IBBJ

Autumn 2016, Vol 2, No 4

Original Article

Prevalence and Pattern of Human Immune Deficiency Virus (HIV) Infection Among Ante-natal Clients in Imo State University Teaching Hospital (IMSUTH), Orlu: A 5-Year Retrospective Study (2009 to 2013)

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Submitted 20 Nov 2016; Accepted 19 Dec 2016; Published 3 Jan 2017

Human immune deficiency virus (HIV) infection is a pandemic, even among pregnant women. It has no cure and so, great importance should be placed on care and support for the sufferer. There is an increasing concern and desire to curb the high incidence of mother to child transmission (MTCT) in Nigeria. Therefore, this study aimed at determining the prevalence and pattern of HIV infection at Imo State University Teaching Hospital, Orlu from 1st January 2009 to 31st December 2013. In this 5 years retrospective hospital-based study, information was obtained from the records of the antenatal clinic, prenatal ward, postnatal clinic and pediatric unit. Of 2727 records of the antenatal care attendees reviewed, 2598 were screened and HIV prevalence was found to be 17.8%. Women aged 31-35 years had the highest age specific prevalence rate (ASPR) of 38.5%, followed closely by age group 26-30 years which recorded ASPR of 35.9%. The lowest ASPR of 1.5% occurred among women aged more than 40 years. The year 2011 recorded the highest HIV prevalence rate of 26.9% while the lowest was in 2009 with a prevalence rate of 11%. All the neonates of booked patients were sero-negative while only 22.2% of their un-booked counterparts tested negative. About 43% of partners of HIV positive women tested positive. Behavioral change communication and expansion of HIV prevention services should be given priority to enhance compliance among the HIV seropositive pregnant women.

Keywords: Prevalence, management, HIV infection, antenatal care, Imo State University Teaching Hospital (IMSUTH)

Human Immunodeficiency Virus (HIV) is a complex retrovirus that causes acquired immune deficiency syndrome (AIDS), a condition in which progressive failure of the immune system

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allows life threatening opportunistic infections such as Kaposi sarcoma, pneumocystis carinii pneumonia, cytomegalovirus and cancer to strive (1). Without treatment, the average survival time after infection with HIV is estimated to be 9 to 11 years (2).

Today, HIV infection has become a global pandemic, and most worrisome among pregnant women. Since the infection has no cure, great importance should be placed on caring and sustaining the life of the sufferer (3). About 90 to 95% of pediatric infections are acquired through mother to child transmission. This underscores the need for effective management strategies in order to reduce the scourge (4). Mother to child transmission can occur *in utero*, at the time of delivery and postnatally through breastfeeding (5, 6).

The national prevalence of HIV in Nigeria and in each state of the federation are estimated from surveys of antenatal attendees and these values can be found in the Nigeria demographic and health survey (NDHS). However, state-specific HIV prevalence has not been determined especially in a large teaching hospital such as Imo State University Teaching Hospital (IMSUTH) that serves as referral center for most health facilities in Imo state. This hospital-based HIV prevalence will constitute an important baseline value for subsequent evaluation of success of HIV control programs in the state.

A number of strategies for the prevention of mother to child transmission of HIV are known or under investigation. These include therapeutic interventions such as the use of highly active antiretroviral therapy (HAART), avoidance of invasive tests, caesarean section delivery and modification of infant feeding practice (7). The management strategies adopted for HIV positive antenatal women are grouped into three different stages viz: antepartum management, intra-partum and post-partum management (8). Caesarean section delivery reduces the risk of vertical transmission of HIV by about 50% (9), and it is therefore an important management strategy as well.

The HIV management strategy adopted by this tertiary health institution will give an insight into the role of the teaching hospital in the overall HIV control effort especially when viewed against the backdrop of HIV prevalence trend in the state over a period of time.

The objective of this study was to determine the prevalence and management strategies of HIV infection at IMSUTH, Orlu from 1st January 2009 to 31st December 2013 (5 years retrospective period).

Materials and methods

Study Location

The study was conducted at Imo State University Teaching Hospital (IMSUTH), Orlu, which is the third largest city of Imo State, South East Nigeria. IMSUTH is a tertiary health facility that provides undergraduate and post graduate medical training programs. It is also a major referral center for most other health facilities within and outside the state.

Study population

All antenatal women that received care from 1st January 2009 to 31st December 2013, their partners and children of the matrimony delivered within the time period, were included in the study.

Study design

This was a retrospective study in which secondary data was collected and analyzed to evaluate the number of antenatal women that were infected with HIV in IMSUTH, Orlu.

Data collection

Proforma was used to collect all relevant data. Data was collected from folders of ante-natal women who visited the hospital within the 5-year period under review, (2009 to 2013). The pregnant women who tested positive were usually asked to bring their husbands for free voluntary counseling and testing (VCT). The records of men that availed themselves of this opportunity were also assessed.

Data analysis

Collected data was analyzed using the statistical packages for the social sciences (SPSS)

version 20 by IBM Corporation America. All qualitative variables were described through frequencies and percentages, while all quantitative variables were illustrated through mean and standard deviation. Person's Chi-square test was applied and P-values less than or equal to 0.05 were considered as significant.

Results

A total of 2727 antenatal care (ANC) attendees were recorded for the 5 years (2009-2013), but 2598 were screened and their HIV status was confirmed. Out of this number, 463 tested positive for HIV giving an overall prevalence rate of 17.8%. Table 1 shows the monthly prevalence of HIV among the ANC attendees for the period of 2010-2013.

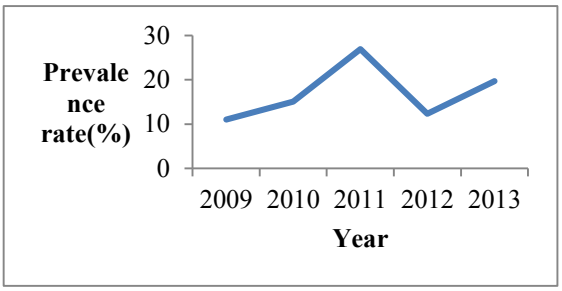

Figure 1. Yearly trend of antenatal HIV prevalence rate.

In figure 1, the yearly HIV prevalence rate is depicted. The trend shows a peak prevalence rate in 2011. In figure 2, the monthly HIV prevalence trend

Table 1. Monthly prevalence of HIV among the antenatal women, 2009-2013

	2009		2010		2011		2012		2013	
	ANC Attendees	**HIV+ (%)**	**ANC Attendees**	**HIV+ (%)**	**ANC Attendees**	**HIV+ (%)**	**ANC Attendees**	**HIV+ (%)**	**ANC Attendees**	**HIV+ (%)**
January	47	3 (6.4)	51	5(9.8)	60	11(18.3)	0	0	32	7(21.9)
February	46	2 (4.3)	47	11(23.4)	8	2(25)	0	0	68	14(20.6)
March	75	3 (4)	43	3(7)	1	1(100)	60	15(25)	48	6(12.5)
April	44	3 (6.8)	30	4(13.3)	76	3(39.5)	62	8(12.9)	53	16(30.2)
May	45	3 (6.7)	44	10(22.7)	88	78(88.6)	60	4(6.7)	62	8(12.9)
June	49	3 (6.1)	24	7(29.2)	81	10(12.3)	47	5(10.6)	52	12(23.1)
July	23	7 (30.4)	55	1(1.8)	78	11(14.1)	78	7(9)	89	15(16.9)
August	18	4(22.2)	0	0	84	14(16.7)	39	3(7.7)	35	1(2.9)
September	38	9 (23.7)	0	0	50	13(26)	14	5(35.7)	46	9(19.6)
October	46	10 (21.7)	0	0	49	14(28.6)	52	1(1.9)	49	15(30.6)
November	47	6 (12.8)	7	4(57.1)	50	16(32)	63	13(20.6)	52	11(21.2)
December	41	3 (7.3)	30	9(30)	30	0	14	4(28.6)	29	7(24.1)
Yearly totals	508	56	331	50	655	176	489	60	615	121
Yearly HIV prevalence (%)	11		15.1		26.9		12.3		19.7	
Five-year total screened ANC attendees	2598									
Five-year total HIV+	463									
Five-year HIV prevalence rate (%)	17.8%									

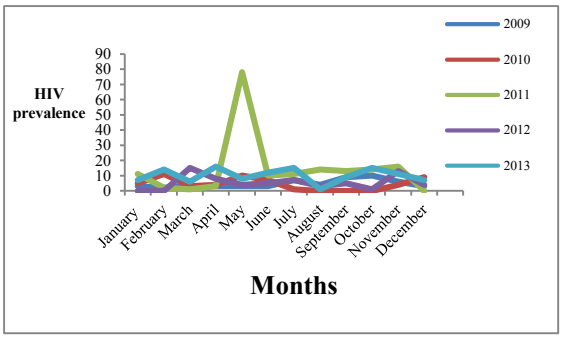

Figure 2. Monthly trend of antenatal HIV prevalence 2009-2013.

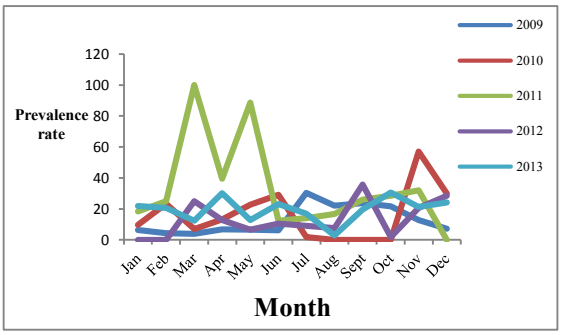

Figure 3. Monthly trend of antenatal HIV prevalence rate 2009 - 2013.

Table 2. Age –specific HIV prevalence among infected antenatal and post-natal women

Age group (years)	Antenatal HIV Prevalence	Antenatal Age-specific prevalence (%)	Postnatal HIV prevalence	Postnatal age-specific prevalence (%)
21-25	75	16.2	35	17.9
26-30	130	28.1	70	35.9
31-35	163	35.2	75	38.5
36-40	85	18.4	12	6.2
>40	10	2.1	3	1.5
Total	**463**	**100**	**195**	**100**

Table 3. Partners' HIV status

Years	HIV Positive	HIV Negative	Total
2009	5	9	14
2010	1	6	7
2011	7	5	12
2012	5	2	7
2013	6	10	16
Total	**24**	**32**	**56**

(2009-2013) shows a marked peak in the month of May, 2011.

Figure 3 shows marked bimodal peaks in antenatal HIV prevalence rates for months of March and May 2011. Another peak in similar parameters is shown in the month of November 2010.

According to Table 2, the antenatal age-specific HIV prevalence is highest among the 31-35 years age group which constitutes 35.2% of all the HIV cases. The least antenatal age-specific HIV prevalence is recorded among the >40 years age group. The trend remains unchanged at postnatal period among those women (195) who delivered at IMSUTH. Of the 463 HIV positive pregnant women who presented for antenatal care at IMSUTH, only 195 (42.1%) delivered in the health facility.

According to Table 3, out of the 56 men whose wives were HIV positive and who agreed to be screened, 24 (43%) tested positive while 32 (57%) were negative.

Table 4 indicates that out of the 195 HIV positive women who delivered at IMSUTH from2009- 2013, 155 (79.5%) were booked while 40 (20.5%) were un-booked. The year 2011 recorded

Table 4. Post-natal HIV seropositive women by booking status and mode of delivery

Years		Booking status		Mode of delivery			
	Age group	**Number Booked**	**Number Un-booked**	**Number by SVD**	**Number by ECS**	**Number by ELCS**	**Number by AVD**
2010	21-25 (7)	4	3	6	1	0	0
	26-30 (11)	8	3	8	1	1	1
	31-35 (11)	9	2	10	1	0	0
	36-40 (1)	1	0	1	0	0	0
	>40 (1)	1	0	1	0	0	0
	Total (31)	**23**	**8**	**26**	**3**	**1**	**1**
2011	21-25 (12)	5	7	6	5	1	0
	26-30 (18)	17	1	15	1	1	1
	31-35 (24)	23	1	21	1	1	1
	36-40 (6)	6	0	6	0	0	0
	>40(1)	0	1	1	0	0	0
	Total (61)	**51**	**10**	**49**	**7**	**3**	**2**
2012	21-25 (10)	6	4	8	2	0	0
	26-30 (20)	12	8	12	7	1	0
	31-35 (17)	15	2	17	0	0	0
	36-40 (2)	2	0	2	0	0	0
	>40(1)	1	0	0	1	0	0
	Total (50)	**36**	**14**	**39**	**10**	**1**	**0**
2013	21-25(6)	5	1	5	1	0	0
	26-30(21)	19	2	19	2	0	0
	31-35(23)	19	4	20	3	0	0
	36-40(3)	2	1	1	1	0	1
	>40(0)	0	0	0	0	0	0
	Total (53)	**45**	**8**	**45**	**7**	**0**	**1**
	Grand total(195)	**155**	**40**	**159**	**27**	**5**	**4**
		Booking rate		**SVD rate**	**ECS rate**	**ELCS rate**	**AVD rate**
2010 rates		74.2%		83.9%	9.7%	3.2%	3.2%
2011 rates		83.6%		80.3%	11.5%	4.9%	3.3%
2012 rates		72.0%		78.0%	20.0%	2.0%	0%
2013 rates		84.9%		84.9%	13.2%	0%	1.9%
4-year rates		79.5%		81.5%	22.1%	2.6%	2.1%

Table 5. Post-natal HIV seropositive women by booking status and mode of delivery

Delivery mode	Booking status		Total	Test statistic	P-value
	Booked	Un-booked			
SVD	133	26	159		
Others	22	14	36		
Total	155	40	95	9.09	P<0.01

Table 6. Percentage of PCR negative result of babies

Booking Status	PCR Results				
	Positive		Negative		
	Number	%	Number	%	Total
Booked	-	0	71	100	71
Un-booked	16	76.2	5	23.8	21
Total	16	17.4	76	76.2	92
X^2	32.2				
P-value	P<0.001				

the highest delivery, with 61 (31.3%) deliveries occurring at this time. Also the yearly delivery rates as well as rates of various modes of delivery are represented.

Table 5 shows that there is a statistically significantly higher number of spontaneous vaginal delivery (SVD) among the booked antenatal women than among the un-booked ones (P< 0.01).

Figure 4 depicts the outcome of the management strategies regarding prevention of mother to child transmission (PMTCT). The figure shows that in the 3rd and 4th weeks, PCR result for the un-booked mothers recorded HIV negative in only 2 out of 9 (22.2%) and 1 out of 10 (10%) babies, respectively. Conversely, among the booked mothers, all the babies (100%) in all the age groups

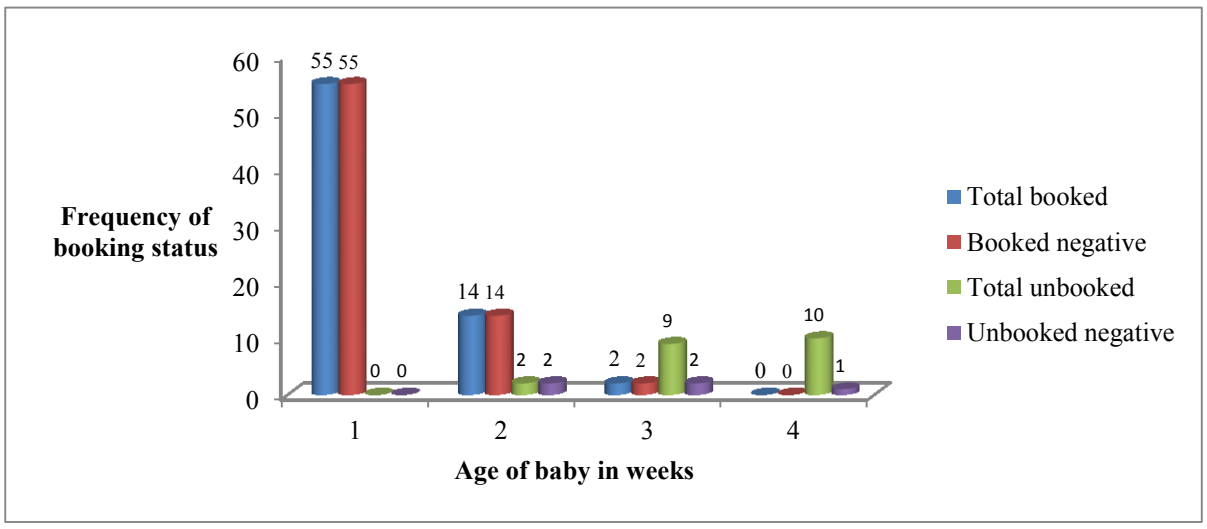

Figure 4. Booking status and age-specific neonatal HIV status tested with polymerase chain reaction (PCR).

tested polymerase chain reaction (PCR) negative.

Table 6 shows that 76.2% of babies born to un-booked patients, were sero-positive. Conversely, sero-negative result was recorded for all the babies born to booked mothers and 23.8% of babies born to un-booked mothers. The difference in sero-negative status of the two groups of babies was statistically significant (P< 0.001).

Discussion

The management strategies to identify HIV positive pregnant women as part of holistic approach to HIV management in Nigeria cannot be over-emphasized in a teaching hospital setting. Thus, the present study shows that 2598 out of 2727 women who attended antenatal clinic of IMSUTH, Orlu from 2009 to 2013 availed themselves of voluntary HIV testing. Of this, 463 tested positive. This figure therefore gives a prevalence rate of 17.8% or 178/1000 which is considered high. This percentage represents the women who gave their consent to be tested and on whom the screening and confirmatory tests were conducted.

This prevalence is much higher than 5% recorded in 2003 sentinel survey in Nigeria (10). According to a report from Federal Ministry of Health in 2005, on HIV and AIDS sentinel sero-prevalence survey in Nigeria, the national HIV prevalence in Nigeria among pregnant women steadily rose from 1.8% in 1991 to 5.8% in 2001 but dropped to 4.4% in 2005 (11). However, in South Africa, HIV prevalence in pregnant women increased steadily from 24.5% in 2000 to 30.2% in 2005 with 2006 and 2007, indicating a slight decline in prevalence (12). As might be expected, some of these women refused being screened after due counseling for voluntary HIV screening and testing (VCT). This could be due to ignorance, illiteracy, fear or defective counseling. The year 2011, recorded the greatest prevalence of 27% while it was lowest in 2009 (11%).

The respondents were mostly young and middle aged women with age range of 20-42 years. The age group of 30-35 years formed the predominant age group, and hence reflected the relationship between HIV infection and peak of sexual activity. On the other hand, the age group 40-42 years accounted for the least age percentage of 2% of the infected women. Also, over 79% of infected women were aged between 20 and 35 years. However, prevalence of HIV infection seems to fluctuate through the years as the rates were 15.1% in 2010, 12.3% in 2012, and 19.7% in 2013.

The HIV results of the partners of these seropositive pregnant women were significant. Out of 56 men whose wives were HIV positive and who agreed to be screened, 24 (43%) tested positive, while 32 (57%) were negative. This agreed with the study in Nigeria by Sagay et al. (11, 13), which recorded a prevalence rate of 52% and mean sero-discordance of 54.7%. The prevalence of sero-discordance between couples was thus 56.1%. This figure was at a ratio of 1:6.

This implies that 6 women were affected for every affected man. This is in dissonance with an approximate of one man for every 2 women reported by Chukwuemeka et al. (14). Several reasons have been adduced for this pattern of HIV prevalence; HIV is more easily transmitted from men to women than vice versa (4). Early marriage, lack of education, low socio-economic status, young married girls cannot negotiate condom use to protect themselves against HIV, and other sexually transmissible infections (15).The age range of the men was 25-55 years and the modal group was 40-45 years which is in the prime of sexual life.

The results of the various interventions in labor and delivery as part of the management strategies are remarkable. While many of these women were booked (79.5%), 20.5% were un-booked women who were either referred from peripheral health centers or only presented while in labor. In general, 150 (77.3%) women delivered through SVD, 40 (20.60%) through emergency caesarean section (ECS), 2 (1.0%) through elective caesarean section (ELCS), 2 (1%) gave birth through assisted vaginal

delivery. To further reflect the quality of the management strategies, 83.8% of booked patients had SVD while 52.5% of un-booked patients had SVD. The result so obtained above was thus in line with what might be expected as the booked women had been properly managed.

On the other hand ECS rate of 13.6% in patients with booked status was observed against 40% for un-booked patients. ECS was actually undertaken by obstetricians to reduce the chance of mother-to-child transmission and also to minimize feto-maternal morbidity or mortality. This is based on the fact that caesarean delivery removes the risk of infection acquired during vaginal delivery.

ELCS can only be done on a woman that has booked in advance for it to be planned before hand as a result of certain obstetric and medical indications or personal choice and thus none was recorded for the un-booked status while 1.3% of booked patients had ECS.

In summary, for women who booked in IMSUTH, SVD was allowed in 83.8%. ECS in 13.6%, ELCS in 1.3% and 1.3% for AVD. The rate of SVD was highest as it is the mode of delivery of choice that is usually aimed at for most booked women, except it is not consistent with the wishes of the patient or there are contra-indications. Rate of ELCS was low at 13.6% as it is done in women where vaginal delivery was contra-indicated following obstetric and / or medical factors. Also, benefit of ELCS has been reduced since combination of anti-retroviral use in pregnancy has been shown to reduce mother-to-child transmission.

Furthermore, the results of HIV status of infants tested using early infant diagnosis by PCR portrayed that seropositive babies (76.2%) were born to un-booked HIV infected mothers, while sero-negative results accounted for 100% of babies born to mothers that had antenatal management and the preferred mode of delivery in IMSUTH. Also, 23.8% of babies born to un-booked mothers were sero-negative.

This study has some limitations as members of staff of IMSUTH should be educated on the importance of good record keeping, as well as the modern methods of record keeping, and this undoubtedly slowed down the tempo of the study and posed a service limitation.

It is recommended to make more efforts to ensure that all HIV seropositive pregnant, continue with antennal care and management in the teaching hospital, as our findings during this study revealed that some of the respondents were not compliant to clinic attendance. Frank measures should be taken to ensure that all babies born to HIV positive mothers in IMSUTH be traced and brought for early infant diagnostic screening tests, so as to aid in evaluation of the outcome or quality of management strategies, and in early institution of antiretroviral therapy.

Also, awareness, enlightenment campaigns and seminars carried out through mass media, church, family, school etc… may further help to curb the trend of HIV infection amongst married couples.

Conflict of interest

The authors declared no conflict of interest.

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