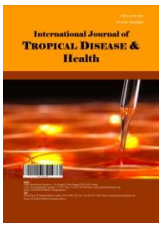

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Prevalence and Demographic Correlates of Seropositive HIV and HBsAg Cases among Women Booking for Antenatal Care at the Rivers State University Teaching Hospital, Nigeria

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Authors' contributions

This work was carried out in collaboration among all authors. Author PAA designed the study, performed the statistical analyses and wrote the first draft of the manuscript. Authors DAM, BOA and DHJ assisted in data collection, managed the analyses of the study and literature searches. All authors read and approved the final manuscript.

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ABSTRACT

Background: Infection with hepatitis B (HBV) and human immunodeficiency virus (HIV) are global public health problems. These infections during pregnancy increase the risk of maternal morbidity and mortality, and also pose a risk to the fetus due to mother to child transmission.
Objective: To determine the prevalence of seropositive HIV and HBsAg cases amongst pregnant women at the Rivers State University Teaching Hospital (RSUTH).
Methodology: A retrospective review of hospital and laboratory records of all pregnant women booked at RSUTH in two years, from May 2017 to April 2019, was carried out. Data on patients' age, parity and educational level and reactivity of HIV and HBsAg test at booking were retrieved

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using structured proforma and analyzed using Epi Info Version 7. Test for significance using Chi-square was set at a significant level of $P<0.05$.

Results: 3560 patients had HIV and HBsAg screening out of which 148 (4.2%) and 9 (0.3%) respectively were positive. The comorbidity rate in this study was 0.06%. The mean age was 31.5±4.7 years and the mean gestational age at booking was 22.1±6.8 weeks. There was no significant relationship between their age ($\chi2 = 2.690$, p-value=0.442) and parity ($\chi2 = 3.759$, p-value = 0.145) with HIV seropositivity, but these were significant for HBsAg ($\chi2 = 13.691$, p-value = 0.003) ($\chi2 = 13.121$, p-value=0.001). Educational status was significant for HIV ($\chi2 = 16.188$, p-value=0.000) but not for HBsAg ($\chi2 = 0.229$, p-value=0.892).

Conclusion: The seroprevalence rate of HIV and HBsAg in this study were low. HIV seroprevalence was significantly affected by lower education, while HBsAg seroprevalence was significantly affected by younger maternal age and nulliparity. Continued screening of pregnant women for these infections remains valuable and further community-based studies to identify risk factors are recommended.

Keywords: HIV; HBsAg; prevalence; demographic correlates; pregnancy; Rivers State.

1. INTRODUCTION

Maternal Infection with hepatitis B (HBV) and human immunodeficiency virus (HIV) are global public health problems [1]. Sub-Saharan Africa remains the most affected region, with 24.5 million people living with HIV, representing a little below two-thirds of all people living with HIV [2]. HIV epidemic affects females more in the sub-region, with women of reproductive age making up 57% of adults living with HIV [2]. HIV infection in pregnancy is associated with adverse maternal and fetal outcome [3], the effect of which includes amongst others infectious morbidity, vertical transmission and severe anaemia [1-3].

Epidemiological surveys show a high prevalence of HIV among pregnant women in Africa [4,5]. HIV infected pregnant women have eight times higher mortality than HIV negative women and it is reported that roughly 24% of postpartum deaths are attributable to HIV [6]. Pregnancy may accelerate HIV infection [7] and there is a high incidence of direct obstetric complications in HIV infected pregnant women [8]. HIV infected pregnant women are also reported to be at greater than three times the risk of infections and puerperal sepsis compared to HIV negative women. HIV positive pregnant women have also been reported to having an increased risk of hypertensive disease [8], anaemia in pregnancy [9] and haemorrhage due to thrombocytopenia [10]. A specific goal to reduce by half the HIV related mortality in pregnancy or postpartum by 2015 was set in the UN General Assembly in 2011 [11].

Nigeria is classified among the group of countries endemic for HBV infection with an estimated infected population of 18 million [12]. Annually, up to 1 million of those infected die due to the consequences of the infection like liver cirrhosis and hepatocellular carcinoma [1]. The prevalence rate differs from place to place. Studies have reported a prevalence rate of 1.6% in Saudi Arabia [13], 5.6% in Khartoum [14], 2.1% in Northern Turkey [15], 1.5% in Libya [16] and 3.7% in Ethiopia [17].

Infection by HBV in pregnancy comes with its attendant effects on both mother and child. Apart from the chronic liver complications, gestational diabetes, antepartum haemorrhage and preterm delivery have been reported to be more common with chronic maternal HBV infection [18]. The risk of mother to child transmission of HBV is about 70-90% [19]. Maternal to child transmission occurs more frequently during labour and delivery [20] and 90% of infected infants would develop chronic infection [16,19]. Although the means of transmission has not been reported to be teratogenic, a higher incidence of low birth weight [15], low intelligence quotient [21], liver cirrhosis and hepatocellular carcinoma in young adulthood [16] may result.

Because of the high risk of developing chronic HBV among infant born to HBsAg positive mothers, administration of anti-HBV immunoglobulin in combination with hepatitis B vaccines as post-exposure prophylaxis (PEP) is very important [16]. However, in about 3% of cases, vertical transmission still occurs despite these measures [22,23]. Likewise, for HIV infection, as part of the prevention of mother to child transmission, infected mothers are treated and their newborn given prophylactic anti-retroviral drugs.

In a previous retrospective study at our centre for over ten years, 2004-2013, the prevalence of HIV and HBsAg was put at 5.9% and 4.9% respectively [24]. That study was quite some time ago and needs to be revalidated. This study, therefore, seeks to determine the current prevalence of seropositive HIV and HBsAg cases among pregnant women who booked at the RSUTH.

2. METHODOLOGY

A retrospective, quantitative study of hospital and laboratory records of all pregnant women booked at the RSUTH for antenatal care in two years (1ST May 2017 to 30TH April 2019) was carried out. The study period of two years was chosen as it marked the period of conversion of the former Braithwaite Memorial Specialist Hospital (BMSH) to the RSUTH and is the expected period of child spacing, to limit duplication of cases.

Data on patients' age, parity and educational status and reactivity of HIV-1/2 and HBsAg tests (positive or negative) at booking were retrieved using structured proforma. Two Interns were trained on the structured Pro-forma and assisted in the data collection. The Age was categorized into 10-19 years, 20-29 years, 30-39 years and 40 years and above. The Parity was categorized into Nullipara (para 0). Multipara (para 1-4) and Grand Multipara (para ≥5).

All pregnant women who registered for antenatal care during the study period and who were tested for HIV-1/2 and HBsAg, and their results entered in the laboratory records were included, those with incomplete records were excluded, and a formal sample size was not calculated. 3560 cases met the stated criteria and formed the study population.

Data were analyzed using the United States CDC Epi Info Version 7. Data were summarized using frequencies and proportions for categorical variables; and means, standard deviation, medians and range employed for quantitative variables. The test of significance for the categorical and discrete variables was done using Chi-square at a statistically significant level of P<0.05.

As the study involved a review of existing MCH records, ethical approval, and a waiver for informed consent, was obtained from the Ethics and Research Committee of the RSUTH.

The RSUTH is one of two tertiary hospitals for referrals from all private clinics, maternity homes, primary health centres and secondary health facilities from all the 23 Local government areas of Rivers State, Nigeria. The hospital is funded by the Government and patients are expected to pay directly for services (except few that participate in the National Health Insurance Scheme). The Department of Obstetrics and Gynaecology runs antenatal clinics Mondays through Fridays. It provides emergency obstetric services to women referred from other centres, as well as providing antenatal care and delivery services for low and high-risk pregnant women booked with the hospital. The Hospital attends to about 2000 bookings annually, with over 1500 deliveries per annum. The hospital is well equipped and has the availability of qualified team comprising of Obstetricians, Pediatricians and Anaesthetist. There is the availability of laboratory and blood bank services in the hospital.

At the Laboratory, all serum samples, test antigens, and control samples were brought to room temperature (26ºC) and tested for HIV1/2 using Alere Determine^{TM} (now Abbott) and for HBsAg using Rapid Diagnostics by DiaSpot$^{©}$ from Indonesia.

3. RESULTS

During the study period, 3560 antenatal clinic patients had HIV and HBsAg screening out of which 148 and 9 respectively were positive. Two (0.06%) of the women had both HIV and HBsAg co-morbidity. The overall prevalence rate for HIV in this study was 4.2%, increasing from 4.0% in 2017 to 4.3% in 2018; while the overall prevalence rate of HBsAg in this study was 0.3%, declining from 0.4% in 2017 to 0.1% in 2018 (see Table 1). The ages of the patients ranged from 15-48 years with a mean age of 31.5±4.7 years and a mean gestational age at booking of 22.1±6.8 weeks and the modal parity was 3. Table 2 and Fig. 1 show the frequency distribution of socio-demographic characteristics of the clinic attendees. Majority of the women (62.2%) were within 30-39 years, are multipara (65.3%) and had tertiary education (72.5%).

The majority of HIV positive women were within 30-39 years (91/148), are multipara (105/148) and had tertiary education (95/148). There was no statistically significant relationship between their age ($\chi2$ = 2.690, p-value=0.442) and parity ($\chi2$ = 3.759, p-value=0.145) with HIV seropositivity, but educational status was

significant for HIV (χ2 = 16.188, p-value=0.000). See Fig. 2 and Table 3.

The majority of HBsAg positive women were within 20-29 years (6/9), are nullipara (8/9) and had tertiary education (7/9). There was statistically significant relationship between their ages (χ2 = 13.691, p-value=0.003) and parity (χ2 =13.121, p-value=0.001) with HBsAg seropositivity, but not significant for educational status (χ2=0.229, p-value=0.892). See Fig. 3 and Table 4.

4. DISCUSSION

The seroprevalence of HIV in this study was 4.2%. This is slightly lower than the Nigerian national overall average prevalence of 4.6% reported among pregnant women [25]. It is also lower than the reported figures in a number of recent Nigerian studies of 5.2% [26], 7.2% [27], 11% [5] and 11.7% [3]. The differences in the prevalence rates from one region to the other can be explained by differences in sexual behaviour, awareness of HIV, socioeconomic factors, cultural practices and sampled population.

An earlier study in our Centre [24] got an HIV prevalence of 5.9%. Like our study, this study also found a higher prevalence in the 30-39 year age group and more prevalence amongst women with less formal education. However, that study was over 10 years and the likelihood of some women having 2-3 children within that period could have caused some duplication of cases, resulting in a higher prevalence.

Table 1. Prevalence of positive HIV and HBsAg cases among the clinic attendees

Year	Disease	Positive (n/%)	Negative (n/%)	Total
2017	HIV	70 (4.0)	1688 (96.0)	1758
2018		78 (4.3)	1724 (95.7)	1802
Overall		148 (4.2)	3412 (95.8)	3560
2017	HBsAg	7 (0.4)	1751 (99.6)	1758
2018		2 (0.1)	1800 (99.9)	1802
Overall		9 (0.3)	3551 (99.7)	3560

Prevalence of HIV patients having HBsAg Co-Morbidity: 2 (0.06%)

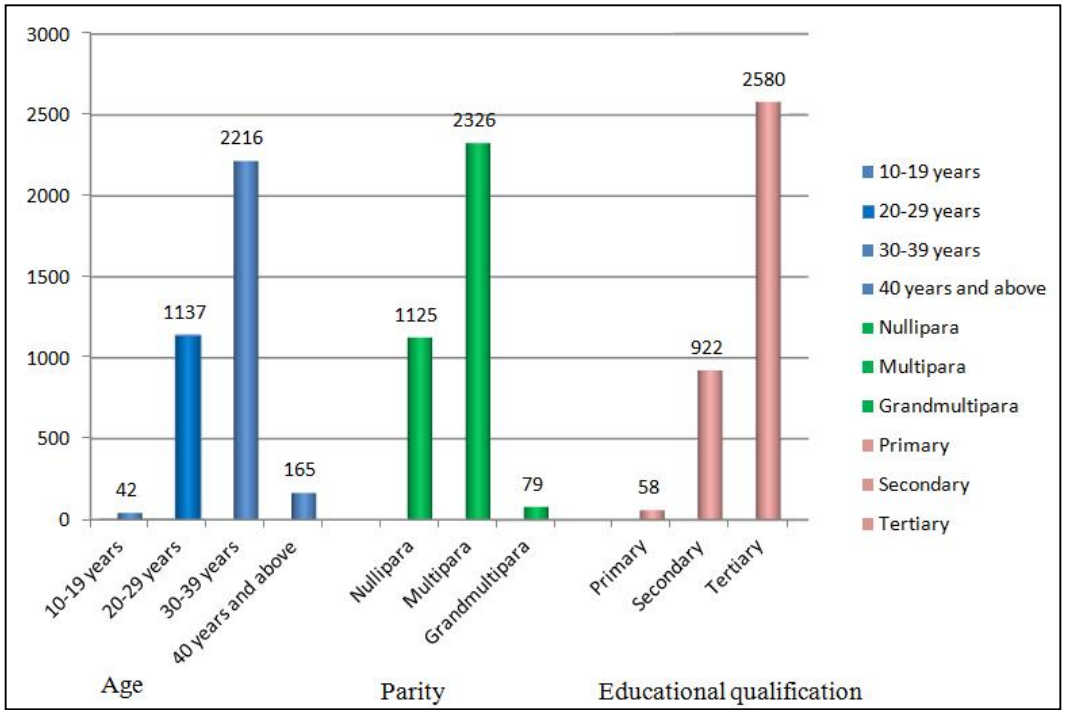

Fig. 1. Frequency distribution of socio-demographic characteristics of the attendees

The finding that pregnant women with less formal education had a higher prevalence of HIV compared to pregnant women of higher educational status had previously been reported [5,24,27]. In Nigeria, HIV prevention messages are often written in the English language and women with less formal education may not appreciate and understand them efficiently. There is, therefore, a need for increased use of local dialect and community-based approach to HIV prevention and awareness campaign, to curb the spread of HIV amongst the poor and less educated which form the bulk of our population.

Seroprevalence of HBsAg was found in 9 (0.3%) of the pregnant women studied. This value is lower than the figures from studies in Onitsha 2.2% [28] and Benin 2.19% [29]; and much lower than that from Enugu 4.6% [30],

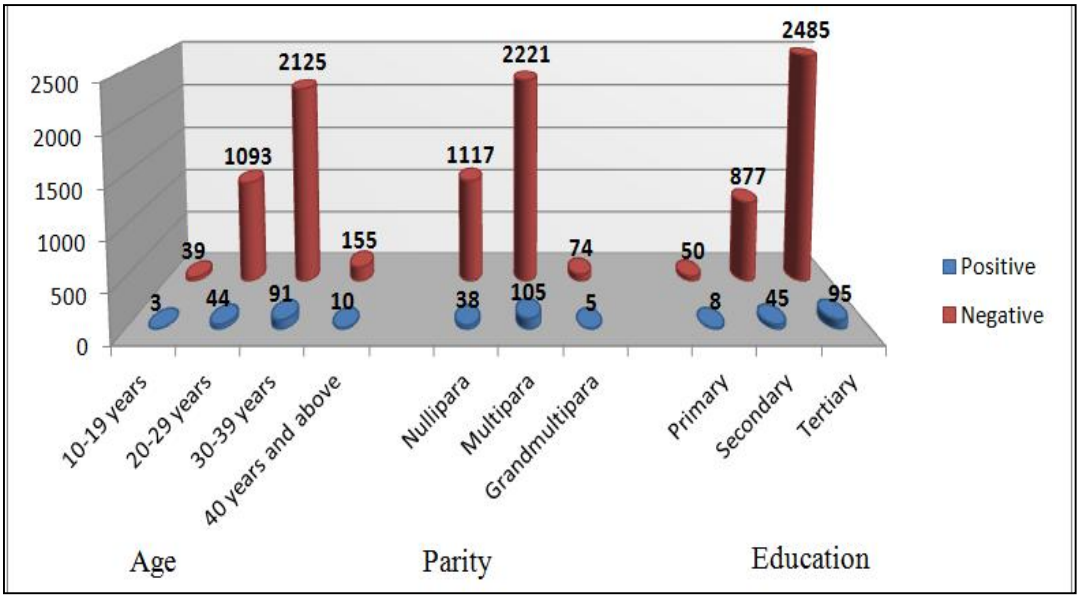

Fig. 2. Prevalence of HIV by age, parity and educational qualification among the clinic attendees

Table 2. Pattern of socio-demographic distribution of the clinic attendees (n=3560)

Characteristics	Frequency (N)	Percentage (%)
1. Age group		
10-19 years	42	1.2
20-29 years	1137	31.9
30-39 years	2216	62.2
40 years and above	165	4.6
Total	3560	100.0
Mean age and Standard deviation	31.5±4.7	
2. Parity		
Nullipara	1125	32.4
Multipara	2326	65.3
Grand multipara	79	2.2
Total	3560	100.0
Modal Parity = 3.		
3. Educational qualification		
Primary	58	1.6
Secondary	922	25.9
Tertiary	2580	72.5
Total	3560	100.0

Table 3. Prevalence and demographic correlates of positive HIV cases among the clinic attendees

	HIV					
Characteristics	**Positive (n/%)**	**Negative (n/%)**	**Total**	**Chi-square**	**df**	**p-value**
Age group				2.690	3	0.442
10-19 years	3 (7.1)	39 (92.9)	42			
20-29 years	44 (3.9)	1093 (96.1)	1137			
30-39 years	91 (4.1)	2125 (95.9)	2216			
40 years and above	10 (6.1)	155 (93.9)	165			
Parity				3.759	2	0.145
Nullipara	38 (3.3)	1117 (96.7)	1155			
Multipara	105 (4.5)	2221 (95.5)	2326			
Grand multipara	5 (6.3)	74 (93.7)	79			
Educational qualification				16.188	2	0.000*
Primary	8 (13.8)	50 (86.2)	58			
Secondary	45 (4.9)	877 (95.1)	922			
Tertiary[R]	95 (3.7)	2485 (96.3)	2580			

**p-value is significant*

Table 4. Prevalence and demographic correlates of positive HBsAg cases among the clinic attendees

	HBsAg					
Characteristics	**Positive (n/%)**	**Negative (n/%)**	**Total**	**Chi-square**	**df**	**p-value**
Age group				13.691	3	0.003*
10-19 years[R]	1 (2.4)	41 (97.6)	42			
20-29 years	6 (0.5)	1131 (99.5)	1137			
30-39 years	2 (0.1)	2214 (99.9)	2216			
40 years and above	0 (0.0)	165 (100.0)	165			
Parity				13.121	2	0.001*
Nullipara	8 (0.7)	1148 (99.4)	1155			
Multipara	1 (0.0)	2325 (99.8)	2326			
Grand-multipara	0 (0.0)	79 (100.0)	79			
Educational qualification				0.229	2	0.892
Primary	0 (0.0)	58 (100.0)	58			
Secondary	2 (0.2)	920 (100.0)	922			
Tertiary	7 (0.3)	2573 (99.7)	2580			

**p-value is significant*

Bayelsa 5.5% [31] and Keffi 6.67% [32]. The variations in prevalence rates are not unusual as studies have shown that it exists even among regions of the same country [16]. Interestingly, the earlier study in our Centre [24] had an HBsAg prevalence of 4.9%. This higher figure may be due to duplication of cases over the 10 years. Again, there has been recent widespread availability and use of Hepatitis B vaccines in the study area, resulting in a decrease in the horizontal transmission of the disease.

The prevalence of HBsAg was significantly higher in the younger age group and among primigravidae (nulliparous) in this study. Other studies have reported an increased prevalence with increasing age [24,32]. An explanation for the higher prevalence in younger age groups may be high-risk sexual practices, while the duration of exposure to the risk of HBV may explain why this infection is sometimes observed more in the older age group.

The finding in this study of an HIV/HBV co-infection rate among the pregnant women of <1% is similar to that of Emmanuel and Ifeanyi [33]. The complications of health problems due to co-infection is usually more severe. Therefore, there is a need for more efforts to curb the trend of spread of the infections.

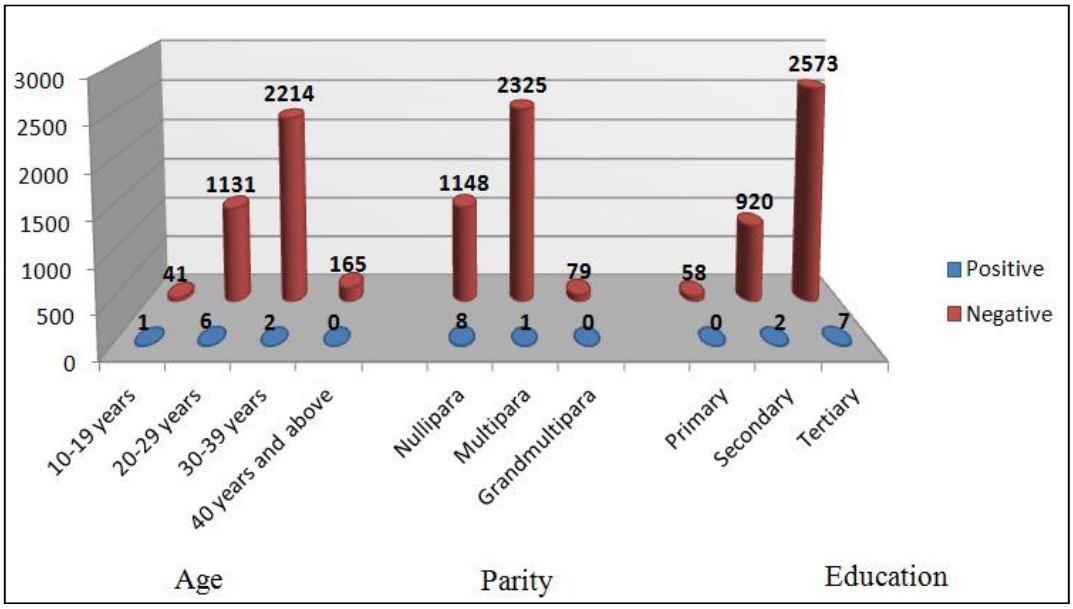

Fig. 3. Prevalence of HBsAg by age, parity and educational qualification among the clinic attendees

5. CONCLUSION

The seroprevalence rate of HIV and HBsAg in this study were low. HIV seroprevalence was significantly affected by lower education, while HBsAg Seroprevalence was significantly affected by younger maternal age and nulliparity. Continued screening of pregnant women for these infections remains valuable and further community-based studies to identify risk factors are recommended. While access to antenatal care and intervention programmes have helped in the reduction of mother to child transmission of these infections, problems of late or non-registration for antenatal care have continued to be a limitation.

6. LIMITATIONS OF THE STUDY

This study may be limited by the fact that it is a retrospective study and there might be inaccuracies in the documented data. The study is also hospital-based and may not reflect what happens in the general population in the state, as some pregnant women do not access the tertiary institutional services.

CONSENT AND ETHICAL APPROVAL

As the study involved a review of existing MCH records, ethical approval, and a waiver for informed consent, was obtained from the Ethics and Research Committee of the RSUTH.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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