

Full Length Research Paper

Mode of transmission of HIV infection among orphans and vulnerable children in some selected States in Nigeria

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Nigeria has high rate of pediatric HIV but there is a dearth of empirical data on the mode of HIV transmission. Association for Reproductive and Family Health (ARFH), with the support of USAID, is implementing a project to mitigate the impact of HIV on Orphans and Vulnerable Children (OVC) affected/infected with HIV/AIDS in Akwa-Ibom, Lagos, and Rivers states, Nigeria. The mode of HIV transmission among their OVC was examined. A retrospective study of enrolled OVC was done in the three states. HIV OVC whose mothers are HIV positive were classified under those who got HIV through vertical transmission, otherwise horizontal. The data was summarized using descriptive statistics. Significance of association between qualitative variables and mode of transmission was determined using Chi-square test. Among the 387 OVC HIV positives who enrolled, there was a slight preponderance of males (50.6%); and about 42% were aged 10 - 17 years and 26% <5 years. Vertical mode of HIV transmission was higher (77%) in children <10 years. Horizontal transmission was highest among Akwa-ibom adolescents. In addition, age and State were significantly associated with transmission mode. A high proportion of children <10 years were infected through vertical transmission; while majority of adolescents are infected through horizontal transmission. Hence, a Swift scale-up of prevention of mother-to-child HIV transmission (PMTCT) services is recommended. Pregnant women infected with HIV need close monitoring to receive counseling as well as to get ARV prophylaxis. Also, condom demonstration should be introduced into the OVC project

Key words: Orphans and vulnerable children (OVC), HIV, prevention of mother-to-child HIV transmission (PMTCT), vertical, horizontal, transmission.

INTRODUCTION

One of the major challenges of the HIV/AIDS pandemic in developing countries is the dearth of empirical data on its mode of transmission among the pediatrics. About 90% of pediatric HIV infections were said to occur in Africa (NASCP, FMOH, NACA, UNICEF, WHO and UNAIDS, 2014). Report by the Nigerian National Agency for the

Control of AIDS (NACA) showed that nearly 1.8 million women and girls were living with HIV and AIDS in 2009; with women between 25 and 29 yearshaving the highest prevalence rate (5.6%) (NACA, 2010). Also, Nigeria is ranked second amongst countries with high rate of newly infected persons with HIV in 2012; with 110,000 new HIV

infections among women aged between 15 and 49 years (UNAIDS, 2013). The mother-to-child transmission (MTCT) of HIV and the high rate of infection among women of reproductive age remains a problem in Nigeria (Anoje et al, 2012, Nkwo, 2012). Globally, almost 400,000 children were infected with HIV in 2009 and virtually all of these infections occurred through mother-to-child transmission (MTCT).

In spite of all efforts intensified by the Federal government of Nigeria, since the official flag off of the PMTCT in 2001, Nigeria still account for about 65% of pregnant women who were tested for HIV as at 2016 (UNAIDS, 2017; NBS and UNICEF, 2017).

Women who are HIV positive, who gave birth and contributed to the pool of mother to child transmission increased to about 26% in 2016 (UNAIDS, 2018). Despite purported enhanced efforts devoted to the prevention of mother-to-child HIV transmission (PMTCT), the nationwide coverage of the Nigerian PMTCT program is poor.

The major susceptible groups to HIV in Nigeria include children between 0-17 years, particularly orphans and vulnerable children (OVC) and youths, especially young women (UNAIDS, 2018). The United Nations Children Emergency Fund (UNICEF) defined 'an orphan' as a child less than 18 years of age who has 'lost one or both parents'. About 11 million of 13.4million children worldwide who had lost one or both parents to AIDS are from sub-Saharan Africa (UNAIDS, 2011, 2018). Also, PEPFAR defined an OVC as someone between 0-17 years who became orphaned by being infected or affected by HIV/AIDS (PEPFAR, 2012).

In 2008, an estimated 2.5 million Nigerian children aged 0-17 years were orphaned as a result of HIV/AIDS out of the 17.5 million orphans. The number of OVC dropped to 2 million in 2017 (UNAIDS, 2018). However a total of 220,000 children are living with HIV and AIDS in Nigeria (UNAIDS, 2018). Thus, the the impact of the current socio-economic problems in Nigeria on OVC cannot be overestimated (PEPFAR 2017).

Vertical transmission (mother to child) is defined as the passing on of HIV-infection from an infected mother to the infant at one or more of the following phases: In the uterus during pregnancy (Trans-placental), during the course of labor and delivery (Peri-natal), and during breastfeeding (Post-natal) (Navabakhsh et al, 2011). The baby of an HIV- infected pregnant woman has between 15% to 45% risk of being infected during pregnancy, delivery, and breastfeeding in the absence of any intervention (WHO, 2018). In developing countries, such as Nigeria, intrauterine infection account for about 25 to 40% while peri-partum infections account for 60 to

75% of vertical infection when infants are not breastfed.

However, breastfeeding account for 8 to 25% of vertical transmission risk (Mor et al, 2006).

The sole mode of transmission that account for 90% of all HIV infections in adults includes: Unprotected sex with an infected person, infected blood and blood products transmission, as well as contaminated instruments and all other transmissions that occur between two individuals who live separately is called Horizontal transmission. In spite of recent massive investments to provide PMTCT services in Nigeria, the burden of pediatric HIV remains a serious challenge particularly among vulnerable population. A big gap is the dearth of information on the mode of HIV transmission among orphans and vulnerable children (OVC) 0-17 years. Hence, this study examined the mode of transmission of HIV among OVC positive to HIV in selected LGAs in 3 states of Nigeria.

METHODS

In 2014, USAID supported the Association for Reproductive and Family Health (ARFH) to implement a 5 year (2014-2019) project called Local Partners for Orphans and Vulnerable Children in selected Local government areas (LGAs) in Akwa-Ibom, Lagos, and Rivers States of Nigeria. The main goal is to mitigate the debilitating impact of HIV/AIDS among orphans and vulnerable children and their families in an accelerated and sustainable manner. The selection of the States and subsequent LGAs were from the PEPFAR priority LGAs based on the highest rate of HIV prevalence in Nigeria. The project is being implemented through Community Based Organizations who recruited Community Volunteers across 14 PEPFAR priority Local Government Areas in Lagos (Agege, Surulere, Ajeromi, Apapa, Badagry, Ojo and Kosofe), Akwa-Ibom (Ikot-Ekpene, Uyo, Okobo, Oron and Uruan) and Rivers (Port-Harcourt, Eleme and Obio/Akpor) states. People living with HIV (PLHIV) were identified and enrolled through the community HIV testing of all members of the households infected or affected by HIV in the LGAs. The community volunteers accompany those referred for HIV Testing Services (HTS) to health facilities, results are collected and those positive are counselled and referred to treatment same day.

All OVC who are HIV positive with mothers that are HIV positive were classified to have vertical transmission of HIV in this study; whereas, all OVC that are HIV positive but their mothers were negative were assumed to have HIV through horizontal transmission.

This study is a secondary analysis of data gotten from the HIV positive OVC on the LOPIN 1 project collected in the 3 implementing states (Akwa-Ibom, Lagos and Rivers states). The database contained information on 387 consecutively enrolled OVC aged between 0-19 years. The data included the child's age, sex, State/LGA of residence, mother's HIV status, and caregiver's HIV status.

Descriptive statistics such as means and proportions were used to summarize the age and sex of the OVC, the transmission mode (vertical or horizontal transmission); while Chi-square statistics was used to determine the significance of the association between the variables of interest using the SPSS version 20.

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Table 1. The distribution of HIV positive OVC enrolled on the LOPIN 1 project by selected variables and mode of transmission in Nigeria, 2018.

	Variable	Mode of transmission			Chi-square	P-value
		Horizontal (%)	Vertical (%)	Total (%)		
Age of OVC (in years)	0-4	17 (17.2)	82 (82.8)	99 (25.6)	15.2	<0.05
	5-9	24 (19.2)	101 (80.8)	125 (32.3)		
	10-14	26 (23.6)	84 (76.4)	110 (28.4)		
	15-17	23 (43.4)	30 (56.6)	53 (13.7)		
Sex of OVC	Female	51 (26.7)	140 (73.3)	191 (49.4)	2.51	0.11
	Male	39 (19.9)	157 (80.1)	196 (50.6)		
State	Akwa-Ibom	38 (44.2)	48 (55.8)	86 (22.2)	35.08	<0.05
	Lagos	25 (12.4)	176 (87.6)	201 (51.9)		
	Rivers	27 (27.0)	73 (73.0)	100 (25.8)		
	Total	90 (23.3)	297 (76.7)	387		

RESULTS

Table 1 showed the age, sex and state distributions of OVC enrolled in the LOPIN 1 project as at 2018 by their mode of HIV transmission. A quarter of the OVC were less than 5 years of age, while almost a third were between 5 and 10 years with only 14% in the age group 15 to 17 years. About 77% of the OVC were infected by their mothers, while the remaining were through horizontal transmission of HIV, with a higher proportion (82%) in this category among children less than 10 years of age. There was a statistically significant association between the age of OVC and mode of HIV transmission $P < 0.05$. Adolescents, 15 to 17 years, were more likely to be infected through horizontal transmission.

OVC males who are HIV positive had a slight preponderance (50.6%) than the females. Although a higher proportion of male OVC (80%) than females OVC (73%) could be said to be a victim of HIV transmission from mother to child, this was not statistically significant, $P > 0.1$.

The highest proportion of the positive OVC (52%) were enrolled in Lagos state followed by Rivers state (26%) and 22% from Akwa-Ibom state. In addition, a greater proportion of OVC acquiring HIV through mother to child transmission were from Lagos state, while HIV positive OVC from Akwa-Ibom state was more of horizontal transmission compared to other states. The mode of HIV transmission and State of the OVC was statistically significant $P < 0.05$.

Table 2 shows the result of the logistic regression analysis to identify independent predictors of Mode of HIV transmission after adjusting for another confounding variable (sex). OVC less than 10 years were more than four times likely to acquire HIV through their mothers compared to those aged 15 years and above, who had the highest proportion of HIV positive. The OVC from horizontal transmission was $P < 0.05$. The logistic

regression analysis also showed only 2 variables (age and state) to be independent predictors of the mode HIV transmission to OVC. While OVC from Lagos state are almost 3 times likely to acquire HIV from their mothers compared to those from Rivers state, the reverse was observed in Akwa-Ibom where OVC were 61% less likely to acquire HIV through mother to child transmission and this were statistically significant ($p < 0.05$)

DISCUSSION

The finding of a high proportion of vertical transmission of HIV among the OVC sample in this study deserves some comments. Although, the places of delivery of OVC are not known, one can attribute the high number of vertical transmission to poor utilization of PMTCT services. The HIV status of a woman can be determined during pregnancy at health facilities (antenatal care (ANC), where the PMTCT can be achieved. Unfortunately, most women usually give birth at home or with the help of traditional birth attendants. Most women in this study might not have had supervised care during pregnancy at hospitals or clinics, where HIV testing is regularly done in Nigeria. This has been a renowned dilemma in Nigeria, where almost 1.8 million women and girls are living with HIV. Despite efforts by the Nigerian Ministry of Health, the prevalence of the HIV infection continues to amplify. Only 32% of women who tested positive during pregnancy received ARVs in 2011 (NACA, 2011). To achieve the UNAIDS 90-90-90 goal (By 2020, 90% of all people living with HIV will know their HIV status, 90% of all people with diagnosed HIV infection will receive sustained antiretroviral therapy, 90% of all people receiving antiretroviral therapy will have viral suppression), it is crucial to recognize the socio-cultural aspect that aid or deter PMTCT service uptake in Nigeria.

The fear of stigma and prejudice are the main deterrent

Table 2. The logistic regression statistics for the predictors of mode of transmission of HIV among OVC in selected states in Nigeria, 2018.

Variable	Vertical (%)	OR (95% CI)	
		Unadjusted	Adjusted
Age group			
0-4	99 (82.8)	4.31 (1.91-9.76)*	4.62 (2.05-10.42)*
5-9	125 (80.8)	4.31 (1.99-9.32)*	4.56(2.12-9.81)*
10-14	110 (76.4)	2.54 (1.20-5.37)*	2.57 (1.22-5.43)*
15-17	53 (56.6)	1.00	1.00
Sex			
Female	191 (73.3)	0.68 (0.40-1.14)	-
Male	196 (80.1)	1.00	-
State			
Akwa-Ibom	86 (55.8)	0.39 (0.20-0.74)*	0.40 (0.21-0.76)*
Lagos	201 (87.6)	2.73 (1.46-5.15)*	2.76 (1.47-5.17)*
Rivers	100 (73.0)	1.00	1.00
Total		387 (76.7)	

to voluntary counseling and testing for HIV, which often influence decisions and actions towards PMTCT service uptake. The negative effects of HIV stigma and discrimination have been highlighted in studies conducted in other African countries (Airhihenbuwa et al, 2009). Non-adherence to ARV's among pregnant women with HIV seems to be another issue of MTCT (Enwereji and Enwereji, 2010). Regular contribution to HIV tests for all pregnant women and their partners, incorporating HIV test with other prenatal tests as well as other services irrespective of socio-economic status should be the major aim. Data from the NDHS 2008 (NDHS 2008) showed that low socioeconomic status is the most imperative factor for low utilization of antenatal and other maternal care services. The relative high cost of health service for the poor general public is another issue of concern in Nigeria, and the OVC are greatly disadvantaged. Therefore, devising inexpensive inventive techniques to get in touch with this group of women is a major task that should be accomplished in order to reduce MTCT. Nonetheless, financial support should be associated with the aim of Federal government to augment access to comprehensive gender-sensitive prevention, care, management and support services for the populace alongside the national strategic structure.

Another option is to develop family-oriented, sustainable community-based programs that proffer PMTCT services as well as voluntary counseling and testing services, clear of the regular clinic settings to all, including Orphans and Vulnerable Children households. It was found that the sex distribution of HIV-positive OVC in this study is slightly in favor of males but this was not statistically significant and may not have anything to do with the mode of transmission as found in this study. This is in conformity with previous reports where no sex difference

was observed (Brahmbhatt et al, 2009). Another major finding in this study is the significant association of age and location of OVC with mode of transmission. The fact that children less than 10 years were more likely to receive HIV transmission from their mothers and a high proportion of adolescents from horizontal transmission has implications for the OVC project. The HIV counseling aspect of the project focused more on abstinence. This study shows that some of these adolescents must have been sexually active to have contracted HIV through horizontal transmission; the implication is that it is now imperative to include condom demonstration and other HIV preventive measures during HIV counseling and testing of the adolescents.

Furthermore, the fact that 24% of the OVC in this study must have acquired their HIV through horizontal transmission could be attributed to their poverty state, negative peer influence, poor sex education and poor gender mainstreaming.

In an attempt to make ends meet financially, some of these children might have been engaged with hawking and child trafficking, which makes them more susceptible to gender based violence including sexual abuse. Children in this age group are also usually sexually active, independent, and are involved in recreational and developmental activities that could lead to sexual abuse. Another finding in this study is that young children contracted HIV through horizontal transmission were more from Akwa-Ibom State, which corroborate the current finding from the National AIDS indicator and impact study (NAIIS) (NAIIS, 2019). This survey indicated Akwa-Ibom to have the highest prevalence of HIV, including pediatrics. These might be because the state is peaceful and many foreigners who could induce some of these young girls into sexual abuse live in these states.

Conclusion

There is an imperative need for a swift scale-up of the PMTCT services in Nigeria to reach many women in communities where there are no access currently. For PMTCT programme to successfully avert vertical transmission of HIV between mother and baby, pregnant women must effectively follow the PMTCT course, starting with receipt of HIV counseling and testing to getting ARV prophylaxis and ensuring safe infant feeding practices. Every healthcare provider concerned with caring for pregnant women should be very familiar with the PMTCT interventions in order to achieve this goal. Furthermore, extensive accessibility of amenities for HIV tests and timely diagnosis or early exclusion of HIV infection in the at-risk infants are required for apt initiation of treatment of infected infants. This is in addition to purposeful assessment of the PMTCT program. It is recommended that HCT centres should be user-friendly and youth-friendly. Media advocacy on HIV knowledge, stigmatization and discrimination should be embarked on, policies to tackle programmatic challenges of extended turnaround time, effectual referrals and connection to care is crucial. OVC programs should include all HIV prevention and control measures used for adults and also ensure the formation of HIV prevention groups in secondary schools.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

REFERENCES

- Airhihenbuwa C, Okoror T, Shefer T, Brown D, Iwelunmor J, Smith E, Adam M, Simbayi L, Zungu N, Dlakulu R, Shisana O (2009). Stigma, culture, and HIV and AIDS in the Western Cape, South Africa: An application of the PEN-3 cultural model for community-based research. *Journal of Black Psychology*, 35(4):407-432.
- Anoje C, Aiyenigba B, Suzuki C, Badru T, Akpoigbe K, Odo M, Odafe S, Adedokun O, Torpey K, Chabikuli ON (2012). Reducing mother-to-child transmission of HIV: findings from an early infant diagnosis program in south-south region of Nigeria. *BMC Public Health* 12(1):184.
- Brahmbhatt H, Kigozi G, Serwadda D, Wabwire-Mangen F, Sewankambo N, Wawer M, Gray R (2009). Is the risk of mother-to-child transmission of HIV higher among female compared with male infants? A case of Rakai, Uganda. *Journal of Pediatric Infectious Diseases* 4(03):275-279.
- Enwereji EE, Enwereji KO (2010). Assessing factors that affect childbirth choices of people living positively with HIV/AIDS in Abia state of Nigeria. *Oman Medical Journal* 25(2):91.
- Joint UN Programme on HIV/AIDS (UNAIDS) (2018). <https://www.unaids.org/en/regionscountries/countries/nigeria>
- Joint United Nations Programme on HIV/AIDS (2013). progress report on the global plan towards the elimination of new HIV infections among children by 2015 and keeping their mothers alive. Geneva: UNAIDS.
- Joint UN Programme on HIV/AIDS (UNAIDS) (2011). UBRAF 2012-2015 Country Case Study: Nigeria. https://www.unaids.org/sites/default/files/sub_landing/files/20110526_UBRAF%20Part%201_final.pdf
- Joint United National Programme on HIV/AIDS (UNAIDS) (2018). UNAIDS 2018 estimates. <http://aidsinfo.unaids.org/>
- Joint United National Programme on HIV/AIDS (UNAIDS) (2018). 'Start free, Stay free, AIDS free: 2017 progress report' [pdf]
- National Agency for the Control of AIDS (2010). National HIV/AIDS Strategic Plan 2010-2015. Abuja, Nigeria: http://www.nationalplanningcycles.org/sites/default/files/country_docs/Nigeria/hiv_plan_nigeria.pdf
- National AIDS & STIs Control Programme (NASCP), Federal Ministry of Health (FMOH) NACA, UNICEF, WHO and UNAIDS (2014). 2014 Annual report on HIV/AIDS Health sector response in Nigeria. <https://naca.gov.ng/wp-content/uploads/2016/11/2014-ANNUAL-REPORT-ON-HEALTH-SECTOR-HIV-and-AIDS-IN-NIGERIA.pdf>
- Mor Z, Chemtob D, Pessach N, Nitzan-Kaluski D (2006). Human immunodeficiency virus in newborn of infected mothers: pregnancy, breast feeding and prevention. *Harefuah* 145(9):682-686.
- National HIV/AIDS indicator and impact survey (NAIIS) (2019). National Summary sheet March, 2019. <https://www.naiis.ng/resource/factsheet/NAIIS%20PA%20NATIONAL%20FACTSHEET%20FINAL.pdf>
- National Agency for the Control of AIDS (NACA) (2011). Fact Sheet: PMTCT in Nigeria, 2011 NACA 2011 Available at [http://naca.gov.ng/content/view/399/lang,en/Accessed November 4, 2011](http://naca.gov.ng/content/view/399/lang,en/Accessed%20November%204,%202011)
- National Bureau of Statistics (NBS) and United Nations Children's Fund (UNICEF) (2017). Multiple Indicator Cluster Survey 2016-17, Survey Findings Report. Abuja, Nigeria: National Bureau of Statistics and United Nations Children's Fund.
- Navabakhsh B, Mehrabi N, Estakhri A, Mohamadnejad M, Poustchi H (2011). Hepatitis B virus infection during pregnancy: transmission and prevention. *Middle East journal of digestive diseases* 3(2):92.
- Nigeria Demographic and Health Survey (NDHS) (2008). Women's Health Issues, 22(4):e407-e414. <http://dx.doi.org/10.1016/j.whi.2012.05.001>
- Nkwo PO (2012). Prevention of mother to child transmission of Human Immunodeficiency Virus: The Nigerian perspective. *Annals of medical and health sciences research* 2(1):56-65.
- The U.S. President's Emergency Plan for AIDS Relief (PEPFAR, (2012). OVC Guidance, <https://www.pepfar.gov/documents/organization/195702.pdf>
- The U.S. President's Emergency Plan for AIDS Relief PEPFAR (2017). factsheets. <https://www.pepfar.gov/press/258063.htm>
- World Health Organization (WHO) (2011) Manual on Paediatric HIV Care and Treatment for District Hospitals. https://www.ncbi.nlm.nih.gov/books/NBK304134/pdf/Bookshelf_NBK304134.pdf
- World Health Organization (WHO) (2018) 'Mother-to-child transmission of HIV'. <http://www.who.int/hiv/topics/mtct/about/en/>