

Prevalence and risk factors of HIV infection among infants, born from HIV seropositive mothers, tested by DNA-PCR at yekatit 12 Hospital, Addis Ababa, Ethiopia.

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Abstract

Background: Since its recognition two decades ago, HIV/AIDS remains a major global challenge. Infants contract the infection from their mother in the womb, during birth and breast feeding. In Ethiopia, limited information is available in relation to mother to child transmission (MCT).

Objective: To determine the prevalence of HIV infection among infants born from HIV seropositive mothers and identify associated risk factors.

Method: Hospital based retrospective record review was employed on 159 infants born from HIV seropositive mothers. Data was collected from the pediatric HIV log book using a structured questionnaire. Data was entered in to excel sheet, cleaned and then exported to STATA and analyzed using appropriate statistical tools.

Result: The study revealed that 32.1% (51/159) of the infants born from HIV seropositive mothers were found to be HIV positive. Majority of the infants were born in health institutions and their birth was attended by health professionals. The rate of HIV transmission was about 3 times higher in those born at home and assisted by traditional birth attendants (TBA) than those born at health institutions and assisted by health professionals (58.5% versus 22.9%; P 0.004). The data also revealed a significant association between HIV infection and feeding practice (p 0.004) which was 45.4% (25/55) in those who practice mixed feeding, 34% (18/53) in those practicing exclusive breast feeding and 15.7% (8/51) among those with replacement feeding.

Conclusion: The vertical transmission rate of 32.1% observed in the present study is quite high and is within the estimated range for Sub saharan African countries.

Key words: HIV/AIDS, Mother to child transmission, breast feeding, traditional birth attendants

Background

Human immunodeficiency virus (HIV) is the cause of a deadly disease called acquired immunodeficiency syndrome (AIDS). It was detected in children for the first time in 1982 [1]. Since then the infection has spread rapidly and is now a significant cause of death within the pediatric group. Although pediatric HIV infection presents many aspects in common with that of adults, the immunological immaturity of the child in the first months of life and the difficulty of diagnosis in this period confer on it some particular characteristics that differentiate it from that found in the adult population [1].

The transmission route in the pediatric population is principally vertical, either before (intrauterine), during (intra partum) or after birth (through breast feeding). However, the majority of infected children acquire the infection during birth through exposure to infected blood and cervical vaginal secretions in the birth canal, where the HIV is found at high levels at the end of gestation and during birth. On the other hand, maternal breast feeding is another important medium in developing countries [1, 2].

HIV infection among infants is a problem all over the world; however it is most acute in sub-Saharan Africa, where almost 90% of all HIV infected children live [3]. An infant born from a mother infected with HIV, which triggers AIDS has a one-in-three chance of acquiring the virus from the mother [3]. A report from President Bush Emergency Plan for AIDS Relief (PEPFAR) supported programs indicated that an estimated 101,500 infant infections occurred in the year 2006 [4]. In SSA, 25-35% of infants born to sero positive mothers are HIV

positive [5, 6]. According to the report from FMOH, the situation in Ethiopia is almost similar with that of SSA. In 2005, there were 30,338 HIV positive births from an estimated 105,675 pregnancies among women living with HIV/AIDS [7].

A report from UNAIDS also indicated that there is a disproportionately high mother to child transmission rates of 25-45 % in developing countries as compared to 5 % and lower in industrialized nations[5].

Thus HIV/AIDS is causing a dual disaster for an infant; many contract the fatal disease in the womb, during birth or breast feeding from their infected mother. Additionally even if the infants are spared, they will soon become orphans because their infected mothers are doomed to die [4]. Despite the magnitude and severe consequences of the pandemic, data on prevalence of HIV infection in infants is less well defined [4]. Hence, this study was intended to determine the prevalence of HIV infection in infants born from HIV seropositive mothers and recommendation is forwarded based on the study findings.

OBJECTIVE

General objective

- To assess the HIV infection status of infants born from HIV seropositive mothers at Yekatit12 hospital.

Specific objectives

- To determine the prevalence of HIV infection in infants born from HIV seropositive mothers at yekatit12 hospital.
- To determine the prevalence of HIV infection in infants born from HIV seropositive mothers at yekatit12 hospital by birth place and birth attendant type.
- To determine the prevalence of HIV infection in infants born from HIV seropositive mothers by infant feeding practice.

MATERIALS AND METHODS.

Study design

A retrospective study was conducted to determine the prevalence of HIV in infants born from HIV seropositive mothers.

Study site

The study was conducted at Yekatit 12 hospital, Addis Ababa (AA), Ethiopia. Addis Ababa is the capital city of Ethiopia as well as Africa. Yekatit 12 hospital is one of the public Hospitals administered by Addis Ababa Regional Health Bureau. It comprises various departments offering multifaceted service including voluntary counseling and testing for HIV as well as initiation and monitoring of Antiretroviral therapy (ART) for eligible adult and pediatric HIV cases.

Study period

The study was conducted from March 1, 2008 to June 30, 2008.

Population

Source population

All infants (children under one year) born from HIV seropositive mothers and tested for HIV at Yekatit 12 hospital were the source population.

Study population

All infants (children under one year) born from HIV seropositive mothers and tested for HIV at Yekatit 12 hospital during February 1, 2007 to January 30, 2008 were the study population.

Study variables

Dependent variable

- HIV infection in infants.

Independent variables.

- Sex
- Place of birth
- Type of birth attendant
- Infant feeding practice

Data collection technique

To study the prevalence of HIV in infants born from HIV seropositive mothers at Yekatit 12 hospital, a one year retrospective record review (i.e. from february 1, 2007 – January 30, 2008) of pediatric HIV log book was utilized. The variables included in the data collection format were identification and DNA PCR number of infants, sex of infant, infant place of birth, infant birth attendant, infant feeding practice and result of HIV test as

obtained by employing DNA PCR test.

Quality assurance

To ensure the quality of data, structured questionnaire was prepared by referring previous studies. Then, the required data was collected from the HIV log book by considering carefully all the variables stated in the questionnaire with due attention to avoid any redundancy of the study subjects. Completeness of the data was asserted through periodic supervision of data collectors. Finally data was analyzed employing appropriate statistical treatment following proper entry and cleaning.

Statistical analysis

Data was entered in to excel sheet, cleaned and exported to STATA statistical package (STATA version 8.0, Stata corporation college station, Texas). Analysis was done using STATA. Descriptive summary of the study participants was presented using proportions. Chi square test was used to test for associations between infant HIV infection and the independent variables. P-values less than 0.05 were considered statistically significant.

Ethical considerations

Ethical clearance was secured from research and ethics committee of the School Of Medical Laboratory Sciences, Medical Faculty, Addis Ababa University. Following that cooperation letter was written to Addis Ababa regional Health Bureau (AARHB). Thus, the study was commenced after obtaining permission from AARHB. In addition, the whole objective of the study was briefly explained to the hospital authorities as well as for those working in the pediatric HIV subunit of Yekatit 12 Hospital, so that we got permission. Moreover, confidentiality was strictly maintained throughout the study period.

RESULT

To determine the prevalence of HIV infection in infants born from HIV seropositive mothers, a retrospective study was conducted in 159 infants who had been tested at Yekatit 12 Hospital from February 1, 2007 to January.30, 2008.

As summarized in Table 1, from a total of 159 infants born from HIV seropositive mothers and had been tested for HIV by DNA PCR, 89 (56%) were males and 70 (44%) were females. The study revealed that 51 (32%) of the infants born from HIV seropositive mothers were found to be HIV positive. Of these, 32 (36%) were males and 19 (27.1%) were females. However, there was no statistically significant difference in the distribution of HIV among male and female infants (P 0.237).

Out of the total 159 infants, 118 were born in health institutions and their birth was attended by health professionals. The remaining 40 were born at home and their birth was assisted by traditional birth attendants (TBA). Only 22.9% of infants who were born in health institutions and attended by health professional were positive for HIV as compared to 58.5% HIV positive births at home and assisted by TBA. The distribution of HIV by place of birth and birth attendant was statistically significant (P 0.000) which is 3 times higher in those born at home and assisted by TBA than those born at healthy institution and attended by health professionals.

Table 1: HIV prevalence as determined by DNA PCR among Infants born from HIV infected mothers attending Yekatit 12 Hospital from February 01, 2007 to January 30, 2008)

	HIV Negative N (%)	HIV Positive N (%)	P value
Sex			
Male	57 (64.0)	32 (36.0)	0.237
Female	51 (72.9)	19 (27.1)	
Place of Birth			
Health Institution	91 (77.1)	27 (22.9)	0.000
Home	17 (41.5)	24 (58.5)	
Type of Birth Attendant			
Health professional	91 (77.1)	27 (22.9)	0.000
TBA [@]	17 (42.5)	23 (57.5)	
Infant Feeding Option			
Breast feeding	35 (66.0)	18 (34.0)	0.004
Formula feeding	43 (84.3)	8 (15.7)	
Mixed feeding	30 (54.6)	25 (45.4)	

[@] type of birth attendant is not known for one subject

As depicted in Figure 1, the proportions of infants with exclusive breast feeding, Formula feeding and Mixed feeding were 33.3% (53/159), 32.1% (51/159) and 34.6% (55/159), respectively. The data also shows that the

distribution of HIV by feeding practice was statistically significant ($P = 0.004$) (Table 1) which is 45.4% (25/55) in those who practice mixed feeding, 34% (18/53) in those practicing exclusive breast feeding and 15.7% (8/51) among those with replacement feeding (Table 1 and Figure 1). This demonstrates that HIV infection rate among those practicing mixing feeding is almost 3 times higher than those with formula feeding and 1.33 times higher than among those practicing breast feeding. HIV infection among those breast feed infants was also more than twice higher than that of infants with replacement feeding.

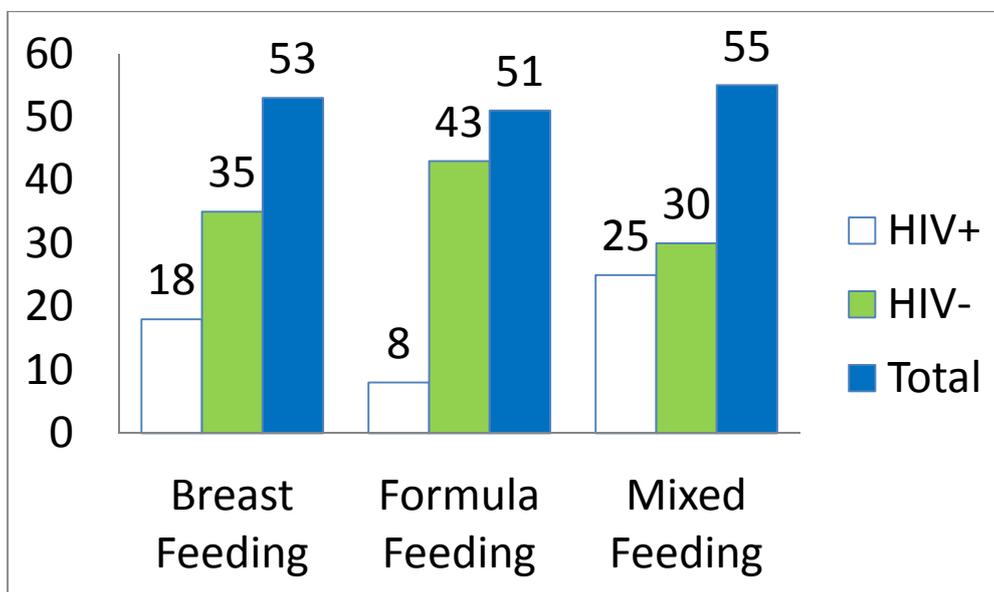


Figure 1. HIV prevalence among infants born from HIV seropositive mothers attending pediatric HIV unit of Yekatit 12 Hospital from February 01, 2007 to January 30, 2008. Number of infants per feeding category is indicated on the bar charts.

DISCUSSION

We conducted a retrospective record review study in 159 infants born from HIV seropositive mothers and attending the pediatric HIV subunit of Yekatit 12 hospital to determine the prevalence of HIV infection. The overall HIV prevalence as determined by HIV-1 DNA PCR testing was 32.1%. The HIV infection rate reported in the present study greatly varies from that reported by Bereket H/Georgis 2006 [8] who reported 16.67% HIV prevalence in infants born from HIV seropositive mothers. Since both studies utilized DNA PCR for infant diagnosis, methodological variations if any cannot explain the observed differences. These differences in prevalence, however, may be due to the socio-economic status and educational background of the families of the infants participating in the two studies, which among other things could also involve differences in the place and type of birth attendants and infant feeding practices.

On the other hand, a report by UNAIDS indicated a 25 - 45% vertical transmission in developing countries [9]. Our finding of 32.1% vertical transmission lies within this range reported by UNAIDS.

The result of the present study is also in line with a report by Michael Lonthan et al which revealed a 25-35% HIV positivity in babies born to HIV seropositive mothers in SSA [10]. Moreover, a study in South Africa also showed that HIV antenatal prevalence rate was 27.9% in 2003 which is comparable with our findings with a slight increment in our case [11].

Our finding also lies within the range of vertical transmission of 14-39% reported by a study from Uganda [12] and is consistent with a research conducted by researchers in Zaire who reported an estimated overall prevalence of 15-30% without breast feeding, and 25-35% with breast feeding [13]. The observation in Zaire is almost consistent with our findings of 15.7% in those without breast feeding (formula feeding) and 34% in infants with breast feeding (exclusive breast feeding). Despite the differences in study area and time, the similarities most probably arise from similarities in socio-economic status, living style of the people living in the mentioned areas and infant feeding practices.

Of note, the finding of significant differences in the rate of HIV transmission by birth place and type of birth attendant, calls for encouraging of pregnant mothers to give birth at health facilities and by health professional.

Taken together, our data revealed that vertical transmission rate of HIV in the studied infants is quite high and lies within the range of what has been estimated for sub-Saharan African countries. Type of birth attendant, place where labor was taking place and type of infant feeding practices significantly influence the rate of vertical transmission of HIV. The interruption of HIV transmission from mother to child is important. Appropriate prevention strategies, including antiretroviral agents administered to the mother and/or child should

be strengthened. Avoidance of breastfeeding (when possible) or the administration of antiretroviral agents to the mother while she continues breastfeeding is another strategy.

Conclusion and recommendation

The vertical transmission rate of 32.1% observed in the present study is quite high and is within the estimated range for Sub-Saharan African countries. Therefore we recommend that the ongoing prevention of Mother to child prevention (PMTCT) has to be further strengthened. Moreover administration of antiretroviral therapy while she is breast feeding is another strategy. Besides, institutional delivery has to be encouraged.

Competing interest

We authors declare that we have no conflict of interest.

Author's contribution

HA, AT designed the study, HA, ZW, AT, EA, RA engaged in the data collection, data entry and cleaning, HA, ZW, AT, FH, KD performed the data analysis and interpretation, HA drafted the manuscript and all authors reviewed and approved the final manuscript.

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