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Research Article
Detection of HIV 1 and 2 Antibodies among Patients Patronizing Some Private Laboratories in Rivers State, Nigeria

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Abstract

Background and Objective: HIV remain a serious public health problem in developing countries especially in Nigeria, as the epidemic continues. This study was performed to detect HIV antibodies and risk factors of transmission among patients patronizing some private laboratories in Aluu and Eleme, Rivers State, Nigeria. **Materials and Methods:** Thereafter, 200 subjects (ages 16-61 years) were consecutively selected. A total of 200 blood samples were collected from these patients attending the Wilko Lab, Aluu and Kennon Lab, Eleme, Port Harcourt, Nigeria. The screening for HIV antibodies was carried out using Abbott Determine HIV-1/2® test kit and a commercially available fourth generation ELISA according to the manufacturers' instructions. **Results:** Majority of the patients were females (55.0%) while 45.0% were males. Overall prevalence rate of HIV was 2.0%. Age groups 40 years and above had a higher prevalence of HIV (2.0%) compared to age group 16-39 years of age with 1.9% prevalence. Higher HIV prevalence was observed among males (3.3%) than their female counterparts (0.9%). The HIV prevalence was also higher among singles (2.5%) than their married counterparts (1.3%). HIV prevalence was also higher among patients patronizing Kennon (4.0%) compared to their counterparts at Wilkor with zero prevalence. **Conclusion:** This study however confirmed the presence of HIV antibodies among patients patronizing some private laboratories in Rivers State, Nigeria. The prevalence rate of HIV in this study is low and of all the four risk factors studied, none appeared to be associated with seropositivity thus, there is still need for adequate counseling and education about HIV and AIDS in the state. Conclusively, this study has contributed to the information on the burden of HIV infection among patients in Rivers State, Nigeria.

Key words: Antibody, HIV, seropositivity, risk factors, awareness, catastrophe

Competing Interest: The authors have declared that no competing interest exists.

Data Availability: All relevant data are within the paper and its supporting information files.

INTRODUCTION

According to UNAIDS[1], HIV and AIDS is the worst Tsunami in human history which has in turn become a worldwide catastrophe. In addition, they called it the most devastating disease that mankind has ever faced. Most of HIV infections are acquired through unprotected sexual intercourse, sex work[2], transfusion of unscreened blood and blood products[3], sharing of sharp objects, contaminated hypodermic needles, injection drug use[4], from mother to child during pregnancy, childbirth or breastfeeding[5], having more than one sexual-partners and having STIs[6] or being exposed to one of the above bodily fluids[7,8].

In Nigeria, group of peoples considered as high risk for HIV and AIDS include commercial sex workers, men that have sex with men, long-distance truck drivers, commercial motorcyclists, military personnel, police officers, migrant and mobile populations and prisoners[9,10]. Importantly, these high-risk groups transmit the HIV to general population through their interaction with other subgroups of the population known as bridge populations[11].

HIV remains a serious public health problem in developing countries especially in Nigeria, as the epidemic continues. Though HIV-1/2 is spread from infected to uninfected predominantly by sexual intercourse, they can also be transmitted perinatally and through blood transfusion. HIV-2, however, is less efficiently transmitted compared[11,12] to HIV-1. HIV-2 antibodies were present in the samples obtained in Africa as early as 1966 and compelling evidence from Europe has linked HIV-1 to HIV-like diseases which occurred in the late 1950s. The study conducted by Olaleye *et al.*[13] showed HIV 1 to be more prevalent in Nigeria. It has also been stated that HIV-1 is more pathogenic and is found in Asia, East and Central Africa, Europe and United States, while HIV-2 is mainly restricted to West Africa.

A lot of study has been done in various part of the world on the extent and magnitude of pediatric HIV infection however, there is scanty literature and paucity of data on HIV infection particularly in these two communities in Rivers State, Nigeria. To the best of our knowledge, there are not many studies, especially in Rivers State, Nigeria, that compared the HIV-1/2 antibody prevalence among these two communities. Thus, this study was performed to determine the seropositivity of HIV-1/2 antibodies among patients patronizing some private laboratories in two communities in Rivers State, Nigeria.

MATERIALS AND METHODS

Study area: This cross-sectional study was carried out from September, 2018 to August, 2019 at the Virus Research Unit of the Department of Microbiology, University of Port Harcourt which is located in Obio/Akpor Local Government Area of Rivers State, Nigeria. Rivers State is located in the Niger Delta region of Nigeria.

Study population: Samples of blood were collected from 200 patients patronizing 2 private laboratories in Rivers State, Nigeria, Wiiko laboratory situated which is at Aluu, Rivers State, Nigeria and Kennon medical Laboratory which is at Eleme, Rivers State, Nigeria. These were collected randomly from patients patronizing these laboratories.

Serological analysis: The presence of HIV-1 and -2 antibodies were screened with the Determine® HIV-1 and -2 recombinant antigen and synthetic peptide coated test card (manufactured by Alere Medical Co Ltd, Japan). Plasma samples were also analyzed for HIV-1 and -2 antibodies using the commercially available ELISA kit (manufactured by DIA. PRO Diagnostic Bioprobes Srl Via G. Carducci n° 27 20099 Sesto San Giovanni (Milano)-Italy). The microplates were washed 5 cycles with an automated microplate washer (Biotek ELx 50, USA). The coloured reaction product was measured using an ELISA microplate reader (Biotek ELx808i, USA) at an absorbance of 450-630 nm[14]. The test and the interpretation of test results were done according to the manufacturer's specifications.

RESULTS

Patients characteristics: A total of 200 (100.0%) subjects were enlisted for this study, 100 (50.0%) from Wilko Laboratory in Aluu, Rivers State, Nigeria and 100 (50.0%) from Kennon Laboratory, Eleme, Rivers State, Nigeria (Table 1). Age ranged from 16 to 56 years of age, majority (75.5%, n = 151) were within age group 16 to 39 years and 49(24.5%) were in age group 40 years and above (Table 2). Ninety (45.0%) were males and 110 (55.0%) were females (Table 3). Single (60.5%, n = 121) marital status predominated the study population and 79 (39.5%) were married (Table 4).

Overall prevalence of HIV: Of the 200 (100.0%) subjects engaged for this study, 4 (2.0%) were positive for HIV-1 and 2 antibodies (Table 1-4).

Table 1: Detection of HIV in relation to locations

	Tested		Positive	
Location	Number	Percentage	Number	Percentage
Wilko	100	50.0	0	0.00
Kennon	100	50.0	4	4.00
Total	200	100.0	4	2.00

Table 2: Detection of HIV in relation to Age

	Tested		Positive	
Age groups (Years)	Number	Percentage	Number	Percentage
16-39	151	75.5	3	1.9
40 and above	49	24.5	1	2.0
Total	200	100.0	4	2.0

Table 3: Detection of HIV in relation to sex

	Tested		Positive	
Sex	Number	Percentage	Number	Percentage
Males	90	45.0	3	3.3
Females	110	55.0	1	0.9
Total	200	100.0	4	2.00

Table 4: Detection of HIV in relation to marital status

	Tested		Positive	
Marital status	Number	Percentage	Number	Percentage
Singles	121	60.5	3	2.5
Married	79	39.5	1	1.3
Total	200	100.0	4	2.00

Distribution of HIV according to Locations: Kennon Medical Laboratory recorded a prevalence rate of 4.0% (n = 4) while Wilko Laboratory recorded a zero prevalence of HIV (Table 1).

Distribution of HIV according to age group: Of the 200 samples tested for HIV in both laboratories, the age group 40 years and above had a higher prevalence of 2.0% whereas the age group 16-39 years had a prevalence rate of 1.9% (Table 2).

Distribution of HIV according to Sex: Table 3 displays the prevalence of HIV according to sex. Higher prevalence of HIV occurred in males (3.3%) than their female counterparts which had 0.9% prevalence.

Distribution of HIV according to marital status: Higher prevalence of HIV occurred among singles (2.5%) than their married counterparts which had a prevalence of 1.3% (Table 4).

DISCUSSION

In this study, the overall prevalence rate of HIV was 2.0%. This study showed a low prevalence rate among these patients than what was previously reported in the state (3.8%). The prevalence rate of 2.0% reported for HIV-1 and -2 antibodies in this study is lower than the 10.0% prevalence reported by Sule *et al.*[15] in Anyigba, Kogi State, Nigeria, the 11.0% prevalence rate reported by Mann *et al.*[16] at Manayemo hospital Zaire, the 31.0% prevalence obtained in a tertiary health institution in the Niger Delta region of Nigeria[17]. This value is also not comparable to the 1.4% overall prevalence reported for Nigeria in the 2019 national sentinel survey[18].

The low prevalence (2.0%) reported for HIV in this study is also not comparable to what was reported in some African countries. Both the people dying from AIDS and HIV prevalence rates differ significantly between African countries. Numerous reports have been published regarding seroprevalence of HIV infection in specific subgroups in Africa[19]. In a study conducted in Rwanda as at 1991, seroprevalence was reported to be 88.0% among prostitutes, 1.3% among rural population, 18.0% among men and 29.0% among women of childbearing age in the capital city of Kigali[20]. In 2018, the HIV prevalence in Somalia (0.1%) and Senegal (0.08%) is under 1.0% of the adult populace, whereas in Namibia (23.7%), South Africa (20.4%), Zambia (17.0%) and Zimbabwe (12.7%) that is, around 13.0-24.0% of adult population[21]. In three southern African countries, the national adult HIV prevalence rate as at 2018 now exceeds 20.0%. These countries include Botswana (24.8%), Lesotho (23.6%) and Swaziland (27.3%)[21].

West Africa has been less affected by HIV and AIDS, however, some countries are facing increasing prevalence rates of HIV. In Cameroon, HIV prevalence is now predicted at 3.1% and in Gabon it stands at 3.8%. Currently, HIV prevalence in Nigeria is low (1.4%) in comparison to the rest of Africa. However, because of its huge population, being the most populous country in sub-Saharan Africa, this prevalence equates to around 1.9 million people living with HIV[21]. Adult HIV prevalence in East Africa exceeds 5% in Uganda (5.7%), Kenya (6.0%) and Tanzania (4.6%)[22].

The 2.0% HIV prevalence reported in this study is not comparable to the values reported in other parts of the country. A prevalence rate of 42.49% was reported in Lafia, Nasarawa State, Nigeria and 50.08% in Makurdi, capital city of Benue State, Nigeria[23]. Pennap *et al.*[24] reported 38.65% prevalence rate of HIV and AIDS in Keffi and environs, Nasarawa State, Nigeria. Among children 6-8 years in a tertiary health institution in the Niger Delta, a seroprevalence of 31.0% was recorded[25].

Motayo *et al.*[26] reported a prevalence of 13.6% among patients attending the special treatment clinic at University College Hospital, Ibadan, Nigeria, 28.6% among pregnant

women attending antenatal clinic, 12.0% among patients with pyrexia of unknown origin and 10.8% among STD patients.

In this study, the location-specific prevalence was 4.0% for Kennon Medical Laboratory, Eleme and zero prevalence for Wilko laboratory, Aluu. This 4.0% prevalence rate reported for Kennon Medical Laboratory Eleme in this present study was also comparable to 5.0% prevalence reported by Shaffer *et al.*[27] in a similar study in Zaire, Nigeria. It is also higher than the prevalence of 3.3% in 2001, 1.7% in 2003 and 1.0% in 2005 reported in Ibadan, Nigeria. Comparatively, HIV rate of 4.0% reported for Kennon Medical Laboratory in this subpopulation may be a true reflection of the HIV rates in the population rather than the 3.8% reported in the 2019 national sentinel survey[18]. However, it may be characteristic of the study population which consist mostly of patients presenting with specific clinical symptoms who visited the laboratory on request by the physician instead of apparently healthy persons accessing voluntary counselling and testing (VCT)[28]. The major determinant of HIV in these patients is the magnitude and scale of HIV infection among adult population[17].

The prevalence rate of 1.9% recorded for the corresponding age groups 16-39 years and 2.0% reported for age group 40 years and above, confirms the report of the UNAIDS and WHO[29] on the global AIDS epidemic that in prevalence of HIV, youth rates are at a percentage of relevance[30]. Documented risk factors for contracting HIV-1/2 such as age, sex and tribal marks were used as bases for comparison[31]. Age has always proved to be the most important factor in all epidemiological studies according to reports from previous studies[32-37]. In this study, age groups 40 years and above had a higher prevalence rate of 2.0% for HIV compared to ages 16-39 years of age with prevalence rates of 1.9%. Shaffer *et al.*[27] reported a statistically significant difference in children. In another study, Mann *et al.*[38] reported a statistically significant difference in seroprevalence rate of HIV among children. In some other study, Okerentugba *et al.*[37] reported a statistically significant difference in prevalence rate of HIV among pregnant women in Port Harcourt, Nigeria. However, this present study collaborated with that of Okonko *et al.*[39], who reported no significant association with HIV-1/2 seropositivity and age. This was also in consonance with that of Alikor and Erhabor[17] and Sule *et al.*[15], which observed no statistical difference in age.

This study observed a higher prevalence among males (3.3%) than the female population (0.9%), however, this difference was not significant (p>0.05). This agreed with the findings of Alikor and Erhabor[17], who reported no statistically

difference in gender. Though, most studies have suggested that a higher proportion of male than female population had antibody to HIV[28,40,41].

Review of the 2003 and previous HIV national sentinel surveillance and also the findings[40] showed that males had a significantly higher HIV infection rate than females in different regions and even in communities within the same geographic location in the country[40,41]. In sub-Saharan Africa region, as well as worldwide, female population is a key factor in the epidemiology of HIV and AIDS because women are predominantly infected via heterosexual transmission make up 50% of all adults with HIV infection, furthermore, females are the most severely affected[31,42,43].

The prevalence rate of HIV in this study is higher in singles (2.5%) than their married counterparts (1.3%). Our study is at disparity with that of Frank-Peterside *et al.*[44], who reported marital status-specific differences in HIV prevalence of traders in Port Harcourt, Nigeria. This is also like that of Mbakwem-Aniebo *et al.*[45], who observed a higher HIV prevalence among singles. It also agrees with Frank-Peterside *et al.*[46] and that of Okerentugba *et al.*[37], who observed no marital status-specific differences in another similar study in Port Harcourt, Nigeria. It disagrees with Okonko *et al.*[47], who reported marital status-specific association in HIV positivity in Ibadan, Nigeria. Other contributing factors such as multiple sex partner, premarital and extra-marital sexual contacts common in Port Harcourt may contribute to this trend in HIV prevalence[37,44-46].

In line with the assertion of Alikor and Erhabor[17], the lower prevalence (2.0%) obtained in this present study compared to what was reported at the national sentinel prevalence rate survey (3.8%) may be attributed to the fact that our study was performed in the urban communities in Rivers State and involved patients for which there was already a low index of suspicion of HIV infection. This also brings to bare the fact that HIV infection among patients residing in this part of Rivers State of Nigeria is on the decrease. In addition, the prevalence among patients is a good indicator of how the epidemic is evolving among the general or the heterosexually active population[5,48]. This is because the risk of HIV transmission to infants by infected pregnant women can be significantly reduced if the status of the pregnant women is ascertained before or during pregnancy[11].

CONCLUSION

This study has further confirmed a decrease in HIV prevalence among patients in some areas of Rivers State, Nigeria. The prevalence rate of HIV in this study is low and of

all the 4 risk factors studied, none appeared to be associated with seropositivity thus, there is still need for adequate education and counseling about HIV and AIDS in the state. Conclusively, this study has contributed to the data on the burden of HIV infection among patients in Rivers State, Nigeria. In unison with previous findings, it was observed that, though this group recorded anti-HIV-1/2 seroprevalence, location, age, gender and marital status were not significantly associated with the HIV-1/2 seropositivity.

SIGNIFICANCE STATEMENT

This study discovered an overall HIV prevalence rate of 2.0% among patients patronizing some private laboratories in Rivers State, Nigeria. This is in line with the observed decrease in National HIV prevalence in the country. This study will help the researchers and healthcare providers to uncover the critical areas of public health implications of HIV in patients patronizing some private laboratories that many researchers and private laboratories in Rivers State were not able to explore using ELISA. Thus, a new area of routine screening for HIV in private laboratories may be arrived at.

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