

Infant Feeding Choices and Practices as Risk Factors of Mother-to-Child-Transmission of HIV among Exposed Infants in Nnamdi Azikiwe University Teaching Hospital Nnewi

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ABSTRACT

Background: *Mother to child transmission of HIV infection (vertical transmission) is of major concern, because of the attendant consequences of morbidity and mortality on the child. The success of a prevention of mother to child transmission (PMTCT) programme in reducing sero-conversion among exposed newborn infants is determined by many factors, including the administration of Anti Retroviral drugs to both HIV-positive mothers and their newborns; infant feeding practices; access to and use of well-baby care; and the health system's ability to provide care, including counseling and support to both the HIV-positive mother and her exposed newborn.*

Aim: *This study is aimed at examining the various infant feeding choices and practices as risk factors of mother to child transmission of HIV among exposed infants in Nnamdi Azikiwe University Teaching Hospital (NAUTH), Nnewi, Anambra State, Nigeria.*

Method: *The study design is descriptive cross-sectional. A total of 288 consenting HIV positive mothers of recruited children were selected using the systematic sampling technique. Data were collected using a pre-tested structured interviewer-administered questionnaire, and analyzed by means of the Statistical Package of Social Sciences (SPSS) software.*

Result: *The mean age of the respondents was 30.46±4.86 years. Majority of the patients were married, and most of them were traders. Inadequate receipt of replacement feed, breastfeeding of an HIV exposed infant, duration of breast feeding among others constitute significant determinants of current health status of baby ($p<0.05$, $p<0.01$ and $p<0.006$ respectively).*

Conclusion: *Infant feeding counseling should be reinforced and the practices strengthened and monitored closely in the PMTCT program so as to significantly reduce child/infant morbidity and mortality on one hand, and transmission of HIV infection from the mothers to their children, on the other.*

INTRODUCTION

The HIV and AIDS pandemic is one of the most serious health crises in the world today. By the end of 2008, AIDS and AIDS-related illnesses had killed more than 25 million people (2 million in 2008 alone including 280,000 children under 15 years) and an estimated 35.8million people were living with HIV, out of which 15.7 and 2.1million were women and children under 15 years respectively¹. Sub-Saharan Africa has continued to bear the greatest burden of the HIV and AIDS epidemic, with approximately 67% of the total number of people living with HIV, 68% of the new infections and 72% of AIDS-related deaths in 2008¹. Over the decades, the epidemic, once dominated by infected males has become progressively feminized and in sub-Saharan Africa approximately 60% of adults living with the HIV are women²⁻⁴.

Over 90% of HIV infections in children less than 15 years are due to mother to child transmission (MTCT). In the absence of interventions, between 15% and 45% of infants born to HIV-infected mothers acquire the infection during pregnancy, delivery or through breast-feeding⁵. The burden of MTCT of HIV is higher in sub-Saharan Africa than the rest of the world, because of higher levels of hetero-sexual transmission, high female to male ratio, high total fertility rate (TFR) and high rate of breast-feeding^{6,7}. Transmission of HIV in children has become a critical health problem undermining the positive impact of child survival strategies in the African continent^{8,9}.

Factors strongly associated with mother to child transmission of HIV include viral characteristics and high viral load; maternal advanced disease, immune deficiency and HIV infection acquired during pregnancy or breastfeeding^{10,11}, obstetric practices like vaginal delivery¹², rupture of membranes for more than 4 hours before delivery¹³; prematurity of the infant; and feeding factors like prolonged breastfeeding, mixed feeding and breast diseases like abscess, mastitis and cracked nipples during breastfeeding¹⁴.

Therefore, the objectives of this study are as follows:

1. To determine the pattern of infant feeding choices and practices among HIV positive mothers

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2. To examine infant feeding choices and practices as risk factors of mother-to child-transmission of HIV among exposed infants.

METHODOLOGY

The study site is Nnamdi Azikiwe University Teaching Hospital (NAUTH), Nnewi, a tertiary health institution owned by the Federal Government of Nigeria. Nnewi is a commercial nerve centre of the state. The catchment areas include Anambra State and the neighbouring states Imo, Abia, Delta, Enugu, Ebonyi and Kogi States. ARV services are offered in the hospital under the Federal Government of Nigeria HIV/AIDS response programme and PMTCT is one such service rendered. HIV-exposed babies are usually brought to the Paediatric HIV clinic at age 6 weeks as part of follow-up and for collection of Dried Blood Spot (DBS) for early infant diagnosis (EID) using PCR. On the average, about 160 mother-child pairs attend the clinic every week.

The study population consisted of HIV-positive women who received services within the PMTCT programme and delivered in the labour ward of NAUTH. Mother-child pairs that attended paediatric follow-up clinic and adult anti retroviral clinics of NAUTH were also eligible for this study.

Study design was descriptive cross-sectional utilizing data obtained through questionnaires administered on HIV-positive women who participated in the PMTCT programme of NAUTH. The sample size for the study population was determined using the formula for studying single proportions with population greater than 10,000¹⁵ as shown below:

$$n = Z^2pq / d^2$$

Where n = desired sample size

Z = constant = 1.96

p = 75% of transmission rate of previous study

q = 1 - p = 1 - 0.75 = 0.25

d = precision using confidence limit of 95% accuracy with 5% margin of error = 0.05

Therefore, $n = 1.962 \times (0.75 \times 0.25) / 0.0025 = 288$. Data were collected using structured interviewer administered questionnaire containing core concepts including demographics, knowledge of HIV/AIDS transmission, perceived HIV-related stigma, perceived quality of care received from providers and social support was used for this study. In addition the questionnaire, which was adapted from the Quality Assurance Project format used in a Jamaican study¹⁶, contains a section on exposed infant profile. Mothers of 10 HIV-exposed babies were selected by systematic sampling technique and the questionnaire pre-tested on them. This was done to identify and modify or

simplify ambiguous questions in the questionnaire¹⁷.

Two Research Assistants (RAs) were trained by the Principal Investigator (PI) to administer the questionnaire on the eligible mother-child pair attending the paediatric follow-up clinic. Data collection took place over a period of 4 weeks.

The sampling frame for the questionnaire administration was the daily list of exposed babies who were brought to the HIV Paediatric follow-up clinic for collection of Dried Blood Spot (DBS) for Early Infant Diagnosis (EID) using the Polymerase Chain Reaction (PCR). The starting participant each day was identified using the table of random numbers. Having estimated that a total of 640 mother-child pairs attend the paediatric clinic per month, every other name on the list was recruited for the study. The questionnaires were administered by the RAs to the consenting mothers of the recruited children until the required sample size of 288 was achieved.

Data was collated, coded, entered into and analyzed using the SPSS software programme. The values were calculated using Chi-square method for comparison of variables. A p-value of less than 0.05 was considered significant.

The inclusion criteria include mother-child pair that had participated in the PMTCT programme of NAUTH, while the exclusion criteria include Post-partum mothers who had not participated in the NAUTH PMTCT programme and HIV-Exposed babies whose mothers did not participate in the NAUTH PMTCT programme

Limitations of the study

1. The mother-child linkage register was not in use and as such mothers who delivered in the labour ward could not be linked to mother/baby pairs in the paediatric clinic. This however did not affect data from the cross-sectional study.
2. This study could not capture neo-natal and infant mortality in the programme as mothers who lost their babies before age 6 weeks would not attend the paediatric follow-up clinic.

Ethical considerations

1. Approval for this study was obtained from the NAUTH Ethical Review Board (ERB)
2. Informed consent was obtained from individual participants

RESULT

Table I shows that the mean age of all the respondents was 30.46 ± 4.86 years. Over 72% of them were aged

between 25 and 34 years while about 6.2% were aged over 40 years. Two hundred and fifty seven (89.2%) of the respondents were married while 4(1.4%) were single, 18 (6.3) divorced and 9 (3.1) widowed. Twenty nine (10.1%) had less than secondary education even as 12 (4.2%) had no formal education. As many as 39 (13.5%) had tertiary education. One hundred and fifty four (53.5%) were of Anglican Christian denomination while 3 (1%) were Muslim. Traders accounted for 159 (55.2%) of the participants, 40 (13.9%) were civil servants while 53 (18.4%) were unemployed. Eighty three (29.2%) were primiparous while 20 (6.9%) were grand multiparous. Median parity was 2 (range=1-8, mean= 2.42±1.38).

A correlation coefficient was subsequently determined to show that the current health status of the infants is negatively correlated to receipt of replacement feed ($p<0.05$). In other words, the inadequate receipt of replacement feed leads to impaired current health status of infant and vice versa (Table II).

The chi-square test in Table III shows that breastfeeding of an infant has a tendency to bring about a positive HIV test result in the infant ($p<0.02$).

Table IV shows there is a statistically significant relationship between duration of breastfeeding and MTCT of HIV to baby ($p=0.006$). The two HIV positive

Table I : Socio-demographic characteristics of the respondents

Characteristics		Frequency	Percentages
Age (years)	0-24	30	10.4
	25-29	97	33.7
	30-34	111	38.5
	35-39	32	11.2
	40-44	17	5.9
	45-49	1	0.3
Marital status	Single	4	1.4
	Married	257	89.2
	Divorced	18	6.3
	Widowed	9	3.1
Educational status	No formal education	12	4.2
	Primary	17	5.9
	JSS	68	23.6
	SSS	152	52.8
	Tertiary	39	13.5
Religion	Anglican	154	53.5
	Catholic	62	21.5
	Pentecostal	69	24
	Muslim	3	1
Occupation	Trading	159	55.2
	Civil service	40	13.9
	Artisan	22	7.6
	Teaching	8	2.8
	Student	6	2.1
	Unemployed	53	18.4
Parity	1	8.4	29.2
	2-4	184	63.9
	≥5	20	6.9

Table II: Correlation of receipt of replacement feed with baby's current health status

Variables	Correlation coefficient (r)	p-value
Baby current status		
Received replacement feed for infant	-0.211	P<0.05*

*Statistically significant

Table III : Breastfeeding infant any time versus result of baby's HIV test (further confirmed)

Ever breastfed Infant at anytime	Result of test		
	Negative (%)	Positive (%)	Total
NO	270 (94.7)	1 (33.3)	271 (94.1)
Yes	15 (5.3)	2 (66.7)	17 (5.9)
Total	285 (100.0)	3 (100.0)	288 (100.0)

Table IV: Relationship between duration of breast feeding and result of baby's HIV test

Length of breastfeeding of infant (months)	Infant HIV test result		
	Negative	Positive	Total
<3	1	0	1
3	2	0	2
≤6	11	0	11
7	1	0	1
14	0	2	2
Total	15	2	17

χ^2 (Pearson's) 16.3; P=0.006*

babies became infected when breastfeeding lasted till 14 months of age. This represents 11.8% of all breast-fed infants.

DISCUSSION

HIV/AIDS has continued to pose great risk to the health of the Nigerian populace. The government, aware that about 90% of HIV infection in children is due to mother to child transmission (MTCT)¹⁸, instituted programmes to reduce this trend since 2003. Prevention of mother to child transmission (PMTCT) of HIV is one of such programmes and is meant to prevent MTCT of HIV. In spite of this, it is estimated that about 15 - 45% of all babies born to HIV positive mothers acquire the infection from their mothers annually. PMTCT involves a number of interventions, such as use of replacement feeds and other infant feeding choices designed to positively influence the health of HIV positive mothers and their exposed infants. The mean age of the participants of 30.46 \pm 4.86 years and median parity of 2 (range 1-8; mean 2.42 \pm 1.38) are similar to that from a study in Jamaica with mean age 28 (range 15-41) years and median parity 2 (range 0-9)¹⁹. However, only 17.4% were unemployed as against Jamaica's average of 69%.

About 94.1% of the mothers did not breastfeed their babies and is similar to the finding in Rukai Uganda where 97% of positive mothers would not breast feed their babies, provided though that they received free formula feeds²⁰. The finding here is however higher than that found in a study in Kitale Kenya where it was found that only 14% of exposed babies were not breastfed at all²¹.

It has been known that postpartum MTCT of HIV occurs through breast milk²². In this study, 271 (94.1%) babies were not breastfed at any time while 17 (5.9%) were. Three babies had acquired HIV from their mothers, representing 1.0%. Of these, 2 (66.7%) were breastfed while one was not. The proportions of positive babies were 11.8% and 0.37% for breastfed and non-breastfed babies respectively. A comparative analysis shows that a breastfed infant was more likely than non-breastfed one to acquire HIV from the mother and this was statistically significant ($X^2=9.16$, $p<0.02$). This shows that formula feeding was more efficacious in preventing MTCT of HIV. However, a formula fed infant acquired the infection earlier at 7 months than the breastfed one which occurred at 14 months. This finding agrees with the finding from a trial of breastfeeding versus formula feeding carried out in California USA which showed a cumulative probability of HIV infection to be 36.7% in the breastfeeding arm and 20.5% in the formula arm at 24 months indicating formula feeding to be more efficacious in PMTCT ($p=0.001$)²³.

Examination of the relationship between result of baby's HIV test and type of ARV taken found no difference between babies of mothers who took ZDV at 7 months ($p=0.836$) and those who took a single dose of Nevirapine in labour ($p=0.784$). This scenario was also found in a study in South Africa by Volmink et al²⁴ where they demonstrated a similarity in the effectiveness of both regimens. In agreement, this study demonstrated a negative correlation between mother taking HAART in pregnancy and baby's HIV test result (CCF= -0.575, $p=0.01$) showing that ARVs taken by mother in pregnancy prevent MTCT of HIV.

Of all the variables including ARVs to mother and breastfeeding baby anytime, only receipt of baby formula was associated with baby's health status ($p=0.003$). Further exploration of this shows a negative correlation between receipt of infant formula and baby's current health status (CCF= -0.211, $p<0.05$). It means that babies whose mothers received replacement feed would likely have poor health status. This could be better understood when viewed in the traditional context where infant feeding is embedded within traditional relationships of intimacy in which both relatives and breadwinner have authority over modes of infant feeding²⁵.

In conclusion, this study has shown that breast milk substitute is the infant feeding choice of most mothers, and that the only factor that has a significant effect on the current health status of the infants is the fact that they (infants) received replacement feed. Conversely, more breast feeding mothers transmitted HIV to their babies than non- breastfeeding mothers. Finally, highly active anti-retroviral drugs when taken in pregnancy protect the baby from HIV infection.

RECOMMENDATIONS

1. Regular assessment of the PMTCT programme should be carried out for sustenance and possible reprogramming.
2. Infant feeding counseling should be reinforced and the practices monitored closely in this programme as this has been found to contribute to child ill-health and transmission of HIV infection from the mothers to their children.
3. HIV positive mothers should continue to receive ARV in pregnancy and postpartum period according to current guideline.

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