22.96				
25–29 years	39.30	21.30				
30 years and above	30.71	23.46				
Attitude score (%)						1<2, 2>4, 3>4
20 years or below	61.46	29.68	3, 392	9.41	0.00*	
21–24 years	73.09	29.82				
25–29 years	68.02	34.21				
30 years and above	44.76	35.19				

*Mean difference significant at the 0.05 level

knowledge of HIV PEP but gender had no impact on the students' attitude to HIV PEP. From the analysis, female respondents had more knowledge of HIV PEP than the male students (P = 0.00). Detailed analysis is shown in Table 5.

Relationship between the students' class levels in their various faculties to their knowledge and attitude of HIV PEP

The result of this study revealed that pharmacy and nursing students different class levels had no statistically significant impact on their knowledge of HIV PEP (P value = 0.21). This study also shows pharmacy and nursing students different class levels had an impact on their attitude to HIV PEP. The result revealed that 400L pharmacy students had a better attitude to HIV PEP than the other levels. The analysis is shown in Table 6.

DISCUSSION

This study assessed the knowledge and attitude of medical, pharmacy, and nursing students toward HIV PEP using a structured questionnaire developed in the English language based on the WHO PEP guidelines and other published articles. The questionnaire was validated and piloted on 39 students who were exempted from the main study. The questionnaire was self administered and data collection was by face-to-face contact with the students. The study revealed significant differences in the student's knowledge and attitude to HIV PEP.

Assessment of knowledge of HIV PEP among medical, nursing, and pharmacy students

This study revealed poor knowledge of HIV PEP among medical, pharmacy, and nursing students. This is consistent with a study[13] that recorded inadequate knowledge of HIV PEP among health workers. A similar study conducted in India among dental students[22] also reported inadequate knowledge of HIV PEP by the students. Studies[23,24] contradicts the result obtained from this study. These studies revealed adequate knowledge of HIV PEP among healthcare providers.

This study revealed that only a few of the students knew when HIV PEP should be initiated. This is consistent with a study[25] where only a few percentages of the students knew the time HIV PEP should be initiated to reduce the risk of exposure. This study also revealed that a very little percentage of the students had undergone any form of training on HIV PEP. This is consistent with a study.[3] About three-quarters of the respondents believed that lack of standard precaution is a perceived cause of HIV. This is consistent with a study.[3] About half of the respondents agreed that administering HIV PEP reduces the risk of developing HIV. This is consistent with a study[26] where half of the respondents agreed that administering HIV PEP reduces the risk of developing HIV. Almost all the respondents agreed that reporting a needle stick injury is important. This contradicts the result of a study[27] in Pakistan where very few percentages of the respondents believe that reporting a needle stick injury is important.

Assessment of Attitude toward HIV PEP among medical, pharmacy, and nursing students

The study revealed good attitude toward HIV PEP by the students. This is consistent with a study[8] where almost all the respondents had a positive attitude toward HIV PEP. A study conducted in eastern Ethiopia[26] reported that a good number of the respondents had a good attitude towards

Table 5: Independent *t*-test of Knowledge and Attitude scores against the gender of respondents

	Respondents Gender				*t*	*P*	95% CI	
	Male		Female					
	M	SD	M	SD			Lower	Upper
Knowledge score	30.98	20.48	40.41	22.53	−3.99	0.00*	−14.09	−4.77
Attitude score	67.58	31.91	67.83	32.27	−0.071	0.94	−7.35	6.84

*Mean difference significant at the 0.05 level

Table 6: One-way ANOVA on knowledge and attitude scores on post-exposure prophylaxis versus different class levels in the various faculties

School of Pharmacy	M	SD	Df	F	*P*	Tukey HSD
Knowledge score (%)						
200 level	32.09	26.04	3, 156	1.97	0.12	-
300 level	28.70	26.69				
400 level	39.37	16.50				
500 level	40.48	18.10				
Attitude score (%)						
200 level	53.98	32.71	3, 156	4.67	0.00*	3>1 > 2
300 level	52.78	34.39				
400 level	75.86	26.20				
500 level	69.64	31.45				
School of Nursing						
Knowledge score in percentage						
200 level	36.90	22.14	3, 69	1.55	0.21	-
300 level	46.49	17.42				
400 level	47.81	19.01				
500 level	49.40	20.27				
Attitude score in percentage						
200 level	69.05	30.41	3, 69	0.39	0.76	-
300 level	78.07	25.49				
400 level	69.30	32.52				
500 level	75.00	36.25				
School of Medicine						
Knowledge score in percentage						
200 level	31.12	20.61	3, 159	8.02	0.00*	1<3 < 4, 2<3 < 4
300 level	30.79	19.30				
400 level	46.84	18.42				
500 level	46.09	20.84				
Attitude score in percentage						
200 level	61.90	33.85	3, 159	7.67	0.00*	3>1 > 2
300 level	62.96	35.21				
400 level	85.06	21.06				
500 level	83.67	22.18				

*Mean difference significant at the 0.05 level

HIV PEP. The result from this study, however, contradicts the result of a study[22,27] that reported poor attitude to HIV PEP by the healthcare workers.

Impact of demographics on medical, pharmacy, and nursing students knowledge and attitude of HIV PEP

The result revealed significant differences in the impact of demographics on the student's knowledge and attitude toward HIV PEP. This study revealed that pharmacy and nursing student's different levels of the study had no statistically significant impact on their knowledge of HIV PEP, whereas medical students different levels of study have impact on their knowledge and attitude to HIV PEP. This is consistent with a study[28] in Northwest Ethiopia which recorded no statistically significant difference in the health workers knowledge of HIV PEP with regards to the number of years of service. A study[22] among dental students in India which demonstrated a difference in attitude among students across their different years of clinical experience.

A study in Gothenburg Sweden[29] recorded a significant difference in health workers' knowledge of HIV PEP and their years of clinical experience. Studies[22,30] also recorded significant differences in knowledge and attitude to HIV PEP among the 3rd and 5th-year dental students, respectively.

Medical students different class levels had a significant impact on their knowledge and attitude to HIV PEP. This is consistent with results of a study[12] that reported impact of level of study on the student's knowledge and attitude to HIV PEP. A study[3] in southwest Ethiopia which reported that there was no statistically significant difference in the knowledge and attitude of the medical students toward HIV PEP contradicts the result from this study.

Impact of age on the students'knowledge and attitude toward HIV PEP

This study revealed that age had no statistically significant impact on the student's knowledge

of HIV PEP. This is consistent with studies[3,28,31] which reported that there was no statistically significant difference in the knowledge of HIV PEP across different age groups of health workers. This study, however, revealed that age had a statistically significant impact on the attitude of the students to HIV PEP. This contradicts the result of a study[3] which stated that there was no significant difference in the attitude toward HIV PEP across the age of the respondents.

Impact of gender on the students' knowledge and attitude of the students toward HIV PEP

This study recorded that gender had a significant impact on the students' knowledge of HIV PEP. This contradicts the result of a study[28] that recorded no statistically significant difference in the knowledge of PEP between the male and female respondents.
On the other hand, this study revealed that gender had no significant impact on the student's attitude to HIV PEP. This is consistent with the result of a study[3] which showed that there was no significant difference in the attitude between the male and female respondents toward HIV PEP. A study[31] also recorded that gender had no impact on the student's attitude to HIV PEP.
This study had some possible limitations. One could be as a result of the single institution the study was carried out. This could prevent the generalization of the findings from this study to other institutions. The self-assessment nature of the questionnaire used in this study may affect the result obtained.

CONCLUSION

This study recorded poor knowledge of HIV PEP among medical, pharmacy, and nursing students of Nnamdi Azikiwe University Awka, Anambra State. Although the students have a favorable attitude toward HIV PEP, there is an urgent need to incorporate training on HIV PEP in the academic curriculum of these students and occasionally organize awareness campaigns to enlighten students on HIV PEP. Health policymaker and employers of health workers should provide and ensure accessibility of standard HIV PEP guidelines for all health care professionals. Further studies are needed to boost the empirical studies available and help in making informed decisions.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest

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