



## Original Article

# Occupational exposure to HIV and use of post-exposure prophylaxis in a general hospital in North Central, Nigeria

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## Abstract:

Occupational exposures to blood borne pathogens including HIV have been well studied. However, limited studies exist about the utilization of post exposure prophylaxis and follow-up in Nigeria

The objectives of the study were to describe the characteristics of occupational exposure to HIV, the utilization of post exposure prophylaxis (PEP) among health workers, and the proportion of exposed health workers reporting for follow-up three months after exposure.

A cross sectional descriptive study involving ninety three health workers was carried out at a general hospital located in an urban area in North Central zone of Nigeria. A simple random sampling technique was used. The prevalence of occupational exposure, utilization of post exposure prophylaxis and follow-up rate were assessed using self administered questionnaire. Data analysis was done using SPSS version 16 and descriptive analysis was carried out.

It was reported that, 73.1% of respondents at least one or more occupational exposures to HIV and other blood borne pathogens through accidental needle injury/prick, blood splash on a fresh wound or conjunctiva exposure in the last one year. Needle stick injury occurred in 83.8% of all respondents who had occupational exposures. 8.8% of exposed respondents commenced post exposure prophylaxis with two-thirds completing the post exposure prophylaxis regimen. Only one (25%) of those who completed the regimen reported for follow-up.

Occupational exposures to HIV are common among health workers. The rates of utilization of post exposure prophylaxis and follow-up were low.

**Key Words:** Post exposure prophylaxis, HIV, occupational exposure, follow-up.

## Introduction

About three in hundred Nigerians are living with the Human Immunodeficiency Virus [1]. Health workers are often

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exposed to blood borne pathogens via infected blood and body fluids, usually through needle stick injuries or muco-cutaneous contact with splashes blood or body fluids [2]. There is a high prevalence rate of needle stick injuries among health workers in developing countries and the average risk of HIV infection after needle-stick injury and mucous membrane exposure are 0.3% and 0.09% respectively [3],[4],[5],[6],[7]. There is a gap in

knowledge concerning the utilization of post-exposure prophylaxis and follow-up among health workers in Nigeria. Hence, we carried out this study to fill this identified gap.

The study was carried out to describe the characteristics of occupational exposure to HIV, the utilization of post exposure prophylaxis (PEP) among health workers and follow-up rate after three months of exposure.

## Methods

The study was carried out in Minna, the capital city of Niger State in the North Central geopolitical zone of Nigeria with a population of about 4 million people and HIV prevalence of 5.3% [8]. The travel distance by road to the nearest tertiary hospital from Minna is about 100 km [9]. General Hospital, Minna therefore serves the majority of the residents of the city as well as people from neighboring parts of the state. The hospital has about 500 beds and 10 wards with more than 170 health workers. The clinical departments in the hospital include Medicine, Surgery, Obstetrics and Gynecology, Pediatrics, Ophthalmology, Ear, Nose and Throat, Dental Surgery and Laboratory Medicine. Medical officers and nurses are usually posted to any of these departments on a rotational basis in order to facilitate skill acquisition in the different aspects of medical practice. The HIV treatment, care and support program of this hospital is being supported by the Family Health International within the USAID/PEPFAR program for HIV. The post exposure prophylaxis program is one of the components of the HIV control program of the hospital.

Healthcare workers (HCWs) are defined as “people (e.g. Employees, students or volunteers) whose activities involve contact with patients or with blood or body fluids from patients in a healthcare or laboratory setting” [10]. However, for the purpose of this study, health workers included in this study were nurses, doctors and laboratory workers. Other health workers were excluded because occupational exposures are less common among them.

Occupational exposure is defined as one which occurs when a health worker is exposed to infected blood, tissue and blood products from a patient who is either confirmed HIV positive or of unknown status [10]. There are guidelines for the management of occupational exposures to HIV in the health care settings including this hospital. [10], [11], [12]

The study was a cross sectional descriptive study. A list of

employees of the hospital was obtained, other categories of health workers were excluded leaving only nurses, doctors and laboratory workers. There were 126 health workers according to our definition. The normal approximation to the hyper geometric distribution was used to determine the sample size for this small population. With 95 % confidence interval, accuracy of 5% and population proportion of 0.3, a sample size of ninety one was obtained. A randomly selected sample of ninety four healthcare workers was obtained from the sampling frame through a spreadsheet generated table of random numbers. Health care workers in the sample were asked to complete an anonymous questionnaire.

A self administered questionnaire designed to collect sociodemographic data including sex of the respondent, age, marital status, occupation, current department and years of professional experience. Other items include questions regarding episodes of exposure to blood and blood products in the last one year, information on previous HIV screening, utilization of post exposure prophylaxis and follow up testing for HIV three months after exposure. Attitude towards the effectiveness of post exposure prophylaxis was determined using a question on the Likert scale. Data was not obtained regarding the HIV status of the source patient because HIV screening is not a routine test in this hospital. It is only being done when there are indications for it. In addition, we assume any patient whose HIV status is unknown should be regarded as being positive. This is the basis for universal precautions. [14]

Data collection took place from 12th to 31st January, 2009. The average time of completion of the self administered questionnaire was fifteen minutes. Data collectors crossed checked questionnaires for completion at the time of collection from the respondents. Ninety three of the ninety four administered questionnaires were completed and returned giving a response rate of 98.9%. Data were analyzed with SPSS version 16.

Permission to carry out the survey was obtained from the management of the hospital. Participation was voluntary and questionnaire was anonymous such that no unique sociodemographic information collected could potentially identify a participant. Questionnaire stated that respondents may choose not to participate in the study hence its completion is considered informed consent.

## Results

### Socio-demographic characteristics

Ninety three health workers completed the self administered questionnaire. More than half (47) of the respondents were in the age group 26-35 years (Table 1).

**Table 1 Sociodemographic characteristics of participants in the study.**

Socio-demographic characteristics	Frequency (N=93)	Percentage (%)
<b>Age group (years)</b>		
<26	9	9.7
26-35	47	50.5
36-44	30	32.3
>45	7	7.5
<b>Sex</b>		
Male	53	57
Female	40	43
<b>Marital status</b>		
Married	61	65.6
Single	32	34.4
<b>Occupation</b>		
Nurses	66	71
Doctors	17	18
Lab. Scientist/Technicians	10	11
<b>Duration of experience (years)</b>		
< 2	8	8.6
2 to 4	40	43
5 to 10	35	37.6
>10	10	10.8

### HIV screening

Seventy six (81.7%) of the respondents has had HIV screening at least once. While 15.8% of these respondents had a recent HIV screening less than 2 months prior to the study, 14.5 %, 34.2%, and 35.5% had HIV test within 3-6 months, 7-12 months and more than 1 year prior to the study respectively.

### Occupational exposure

Sixty eight respondents (73.1%) reported at least one or more episodes of occupational exposures to HIV and other blood-borne pathogens through accidental needle injury/prick, blood splash on a fresh wound or conjunctiva exposure in the last one year. While twenty one respondents (30.9%) reported a single exposure, forty-one (60.3%) reported two episodes of occupational exposure, and six respondents (8.8%) had more than three or more episodes (Table 2).

**Table 2 Frequency and characteristics of self reported occupational exposure among respondents.**

Frequency of exposure	Frequency (N=68)	Percentage (%)
Once	21	30.9
Twice	41	60.3
Thrice or more	6	8.8
<b>Exposure characteristic (more than one type of exposure is possible)</b>		
Accidental needle injury	57	83.8
Conjunctival exposure	20	29.4
Blood splash on fresh wound	16	23.5

Accidental needle injury (needle prick) was the most commonly reported exposure with fifty seven respondents (61.3% of total population of respondents) reporting accidental needle injury. This accounts for 83.8% of total exposures among respondents (Table 2).

### HIV screening among exposed respondents

Twelve of the exposed respondents (17.7%) had HIV screening before the exposure.

### Frequency of exposure in relation to experience

Occupational exposure to HIV was found to be related to years of experience. 77.1% of those with 5-10 years' experience reported having had either a needle prick, a conjunctiva exposure or blood splash on fresh wounds while 22.9 % of those with less than 2 years experience reported a similar exposure.

### Post exposure prophylaxis

Six of the exposed respondents (8.8%) commenced post exposure prophylaxis. Of these, only four (66.7%) completed a 28-day course of post exposure prophylaxis. All the forty seven

respondents who had more than one episode of exposure did not take post exposure prophylaxis. All the respondents who took post exposure prophylaxis regimen are those with only one episode of exposure either a needle prick, a conjunctiva exposure or blood splash on fresh wound but not both. They were all unmarried males; belong to 26 to 35years age group with three to five years of work experience.

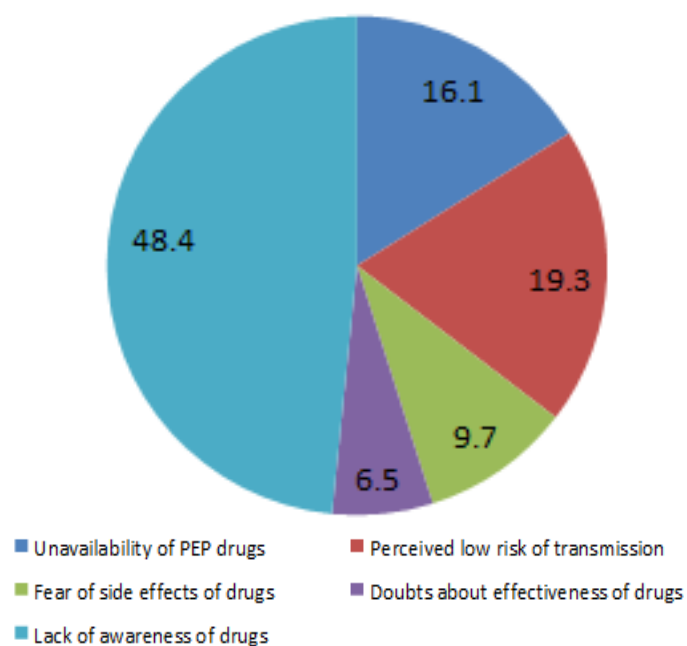
### Screening after the exposure

Twenty three of the exposed health workers reported to have had HIV rescreening three months after exposure. While three of the six respondents (50%) who commenced post exposure prophylaxis reported for HIV rescreening, only one (25%) of those who completed the 28-day medication rescreened.

### Reasons for non use of post exposure prophylaxis (PEP)

Unavailability of drugs (PEP drugs) was reported as one of the reasons for non use of post exposure prophylaxis by 16% of respondents. Perceived low risk of HIV transmission through occupational exposure, fear of the side effects of the drugs, doubts about the effectiveness of post exposure prophylaxis, and lack of awareness about the availability of the drugs were other reasons (Figure 1).

**Figure 1 Reasons for non use of post exposure prophylaxis.**



### Perception about effectiveness of post exposure prophylaxis (PEP)

Almost four-fifths of the respondents agree that PEP is effective in preventing seroconversion after occupational exposure with

21.5% strongly agreeing. 18.3% do not know, 2.2 % disagree and none strongly disagree. All respondents who took PEP agreed that it is effective. Further, those who took PEP constitute 12.2% of those who were exposed and agreed that post exposure prophylaxis is effective.

### Discussion

A healthy workforce is important for the economic development of any nation [15]. This cannot be overemphasized with regard to the health workforce on whose performance the health of workers in other sectors of the economy depends. The burden of HIV/AIDS in sub Saharan Africa places an additional stress on the overburdened health workers in this region. In addition, there is a high prevalence of occupational exposure to HIV infection among health workers [6]. Each exposure carries a potential risk of infection and post exposure prophylaxis (PEP) has been found to reduce this risk [16]. This study describes the pattern of utilization of PEP follows occupational exposure to blood from a patient whose HIV status is either unknown or is positive.

Half of the respondents were in the age group 26-35 years. This is important because people in this age group are often single with the married ones being in their active reproductive years. Hence, the utilization of PEP is not only important for their own health but also for the health of their future or current spouses and the unborn generation. The majority (81.7%) of the health workers has had HIV screening at least once. This is consistent with the finding from a study in Malawi which reported that about 74% of sampled HCWs know their HIV status [16]. While this seems to be a fair proportion, qualitative studies are needed to explore the reasons for the reluctance of some health workers to take the HIV screening test. Health promotion activities should be geared towards motivating health workers to access the available HIV screening and other prevention services.

The prevalence of occupational exposure to HIV and other blood pathogens has been shown to be high by several studies. A study in Egypt estimated the risk of occupational exposure at about 4.9 needlesticks per worker [17]. Another one in Iran also reported needlestick injury as the commonest occupational exposure among health workers (87.6%) followed by mucocutaneous exposure through splashing blood [18]. This study found an equally high prevalence of occupational exposure among health workers. In addition, more than three quarters of exposed health care workers have had multiple occupational exposures in the last two years. This is particularly

disturbing as the risk of acquiring HIV infection is said to about 0.3% following each episode of needle stick injury [7]. However, factors influencing the acquisition of infection after each exposure are still unknown. One then imagines the enormous risk these health workers face on a daily basis in their care for patients. This is an important occupational health issue which deserves the attention of health service managers. Although the risk of HIV infection may be low following occupational exposures, studies have reported new infections following occupational exposure [19], [20]. There is a need to rise to the challenge of protecting health workers and preventing new HIV infections among them. Promoting universal precautions is necessary to reduce these risk exposures.

It is believed that experience enables one to avoid danger and unpleasant circumstances. We also believe that an individual will be more careful in handling sharps after a previous needle stick injury more than a new entrant in a profession. A significant difference in the occupational exposure among those who have had 5-10 year experience and those who have worked for 2 years or less was therefore unexpected. This study reveals a higher proportion of health workers with 5 or more years of work experience had an occupational exposure. This differs from the finding of Hsieh et al which reported interns as having the highest incidence density (4.48 per 100 person-years) among the health workers [21]. This difference could be due to the different methods used in both studies. A limitation of self reported measures which this study used could account for this observation.

Health workers in developed countries like the US have a better PEP initiation and completion rates after exposure. A study found 31% of exposed health care workers commencing PEP in the US [22]. This contrasts with our own finding of 8.8% which is consistent with an Indian study that reported that 7.8% of health workers who had a needle stick injury took PEP after the exposure [23]. Possible reasons for the different results could be that health workers in the US are more careful about their health. Knowing that HIV infection can be transmitted through occupational exposure is not enough to make a health worker adopt universal precautions. Vicarious experiences have been known to promote behavioural change. The case of a nurse who got infected in the course of her duty in the US was widely publicized [24]. This could have made health workers more cautious. In addition, the health system in the US may be more efficient in the management of post exposure prophylaxis. Occupational Health laws are more effective in the developed

countries like the US [25] than in developing countries. Evidence buttressing this argument includes the fact that 64.5% of the respondents in our study did not take post exposure prophylaxis because the PEP drugs were either not available or the HCWs were not aware of the availability of the drugs. The health systems in developing countries need to be strengthened for better management of occupational exposures. The low rate of completion of PEP among those who commenced reported in this study is similar to findings of other studies. [26]

Another important point in this study is that none of the HCWs who reported to have had more than one exposures utilized PEP. Previous studies did not describe issues about PEP utilization and frequency of occupational exposures. Studies exploring the association between PEP utilization and duration of work experience would be beneficial so as to direct the focus of preventive strategies in the control of HIV infection in the workplace.

Van der Maaten et al reported poor attendance of follow up visits after occupational exposures in both developed and developing countries which is similar to the finding of the current study [26]. However, we observed that even a significant proportion of those who were exposed and who did not take PEP reported for follow up. This suggests that counselling and testing services following PEP can improve the uptake of PEP thereby reducing the risk of new HIV infections as a window of opportunity exists in this category of health workers.

Unavailability or inadequate publicity of available services is detrimental to the success of any program. Health managers should make post exposure prophylaxis of occupational exposures to HIV a priority. Perception of low risk of HIV transmission following the exposure, psychological reasons and tolerability of side effects of PEP antiretroviral drugs were reported as reasons for not utilizing or not completing HIV post exposure prophylaxis. These are in agreement with findings of an HIV PEP prophylaxis registry which noted side effects as one of the most common reasons for not completing the therapy and seronegative status of the source patient is another reason. [21]

This study was conducted in a general hospital in an urban area. While its findings can be generalized to health workers in the city, this may not be appropriate for workers in rural areas as the risks and conditions differ. The use of self reported measures in this study is a limitation. It is believed that people often remember significant occurrences in their lives. However, recall bias is not a remote possibility in this study. Further studies



using both qualitative and quantitative methodologies are suggested.

This study showed that occupational exposures to HIV infection are common among health workers while PEP utilization rates are very low in general hospital settings. The follow up rates of seroconversion are better than PEP utilization rates and most health workers believe in the efficacy of highly active retroviral (PEP) drugs. Furthermore, the perception of low risk of transmission, non availability of PEP drugs, psychological factors and side effects are the main reasons why exposed health workers do not utilize PEP. The overwhelming majority of health workers believes in the efficacy of PEP drugs. Working in a situation of fear of contracting an incurable disease is counterproductive in health care delivery. Health workers need to be protected in the course of caring for sick patients. It is important for health service authorities take note of Sir Thomas Legg's aphorisms: "Unless and until the employer has done everything-and everything means a good deal-the workman can do next to nothing to protect himself, although he is naturally willing enough to do his share. All workmen should be told something of the danger of the material with which they come into contact and not be left to find it out for themselves-sometimes at the cost of their lives"[27] Therefore, health promotion about universal precautions, commitment to the health workers welfare and health, counselling and testing are suggested ways of controlling HIV in the workplace.

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