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Socio - demographic characteristics of HIV patients diagnosed at immunization centres in Calabar, South – south, Calabar, Nigeria

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Abstract: *Introduction:* The World Health Organization (WHO) estimated that 3.2 million children were living with Human Immunodeficiency Virus (HIV) at the end of 2013, mostly in sub-Saharan Africa. Socio- economic and demographic factors do not only affect viral transmission but also the success of preventive strategies and treatment.
Objective: To determine the socio -demographic characteristics of mothers, and the relationship between maternal and HIV status of their infants attending immunization clinics in Calabar.
Methods: Using multistage sampling method, 330 subjects were enrolled and screened from 63 immunization centres. The socio-demographic characteristic of each infant's mother was documented. The results of Rapid test for mothers and Dried Blood Spots (DBS) results for infants were compared.
Results: Of the 330 subjects recruited, 173 (52.4%) were males while 157(47.6%) were females. Mean age of the infants was 9.20 ± 3.1 weeks. Twenty four mothers and infants tested positive for HIV antibodies. After confirmatory tests using HIV Deoxyribosenucleic acid (DNA PCR), 14(58.3%) out of 24 antibody seropositive infants were infected. The transmission rate after confirmation was 58.3%.
Conclusion: Parental education, social class and low maternal Antiretroviral drug (ARV) use were responsible for transmission. It is therefore recommended that health education on ARV use during antenatal period and HIV status of mother baby pair be done at immunization centres. HIV positive mothers and babies should be promptly referred for therapy.

Key words: Immunization, HIV, Infants, DNA PCR, PMTCT, ARV

Introduction

The World Health Organization (WHO) estimated that 3.2 million children were living with HIV at the end of 2013, mostly in sub-Saharan Africa. Majority of them acquire HIV from their HIV-infected mothers during pregnancy, birth or breastfeeding.[1]Prevention of Mother-to-child transmission of HIV (PMTCT) is the key to reducing paediatric HIV/AIDS. With efficacious interventions the risk of mother-to-child HIV transmission can be reduced to 2%. Nigeria contributes 32% to the world gap in achieving the global target of eradicating MTCT of HIV, the highest in the world.[2]
Implementation of PMTCT remains low at 30% as only about 4% of HIV exposed infants are tested for HIV in the first two months of life.[3] Several challenges hinder the PMTCT delivery in Nigeria. These arise from poor uptake of antenatal care services and very low utilization of orthodox health care facilities for delivery[2,4] resulting in low early infant diagnosis.
Socio-economic factors do not only affect viral transmission but also the success of preventive strategies and treatment. The most important demographic and socio-economic features that influence HIV infection and eventual transmission to children include age, sex, residence, education, marital status, religion, family/social units and ethnic identity. Low socioeconomic status and lack of formal or primary education were outlined as the major risk factors for HIV infection of infants of HIV positive mothers.[5]

This study was therefore conducted to determine the effect of socio-demographic characteristics and concordance between maternal HIV status and HIV status of the infants attending immunization clinics in Calabar. This will serve as a portal for early identification of predisposing factors and determinants of paediatric HIV infections. The results obtained should help stake hold-

ers; governmental and non-governmental agencies to formulate policies aimed at addressing the socio-demographic challenges promoting HIV infection.

Methods

This cohort descriptive study was conducted among infants aged six to 14weeks attending immunization clinics in Calabar, Nigeria. The study was carried out from 1st August 2014 to 30th September 2014 to determine role of socio-demographic characteristics of parents as a risk factor for the transmission of HIV infection to their infants.

Calabar as earlier described by Udo et al[6] is made up of two Local Government Areas (LGAs) namely Calabar Municipality and Calabar South. Immunization centres were used for the study. The study was approved by the University of Calabar Teaching Hospital, Calabar and the Cross Rivers state Ministry of Health ethical committees. Informed consent was obtained from the mothers. Children aged six to 14 weeks that met the inclusion criteria were recruited. Multistage sampling method was used to select 330 subjects from the 22 immunization centres using table of random numbers. Those excluded were ill infants and those already on antiretroviral drugs. Pretest counseling was done. A detailed history was obtained which included maternal and child's biodata, maternal and infant HIV status as well as the socio-demographic characteristics of the parents (Age, Sex, levels of education and occupation etc). General examination was conducted and anthropometry measured included weight, Occipito Frontal Circumference (OFC) and length.

HIV testing was done on all infants-mother pair using Determine™ HIV 1/2 from ABBOT Medical Japan and HIV 1/2 STAT PAK™ from CHEMBIO Diagnostic systems, Inc. USA. Post test counseling was done, and infants who were reactive had specimen collected for Dried Blood Spot (DBS) using DNA PCR according to the National guidelines for the diagnosis of Paediatric HIV. Those who had positive DBS were enrolled into the treatment programme. All HIV positive mothers were referred for treatment. Refusal to participate in the study carried no penalty.

Data were recorded and standard statistical analysis was performed using SPSS statistical package version 20. Continuous variables were summarized using means, median and ranges as appropriate. Proportions were compared using Chi-square test of significance. A probability (P-value) less than 0.05 was considered statistically significant.

Results

Of the 330 subjects recruited, 173 (52.4%) were males while 157(47.6%) were females with M: F ratio 1.1:1. Mean age of the infants was 9.20 ± 3.1 weeks. Twenty four mothers and infants tested positive for HIV antibodies. Those that tested negative were taken as controls. After confirmatory tests using HIV DNA PCR, 14 (58.3%) out of 24 antibody sero-positive infants were infected while 10 were HIV exposed. Hence, the prevalence of HIV infection after confirmation was 58.3%. Of the 14 infected infants9(64.3%) were males and 5 (35.7%) females. They were mostly aged 12-14weeks (42.9%). (Table 1.)

Table 1: Age Sex and HIV Status of infants

Variable	Infected n=14(%)	Uninfected n=10(%)	Total N=24(%)	X^2	p-value
Age group (weeks)					
6-8	5(35.7)	2(20	7(29.2)	FET	0.759
9-11	3(21.4)	3(30)	6(25)		
12-14	6(42.9)	5(50)	11(45.8)		
Total	14(100.0)	10(100.0)	24(100.0)		
Sex					
Male	9(64.3)	6(60)	15(62.5)	FET	0. 582
Female	5(35.7)	4(40)	9 (37.5)		
Total	14(100.0)	10(100.0)	24(100.0)		

Mothers aged 25-34yrs had the highest HIV infected infants'. Parents of the HIV infected infants mostly had secondary levels of education (father 85.8%; mother 78.6%) compared with the uninfected infants whose mothers (70%) and fathers (60%) had tertiary education respectively. (Father FET 0.019; Mother FET 0.004).Parents of the infected infants were mostly from the middle social class family (71.4%),while parents of the uninfected infants were of the higher social class (50%). The family sizes 1-3 were similar for both infected (85.7%) and uninfected (90%) infants. Both the infected and uninfected infants were product of married couples. Majority (92.9%) of the mothers whose infants were HIV infected did not receive ARV drugs while 50% of the uninfected received ARV drugs. (p value= 0.048)Table 2

The relationship between maternal antenatal HIV status and eventual outcome of the Infant HIV status was highly statistically significant (FET 0.00). (Table 3)

Table 2: Parents' related socio-demographic characteristics and HIV infection in infants

	HIV Status of infant Confirmation by DNA PCR				
Variable	Infected n=14(%)	Uninfected n=10(%)	Total N=24(%)	test	p-value statistic
Mother's age					
15-24	4(28.6)	1(10.0)	5(20.8)	FET	0.180
25-34	7(50.0)	8(80.0)	15(62.5)		
35-44	3(21.4)	0(0.0)	3(12.5)		
≥45	0(0.0)	1(10.0)	1(4.2)		
Total	14(100.0)	10(100.0)	24(100.0)		
Fathers Education					
Primary	1(7.1)	0(0)	1(4.1)		
Secondary	12(85.8)	4 (40)	16(66.7)	FET	0.019 *
Tertiary	1(7.1)	6 (60)	7(29.2)		
Total	14(100.0)	10(100.0)	24(100.0)		
Mothers Education					
Primary	2(14.3)	0(0)	2(8.3)		
Secondary	11(78.6)	3(30)	14(58.3)	FET	0.004*
Tertiary	1(7.1)	7(70)	8(33.4)		
Total	14(100.0)	10(100.0)	24(100.0)		
Social class					
Higher	1(7.1)	5(50)	6(25)	FET	0.180
Middle	10(71.4)	4(40)	14(58.3)		
Lower	3(21.5)	1(10)	4(16.7)		
Total	14(100.0)	10(100.0)	24(100.0)		
Parent's marital status					
Married	9(64.3)	6(60)	15(81.8)	FET	1.000
Cohabiting	2(14.3)	1(10)	3(12.1)		
Single	3(21.4)	3(30)	6(6.1)		
Total	14(100.0)	10(100.0)	24(100.0)		
Family size					
1-3	12(85.7)	9(90)	21 (87.5)	FET	1.0
4-6	2(14.3)	1(10)	3(12. 5)		
≥ 7	0(0.0)	0(0)	0 (0.0)		
Total	14(100.0)	10(100.0)	24(100.0)		
Maternal ARV Use					
Yes	1(7.1)	5(60)	6(25)	FET	0.048*
No	13(92.9)	5(40)	18(75)		
Total	14(100.0)	10(100.0)	24(100.0)		
Religion					
Christianity	14(100.0)	9(99.4)	23(99.4)	FET	1.00
Muslim	0(0.0)	1(0.6)	1(0.6)		
Total	14(100.0)	10(100.0)	24(100.0)		

* FET = Fisher's Exact Test

Table 3: Relationship between infant and maternal HIV status

	HIV Status of infant (DNA PCR)				
Variable	Infected n=14(%)	Uninfected n= 316 (%)	Total N=24(%)	X^2	p-value
Maternal HIV status					
Positive	14(100.0)	10(3.2)	24(7.3)	FET	0.00*
Negative	0(0.0)	306(96.8)	306(92.8)		
Total	14(100.0)	316(100.0)	330(100.0)		

*Statistically significant (p<0.05)

Discussion

The prevalence of 4.2% and male preponderance among HIV infected infants is similar to report by Udo *et al* [10] in Calabar and Ibeziako *et al* [7] in Enugu. Okeudo *et al* [8] in Orlu, Nigeria and Taha *et al* [9] in Malawi however reported female preponderance. Alvarez-Uria *etal* [10] in contrast reported equal proportion of both males and females from their study in India. This sex difference is probably because neonatal infections are commoner in males as a result of gene constitution.[11]

The sixth week of life is a landmark time in the lives of the HIV exposed or non exposed children because this is the period for immunization, postnatal check up, and the diagnosis for HIV infection (DNA PCR) using the DBS. In addition, it's an opportunity to seek for circumcisions for their male infants hence responsible for the increased number. Though the infants in our study were older this may be due to delay in accessing immunization centres in our communities.

The mothers peak age observed in our study corresponded to the peak of age of procreation (21-40 years),[12] therefore it is not surprising that most mothers in this study were within this age group. This finding is corroborated by Berhan *et al* [13] in Ethiopia and Orenuga *et al* [14] in Nigeria. In contrast, Bucagu *et a* [15] in Rwanda documented a lower maternal age of 18- 20 years. The differences observed in peak age of parents' are not unrelated to cultural and religious differences regarding timing of marriages of mothers.

The middle class and secondary level of education was responsible for the highest prevalence. This is statistically significant; it also buttresses the fact that parental education had influence on transmission in this study. However, this is contrary to previous study by Rabasa *et al* [16]which demonstrated a significant association between high HIV positive sero- prevalence and low socio -economic class. Similarly, Fetuga *et al*[17] in Sagamu, western Nigeria showed that more than half of the parents of infected children were within the low socioeconomic class.

Different methods of establishing socioeconomic status in Nigeria may contribute to these apparent differences. We therefore recommend that appropriate tool for measurement of socioeconomic status in the country and subregion is used across board.

Most of the infected infants were of higher birth orders (>1) probably because majority of the subjects belonged to similar families and large family is the norm rather than exception. Family of 1-3 is a risk factor for HIV infection in children because multiparous women may be tempted to deliver at home unaided or assisted by TBAs having delivered previously. This increases the risk of HIV infection in infants as the mothers do not present in hospitals where access to PMTCT is available. Similarly, Berhan *et al*[13] in Ethiopia reported that infected children were mainly from families with 1-3 children.

Surprisingly, we observed that many parents of the HIV infected children were married. This is a serious concern as married couples are said to belong to low risk group because they have single or stable sexual partners. Nonetheless, the premarital HIV status of these parents could not be ascertained to verify time and possible

source of infection. There will be need to screen husbands to enable them benefit from ARVs.

Antiretroviral therapy (ART) reduces the maternal HIV levels, thereby minimizing the risk of infection in the infant via perinatal transmission.[18]In the absence of any intervention, the combined risk of MTCT of HIV in utero and intra-partum is 15-30 percent.[8] This is also evident from our study that mothers who did not receive ARV had higher transmission rate. Studies have implicated lack of intervention as a risk factor for paediatric infections as evidenced by lower rates of infection among infants that received intervention in comparison to those that did not.[18]Esene et al from Benin,[19] observed that ARVs use in both mother and infant lowered risk of infection in children. Another Nigerian study by Anoje et al[20] reported similar results among babies' zero to six weeks old.

Mother-to-child transmission of HIV(MTCT) accounts for over 90% of paediatric HIV infection[21]. Unfortunately, about 30% of pregnant women are not tested for HIV during pregnancy, and another 15-20% receives no or minimal ANC, thereby allowing for potential new born transmission of HIV from infected mothers.[22,23]Our study revealed 58.3% transmission which was also high. This was probably due to the low use of ARVs as well as middle to low maternal literacy levels and social class. However, lower sero-prevalence of 0.9% was observed among infants aged one to 55weeks attending immunization clinics in Ibadan[24]. It was assumed to be due to the effectiveness of PMTCT in reducing HIV infections in their locality.

Based on the aforementioned, it is feasible to significantly target mother-baby pairs whose mothers were missed during antenatal period at the immunization centres in all health facilities. Thus provide opportunity for health education, identification of HIV infected mothers and their children.

Conclusion

There is high Mother-to-child transmission due to low parental education, social class and lack of maternal antiretroviral drugs use.

Recommendation

It is therefore recommended that health education, testing of mother-baby pair be done at immunization centres. HIV positive mothers should be advised on ARV use during antenatal period and Mother - baby should be promptly referred for therapy.

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