

Assessment of Infant Feeding Practices among HIV Positive Mothers Receiving ARV/ART and HIV Status of Their Infants with its Determinants in South and North Wollo Zone, Amhara Region, Ethiopia.

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ABSTRACT

Back ground: Infant feeding of HIV positive mother is one of the challenging issues particularly in developing countries. Breast feeding by an infected mother increases the risk of transmission and provision of ARV prophylaxis for both mothers and her exposed infant with recommended infant feeding practice for HIV positive mothers reduces MTCT of HIV.

Objective: To assess the infant feeding practices of HIV Positive mothers receiving ARV/ART and HIV status of their infants with its determinants in South and North Wollo Zone.

Methods: Institution based cross sectional study with quantitative, qualitative methods.

Results: Prevalence of HIV among infants was 7.8%.

Conclusions: HIV status of infant was determined by infant feeding practice, maternal and infant illness, and mother's knowledge on PMTCT. Educating mothers focusing on PMTCT, early seeking of treatment during their illness and behavioral change on infant feeding practice with proper ARV/ART service are important interventions for PMTCT of HIV

Introduction

Worldwide, approximately 750,000 children become infected with HIV every year, mostly through mother-to-child transmission (MTCT). Without specific interventions, the rate of MTCT is approximately 15–20%, with prolonged breastfeeding doubling the rate to 35–40% (2).

In Ethiopia, 14,276 new HIV infected children and 13,257 pregnant women tested positive for HIV. Out of these, 6,990 received ARV prophylaxis and 5,051 children received niverapine as prophylaxis. In Amhara region, 201,291 pregnant women were tested for HIV, and out of these, 4,790(2.4%) were HIV positive of which, 1,959 received ART/ARV prophylaxis. In this region, there were 5,029 newly HIV infected children and 1,455 children received nevirapine (NVP) as a prophylaxis (3).

Even though the provision of PMTCT reduces the risk of MTCT of HIV, there is a chance to acquire HIV infection through infant feeding practices particularly mixed breast feeding. In Ethiopia, all infant feeding options commonly ERF (exclusive replacement feeding), EBF (exclusive breast feeding), and MBF (mixed breast feeding) were practiced and assessed, but there is gap. Therefore, this study is proposed to fill this gap.

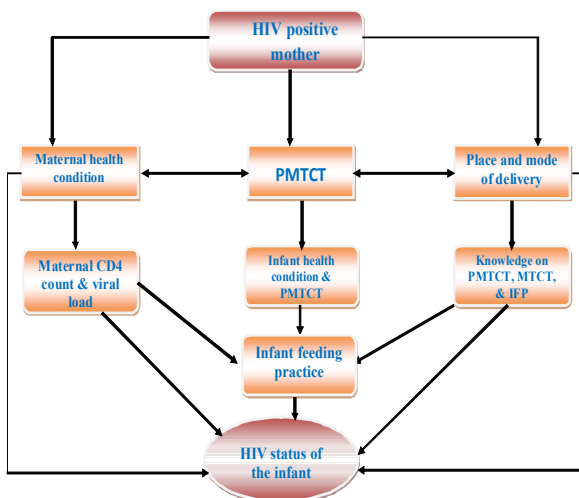


Figure 1: Conceptual frame work on Infant Feeding Practices among HIV Positive Mothers Receiving ARV/ART and HIV Status of Their Infants with its determinants.

General objective

To assess infant feeding practices of HIV Positive mothers receiving ARV/ART and HIV status of their infants with its determinants. Determinants in South and North Wollo Zone, Amhara Region, Ethiopia.

Specific objectives

- To assess infant feeding practices of HIV positive mothers receiving ARV/ART.
- To assess the prevalence of HIV infection among infants born from HIV positive mothers receiving ARV/ART.
- To determine the factors for MTCT of HIV through infant feeding practices.

Methods

Institution based Cross-sectional descriptive study was conducted from January to April 2012 in all health institutions providing ART, PMTCT and care for HIV exposed infant with Quantitative and qualitative methods. Sample Size was calculated by using EPI Info version 3.5.1 statistical software. The largest number which was 404 from the first objective with single population proportion was used.

HIV status of exposed infant (**Dependent Variable**) and educational background, socio economic status, infant feeding practice, birth weight of infants, mode and place of delivery, maternal knowledge about PMTCT, MTCT of HIV and infant feeding practice, child and maternal illness, dose, duration and type of ARV prophylaxis, duration of breast feeding and maternal CD4 count (**Independent variables**) were used for the study.

Software versions Epi info 3.5.1 for entering and SPSS 16 for analysis of Quantitative data were used. For the qualitative data, narrative analysis was used based on the recording and notes taken during the interview. The data were transcribed and translated word by word for analysis. Ethical clearance was obtained from the concerned bodies.

Results

Socio-demographic Characteristics

The mean age (SD) was 28.97(5.92) years, ranging from 19 to 45 years which are muslim & Christian religions and about 31.9% of the mothers were illiterate. The mean age of the infants (SD) was 8.0(2.71) months, ranging from 2 to 11 months and there were 191 (51.2%) female infants. The mean birth weight was 2.88kg (SD 0.42 kg) with the range between 1.5 – 4.5kg, and infants with

low birth weight (less than 2.5kg) were 57 (23.1%). 78.6% of the infants were initially tested with DNA PCR test at the age of 6 weeks and 72.4% of the infants were tested with DNA PCR test for the second time at the age between 7 – 9 months.

Obstetric and ARV Prophylaxis History

Among ANC follow of mothers, of which 250 (67%) had started the follow up from second trimester. Majority of the mothers 180 (48%) mother had attended ANC follow up more than four times, and all (100%) of the mothers had received postnatal follow up. Concerning ARV/ART prophylaxis all of the mothers had received ARV/ART during pregnancy and postnatal period, and all of the infants also received ARV prophylaxis, of which 82% received ARV prophylaxis immediately after birth. Majority of the mothers 195 (52.3%) received ARV prophylaxis, and 178 (47.7) were on ART during post-partum period. Of all mothers, 334 (89.5%) of them delivered in the health institutions. The mode of delivery was SVD in 314 (84.2 %) of the cases. Majority received infant feeding counseling during pregnancy 216 (57.9%), and 294 (78.8%) during postnatal period

Mother’s Knowledge on MTCT and PMTCT of HIV/AIDS.

Almost all (97.6%) of the mothers know the possibility of mother to child transmission of HIV/AIDS, 286(76.7%) and 217(58.2%) have sufficient knowledge on MTCT and PMTCT

Infant Feeding Practices among Mothers Receiving ARV/ART

Out of the total 373 mothers, 323(86.6%) had ever breast fed their infants. 179 (47.9%) of the mothers stopped to breast feed their infants during the study period of which 56.9 % had stopped before the age of six months, and 43% of the infants took breast milk for 7-11 months and 267(71.6%) of the infants had started complementary feeding, of which 211(79%) had started complementary feeding at six months of age

Maternal and Infant Health Conditions

Out of the 373 respondents, 46(12.3%) encountered health problems; Breast and nipple problems in 16(34.8%). and 30(65.2%) had non breast related health problems. As a result of maternal illnesses, 21(45.6%) reported to change their infant feeding practices from EBF to mixed feeding during their illness time.

Out of 373 respondents 78(20.9%) infants had at least one illness since birth and 35(44.9%) of their mothers changed their infant feeding practice from EBF to mixed feeding, during infants’ illness time

Maternal CD4 Count

Majority 200(60.8%) of mothers’ CD4 count lies between 200-500cell/mm³ whereas 15(4.5%) of the mothers’ CD4 count were less than 200cell/mm³ (Figure 4).

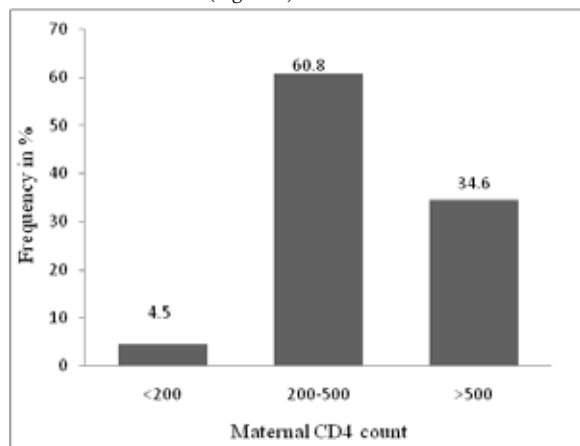


Figure 2: CD4 count of HIV positive mothers receiving ARV/ART

HIV Status of the Infants

The overall prevalence of HIV for the infants was 29 (7.8 %) at first DNA PCR test (Figure 5). The prevalence in the second DNA PCR test was 9(13%) but only 69 infants were tested for the second time and all positive cases were HIV positive during first test.

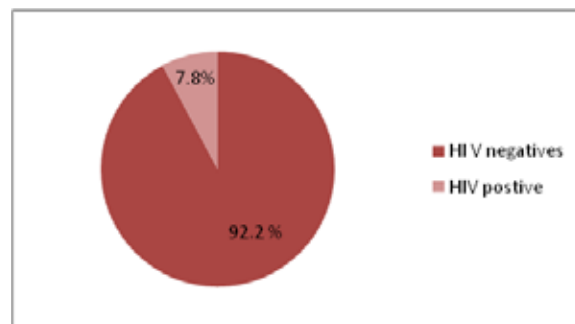


Figure3: HIV status of infants.

The above prevalence rate may vary based on type of ARV/ART taken by mothers and infants, age of infants at first DNA PCR test and infant feeding practices. The highest rate 13(29.5%), was recorded in the mixed feeding practice followed by exclusive breast feeding 15(5.4%) and the lowest rate was found in formula fed infants 1(2.0%).

Age Specific HIV Transmission Rate

The analysis of DNA PCR test result shows that age specific HIV transmission rate with infant feeding practice. The transmission rates of HIV in feeding were 2.3% at 6 weeks of age and zero/none at 2-11 months of age. In the case of EBF(exclusive breast feeding), the transmission rate were 4.1% , 9.6%, and 12.5 % at 6 weeks, 2-6 months and 7-11 months of age respectively, and in case of mixed feeding practice, the transmission rate were 22.5% ,50 % and 0% , at 6 weeks, 2-6 months and 7-11 months of age respectively. The rate of transmission is relatively high in the age group 2- 6 months in almost all cases. In relation to ARV/ART taken by mothers and infants transmission were relatively high in each age for mothers receiving ARV prophylaxis than for mothers on ART and it is relatively higher for infants who took ARV for 4 weeks than for 7 days, due to the reason that the mothers of those infants were not taking adequate ARV prophylaxis during

HIV transmission/ prevalence were relatively high among:

Mothers receiving ARV prophylaxis 11.4% and 10.5% during pregnancy and postnatal period respectively as compared to mothers receiving ART,

Infants receiving triple ARV(sdNVP+AZT+3TC) for 4weeks 13.8% as compared with taken for 7 days and

Infants age between 2 – 6 months (15.7%)

Factors Associated with HIV Status of the Infant, Bivariate Analysis

Those infants whose mothers live in rural area are more than 2 times more likely to become HIV positive than those whose mothers lives in urban areas [COR=2.5, 95%CI=(1.16, 5.43)]. Age of the mother, marital status, and level of education, religion, ethnicity, occupation, and monthly income of the household had no significant association with HIV status of the infants.

The likelihood of infant to become HIV positive was more than 3 times higher for those infants with birth weight <2.5kg than for those birth weight > 2.5kg [COR=3.66, 95%CI = (1.23,

10.9)]. Infants tested with DNA-PCR for the first time between 2-6 months of age were more than 3 times more likely to become HIV positive than from those tested at 6 weeks of age [COR=3.02, 95%CI=(1.35, 6.8)]. Age and sex of infant had insignificant association.

Those infants whose mothers started ANC follow up at third trimester were four times more likely to become HIV positive than those whose mothers started ANC follow up at first trimester [COR=4.36, 95%CI = (1.28, 14.8)]. Mothers taking ARV prophylaxis during pregnancy were more than three times likely to have HIV positive infants with the odds of [COR=3.58, 95%CI = (1.42, 8.99)] than those mothers on ART. Mothers taking ARV/ART for <4 weeks during pregnancy had relatively high prevalence of HIV on their infants with the odds of [COR=5.34, 95% CI= (1.56, 18.26)]. Mothers who delivered at home had relatively high risk with the odds of [COR=5.70, 95% CI = (2.43, 13.4)]. Attending operational delivery had a risk with the odds of [COR=2.65, 95% CI= (1.14, 6.14)]. And infants taking AZT and 3TC for 4 weeks as postnatal ARV prophylaxis [COR=2.57, 95%CI= (1.11, 5.95)] were 3 times more likely to be HIV positive (table-11)

Infant Feeding Practice in Relation to HIV Status of the Infants

Those mothers who practiced exclusive replacement feeding were 95.1% times less likely to have HIV positive infants [COR=0.049, 95 %CI= (0.006, 0.39)]. Mothers who practiced exclusive breast feeding were 86.5% times less likely to have HIV positive infants [COR=0.135, 95 % CI= (0.059, 0.311)] as compared with mixed feeding. The odds of HIV positive infants were high among infants whose mother not receiving infant feeding counseling during postnatal period [COR=3.10, 95 %CI = (1.43, 6.98)].The likelihood to become HIV positive among infants whose mothers having insufficient knowledge on PMTCT was six times higher than from those infants whose mothers had sufficient knowledge on PMTCT [COR=6.55, 95 % CI= (2.59, 16.5)]. On the others hand, infant feeding counseling during pregnancy, ever breast feed, duration of breast feeding, complementary feeding, age of initiation of complementary feeding and knowledge on MTCT had no significant association with HIV status of the infant (Bivariate Analysis)

Maternal and Infant Health Condition in relation to HIV Status of the Infants

Mothers with CD4 count below 200cell/mm³ were more than eight times more likely to have HIV positive infant than those mothers who have CD4 count >500cell/mm³ and Types of maternal and infant illness were not significantly associated (Table-1)

Table1: Maternal and infant health condition in relation to HIV status of the infant

Variables	HIV status		COR (95%CI)
	positive	Negative	
Maternal CD4 count(n=373)			
<200	6	9	8.83 (2.51, 31.0)*
200-500	15	185	1.07 (0.44, 2.62)
>500	8	106	1.0
Maternal illness(373)			
Yes	10	36	4.50 (1.94, 10.4)*
No	19	308	1.0
Type of maternal illness(n=46)			
Breast related	5	11	2.18 (0.52, 9.12)
Non breast related	5	25	1.0
Infant illness(n=373)			
Yes	18	60	7.70 (3.48, 17.2)*
No	11	284	1.0
Type of infant illness(n=78)			
Fast/difficulty of breathing	4	13	1.0

Mouth sore	5	22	0.77(0.18, 3.41)
Diarrhea	9	25	1.17(0.30, 4.53)

* Significant at p<0.05

Multivariate result

Determinants factors of HIV Status of the Infants

Multivariate analysis was done to control the confounding effect of one variable over the other with logistic regression. Variables which were identified to have significant association (P<0.05) with HIV status of infants in the bivariate regression model were adjusted for multivariate regression model in order to avoid an excessive number of variables and unstable estimate in the subsequent model.

Some variables like infant birth weight and maternal CD4 count, with p<0.05 value were not included for multivariate analysis due to small number of respondents, in order to avoid unstable estimate with wide confidence interval in the model. Hosmer -Lemeshow goodness of fit test was used to check for how well the model fits.

After controlling for possible confounding effects of other covariates like place of residence, time of first antenatal visit, infant feeding counseling, type of ARV prophylaxis during postnatal period and age of infants at first DNA/PCR test which have no significant association with HIV status of infants, were adjusted, and then place and mode of delivery, mothers knowledge on PMTCT, infant feeding practice, maternal and infant illness were found to be significantly associated with HIV status of the infant.

The analysis shows that the odds of infants being HIV positive were 5 times higher on infants born at home than those infants born in the health institutions [AOR=5.00, 95%CI= (1.45, 17.17)]. The odds of infants being HIV positive were more than 5 times higher on infants born with vacuum, C/S or episiotomy than vaginal delivery [AOR=5.20, 95%CI=(1.60, 16.95)]. Infants whose mothers have had at least one illness during postnatal period were more than 4 times more likely to become HIV positive than those whose mother were not ill [AOR=4.61, 95% CI=(1.52, 13.96)], and infants having at least one sign of illness were 7 times more likely to become HIV positive than those who were not having an illness [AOR=7.23, 95%CI= (2.64, 19.78)]. Those mothers who have insufficient knowledge on PMTCT were three times more likely to have HIV positive infants [AOR=3.35, 95%CI=(1.22, 9.15)] than those who have sufficient knowledge, and those mothers practicing EBF were 77% less likely to have HIV positive infants than those who practiced mixed feeding [AOR=0.23, 95%CI=(0.08,0.68)]

Results for qualitative study

An in-depth interview was carried out with a total of 10 HIV positive women receiving ARV/ART. Their age ranges from 23-36 years and their education levels also ranges from illiterate to secondary school graduate. Nine of them have HIV negative infant and only one mother has HIV positive infant.

Knowledge of PMTCT

Almost all participants in the in-depth interview explained prevention methods on MTCT of HIV which includesVCT, ANC follow up, taking ARV/ART prophylaxis for the mother and for the infant, getting counseling on infant feeding, transmission, attending safe delivery in health institutions and disclosing the status to partner and to others.

Practices and Benefit they get from PMTCT

All of the mothers attended ANC and postnatal follow up, received ARV/ART prophylaxis, infant feeding counseling and delivered in health institutions except one mother.Concerning the benefit they get, almost all mothers said that getting HIV negative infant was the great issue for them.

Knowledge of Infant Feeding Option

Concerning the options of infant feeding practices among HIV positive mothers, most of the participants knows about exclusive breast feeding and replacement

Infant Feeding Counseling

Almost all of the mothers who were interviewed received infant feeding counseling during pregnancy and postnatal period on the importance of infant feeding practice. The health professionals gave more emphasis to EBF than ERF feeding option till six months but few said that the professionals were so busy and the counseling time was too short to discuss more with them.

Discussion

Majority (74.8%) of the participants experienced exclusive breast feeding, 13.4% and 11.8 % experienced exclusive replacement feeding and mixed feeding respectively. This is similar to a study in Gondar, 78.5% practiced EBF, 10 practiced ERF and 11.4% practiced mixed feeding (25). But the prevalence of EBF 74.8% is much higher from a study conducted in Addis Ababa (30.6%) and South Africa (35.6%) (10, 12). The prevalence of mixed feeding (11.8%) in this study is much lower than a study conducted in Jimma (80%) (6), and two studies conducted in Nigeria (70.45) (15), and (18%) (14). The prevalence of ERF (13.4%) in this study is comparable with a study in Gondar (10%) (25) but it is much higher than a study conducted in Jimma (0.4%) (6) and much lower than a study conducted in Cameroon (85%) (13), Addis Ababa (46.8%) (10) and the two studies conducted in Nigeria (50.6%) & (75%)(12, 14).

compared with different studies, this result shows an increase in prevalence of EBF, and a decreased in mixed and replacement feeding practices, one of the possible reason is an increased mother's knowledge about PMTCT (58.2%) through infant feeding counseling particularly by mother support group, and other reason is that replacement feeding does not fulfill AFASS criteria as a result of low economic status, the median monthly income of the participants is 500 ETB and this is supported with the qualitative study. Mother to mother support group advice/service makes a great change on infant feeding practices in relation to prevention of MTCT of HIV.

The overall prevalence of HIV which is 7.8% in the study area is comparable with the finding in Addis Ababa (9.1%) (17), and in Nigeria (7.4%) (9). But it is much lower than the finding in Gondar 13.4% (25) and in South East Nigeria 16.4% (23). This is due to the reason that all participant in this study had received ARV/ART as compared to 77.4% and 36% in Gondar and S.E. Nigeria respectively. This is probably the promising indicator for the success of PMTCT and the effect of ARV/ART in the area. The prevalence may vary with type of ARV/ART, with age of infants at diagnosis and with infant feeding practices.

HIV transmission may vary with type of ARV, HIV transmission rate of 4.5% is observed for infants whose mothers received ART/HAART for PMTCT and 10.5% for mothers who received ARV prophylaxis. These findings were compared with related studies in Gondar; it was observed that the transmission rates were 2.3% and 8% respectively (25). A similar study in Cameroon concluded that Multi drug ARV/HAART regimens are feasible and effective in PMTCT (13). These indicate that ART treatments were effective in a resource-limited program setting than ARV prophylaxis.

Age specific transmission rates in this study which are 5.8% at 6 weeks of age, 15.7% at 2-6 months and 10% at 7- 11 months age are comparable with a study done in Uganda (8.77%), (8.75%), and (10.3%) transmission at 1 month, 6 month and 12month respectively (18), and with a study in Cameroon which shows (6.6%) at 6 -10 weeks age (13). But the transmission rate

from 2-6 months of age in this study is relatively high. This may be due to high prevalence of breast feeding and low prevalence of replacement feeding as compared with 41% replacement feeding in Uganda and infants at this age usually on breast fed.

Variation on Infant Feeding Practices

86.6% of the mothers were ever practicing breastfeeding (including mixed feeding). This finding is consistent with a related study in South-south regions of Nigeria which showed that about 80% of HIV exposed infants had ever been breastfed (34). This has the potential to increase HIV transmission rate particularly with mixed feeding and reduce the benefits of PMTCT interventions.

Regardless of ART/ARV prophylaxis, infants who were exclusively breastfed had transmission rates of 4.1%, 9.6%, and 12.5% at 6 weeks, between 2-6 months and 7-11 months of age respectively. For the infants in the replacement feeding practice, transmission rate at 6 weeks age was 2.3% and zero in the age greater than 2 months. And the transmission rate for the infants whose mothers practice mixed feeding was 22.5 at 6 weeks age and 50% at the age between 2-6 months. This is comparable with a study done in South-south regions of Nigeria regardless of chemoprophylaxis; babies who were exclusively breastfed had a transmission rate of 2.7% at 6 weeks and 11.8% from 6 weeks to 6 months and 19.1% from 6-18 months of age. The transmission rates among babies whose mothers practiced mixed feeding was 13.4% for babies aged zero to six weeks and 25.6% for babies aged 6 weeks to 6 months (34). And it is inconsistent with a study in Kenya which was 4.2%, 5.0%, and 5.7%, at 6 weeks, 6 months, and 12 months of age respectively with exclusive breast feeding in the first 6 months (21). This is because of all mothers in Kenya study were received ART/HAART starting from 34 -36 weeks of gestation till 6 months after delivery and were exclusively breast feed till 6 months as compared to this study with 47.7% HAART and 74.8% exclusive breast feeding.

This study identified that provision of HAART drug to the mothers starting from late pregnancy till cessation of breast feeding with exclusive breast feeding was preventive as compared with ARV prophylaxis and mixed feeding practice. This shows that exclusive breastfeeding is safer than mixed feeding as a feeding option for HIV exposed infants. This finding is consistent with WHO guidelines (1) and a study in Zimbabwe mixed feeding practice during the first 3-6 months of life to HIV exposed infants which is associated with a 4 to 10-fold greater risk of post-natal transmission, compared with exclusive breast-feeding (5).

This is also supported with key informants from qualitative study, where majority of them mentioned and practiced either exclusive breast feeding or exclusive replacement feeding and avoid mixed feeding. Concerned with the Determinant Factors for HIV Status , infant feeding practice is also a significant predictor of HIV status of infants in multivariate analysis which shows that those mothers who practiced EBF were 77% less likely to have HIV positive infants than those who practiced mixed feeding

ConclusionsPrevalence of exclusive breast feeding was 74.8% which was slightly higher than the previous studies and which is promising for PMTCT. And there is still a chance for MTCT of HIV with proper provision of ARV/ART for both mother and infant with 7.8% prevalence of HIV among infants in the study area.

Recommendations

- Improve infant and maternal health condition by improving mothers' knowledge on PMTCT through counseling.
- Mother to mother support group advice/service on infant feeding practice in relation to prevention of MTCT of HIV

should be availed and sustained in all health care facilities.

- More advocacy and economical support needed for adherence of replacement feeding, to improve maternal life, and PMTCT of HIV.
- HAART/ART treatments starting from pregnancy till cessation of breast feeding should be promoted in PMTCT program.
- The health policy makers should be involved in expanding infant feeding counseling, PMTCT and ART service at least in all health centers.
- More advice for mothers to get a timely treatment during mother & infants' illness
- Encourage to practices SVD in the health care facility.
- Further studies should be conducted with large sample size in this area.

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