The Outcome of Prevention of Mother to Child Transmission (PMTCT) of HIV Infection Programme in Nnewi, Southeast Nigeria.

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ABSTRACT

BACKGROUND: A lot of challenges face the current efforts at reducing Mother to Child transmission of HIV infection (MTCT) in Sub Saharan Africa due to limited access to Highly active antiretroviral therapy (HAART) and breast feeding practices. A regular review of progress is necessary in order to identify areas of need.

METHOD: This is a one year prospective descriptive study of seven hundred and twenty six mother-infant pairs managed in the PMTCT programme in Nnamdi Azikiwe University Teaching Hospital, Nnewi Southeast Nigeria. The babies HIV status was tested with PCR for HIV DNA while the mothers provided information on infant feeding pattern and the use of antiretroviral (ARV) drugs including prophylaxis for the baby. Information was augmented from the antenatal records.

RESULT: The transmission rate was 2.8% for mothers, who were on HAART, did not breastfeed and whose babies received ARV prophylactic therapy. But for mothers who did not receive HAART, did breastfeed and whose babies did not received ARV prophylactic therapy, the transmission rate was 37.5%. When both the mother and child received ARV drugs, the transmission rate was significantly lower in those who did not breastfeed (2.8%) than in those who breastfed (12.5%)($P < 0.001$). When both the mother and child did not receive ARV drugs, the transmission rate significantly lower in those who did not breastfeed (21.1%) than in those who breastfed (37.5%)($P < 0.02$).

CONCLUSION: The use of HAART in PMTCT programme in the under resourced areas can achieve similar success rates to that in the industrialized countries. Breastfeeding reduces the efficacy achieved by the use of ARV drugs. Provision of wider access to HAART as well as adequate counselling and support for safer infant feeding practices is recommended.

KEY WORDS: PMTCT, Outcome, Breastfeeding, HAART, HIV infection, Southeast Nigeria

INTRODUCTION

Globally, Mother to child transmission (MTCT) of HIV infection accounts for at least 90% of all paediatric HIV infection and it is estimated that 700,000 children were newly infected in 2006 alone[1]. Among the developed countries, the widespread use of Highly Active Antiretroviral Therapy (HAART) which is a combination of three potent antiretroviral drugs in pregnancy, avoidance of breastfeeding and use of safer obstetric practices have reduced the mother to child transmission rate to less than 2% [1,2]. This has led to near elimination of MTCT as a route of HIV transmission. Therefore, most of these perinatally transmitted new infections occur in the less developed countries.

In Sub Saharan Africa, current PMTCT programs are based on the use of the more accessible simpler and shorter course antiretroviral (scARV) prophylactic regimens [3-5]. These short course therapies do not achieve equal success rates with the use of HAART. Worse still the relative success achievable with these drugs in the region is often compromised by the breastfeeding culture of the people. On the basis of difficulty with accessing HAART, The World Health Organization (WHO) recommends HAART for pregnant women in the resource-poor countries who require HAART for their own disease. For pregnant women with HIV who do not need HAART for their own health, less complicated treatments, involving a short course of one or two ARV drugs can be used to reduce the risk of MTCT of HIV [6]

The Nigerian National goal for PMTCT as contained in the 2003 AIDS policy is to reduce the transmission of HIV through MTCT by 50% by the year 2010 and to increase access to quality HIV counselling and testing services by 50% by the same year[7]. To achieve this target, the WHO four prong approach is being implemented. These are primary prevention of HIV infection in women of reproductive age group and their partners, prevention of unintended pregnancies among HIV positive women, prevention of HIV transmission from the HIV infected mothers to their babies and Care and support for HIV infected mothers and their families. Currently the National guideline for PMTCT in Nigeria stipulates the use of HAART for women who need it for their own health and the use of short course ARV from either the 28th or 34th-36th week of gestation[7] . This is in line with the WHO recommendation for the use of ARV drugs in pregnancy in the resource-poor countries. But in our centre which is a big referral centre and a major PMTCT site, every HIV positive pregnant woman receives HAART after the first trimester. Due to the limited use of HAART in African PMTCT programs, there are very few documented experience with its use among pregnant women. This study evaluated our experience with PMTCT utilizing HAART for all pregnant women in a tertiary health centre in the South-

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eastern part of Nigeria.

STUDY DESIGN AND SUBJECTS

This is a prospective study of mother-infant pairs who were managed in our PMTCT program between 1st October 2007 and 31st September 2008. It included booked pregnant women enrolled antenatally into our program, unbooked mothers who were referred to us in labour and were found to be HIV positive. We also included HIV positive mothers who had delivered elsewhere without any intervention and referred to us for subsequent management. Mothers who brought their babies at 6 weeks postpartum for PCR testing were interviewed about breastfeeding and the use of antiretroviral drugs. Descriptive data analysis was done with the EPI info statistical package.

PMTCT Program. Following pre-test counselling and confidential testing, all booked pregnant women identified as HIV-positive were enrolled into the PMTCT program. This provides pregnant and postpartum HIV-positive women with holistic, family-centered HIV care including HAART to the woman and appropriate ARV to her children. They were commenced on HAART from 14 weeks of gestation according to the last menstruation date, usually with zidovudine (ZDV) 300mg BD, lamivudine (3TC) 150mg BD and nevirapine (NVP) 200mg BD. HIV positive women on HAART who become pregnant were continued on HAART through the pregnancy. Treatment was continued during labour. Postnatally, pregnant women who were not eligible for HAART stopped nevirapine and continue on lamivudine and zidovudine for seven days while the HAART eligible ones continued. Baseline adherence and psycho-social assessments were done before initiation of HAART, and the women are followed up 4 weekly at the antenatal clinics with detailed clinical evaluation, including symptom review, physical examination, and review of medication adherence to detect side effects and ensure adherence.

Concerning infant feeding, women were counselled on either the use of breast milk substitutes if affordable, feasible and acceptable or were encouraged to practice exclusive breast-feeding for a maximum of 6 months with abrupt cessation. The unbooked patient in labour identified as HIV positive upon rapid screening, is given single dose nevirapine and continued on zidovudine (ZDV), lamivudine (3TC) for 7 days [7]. She is subsequently assessed for eligibility for HAART. Unbooked postpartum women are assessed and those found eligible are commenced on HAART. All infants received sdNVP syrup 2mg/kg and ZDV syrup 4mg/kg for 6 weeks, irrespective of the maternal drug regimen.

Laboratory Procedure. Following adequate pre-test counselling, sequential screening tests were done with Capillus test kit (Trinity -USA), followed by the Genie test kit (BioRad France) for the positive tests. Those that tested positive with the second kit (Genie) were confirmed positive while those that gave discordant result for the above two kits were resolved using Determine kit (Abbot Japan) as the tie breaker. CD4 T cell count was measured upon enrolment and at intervals of 3 months. Hepatic and renal functions were measured prior to HAART initiation; liver function tests were repeated 2 weeks after treatment initiation and monthly throughout pregnancy for women on HAART or as indicated. Additional laboratory evaluation was restricted to patients with clinical indications.

Early diagnosis of paediatric HIV infection was performed using a quantitative real-time PCR technique. All infants were tested at 6weeks of age, and if positive, confirmed with repeat testing. Infants with two positive tests were classified as HIV positive. Infants with a negative PCR test at 6weeks of age were classified as uninfected and were subsequently tested at 18 months with the rapid HIV antibody testing. If the antibody test was positive, we performed a second test for confirmation. Mothers who were breastfeeding were encouraged to bring their infants for a repeat screening, 6 weeks after the cessation of breastfeeding.

RESULT

Seven hundred and twenty six mother-infant pairs were studied. Out of this studied group, 422 mothers (58.1%) participated fully in the program and had the full PMTCT interventions (ARV drugs to mother and child and no breast feeding). One hundred and twelve (15.4%) did not participate at all and had no PMTCT intervention, while 144(19.8%) had some form of PMTCT intervention. The PMTCT history of 48 mothers could not be accessed as the babies were brought from the motherless babies homes. They have been included in this analysis as mothers with unknown HIV status.

The transmission rate was 2.8% for mothers who were on HAART, did not breastfeed and whose babies received antiretroviral prophylactic therapy (full intervention). But for mothers who did not receive HAART, did breastfeed and whose babies did not received ARV prophylactic therapy, the transmission rate was 37.5%.

For the mothers who did not access PMTCT interventions in our centre but whose babies were referred to our centre after delivery and were given ARV prophylaxis without breastfeeding, the transmission rate was 10.6%. For the mothers who received HAART but delivered their babies outside our facility and the babies were not breastfed and did not receive ARV prophylaxis, the transmission rate was 8.1% (See Table)

When mother received HAART and baby received ARV prophylaxis, the transmission rate was significantly

lower in those who did not breastfeed (2.8%) than in those who breastfed (12.5%)(P < 0.001). When both the mother and child did not receive ARV drugs, the transmission rate significantly lower in those who did not breastfeed (21.1%) than in those who breastfed (37.5%)(P < 0.02) (See Table).

Table: PMTCT interventions in HIV positive mothers and the HIV status of the baby.

S/N	Mother Received HAART	Baby received PEP	Baby Breastfed	No of babies tested	No of babies positive	Percentage positive
1	No	No	Yes	112	42	37.5
2	Yes	Yes	No	422	12	2.8
3	Yes	No	No	37	3	8.1
4	No	Yes	No	47	5	10.6
5	No	No	No	19	4	21.1
6	Yes	Yes	Yes	40	5	12.5
7	Unknown HIV status	No	No	48	5	10.4
	Total			**726**	**76**	**10.5**

DISCUSSION

The study evaluated the effectiveness of PMTCT in our centre. Only 58.1% of the studied mothers participated fully in the PMTCT program. This shows a low coverage and the need to scale up PMTCT services for a wider access and the benefit to the society. Overall, we found mother to child transmission (MTCT) rate of 2.8% for the women who received HAART, did not breastfeed and whose babies received prophylactic antiretroviral therapy. This rate compares with that, reported from the industrialized countries [1,2]. For women who did not receive HAART, breastfed their babies and the babies did not receive ARV prophylaxis, the transmission rate was 37.5%. In Abuja, Nigeria a transmission rate of 2.7% was reported for women who participated fully in PMTCT programme and 68.6% for mothers who did not receive any interventions[8]. Our rate was however higher than 1.2% reported from the DREAM cohort study in Mozambique where HAART was instituted at 25 weeks gestation, irrespective of clinical and immunological staging [9].

Our experience shows that when HAART is used in PMTCT programs in the under resourced areas, results are quite comparable to the rate among the developed countries. These findings have to an extent addressed the concerns that the maternal and PMTCT benefits of HAART as observed in the developed world may differ for populations from Sub Saharan Africa because of the poor socioeconomic, nutritional and obstetrical conditions. Findings from our study support the universal use of HAART in PMTCT programs in Africa. This has numerous advantages. Not only does it reduce the maternal viral load, HAART also enhances the immune system, treats the maternal HIV infection as well as reduces the likelihood of transmission to the newborn. Also the use of HAART avoids short course ARV drugs which do not benefit the woman's health and are associated with some risk of development of HIV resistance in the mother and the infant, particularly with single dose nevirapine (sdNVP). The major setback to the universal access to HAART within the Sub Saharan Africa is that of availability and cost. Most of the PMTCT programs in Africa are sponsored by foreign donor agencies and therefore are subject to the preferences of these agencies. There is the need for African Governments to commit themselves to the fight against the spread of HIV infection within the region. Apart from access, toxicity concerns especially about nevirapine containing HAART in women with higher CD4 count also poses a challenge to the use of HAART in Africa.

The effect of breastfeeding on MTCT from this study was very significant. In mothers who received ARV drugs together with the babies, the transmission rate increased from 2.8% in those who did not breastfeed to 12.5% in those who breastfed. Again, in the group where the mother and baby did not received any ARV drug, the transmission rate increased from 21.1% in those who did not breastfeed to 37.5% in those who breastfed. All these show that breastfeeding contributed significantly to MTCT.

The best mode of infant feeding within the context of PMTCT in Sub Saharan Africa has not been settled. Exclusive formula feeding has a zero transmission rate and it is the standard in the developed countries where it is readily available, sustainable and safe. But in the underdeveloped countries, it is not often available. In consideration of these difficulties, the WHO recommend that exclusive breastfeeding for 4-6 months should be practiced by HIV positive mothers in under resourced areas except where replacement feeding is available, feasible, affordable, safe and sustainable [10]. This new WHO Consensus Statement on HIV and Infant

Feeding highlights critical issues in the continuing debate on whether the HIV transmission resulting from breastfeeding can ever be superseded by the benefits of breastfeeding and therefore justified ethically. Some of the new findings that are referred to in the document include [10]: (1) exclusive breastfeeding for up to 6 months was associated with a three- to fourfold decreased risk of HIV transmission compared to non-exclusive breastfeeding in three large cohort studies; (2) where free infant formula was provided, the combined risk of HIV transmission and death was similar whether infants were formula fed or breastfed from birth; and (3) early breastfeeding cessation was associated with reduced HIV transmission but also with increased risk of morbidity and child mortality in infants born to HIV-infected mothers. These findings should encourage developing countries to reassess their positions on infant feeding for HIV-infected mothers and balance policies that support breastfeeding and formula feeding by HIV-infected mothers.

Overall, children under PMTCT programs within Sub Saharan Africa are exposed to two main risks: (1) the risk of HIV transmission through breastfeeding; and (2) the risk of mortality due to common childhood illnesses. The goal of any PMTCT program is to keep children free of HIV infection and to reduce mortality risks. In the light of the necessity to be able to measure the balance between these two risks, the international community now encourages the use of a single index, HIV-free survival, which gives the net result of number of children who are not infected and who have survived [11]. Evidence was presented at the recent WHO consultation on HIV and Infant Feeding[10] which showed that in carefully controlled studies (Botswana and Côte d'Ivoire) where free infant formula was provided, the 18-month HIV-free survival was similar in infants who were replacement fed from birth and infants breastfed for 36 months.

Although it is plausible to recommend formula feeding from the findings in our study, the weight of current evidence favours exclusive breastfeeding for a short period. Also our study is hospital based and may not reflect the true position as found in the rural areas. In the South-Eastern part of the country that is predominantly populated by the Igbo's, it is customary for the nursing mother's mother to closely attend to her during the 1st month following the delivery. During this period, she is expected to oversee the feeding of the newborn, nutritional support for the nursing mother as well as other traditional rites that accompany delivery. Under this setting, it is usually not easy for the nursing HIV positive mother to abstain from breastfeeding the newborn for any good reason. The nursing mother is literally forced to breastfeed and to only augment with formula feeding whenever feasible. The result is mixed feeding. This study did not explore whether breastfeeding was exclusive or not, otherwise it would have been possible to determine the effect of exclusive breastfeeding on PMTCT. In the light of these difficulties, it is pertinent to reassess the place of exclusive breast feeding in preventing mother to child transmission of HIV infection within the African PMTCT programs. There is no doubt that there exists a small group of women, in whom formula feeding applies, but in majority of the women in the region, exclusive replacement feeding is not affordable, feasible, safe and sustainable. For these people, exclusive breastfeeding for 4-6months with abrupt cessation provides the best alternative. Adequate antenatal and postnatal counselling of the patients are key to a successful infant feeding method.

CONCLUSION: The use of HAART in PMCTCT program in the under resourced areas can achieve similar success rates to that which obtains in the industrialized countries. Breastfeeding reduces the efficacy achieved by the use of ARV drugs. Provision of wider access to HAARTS as well as adequate counselling and support for safer infant feeding practices is recommended.

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