

Determinants of appropriate knowledge on human immunodeficiency virus postexposure prophylaxis among professional health-care workers in Sokoto, Nigeria

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ABSTRACT

Introduction: The prevention of human immunodeficiency virus (HIV/AIDS) among health-care workers (HCWs) has remained a major topical issue worldwide. Accidental transmission of HIV infection to HCWs during occupational exposure is a real threat today. The study aimed to assess the knowledge, attitude, and practice of postexposure prophylaxis (PEP) among HCWs in a tertiary health institution in Sokoto, Northwestern Nigeria. **Methodology:** The study was carried out at Usmanu Danfodiyo University Teaching Hospital, Sokoto, through a cross-sectional descriptive study design; a total of 156 participants were recruited using a stratified sampling technique. Data were collected using a semi-structured, self-administered questionnaire and analyzed using SPSS computer software after obtaining ethical clearance from the Health Ethics and Research Committee of the teaching hospital. **Results:** A total of 87.2% (136) of the respondents had heard of PEP and 71.8% (112) thought that HIV/AIDS could be prevented through PEP. A total of 71.2% (111) had good knowledge about PEP, whereas 86.8% (118) had a positive attitude toward PEP. **Conclusion:** Although the study demonstrated high knowledge and positive attitude toward PEP, the observance of safety measures against needlestick injuries that could result in HIV infections was abysmally low. There is the need to create more awareness and strengthen the use of PEP protocol by all cadres of health workers as this will go a long way in minimizing blood-borne infections.

Keywords: Health-care workers, human immunodeficiency virus, knowledge, postexposure prophylaxis, Sokoto

Introduction

Health-care workers (HCWs) are key players in the prevention and management of blood-borne infections including human immunodeficiency virus (HIV).^[1,2] Accidental transmission of HIV infection to HCWs during occupational exposure is a real threat today,^[3-6] approximately 3 million HCWs experiencing percutaneous exposure to blood-borne viruses (BBVs) each year. This results in an estimated 16,000 hepatitis C, 66,000 hepatitis B, and 200–5000 HIV infections annually.^[7,8]

It is postulated that >90% of these infections are occurring in low-income countries, and most are preventable.^[7] HCWs have increased chances of acquiring blood-borne pathogens through occupational exposure in developing countries due to a combination of increased risk and fewer safety precautions.^[9] Since the loss of workers can seriously undermine developing health systems, it is important that risks of exposures are minimized. There are many difficulties faced by developing countries in minimizing the risks of occupational exposure. Efforts have been made to address these problems both on national and international levels. It is imperative that all HCWs are protected to prevent the loss of such a crucial component

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of developing health-care systems.^[9] Adequate knowledge about the disease and practice of safety measures are our best bet to reduce such transmissions.^[3] The study aimed to determine the knowledge, attitude, and practice of HIV postexposure prophylaxis (PEP) among HCWs in a tertiary health institution in Sokoto, Northwest Nigeria.

Methodology

The study was carried out at the Usmanu Danfodio University Teaching Hospital (UDUTH), Sokoto, which is a tertiary health facility/referral center that serves Sokoto, Zamfara, and Kebbi states all located in Northwestern Nigeria. The hospital has an 860-bed capacity and provides services for HIV infection and AIDS care among a myriad of other specialist services. The services include HIV counseling services, medication adherence, treatment support services, home-based care, consultation services, and ART drugs dispensing services. The facility presently provides these specialist services for over 4500 clients in the region. A cross-sectional descriptive study design was used. Using the formula for cross-sectional studies, a sample size of 156 was calculated after correcting for study population < 10,000. HCWs working in the clinical departments of UDUTH for at least 6 months were considered eligible to participate in the study (inclusion criteria).

A two-staged (multi-stage) sampling method was employed. Stratified sampling was done to allocate questionnaires to the various cadres of HCWs. Systematic sampling was applied to the sampling frame of each cadre of HCWs to recruit respondents into the study after obtaining informed consent. Participants' data were collected using self-administered, semi-structured questionnaire. The data were collected by six trained research assistants under direct supervision of the principal investigator.

The data collected were entered into and analyzed using Microsoft excel and SPSS version 20. Descriptive statistics were used to summarize sociodemographic characteristics, knowledge, attitude, and practice questions. Correct answers to questions on knowledge and attitude were scored one (1) and incorrect ones and no response were awarded no scores (0), and these were converted to percentages. Respondents with scores $\geq 50\%$ were adjudged as having good knowledge and positive attitude, respectively, while those with scores $< 50\%$ were said to have poor knowledge and negative attitude respectively. Bivariate analysis was used to determine the factors associated with the knowledge, attitude, and practice of PEP. $P < 0.05$ was considered statistically significant. Ethical clearance was sought from the Ethical Committee of UDUTH, Sokoto, while informed consent was obtained from the HCWs before data collection.

Results

The ages of the respondents ranged from 20 to 59 years with a modal class of 30–39 years constituting 57.1% (89) of all participants and a mean age of 33.04 ± 7.29 years. Most respondents, i.e. 61.5% (96) were males, 60.9% (95) belonged to

the Hausa/Fulani tribe, 67.9% (106) are adherents of the Muslim faith, and 95.5% (149) had a tertiary level of education. Doctors, nurses/midwives, and community health workers constituted about two-thirds (65.4%) of all participants [Table 1].

About 92% (145) had heard of universal precautions, 87.2% (136) had heard of PEP for HIV/AIDS, 36.5% (57) did so from a training, 71.8% (112) believed that HIV/AIDS could be prevented through PEP [Table 2]. A total of 71.2% (111) of the respondents had good knowledge about PEP for HIV/AIDS, whereas only 28.8% (45) had poor knowledge about it. Majority of the respondents (86.8% [118]) had a positive attitude toward PEP for HIV/AIDS.

Only 44.9% (70) of the respondents alluded to the availability of a PEP protocol in their workplace, 44.2% (69) knew what to do when an HCW had a needlestick injury. Thirty-five (22.4%) respondents have had needlestick injuries with HIV contaminants in the past and only 8 (22.9%) received the right treatment based on the responses given. About 77% (120) took special precautions in the course of caring for HIV/AIDS patients, whereas 46.2% (72) used a combination of several safety measures [Table 3].

Knowledge on postexposure prophylaxis

Logistic regression was used to predict which variables fitted knowledge on HIV PEP among participants [Tables 4 and

Table 1: Sociodemographic characteristics

Variable	Frequency (%)
Age (years)	
20-29	30 (19.2)
30-39	89 (57.1)
40-49	30 (19.2)
50-59	7 (4.5)
Sex	
Male	96 (61.5)
Female	60 (38.5)
Ethnicity	
Hausa/Fulani	95 (60.9)
Yoruba	23 (14.7)
Igbo	15 (9.6)
Others	23 (14.7)
Religion	
Muslim	106 (67.9)
Christian	50 (32.1)
Cadre of staff	
Doctor	32 (20.5)
Nurse	26 (16.7)
Laboratory scientist/technologist	19 (12.2)
Pharmacist	16 (10.3)
Community health worker	44 (28.2)
Others	19 (12.2)
Highest educational qualification	
Primary	1 (0.6)
Secondary	6 (3.8)
Tertiary	149 (95.5)

Table 2: Knowledge of postexposure prophylaxis

Variable	Frequency (%)
Ever heard of universal precautions	
Yes	145 (92.9)
No	11 (7.1)
Availability of universal precautions guidelines at workplace	
Yes	99 (63.5)
No	57 (36.5)
Ever heard about PEP for HIV and AIDS	
Yes	136 (87.2)
No	20 (12.8)
Source of information regarding PEP for HIV and AIDS	
Workplace	72 (46.2)
Colleagues	12 (7.7)
Training	57 (36.5)
Friends	5 (3.2)
Mass media	7 (4.5)
Others	3 (1.9)
HIV/AIDS can be prevented through PEP	
Yes	112 (71.8)
No	20 (12.8)
Aim of PEP for HIV/AIDS is to: Boost immune response	
Yes	53 (34.0)
No	24 (15.4)
Prevent infection with HIV/AIDS after accidental exposure	
Yes	98 (62.8)
No	8 (5.1)
Treat HIV/AIDS patients who work in the hospital	
Yes	21 (13.5)
No	39 (25.0)
Grading of knowledge	
Good knowledge ($\geq 50\%$)	111 (71.2)
Poor knowledge ($< 50\%$)	45 (28.8)

PEP: Postexposure prophylaxis; HIV: Human immunodeficiency virus

5]. The model contained five predictive variables (sex, cadre, highest education level, source of information on PEP, and availability of PEP guidelines at workplace). The model was statistically significant χ^2 ($df=16$, $n = 213$) 142.15; $P < 0.0001$ [Table 4], indicating that the model was able to distinguish between participants who had appropriate knowledge regarding the indications and benefits of PEP from those with incorrect knowledge. The model accounted for 48% (Cox and Snell R^2) and 93% (Nagelkerke R^2) of variability among participants and correctly classified 84% (131) of cases which together with Hosmer and Lemeshow goodness of fit test indicated the model being useful with the P value of the later test of 0.767 which is larger than the alpha value of 0.05 [Table 4].

Model on appropriate knowledge of postexposure prophylaxis

However, only three out of the five predictor variables, namely, sex, highest education level, received information on PEP

Table 3: Practice of postexposure prophylaxis for human immunodeficiency virus/AIDS

Variable	Frequency (%)
Availability of PEP protocol at workplace	
Yes	70 (44.9)
No	59 (37.8)
Protocol carried out when a health worker has a needlestick injury	
Nothing happens	4 (2.6)
Takes antibiotics only	1 (0.6)
Takes IM tetanus	27 (17.3)
Washed the place thoroughly and applied antibiotics	17 (10.9)
Client is given a course of ARVs for a month after being asked to do RVS test	69 (44.2)
Others	10 (6.4)
Ever had a needlestick injury with HIV contaminants at work ($n=137$)	
Yes	35 (22.4)
No	102 (65.4)
Procedure done following needlestick injury ($n=35$)	
Nothing	9 (25.7)
Prayed to God only	7 (20)
Received tetanus injection	3 (8.6)
Was given a course of ARVs for a month after being asked to do RVS test	8 (22.9)
Washed the infected place thoroughly and applied antibiotics	7 (20)
Others	1 (2.9)
Any special precautions taken when carrying out a procedure on HIV patients ($n=134$)	
Yes	120 (76.9)
No	14 (9.0)
Precautions taken when carrying out procedures on HIV patients ($n=120$)	
Used surgical/latex gloves only	37 (23.7)
Washed my hands with soap and water afterward	2 (1.3)
Cleaned hands with antiseptic afterward	5 (3.2)
Used protective wears	4 (2.6)
Used a combination of any two or more safety measures	72 (46.2)

HIV: Human immunodeficiency virus; ARV: Antiretroviral; RVS: Retroviral screening; IM: Intramuscular

during school days, and reading of journals/textbooks had significantly contributed to the model with $P < 0.0001$ [Table 4]. Furthermore, the model indicated that participants who are nurses/midwives, laboratory scientists/technologists, and community health workers had appropriate knowledge on PEP compared to doctors and pharmacist with an odd ratio of 4 and 7, respectively [Table 5].

Discussion

According to the World Health Organization's estimation, about 2.5% of all HIV cases among health workers worldwide are as a result of exposures to risky conditions.^[10] Evidence suggests that treatment with antiretroviral drugs soon after occupational

Table 4: Predictive model on the appropriate knowledge of postexposure prophylaxis among professional health workers

Model	Model fitting information				R^2		
	-2 Log likelihood	χ^2	df	Significant	Cox and snell	Nagelkerke	Hosmer and Lemeshow test
Constant	1.08	142.152					
Final model	15.903	142.152	16	0.000	0.48	0.93	0.767

Table 5: Predictive variables in the model that is associated with good knowledge on postexposure prophylaxis

Variables	B	Wald	df	Significant	95% CI for EXP(B)	
					Lower	Upper
Step 1 ^a						
Sex males	-50.138	0.000	1	0.992	0.000	
Cadre		0.052	5	1.000		
Doctors	49.911	0.000	1	0.993	0.000	
Nurses/midwives	48.320	0.000	1	0.992	0.000	
Laboratory scientist/technologist	29.928	0.000	1	0.997	0.000	
Pharmacist	48.640	0.000	1	0.992	0.000	
Community health worker	29.604	0.000	1	0.998	0.000	
Highest education level		0.000	2	1.000		
Primary/secondary	16.297	0.000	1	1.000	0.000	
Tertiary	-4.991	0.000	1	1.000	0.000	
Source of information on PEP		0.000	6	1.000		
Workplace	56.552	0.000	1	0.997	0.000	
Colleagues/friend	20.679	0.000	1	0.999	0.000	
Training (seminars, conferences, workshops)	2.578	0.000	1	1.000	0.000	
As a student	-25.862	0.000	1	0.999	0.000	
Mass media	1.986	0.000	1	1.000	0.000	
Scientific journals/boks	-28.086	0.000	1	0.999	0.000	
Availability of PEP guidelines at workplace		0.052	2	0.974		
Available	31.610	0.000	1	0.991	0.000	
Not available	-0.320	0.052	1	0.820	0.046	11.391
Constant	-64.953	0.000	1	0.999		

^aVariable(s) entered on step 1: Sex, cadre, highest education level, source of information on PEP, availability of PEP guidelines at workplace. PEP: Postexposure prophylaxis; CI: Confidence interval

exposure to HIV decreases the risk of infection. PEP regimens are chosen depending on the type of exposure. Typically regimens are prescribed for a 4-week period, and PEP should be started within hours of the potential exposure. The sooner PEP is started the better, and it should be started within the first 72 h after exposure.

This study revealed that majority of the respondents (91.7% and 87.2%) were aware of universal health precautions and HIV PEP, respectively. This is not unexpected given the respondents' educational background and occupational setting. This is similar though slightly higher than that reported among HCWs at Lagos University Teaching Hospital where 83.3% had prior awareness about PEP^[11] but lower than the findings in another study among health workers where 97% were aware of PEP.^[12] Our finding was also consistent with findings in Western Ethiopia where 92.8% of respondents had heard about PEP.^[13] Among the respondents that are aware of PEP, only 46.2% got to know of it from their workplace. This may be a pointer to the lack of regular in-house trainings toward identification and control of workplace hazards which should be an important consideration at tertiary health facilities. HCWs are by virtue of their exposures be availed the opportunities of training and retraining on the prevention of accidental exposures which will in no small means reduce the incidents of blood-borne infections. The finding that

almost three-quarters of the respondents (71.8%) were aware that PEP reduces the transmission of HIV following occupational exposure was corroborated by findings in previous studies done in Southwestern Nigeria (87.0%),^[11] the United Kingdom,^[14] and Spain.^[15]

The fact that up to 28.8% of the respondents had poor knowledge of PEP for HIV/AIDS underscores the need for every HCW to be aware of HIV PEP to prevent them from being infected should they accidentally have a needlestick injury with an HIV-infected patient. This is alarming considering the fact that slightly above a quarter of the respondents lack information on to what needs to be done when faced with a needlestick injury/exposure in the workplace. This finding is lower than that reported from West Ethiopia (36.9%)^[13] and significantly lower than that reported in Zimbabwe (65%).^[16] These findings from across the African region call for an immediate action to ensure refresher courses, training and retraining on infection prevention, and control measures in our health-care centers.

Expectedly, majority of the respondents (86.8%) had a positive attitude toward PEP. This means that they will accept the use of PEP after occupational exposure. This is not surprising since majority of the respondents are aware that HIV PEP reduces

the transmission of HIV following occupational exposure, and more importantly, HIV/AIDS is a highly stigmatized infection with no known cure besides a management regimen aimed at suppressing the viral load.

Majority of the respondents (76.9%) took special precaution when carrying out procedures on HIV/AIDS patient with about 46% using a combination of safety measures which included the use of surgical or latex gloves and other protective wears. This will go a long way in preventing HIV infection.

The study further revealed a significant occurrence (22.4%) of needlestick injury among respondents during their practice. This is lower than those reported from previous studies done in Lagos, Nigeria (47.3%);^[11] 74.5% reported in studies carried out in the southern part of India;^[17] and 82.9% in studies done in Uganda though much higher than 11.3% reported from a study in Italy.^[18] This relatively lower rate found in the study in Italy compared to the findings in other countries has to do with the improved quality of health-care services provided in their settings. This should be the aim of health-care systems in developing countries like Nigeria where this study was carried out. Each health-care service should also aim to have a comprehensive universal precaution package and improved disposal of sharps in the hospital to deter the continued occurrence of needlestick injuries among HCWs.

Furthermore, among those who experienced needlestick injury, only about a quarter (23%) reported it and was given PEP for HIV infection. This is consistent with findings in a study done in Uganda where only 21% of respondents reported needlestick injury^[9] but significantly lower than what was found in another study done in Lagos, Nigeria (41%)^[11] and Ethiopia (70%) revealing a very high level of underreporting of needlestick injury among HCWs. The findings from our study may not be unrelated to the high level of awareness and knowledge demonstrated by our study subjects

Conclusion and Recommendations

In general, the findings from this study showed a high level of awareness, knowledge, and attitude for HIV PEP among the study subjects. Although few (22.4%) of the HCWs experienced needle prick episodes, only a quarter of them reported the incidents, of which only a small proportion of them benefitted from PEP. This underscores the need for on-the-job training for HCWs in health facilities in Sokoto and Nigeria at large as well as identifying and addressing barriers of under-reporting and nonuse of PEP service. This will go a long way in reducing the incidence and prevalence of HIV in the country.

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Conflicts of interest

There are no conflicts of interest.

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