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## Post exposure prophylaxis against human immunodeficiency virus: Awareness knowledge and practice among Nigerian Paediatricians

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**Abstract:** *Objective:* To determine the level of awareness, knowledge and practice of human immunodeficiency virus post exposure prophylaxis (HIV PEP) among paediatricians in Nigeria.

*Methodology:* The study was a cross sectional questionnaire-based survey conducted among paediatricians that attended the Paediatric association of Nigeria annual scientific conference in 2015.

*Results:* Most of the respondents (96%) were aware of the concept HIV PEP. The scores on knowledge of PEP for all the respondents ranged from 18% to 91 % with a mean score of  $46.5 \pm 14.1\%$ . There was no significant difference between the performance of those who had received training on HIV PEP ( $48.0 \pm 13.2\%$ ) and those who had not

( $45.1 \pm 14.8\%$ ),  $p = 0.21$ ,  $t = 1.26$ . Ninety one (60.7%) of the respondents had been exposed to percutaneous injury during work. Thirty (33%) of the exposed paediatricians did not know the patient's HIV status and only 10 (11%) received PEP, with only 7 (7.7%) of them completing the PEP for 4 weeks

*Conclusion:* Despite the high level of HIV PEP awareness, there was an unacceptable high rate of occupational exposures and poor knowledge of HIV PEP among Paediatricians. Additionally, there was a low uptake of HIV PEP services amongst exposed Paediatricians in Nigeria. There is need for urgent action to curb this trend.

**Key Words:** HIV PEP, Paediatrician, Nigeria

### Introduction

Paediatricians practicing in developing countries are frequently exposed to a wide range of blood borne pathogens including human immunodeficiency virus (HIV) during the course of providing care for their patients. With this comes the attendant risk of acquiring HIV infection from occupational exposure. Several measures to prevent blood exposure through safe practices have been documented,<sup>1,2</sup> but in spite of these precautionary measures, occupational exposures still continue to occur and are often under-reported<sup>3</sup>.

The risk of acquiring HIV infection following percutaneous exposure to HIV infected blood in the healthcare setting has been documented to be 3 per 1000 injuries.<sup>4</sup> Certain factors are known to increase the odds of HIV transmission after percutaneous exposure and they include a deep injury, the presence of visible blood on the instrument causing the exposure, injury via a needle that was placed in a vein or artery of the source patient, and terminal illness in the source patient.<sup>5</sup> Occupational exposure to HIV can result in a variety of serious and dis-

treasing consequences ranging from extreme anxiety to chronic illness and premature death for the individual involved.<sup>6</sup>

Post exposure prophylaxis (PEP) following occupational exposure to HIV has been shown to significantly decrease the risk of acquiring HIV infection.<sup>5</sup> Animal models have shown that after initial exposure, HIV replicates within dendritic cells of the skin and mucosa before spreading through the lymphatic vessels and developing into a systemic infection.<sup>1</sup> This delay in systemic spread leaves a "window of opportunity" for PEP using antiretroviral drugs designed to block replication of HIV.<sup>1</sup> PEP is thus aimed at inhibiting the replication of the initial inoculum of virus and thereby prevent establishment of HIV infection.<sup>7</sup> HIV PEP procedure involves initial first aid and counseling, followed by an immediate risk assessment, conduct of relevant laboratory investigations based on the informed consent of exposed person and source patient, short term antiretroviral drug administration for 28 days, and follow-up evaluation.<sup>8</sup>

Unfortunately, many healthcare workers including doc-

tors do not appear to have adequate knowledge about PEP in spite of being at risk of acquiring the infection.<sup>9</sup> This study was done to assess the level of awareness, knowledge and practice of HIV PEP among Paediatricians in Nigeria.

## Materials and Methods

This was a across sectional study conducted among paediatric residents and consultants during the 46th annual general and scientific conference of the Paediatric association of Nigeria that held at Abakaliki, Ebony state from January 21st – 23rd, 2015. Approval for the study was obtained from the research and ethics committee of Federal Medical Centre Owerri, Imo State.

A two-part structured questionnaire was formulated, field-tested, reviewed and subsequently distributed to the resident and consultant Paediatricians at the conference. The first part of the questionnaire obtained demographic information such as age, sex, cadre and place of paediatric practice. In addition, information regarding exposure to percutaneous injury and patient's blood as well as action taken was obtained. The second part of the questionnaire assessed PEP awareness and knowledge of basic information regarding PEP and respondents performance scored over 100%.

Data collected was inputted into IBM SPSS version 20 (IBM Corp. 2011). Analysis was mainly descriptive. The means and standard deviations of the various variables were calculated where applicable. The performance of those who had received previous training on PEP was compared with those who did not using student's t-test. A p-value of 0.05 was considered significant. Results were documented as prose, tables and figure.

## Results

### *Socio-demographic characteristics of the respondents*

A total of 180 questionnaires were distributed but only 156 respondents returned their questionnaires. Six were excluded because they did not complete the second part. Of the 150 respondents who returned their completed questionnaires, there were 69 males and 81 females giving a male to female ratio of 1: 1.2. Their ages are as shown in Table 1. Among the respondents were 46 consultant paediatricians, 41 senior registrars and 45 registrars. Eighteen (12%) of the respondents did not indicate their cadre. One hundred and thirty three (88.7%) practice in government hospitals while only 17 (21.3%) practice in private hospital setting.

**Table 1:** Age and Cadre of the respondents

| Age              | Frequency (n= 150) | Percentage (100%) |
|------------------|--------------------|-------------------|
| 25 – 29          | 07                 | 4.7               |
| 30 – 34          | 46                 | 30.7              |
| 35 – 39          | 44                 | 29.3              |
| 40 and above     | 53                 | 35.3              |
| <i>Cadre</i>     |                    |                   |
| Consultant       | 46                 | 30.7              |
| Senior registrar | 41                 | 27.3              |
| Registrar        | 45                 | 30.0              |
| Did not indicate | 18                 | 12.0              |

### *Practice of PEP*

Ninety one (60.7%) of the respondents had been exposed to percutaneous injury during work. Most (92%) of the exposures were from needle stick injury, while 12 (8%) were from blood splash into the eyes. Seventeen (18.7%) of the exposed doctors had more than five exposures while 41 (45.0%) and 33 (36.3%) were exposed 2 – 5 times and once respectively. Thirty (33%) of the exposed paediatricians did not know the patient's HIV status and only 10 (11%) received PEP, with only 7 (7.7%) of them completing the PEP for 4 weeks. Reasons for not receiving PEP included unavailability, fear of drug side effects, patient was unlikely to be positive, fear of stigma and one was pregnant. Three doctors stated that they just didn't want to receive it.

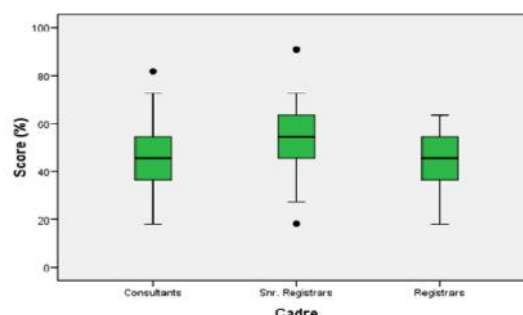
### *Awareness and Knowledge of PEP*

Most (96%) of the 150 respondents have heard of PEP but less than half (71, 47.3%) admitted to having had any formal training on PEP. One hundred and twenty eight (85.3%) have a protocol for PEP established at their workplace, 16 (10.7%) do not have any, while 6 (4.0%) were not aware of such protocol.

The score for all the respondents ranged from 18% to 91% with a mean score of  $46.5 \pm 14.1\%$ . There was no significant difference between the performance of those who had received training on PEP ( $48.0 \pm 13.2\%$ ) and those who had not ( $45.1 \pm 14.8\%$ ),  $p = 0.21$ ,  $t = 1.26$ .

Among the 3 cadres of respondents, the senior registrars performed better than the consultants and the registrars with mean scores of 52.1%, 45.7% and 44.8% respectively, (figure 1). This difference was not statistically significant ( $p = 0.444$ ,  $F = 16.12$ )

**Fig 1:** Performance of the different cadres of paediatricians on knowledge of PEP



**Table 2:** Response to questions on PEP among the paediatricians

| S/N | Question  | Percentage(%) of respondent that answered correctly |                    |               |                  |                  |
|-----|---|---|--------------------|---------------|------------------|------------------|
|     |   | Consult.<br>n = 46                                  | Snr. Reg<br>n = 41 | Reg<br>n = 45 | Others<br>n = 18 | Overall<br>N=150 |
| 1   | How soon after needle stick injury should HIV post exposure prophylaxis be commenced?(A)within 1Hour (B) within 24 hours (c) within 72 hours (D) don't know | 41.3  | 24.4               | 17.7          | 22.2             | 28.0             |
| 2   | What is the maximum delay to take PEP?<br>(A) 12hours (B) 24 hours (c) 48 hours (D) 72hours   | 52.2  | 85.4               | 77.8          | 38.9             | 67.3             |
| 3   | What is the duration of HIV post exposure prophylaxis?<br>A) 2 weeks (B) 4 weeks (C) 3 months (D) 6 months.   | 67.4  | 68.3               | 64.4          | 27.8             | 62.7             |
| 4   | What proportion of needle stick injury results in HIV/AIDS transmission?<br>A)1/100 cases B) 1/1000 cases (C) 3/ 100 cases (D) 3/ 1000 cases                | 8.7   | 14.6               | 8.9           | 22.2             | 12.0             |
| 5   | What percentage of mucosa exposure to HIV infected fluids results in HIV/AIDS transmission<br>(A) 0.9% (B) 0.09% (C) 0.3% (D) 0.03%                         | 4.3   | 0                  | 2.2           | 0                | 2.0              |
| 6   | Should HIV post exposure prophylaxis be administered for accidental non –occupational exposure to HIV<br>(a) Yes (B) No                                     | 87.0  | 97.6               | 95.6          | 72.2             | 92.7             |
| 7   | The first aid measures to institute following needle stick injury include:  |   |                    |               |                  |                  |
| i   | Promote active bleeding of wound by squeezing. (A) Yes (B) No   | 39.1  | 51.2               | 35.6          | 27.8             | 40.0             |
| ii  | Wash thoroughly with soap and water (A) Yes (B) No  | 97.8  | 90.2               | 84.4          | 72.2             | 89.3             |
| iii | Cleansing the skin with bleach (A) Yes (B) No   | 69.6  | 26.8               | 15.6          | 11.1             | 22.7             |

Consult. = Consultants, Snr. Reg. = Senior Registrars, Reg. = Registrars, Others = Cadre not indicated.

Concerning the drugs used for PEP, there were several combinations provided. Sixteen (10.7%) of the respondents stated a monotherapy, while about one third (34.7%) did not provide any answer. Table 3 summarizes the drugs listed by the respondents.

**Table 3:** Drugs listed by respondents as used for PEP

| Drugs                                 | Frequency<br>(n =150) | Per-<br>centage |
|---------------------------------------|-----------------------|-----------------|
| Zidovudine + Lamivudine + Nevirapine  | 32                    | 21.3            |
| Zidovudine + Lamivudine + Efavirenz   | 12                    | 8.0             |
| Tenofovir + Lamivudine + Efavirenz    | 4                     | 2.7             |
| Zidovudine + Stavudine + Efavirenz    | 2                     | 1.3             |
| Tenofovir + Emtricitabine + Efavirenz | 2                     | 1.3             |
| Zidovudine + Nevirapine               | 18                    | 12.0            |
| Zidovudine + Stavudine                | 8                     | 5.3             |
| Zidovudine + Lamivudine               | 2                     | 1.3             |
| Tenofovir + Efavirenz                 | 2                     | 1.3             |
| Nevirapine alone                      | 14                    | 9.3             |
| Zidovudine alone                      | 2                     | 1.3             |
| No drug listed                        | 52                    | 34.7            |

## Discussion

This study shows that majority of Paediatricians in Nigeria are aware of PEP for HIV. This corroborates the findings of Agaba *et al.*<sup>10</sup> However, while there is awareness, the knowledge of HIV PEP among Paediatricians is poor. This differs from other studies which documented good knowledge of HIV PEP.<sup>10,11,12</sup> This difference may be due to differences in the tool used for the assessment of HIV PEP knowledge. A standardised and universally acceptable tool for assessment of knowledge would allow for better comparison and assessment of knowledge.

Majority of Paediatricians (85.3%) did not know the

ideal antiretroviral drug combination for PEP for HIV. As much as 42.7% wrongly listed Nevirapine as one of the drugs used for PEP. It is noteworthy that Nevirapine is not used for PEP for HIV owing to its side effects in individuals with normal CD4 count. The World health Organization currently recommended drug combination for HIV PEP includes: Tenofovir with lamivudine or emtricitabine plus ritonavir-boosted lopinavir.<sup>13</sup> Zidovudine is reserved for children ten years and below, in combination with lamivudine and ritonavir-boosted lopinavir.<sup>14</sup>

Although it was observed that senior registrars were more knowledgeable than the other cadres of Paediatricians and a plausible explanation could be their active reading in preparation for fellowship exams, this finding was not statistically significant. No significant difference was noted between the performance of respondents who had received training on PEP and those who had not. This obviously underscores the need for HIV PEP training on a periodic and regular basis rather than the one-off type of training usually funded by non-governmental organisations.

The prevalence of percutaneous injury among Nigerian Paediatricians is 60.7% with majority having multiple exposures. This high prevalence of percutaneous injury would appear to suggest that there is a failure or inadequate adoption of universal precautions methods among Paediatricians during the course of discharging their clinical duties. Although the risk of transmission of HIV following occupational exposure is low, the price to be paid in the event a Paediatrician acquires HIV following occupational exposure is enormous. The frequent percutaneous exposures and the need to access PEP services thereafter would constitute a drain on scarce health resources and reduce availability for those with actual HIV infection. It is noteworthy that beyond HIV infec-

tion, there are other blood-borne pathogens such as Hepatitis B and C viruses, which can be transmitted following percutaneous injury. The need for training and retraining of Paediatricians on universal precautions methods cannot be overemphasized.

It is worrisome that 33% of the Paediatricians exposed to percutaneous injury did not know the patient's HIV status and only 11% received PEP. Furthermore, only 7.7% that commenced PEP completed the 4-week course despite the fact that most sampled institutions had existing HIV PEP policies and protocols. This poor practice of HIV PEP is in keeping with the findings of Agaba *et al*<sup>10</sup> who also observed that majority of doctors that had been exposed to needle stick injury did not access HIV PEP. The reasons for this would need to be further explored because it would be pathetic to believe that doctors are careless about issues bothering on their health and general wellbeing. They are preoccupied with rendering help to others and neglecting their own health. Other researchers have also documented low uptake of HIV PEP among exposed health workers. Challenges faced by Pediatricians who accessed HIV PEP include: unavailability of antiretroviral drug, fear of side effects of drug, stigma among others. These challenges are surmountable. The findings of this cross sectional study can be generalised because it was a nationwide survey of Paediatricians from all over Nigeria.

## Conclusion

There was an unacceptable poor knowledge and low uptake of HIV PEP among exposed Paediatricians in Nigeria. We recommend that there should be concerted efforts geared at regular training and re-training of Paediatricians in Nigeria on HIV PEP and universal precautions. The Paediatric Association of Nigeria should incorporate HIV PEP sessions at her annual and scientific conference. Hospitals should have established protocols for HIV PEP which should be routinely communicated to all health workers and antiretroviral drugs should be made readily available for exposed health workers.

### Author's contributions

OK conceived and designed the study. EB, NE, AI and IA also participated in the design. OK and AI participated in the acquisition of data. OK, EB, and IA participated in interpretation of data and the statistical analysis. All authors participated in the drafting of the manuscript for important intellectual content, read the final draft and gave approval.

**Conflicts of Interest:** None

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