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Prevalence of HIV among Pregnant Women in Awka Metropolis, Anambra State, Nigeria.

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ABSTRACT
This study was aimed at determining the prevalence of HIV(Human Immunodeficiency Virus)among pregnant women in Awka Nigeria. Blood samples were collected from 196 pregnant women and screened for antibodies to HIV using Determine HIV-1/2 and Stat Pak HIV-1/2 rapid strips. Demographic characteristics were collected using a predesigned questionnaire. The generated data were presented in descriptive statistics using Statistical Package for the Social Sciences (SPSS) 21.0 window-based program. The overall prevalence of HIV was found to be 4.6% (n=9). Of which 6(66.7%) were due to infection by HIV-1 while 3 (33.3%) were due to infection by HIV-2. HIV prevalence was higher among pregnant women within age groups 15-25 years (22.7%) than age group 26-36 years (3.3%). HIV prevalence was higher among unemployed women 7(9.5%) than employed 2(1.6%). Prevalence was higher in single ladies 6(14.0%) followed by cohabiting women 2(4.3%). Pregnant women with no education had the highest prevalence of6(28.6%) while women with primary education had prevalence of 3(9.4%). Higher prevalence was observed in multigravida women 6(7.9%) and women in their third trimester 5 (10.4%). This study confirmed the presence of HIV-1 and HIV-2 antibodies among pregnant women in Awka, Anambra State, Nigeria. This calls for urgent and concerted efforts aimed at promoting behavioral, cultural and social changes that will reverse the current trend in the prevalence of HIV among the pregnant women.

Keywords: Prevalence, HIV, Antibodies, Pregnant women

I. INTRODUCTION

HIV is a slow replicating virus (lentivirus) that causes Acquired Immunodeficiency Syndrome (AIDS), a condition leading to gradual collapse of the human immune system allowing invasion by lethal opportunistic pathogens and cancers (Singh et al 2018). HIV infection leads to low levels of CD4+ T-cells. Infection with HIV occurs via contact with infected blood, semen, vaginal fluid, pre-ejaculate, or breast milk. People who have become infected with HIV may be asymptomatic for up to ten years though they remain able to infect others.

Symptoms related to HIV are usually due to the different opportunistic infections in the body. These symptoms range from diarrhoea, fatigue, fever, frequent vaginal yeast infections and headaches to seborrheic dermatitis, psoriasis, thrush, muscle stiffness and numbness (Awofala and Ogundele 2018).

HIV/AIDS has claimed more than 35 million lives since its characterization in 1981 (Oleribeet al. 2018). As at 2017, the number of individuals estimated to be living with HIV/AIDS worldwide was 31.1 million – 43.9 million counting 1.8 million new infections in that same year. Adults account for 86% of this figure. There are 19.6 million (53.1%) people living with HIV/AIDS (PLWHIV) in eastern and southern Africa and 6.1 million (16.5%) in western and central Africa. Approximately 670,000 – 1.3 million deaths from AIDS – related illnesses were recorded across the globe in 2017.

Prevalence in Nigeria has fluctuated over the last few decades; from 1.8% in 1991 through 5.8% and 3.0% in 2001 and 2014 respectively to 2.9% in 2016 (Federal Ministry of Health, 2014). Nigeria has the second largest HIV epidemic in the world. The country currently accounts for 3.2million People Living with HIV (PLWHIV) with an average of 160,000 AIDS-related deaths annually. Of the estimated 220,000 new infections in Nigeria, 37,000 were from mother-to-child transmission. With increasing access to antiretroviral therapy (ART), there has been a gradual decline in the occurrence of HIV/AIDS – related deaths even though the number of new infections amongst the poorly educated and low income group continues to rise in certain countries and has plateaued in others.

The prevalence of fresh HIV infection is thus, persistently high in several countries across the sub-Sahara with South Africa (23%), Nigeria (15%), Uganda (10%), Mozambique (8%) and Kenya (7%) ranked top [Singh et al.2018; Kharsanyiet al.2016]. HIV is considered a major

concern in the achievement of the Sustainable Development Goals (SDGs) with particular emphasis on the 3rd goal of healthy living and the promotion of well-being for all including the pledge to terminate the scourge of infectious diseases and eliminate epidemics across the globe such as those of HIV/ AIDS and tuberculosis by 2030 (Kasondeet al.2018).

Poverty, gender-based vulnerability and low risk perception are thought to be the key drivers of the HIV pandemic (Anyakaet al.2016). Most studies have highlighted heterosexual intercourse as the main route of transmission in Nigeria being responsible for 80% of incidents, other studies found that homosexual intercourse and intravenous drug use are equally important means of spreading HIV. The relevant high risk groups including commercial sex workers, prison inmates and drug addicts are thought to make up 1% of the Nigerian population (Awofala and Ogundele 2018). HIV/ AIDS is the major reason for mortality amongst women of child-bearing age; it further plays a key role in the mortality among children and infants as well. Studies have shown that the HIV-infected expectant mothers have 8 times greater mortality rates than found in uninfected pregnant women. Furthermore, about 24% of maternal mortality in the sub-Sahara has been attributed to HIV/ AIDS. The HIV-related maternal deaths range from 7% - 21% globally with higher values in the sub-Saharan region (Okerentugbaet al. 2015; Fouedjioet al.2017). It is opined that absent well-tailored management strategies, Mother to Child Transmission (MTCT) of HIV has been known to rise to highs of 25% – 40% prevalence. The risk of MTCT in infected breast-feeding women is 25% - 45% and 15 – 25% in mothers that do not breastfeed (Anyakaet al.2016). In most developed countries, incidence of MTCT have fallen below 2% with the employment of effective interventions.

Prevalence studies are fundamental to combatting the HIV/AIDS pandemic and achieving the Sustainable Development Goals (SDGs) in the sub-Saharan region. Antenatal clinics have served as the prime source of data for determining both regional and national incidence and prevalence of HIV especially in countries with widespread HIV epidemics such as found in the sub-Sahara. Such statistics are valuable in epidemiological monitoring as HIV prevalence trends in antenatal clinics will often mirror the trends in the general population (Aghoghoroma and Iliyasu 2015; Eaton et al.2014). This study, therefore, was aimed at establishing the prevalence of HIV among pregnant women attending the antenatal clinic at Chukwuemeka Odumegwu Ojukwu University Teaching Hospital Awka Anambra State, Nigeria.

II. MATERIALS AND METHODS

2.1. Study Area

The study was conducted in Chukwuemeka Odumegwu Ojukwu University Teaching Hospital(COOUTH) located inAwka the Anambra State Capital.It is geographically located at latitude 6° 12' 45" N and longitude 7° 4' 19" Emidway between two major cities in Northern Igboland, Onitsha and Enugu, which has played a significant role in its choice as an administrative center for the colonial authorities and today as a base for the Anambra State government.The city has an estimated population of about 2.5 million as of a 2018 estimate. The city is located at 199.1 kilometres (123.7 mi), by road, directly north of Port Harcourt in the centre of the densely-populated Igbo heartland in South-East Nigeria.The study was carried out betweenthe months of January and October, 2021.. (Available at www.onehealthjournal.org/Vol.6/No.1/9.pdf).

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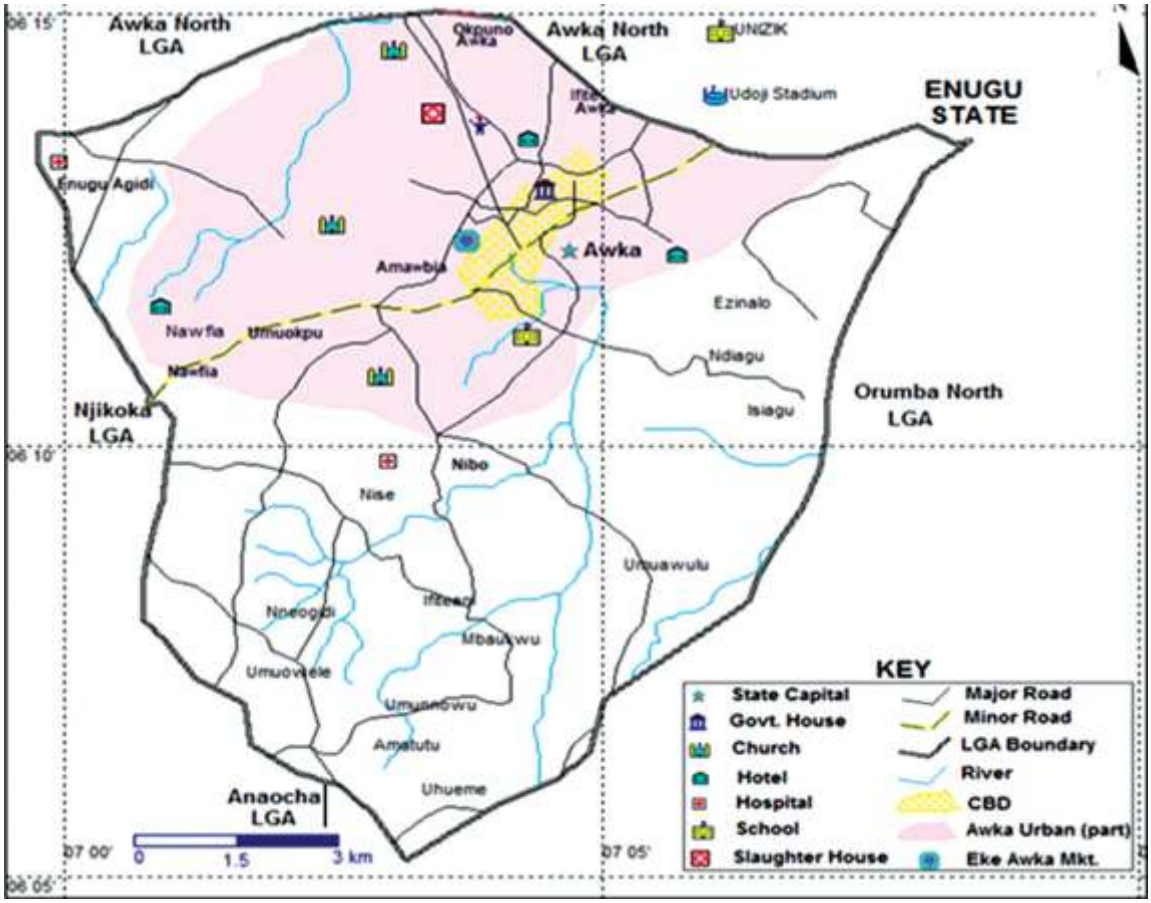

Map of Awka metropolis (Source: Department of Geography, University of Nigeria, Nsukka.).

2.2 Study Population

A total of one hundred and ninety-six consented pregnant women were enrolled in this study. Informed consent was obtained from each patients and relevant confidentiality was maintained throughout the study.

2.3 Sample size determination

The study population comprised of one hundred and ninety-six (196) pregnant women attending the antenatal clinic at COOUTH. The sample size was determined using single population proportion formula working under the assumed working proportion of 6.5% with 5% tolerated margin of sampling error at 95% confidence interval.

The formula n=Z2PQ/d2 was used to derive the desired sample size. Where n is the desired sample size, P is the expected prevalence in the target population, Q is 1-P, Z is 1.96; standard error, d is the level of statistical significance (0.05). A P-value of 7.3% was used representing maximum uncertainty for Anambra State during the last National HIV sentinel study (Okerentugbaet al. 2015; Fouedjioet al.2017). Hence, the estimated sample size was 100 with an additional 10.0% sampled to take care of data inconsistencies (Aghoghoroma and Iliyasu, 2015), providing a total sample size of 111 which was approximated to 196. Thus, N= 196 participants were recruited for this study.

2.4. Inclusion Criteria and Data Collection

Only pregnant women attending the antenatal clinic who voluntarily consented to participation were included in the study. Participants had to be confirmed pregnant.

2.5. Exclusion Criteria

Non-pregnant women and those unwilling to provide informed consent were considered ineligible.

2.6. Demographic Characteristics

Participant's demographic data and medical history were collected anonymously using a predesigned questionnaire.

2.7. Ethical Considerations

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Ethical approval for the study was given by hospital management board. The purpose, importance and method of the study was explained to the attendees in detail both in English and in Igbo language before requesting consent for participation. Participants after signing consent form were further informed of their right to withdraw consent at any point during the study.

2.8. Assay for HIV Antibodies

Approximately 5ml of venous blood samples were collected using sterile syringes and transferred into anticoagulant bottles. The bottles were sent to the medical laboratory for screening in a collection bode. The blood samples were separated into their components by centrifuging at 2000 resolution per minutes (rpm) for five minutes to obtain sera. Following separation, the obtained serum was collected and transferred into sterile labelled serum bottles and stored at 4^{o}C until use. Screening for HIV antibodies was done using Enzyme Linked Immunosorbent Assay (ELISA) Gen Screen™ ULTRA HIV Ag-Ab Kit. The test and interpretation of the results were carried out according to the kit manufacturer's specifications. Samples found to be positive were re-tested for confirmation.

2.9. Statistical Analyses

The generated data were presented in descriptive statistics using Statistical Package for the Social Sciences (SPSS) 21.0 (International Business Machines Corporation (IBM), NY, USA). Microsoft Excel 2017 were used to analyze the data. Statistical significance of data sets was determined at $p \leq 0.05$. Prevalence was determined by comparing the number of pregnant women positive for HIV antibodies with the total number tested.

III. RESULTS

A total of one hundred and ninety six (196) samples were screened for antibodies of HIV. Nine (4.6%) samples were positive for HIV, of which 6(66.7%) were due to infection by HIV-1 while 3 (33.3%) were due to infection by HIV-2

Table 1. Distribution of HIV-1 and HIV-2 among infected pregnant women

HIV Serotype	No. Positive (%)
HIV -1	6 (66.7)
HIV -2	3 (33.3)
Total	9 (100)

Table 2 shows the socio-demographic data and seropositive outcomes of pregnant women tested for anti-HIV-1 and -2 antibodies. In all, 187 (95.4%) of the pregnant women had no detectable antibodies to HIV genotypes 1 and 2 while 9(4.6%) had detectable antibodies to HIV genotypes 1 and 2. It also showed that there was significant difference (age, marital status, educational status and occupation). HIV prevalence was higher among pregnant women within age groups 15-25 years (22.7%) than age group 26-36 years (3.3%). HIV prevalence was higher among unemployed women 7(9.5%) than employed 2(1.6%).

Table 2. Socio-demographic data and seropositive outcome of pregnant women tested for anti-HIV-1 and -2 antibodies.

Characteristics	No. Tested (%)	No. positive (%)	χ2df		P- Value
AGE					
15 – 25	22(11.2)	5(22.7)			
26 – 35	61(31.1)	2(3.3)			
36 - 45	78(39.8)	2(2.6)			
≥ 45	35(17.9)	0			
Total	**196(100)**	**9(4.6)**	**6.945**	**3**	**0.006**
MARITAL STATUS					
Single	43(21.9)	6(14.0)			
Married	55(26.0)	0			

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Cohabiting	47(24.0)	2(4.3)			
Divorce	21(10.7)	0			
Separated	17(8.7)	1(5.9)			
Widow	13(6.6)	0			
Total	**196(100)**	**9(4.6)**	**4.211**	**1**	**0.003**
EDUCATIONAL STATUS					
None	21(10.7)	6(28.6)			
Primary	32(16.3)	3(9.4)			
Secondary	68(34.7)	0			
Tertiary institution	75(38.3)	0			
Total	**196 (100)**	**9(4.6)**	**5.246**	**2**	**0.001**
OCCUPATION					
Employed	122(62.2)	2(1.6)			
Unemployed	74(37.8)	7(9.5)			
Total	**196(100)**	**9(4.6)**	**6.451**	**2**	**0.042**

Table 3 shows the prevalence of HIV in relation to gravidity. There was no statistical significance between HIV sero-prevalence and gravidae (p = 1.006)

Table 3: Prevalence of HIV in relation to gravidity

Gravidae	No. of patients	No. of HIV positive Patients (%)	x2	df	P- value
Primigravidae	120 (61.2)	3(2.5)	6.024	4	1.006
Multigravidae	76 (38.8)	6(7.9)			
Total	196(100)	9(4.6)			

Table 4 shows the prevalence of HIV sero-prevalence in relation to trimester. There was no statistical significance between HIV and trimester (p = 1.005)

Table 4: Prevalence of HIV in relation to Trimester

Trimester	No. of patients	No. of HIV positive Patients (%)	x2	df	p- value
1st trimester	86(43.9)	0	8.241	3	1.005
2nd trimester	62(31.6)	4 (6.5)			
3rd trimester	48(24.5)	5 (10.4)			
Total	196 (100)	9(4.6)			

IV. DISCUSSION

The overall prevalence of HIV in this study was 4.6% (n=9). This prevalence rate is lower compared to that of National prevalence of 3.6% and 7.3% in Rivers State. Four (67.0%) of them was due to infection by HIV-1 while 2(33.0%) was due to infection by HIV-2. Other studies in Africa show 0.8% HIV-1 and 0.5% HIV-2 in south Africa and Ethiopia (Bisnauth, et al. 2011; Melku, et al.2015).

The low prevalence (3.0%) observed in this study may have been accounted for by the fact that the sampling was done in one hospital only. Different studies to determine the prevalence of HIV among different populations have been carried out. A prevalence of 41.23% was reported for HIV in Ethiopia and Zimbabwe(Geremew, et al. 2018). Rwafanet al.(2019) reported 32.43% prevalence rate of HIV and AIDS in Zimbabwe. The study showed age-related differences ($p \leq 0.05$).

In this study, HIV prevalence was higher among pregnant women within age groups 20-29 years (8.3%) than age group 30 years and above (1.3%). Results from previous studies have shown that age has always proved to be the most important factor in all epidemiological studies (Tolossaet al. 2021; Mahandeet al., 2016). The difference in prevalence of HIV in various age groups indicates that this factor plays an important role in the prevalence rate. Our study confirmed

that majority of those who contract HIV fell under the age below 30 years (Wall et al. 2020). However, this was also not in line with the findings (Letaet al. 2021), who reported no statistical difference in age.

There was significant difference ($p \leq 0.05$) between HIV seropositivity and marital status. Results obtained shows that the prevalence of HIV to be 3.3% among singles and 2.5% among the married. This disagrees with the findings of Isichie, et al.(2015) who reported marital status differences in HIV prevalence of traders in Jos Plateau, Nigeria. The possible explanation for this trend in prevalence might be due to other contributing factor such as multiple sex partners, pre-marital and extra-marital sexual contacts which were common in Jos(Isichieet al., 2015). This finding is similar to that of Chilaka and Konje(2021) who found HIV prevalence to be highest among singles. However, the finding of this study disagrees with Carolineet al.(2016) who reported marital status associated HIV positivity in their study in Ibadan, Nigeria.

The study showed occupation-related differences ($p \leq 0.05$). HIV prevalence was higher among unemployed women 7(9.5%) than employed 2(1.6%). Previous studies found that women with low income and low socioeconomic status are more likely to access antenatal care late or be uninterested (Atilola, et al. 2018; Olugbengaet al. 2018).

There was significant difference ($p \leq 0.05$) between HIV seropositivity and educational status. According to the level of education, the highest prevalence of HIV was recorded for participants with no education. This was closely followed by the less educated (primary). This disagrees with Olugbenga et al. (2018) who reported significant difference between educational status and HIV seropositivity. A study by Gbadamosiet al. (2019) found a correlation in terms of occupation and HIV seropositivity. Previous studies found that women with a low level of education were more likely to access antenatal care late or be uninterested.

Concerning gravidity, the majority of the mothers (49.2%) were multigravida, and it was this gravidity category that leads to the seropositivity (3.5%) of women. The Gondar study reported 13 women (42%) were secundigravidae among the total 31 HIV-seropositive pregnant women. The differences mainly lie in the sample size variation between the current study and that of the report from Gondar.

The current study reported no statistical significance between HIV and trimester ($p = 1.005$). The previous result from EthiopiaGeremew et al 2018reported that gestational age of pregnant women who became seropositive was 3.2% in the first trimester, 42% in the second trimester, and a significantly higher proportion (54.8%) in the 7th month.

V. CONCLUSIONS

This study further confirmed the presence of HIV-1 and HIV-2 antibodies among pregnant women in Awka Anambra State, Nigeria. This calls for urgent and concerted efforts aimed at promoting behavioral, cultural and social changes that will reverse the current trend in the prevalence of HIV among the pregnant women.

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