ADDIS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCE

SCHOOL OF PUBLIC HEALTH

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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Abbreviations and Acronyms

AAU	Addis Ababa University
AFASS	Acceptable feasible affordable sustainable and safe
AIDS	Acquired immune deficiency syndrome
ANC	Antenatal care
AOR	Adjusted odds ratio
ART	Anti retroviral therapy
ARV	Anti retroviral
AZT	Zidovudine
C/S	**C**aesarian section
DNA PCR	Deoxy Ribonucleic Acid Polymerase Chain Reaction
DBS	Dry blood sample
EBF	Exclusive breast feeding
EFF	Exclusive formula feeding
ERF	Exclusive replacement feeding
FGD	Focus group discussion
FMOH	Federal Ministry of Health
HAART	Highly Active Antiretroviral Treatment
H/C	Health Center
HI	Health institution
HIV	Human Immunodeficiency Virus
IFP	Infant feeding practice
MBF	Mixed breastfeeding
MF	Mixed feeding

MSG	Mother Support group
MTCT	Mother to child transmission
NVP	Nevirapine
OR	Odds ratio
PARV	Prophylaxic anti retroviral
PBF	Predominant breast feeding
PCR	Polymerase Chain Reaction
PMTCT	Prevention of mother to child transmission
SdNVP	Single-dose Nevirapine
SPH	School of public health
SPSS	Statistical Package for Social Sciences
SVD	Spontanus vaginal delivery
3TC	Lamivudine
WHO	World Health Organization

Abstract

Back ground: Infant feeding practice is one of the challenging issues on prevention of MTCT of HIV particularly in developing countries due to the benefits and risks of replacement and exclusive breast feeding practice. 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 both quantitative and qualitative methods was conducted among 373 HIV positive mothers with their exposed infants. The study subjects were drawn from 21 health institutions in South and North Wollo Zone in the order of their arrival starting from January to April 2012 till the sample size was fulfilled. Quantitative data were collected using pre-tested structured questionnaire where as qualitative data were obtained from selected HIV positive mothers through in-depth interview with semi-structured interview guide.

Results: The prevalence of HIV among infants was 7.8% with the following feeding practice Exclusive replacement feeding (ERF), exclusive breastfeeding (EBF) and mixed feeding (MF) were13.4 %, 74.8 %, and 11.8% respectively. The predictors for HIV status of infants were infant illness [AOR=7.23, 95%CI =(2.64, 19.78)], maternal illness [AOR=4.61, 95% CI=(1.52, 13.96)], maternal knowledge on PMTCT [AOR = 3.35, 95%CI = (1.22, 9.15)], place of delivery [AOR =5.00, 95%CI = (1.45, 17.17)], mode of delivery [AOR=5.20, 95%CI = (1.60, 16.95)] and, infant feeding practice with exclusive breast feeding [AOR=0.23, 95%CI=(0.08, 0.68)] .

Conclusions: In this study HIV status of the 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.

1. Introduction

1.1 Back ground

Infant feeding practice for HIV positive mothers is more challenging and it needs Balancing between HIV prevention and protection from other causes of child mortality. The 2010 WHO guidelines' recommendations for infant feeding options were, Where ARVs are available, mothers known to be HIV-infected are now recommended to breastfeed until 12 months of age with an antiretroviral intervention to reduce transmission or avoidance of all breastfeeding or exclusively breastfeed in the first six months of life (1).

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, the 2002 health indicator shows that there were 14,276 new HIV infected children and 13,257 pregnant women were also tested positive for HIV. Out of these women, 6,990 received ARV prophylaxis and children who received niverapine as a prophylaxis were 5,051. 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).

The association between breast feeding, particularly mixed breastfeeding, and increased HIV transmission risk was supported by different studies and exclusive breast-feeding for the first 6 months was assumed to be preventive; however, the mechanism of exclusive breast-feeding protection is un-known. But, it is hypothesized to be mediated through reduced mastitis over mixed feeding and mixed breast feeding was associated with increased HIV transmission (OR, 2.50). Even if infant-feeding counseling is critical to the success of infant survival strategies and reducing mixed feeding practice, it is generally done poorly with few examples of successful consequences other than in research settings (4, 5).

1.2. Statement of the Problem

There are about 2.5 million under 15 years' children living with HIV worldwide. Of these children, 90% live in sub-Saharan Africa and about 64,813 live in Ethiopia. The primary mode of acquiring HIV in children is mother to child transmission which accounts 90% of cases, and without specific intervention, the rate of mother to child transmission is approximately 15-30% in non breastfeeding populations. Breast feeding by an infected mother increases the risk by 5-20% to a total of 20-45%. With effective PMTCT and breast feeding counseling this risk can be reduced to less than 5% (6-8).

Infant feeding practice, particularly mixed breast-feeding [MBF]) during thefirst 3 –6 months of life to infants born from HIV-positive mothers, is associated with a 4 to 10-fold greater risk of postnatal transmission compared to exclusive breast-feeding. Hence, debates on infant feeding in the context of HIV infection continue in the developing world (5, 9, and 10).

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. However, there is still a gap in the assessment of infant feeding practice of HIV positive mother s receiving PMTCT in relation to HIV status of their children. Therefore, this study is proposed to fill this gap.

1.3. Rationale of the Study

Currently, infant feeding practice and the risk of mother to child transmission of HIV infection with its determinant factors are the major public health problems among women receiving PMTCT due to inappropriate infant feeding practice and poor access of infant feeding counseling with its options. Since there was limited research on this specific area, this study is supposed to specify the role of infant feeding practices and PMTCT on HIV status of infants and to fill the information gap for decision and policy makers, NGOs and other concerned bodies, for providing important opportunities for research and programming to improve the welfare of HIV-infected women and their children, for designing strategies to prevent postnatal mother to child transmission of HIV, and to promote appropriate infant feeding practices in the study area and the country at large.

2. Literature Review

2.1. Infant Feeding Practices

The 2010 WHO guidelines' recommendation for infant feeding options is that optimal breast feeding for HIV exposed infants is to breastfeed until 12 months of age with ARV prophylaxis for both the mother and infant or avoidance of breastfeeding. The other option recommended is that either practicing replacement feeding or heat treated expressed breast milk in the absence of ARV prophylaxis to increase child survival. It was then for the mothers to decide on the options (1, 11).

Mothers who are known to be HIV uninfected or whose HIV status is unknown should be counseled to exclusively breastfeed their infants for the first six months of life and then introduce complementary foods while continuing breastfeeding for 24 months or beyond. The recommendation that replacement feeding should not be used unless it is acceptable, feasible, affordable, sustainable and safe (AFASS) remains the same with the 2007 WHO guidelines (1).

A study conducted in South Africa on the prevalence of infant feeding practice among HIV positive mothers shows that 35.6%, 50.6%, and 12.4% practiced EBF, EFF and MF respectively (12). Another study in Cameroon shows that, 85%, 9.1%, and 5.5% mothers practiced EFF, EBF and MF respectively (13). Another cohort study in Nigeria shows that, even after provision of infant feeding counseling during pregnancy, 75%, 8%, and 18% of mothers practiced EFF, EBF and MF respectively (14). Another study in the same country shows that the mixed-feeding rate was as high as 70.45% in the non-PMTCT cohort (15).

Based on a study in Addis Ababa about the prevalence of infant feeding practice of known HIV positive mothers, 46.8%, 30.6% and 15.3% practiced ERF, EBF and MF respectively (10).

Another study in Jimma town shows that the prevalence of infant feeding practice of HIV positive lactating mothers were 81%, 13.4% and 0.4%, for mixed feeding, exclusive breastfeeding and exclusive replacement feeding respectively and most (90.9%) of the pregnant mothers intended to mix feed their infants 0-6 months of age (6).

2.2. Determinant Factors for Postnatal HIV Transmission and its Prevention

As far as breast feeding of HIV positive mothers is concerned, there are two major problems: complete avoidance of breastfeeding is impossible in many settings and there is a chance of HIV transmission through breast feeding particularly in developing countries. Therefore, identification of risk factors for MTCT of HIV through breastfeeding has been important in order to design interventions to prevent such transmission (16).

A study conducted in Zimbabwe discussed that, the risk factors for postnatal transmission of HIV include maternal mastitis, breast-feeding exclusivity, breast milk HIV load, and maternal plasma HIV load and MBF was associated with postnatal transmission (5). Another study in Addis Ababa shows that the risk factors for MTCT of HIV include feeding practice, maternal breast related problem, and provision of ARV prophylaxis for both the mother and the infant which have significant association with HIV positive result of infants born from HIV positive mothers ($p<0.05$) (17).

PMTCT is a key component of overall HIV prevention efforts and represents a critical opportunity for stemming the tide of the HIV epidemic. Comprehensive PMTCT service consists of a 4-pronged approach: primary prevention of HIV infection, Prevention of unintended pregnancies among women infected with HIV, Prevention of HIV transmission from infected women to their infants and treatment, care and support of women infected with HIV, their infants and their families(8).

2.2.1. Infant Feeding Practice and HIV Transmission

A study in Uganda on breast-feeding practice for surviving infants shows that only 25% of lactating women practiced exclusive breast-feeding at one month and 18% at six months. Cumulative HIV transmission rates at 1 month, 6 months and 12 months in the study were 8.77%, 8.75, and 10.3% respectively (18). Another study in Zimbabwe reported that the rates of postnatal transmission in infants with negative polymerase chain reaction (PCR) result for HIV at 6 weeks) were 5.1, 6.7, and 10.5 infections per 100 child-years of breast-feeding for infants who used EBF, predominantly breast-fed, and MBF, respectively. (5 in Iliff PJ, Piwoz EG, Tavengwa NV, et al.AIDS (2005).

In another cohort study in Cameroon, MTCT rate of HIV by 12 months for mothers having mixed feeding practice was [HR = 8.7, 95%CI: 3.6–20.6] (13).

In an unadjusted analysis, non-EBF was associated with >3-fold increased risk of early postnatal HIV transmission (in the first 4 months of life). The association remained significant [RH=2.68; 95% CI: (1.28-5.62)] even after adjusting for maternal CD4 count, plasma viral load, syphilis screening results and low birth weight (19).

Another study in Addis Ababa shows that the odds of infants being HIV positive were 11 and 5.5 times higher for mothers who practiced mixed feeding than ERF and EBF respectively. Only mixed feeding was remained as a factor in multivariate analysis for HIV positive status of infants with 6 times more likely to be HIV positive than those who got ERF and EBF (OR, 6.1, 95%CI, 1.4 – 25.7) (17).

2.2.2. Duration of Breast Feeding

As duration of infant feeding increases the risk of HIV transmission also increases even with ARV prophylaxis and it is supported by different studies: A review of clinical trial and cohort study by California University, USA shows that complete avoidance of breastfeeding would be an obvious intervention to prevent HIV transmission through breast milk. Where complete avoidance is not possible, early cessation from breastfeeding would decrease a child's exposure to breast milk and HIV infection and the cumulative probability of transmission increased as the duration of breastfeeding increased (from 1.6% at three months of age to 9.3% at 18 months of age) (20).

A Clinical Trial to deal the effect of triple ARV prophylaxis on PMTCT in Kenya concluded that cumulative HIV-transmission rates at birth, at 6 weeks, 6, 12, and 24 months were 2.5%, 4.2%, 5.0%, 5.7%, and 7.0%, respectively with exclusive breast feeding in the first 6 months (21).

Another study in South Africa indicated that the median duration of cumulative exclusive breastfeeding was 159 days. Within this period 14·1% of EBF infants were infected with HIV-1 a t 6 weeks and 19·5% at 6 months of age (22).

2.2.3. Infant Health Condition

Infant illness like Mouth sore (oral thrush), Fast or difficulty of breathing, Fever, Diarrhea, malnutrition, prematurity, low birth weight, and poor defenses against HIV were the risk factors for acquiring HIV from their infected mothers and had significant association with HIV status of the infant. Infants who have <2.5 kg birth weight were about 95% more likely to become HIV positive (16, 17, 19). Another study in Cameroon reveals that infants who have low birth weight of <2.5kg were at high risk for early MTCT of HIV with the odds (OR: 8.6; 95%CI: 3.9–19.2) (13).

One third of the infants (42.2%) had encountered at least one illness since birth and infant illness was one of the determinants for mixed feeding accounts (6%) (10).

2.2.4. Maternal Health Condition

A study conducted in Zimbabwe shows that the odds for postnatal transmission of HIV were associated with mastitis or any breast problem at current or previous visit. The prevalence of mastitis at 6 weeks and at 3 and 6 months was 29.1%, 18.4%, and 12.7%, respectively (5).

The odds of infants being HIV positive were 6 times higher for mothers who had breast related problem than who had not. And another study also shows that maternal nipple bleeding increases the chance of HIV transmission (10, 16).

2.2.5. Type and Duration of ARV Prophylaxis (PMTCT)

HIV-infected pregnant women took zidovudine, lamivudine, and either nevirapine or nelfinavir starting from 34–36 weeks of gestation to 6 month post partum period, and their infants received single-dose nevirapine at birth. The women were advised to breastfeed exclusively, wean rapidly and cease breast feeding just at 6 months, and the researcher's follow up continued till 24 months. The cumulative HIV-transmission or death rate at 24 months was 15.7%. They conclude d that this trial shows that a maternal triple-antiretroviral regimen from late pregnancy through 6 months of breastfeeding for PMTCT is safe and feasible in a resource-limited setting (21).

Breast-feeding of HIV-exposed infants can be made considerably safer in resource-constrained settings through the provision of maternal highly active antiretroviral therapy (HAART), maternal short-course antiretroviral, and extended infant antiretroviral prophylaxis (4).

A study in Cameroon concluded that Multi drug ARV regimens for PMTCT are feasible and effective in PMTCT, and early initiation of ARV during pregnancy and proper obstetrical care are essential to improve PMTCT. 80% of the mothers received multidrug ARV regimens and the overall MTCT rate was 6.6% at 6-10 weeks. Without any significant difference between regimens, postnatal transmission rate at 12 months was 25%. This occurred throughout breastfeeding (13).

Duration of mothers' ARV regime during pregnancy has significant association with MTCT of HIV. For mothers who took ARV prophylaxis for 4 weeks and above, the infants were 4.7 times more likely to become HIV positive [OR = 4.7, 95%CI= (1.3–17.6)] and for shorter than 4 weeks, the infants were 6.6 times more likely to become HIV positive [OR=6.6, 95%CI= (2.9–15.3)] (13).

Another study conducted in Nigeria for early infant diagnosis of HIV infection with DNA PCR analyzed that 3.6% of mother-baby pairs who had received prophylactic anti-retroviral (PARV) were PCR-positive whereas 53.4% of mother-baby pairs who had no PARV were positive for PCR test. A similar study in Tanzania shows that 0.5% transmission rate was observed in both mothers and babies who have received PARV compared to 20.6% for those who have not received prophylaxis (23, 24).

A study in Addis Ababa also shows that infants who took ARV prophylaxis (nevirapine) within 72 hours of delivery were 82% less likely to be HIV positive than who did not take, and mothers who had taken nevirapine at the onset of labor were 81% less likely to have HIV positive infants (17).

Another study in Gondar University Referral Hospital shows that **t**he overall MTCT rate for HIV exposed infants was 13.4%, but it varied by type of PMTCT intervention. The transmission rate for infants whose mothers were not receiving PMTCT was highest (41%), followed by infants whose mothers took short course prophylaxis (8%), and the lowest rate was 2.3% which was found in infants whose mothers took HAART during pregnancy. The transmission rate for infants who were receiving post exposure ARV prophylaxis was 4.8% and for those who were not receiving ARV was 42% (25).

2.6. Maternal CD4 Count

Studies review on investigating ways to decrease the viral load in breast milk, either through provision of antiretroviral prophylaxis for HIV-infected mothers while breast feeding, or through the treatment of breast milk with chemical agents or heat. The 24-months HIV-transmission rates stratified by baseline maternal CD4 cell count <500 and ≥500 cells/mm ^{3} were 8.4% and 4.1% respectively (p = 0.06) (16, 21).

Maternal CD4 count was a strong predictor of early post-natal transmission with 86.1% of early postnatal infections occurring for women with CD4 counts <350 cells/ml. The cumulative probability of postnatal HIV transmission by 4 months was 0.191 for non-EBF and 0.063 for EBF (RH=3.40). For women with CD4 counts >350 cells/m, there were no infections on the infants at 4 months of age for non-EBF and the cumulative probability of postnatal transmission was 0.017 for EBF (13).

A study in Cameron shows that, MTCT rate with multidrug regimens for mothers who have CD4 ≤350 cells/mm3 was [OR = 6.4, 95%CI= (1.8–22.5)] and had a fourfold risk [OR= 4.0; 95%CI: (1.7–9.2)] of MTCT. Another study in South Africa shows that the risk of acquiring postnatal HIV in children at the age of 6 months was significantly associated with maternal CD4-cell counts < 200 cells per µL [AHR] =3·79 and the overall risk of transmission was strongly associated with maternal CD4-cell counts. The estimated transmission rates of exclusively breastfed infants at 6 months whose mothers have CD4-cell counts less than 200 per µL or ≥200 cells per µL were 34% and 17%, respectively (22, 23).

2.2.7. Place and Mode of Delivery

A study conducted in London on current issues in PMTCT shows that for mothers who deliver in health institutions with C/S, avoidance of breastfeeding, and/or encouraging exclusive breastfeeding has been suggested to reduce MTCT. MTCT rates of less than 2% are now reported in the case where antiretroviral prophylaxis, elective Caesarean section in health institutions and refraining from breastfeeding are being applied. If not possible, provision of per partum antiretroviral therapy can halve the risk to levels of approximately 10% at 6 weeks, even though further acquisition of infection through breastfeeding substantially increases the overall transmission rate to 20% or more (2).

Another study in Thailand shows that mode of delivery in HIV-infected pregnant women was one of the risk factors for MTCT of HIV. Antiretroviral therapy, elective caesarean section and formula feeding can also significantly reduce per partum or postpartum risk of HIV transmission (26).

2.2.8. Knowledge of Mothers about MTCT of HIV and Infant Feeding Practice

A study conducted in South Africa to assess infant feeding practices and maternal knowledge result shows that 78% of HIV positive mothers agreed that HIV could be transmitted by breastfeeding. And 50% of them practiced EFF, 35.6% practiced EBF and 12.4% practiced MF (20).

The study in Nigeria shows that only (58%) of the women indicated that breast milk is a possible route of transmission of HIV, and (24.4%) of the study participants have knowledge on the use of breast milk substitute by HIV positive nursing mothers. Nearly every woman described being instructed by the health care workers on what infant feeding method to practice (27, 28).

The 426 mothers responded that the risk of MTCT of HIV is through breastfeeding (99.8%) and during labor (97.2%), but only 61.5% knew that it can be transmitted during pregnancy. The majority of the mothers knew that it is possible to reduce the risk of transmission during pregnancy (82.2%) and the breastfeeding period (71.6%). Regarding feeding practice, only half of the mothers knew that exclusive breastfeeding can reduce the risk of transmission during the breastfeeding period. (29)

The mother's choice of infant feeding if she had been HIV infected is strongly associated with her PMTCT knowledge ($p < 0.001$), and HIV status of the infant is also associated with maternal knowledge of PMTCT ($p<0.05$) (29).

2.3. HIV Status of Infants with Infant Feeding Practices

Even if the 2010 guidelines recommends to continued breastfeeding till 12 month with extended ARV prophylaxis, the optimal duration of breastfeeding for HIV-exposed infants, that is one which balances the health risks of virus and ARV exposure with the nutritional and immunologic benefits of breastfeeding, is not yet clear (30).

The study in Nigeria shows that infant-feeding practice and HIV status of the infant from HIV positive mothers who have received PMTCT were all of them were negative (0%) in EBF, 7.5% in EFF and 22.2%in MF were HIV positive with PCR test at 6 weeks of age after birth. And the overall transmission rate at 6 weeks of age was 7.4% (9).

Another study in South-eastern Nigeria for Early Infant Diagnosis of HIV Infection with DNA PCR were analyzed that Exclusive breastfeeding (EBF) rate was 35.5%. Out of these babies 18.5% were infected, while 75% of babies were exclusive formula fed (EFF) out of which 4.8% were infected. 15.5% of the babies were mixed-fed, and 68.0%of them were infected with HIV with an overall prevalence of 16.4% (23).

In a study conducted in Addis Ababa, the overall HIV transmission rate from HIV positive mothers during post natal period was 9.1% (17). And a retrospective study conducted in Gondar university referral hospital also shows that the HIV transmission rate during postnatal period in relation to infant feeding practice was highest in mixed feeding 49% followed by exclusive breast feeding 9.3% and the lowest rate were found in formula fed infants 4.3% and the overall transmission rate were 13.4% (25).

Summary of Literatures

To summarize the whole literature reviewed; infant feeding practice for HIV positive mother was challenging in developing countries and it is the primary mode of MTCT of HIV during post natal period particularly mixed breast feeding (MBF). It is associated with an increased in HIV transmission [OR= 6.1, 95%CI= (1.4-25.7)] (17). Transmission through breast feeding was substantially high (46.6%) in conditions where neither the mother nor the infant received PMTCT interventions while it was 4.4% when both the mother and infant received PMTCT interventions (25). The risk factors for an increase transmission rate for HIV positive mothers receiving PMTCT include, infant feeding practices, duration of breasting feeding, infant and maternal health condition, maternal CD4 count and viral load, knowledge on MTCT, PMTCT and also place and mode of delivery as confounding factor were factors for postnatal transmission of HIV. And the suggested intervention was proper provision of PMTCT starting from pregnancy till cessation of breast feeding. So that, having such literature findings this research is used to assess the association of those determinant factors with HIV status of infants born from HIV positive mothers who have received ARV/ART.

The interrelationship between factors and the outcome variable is indicated in the following conceptual framework.

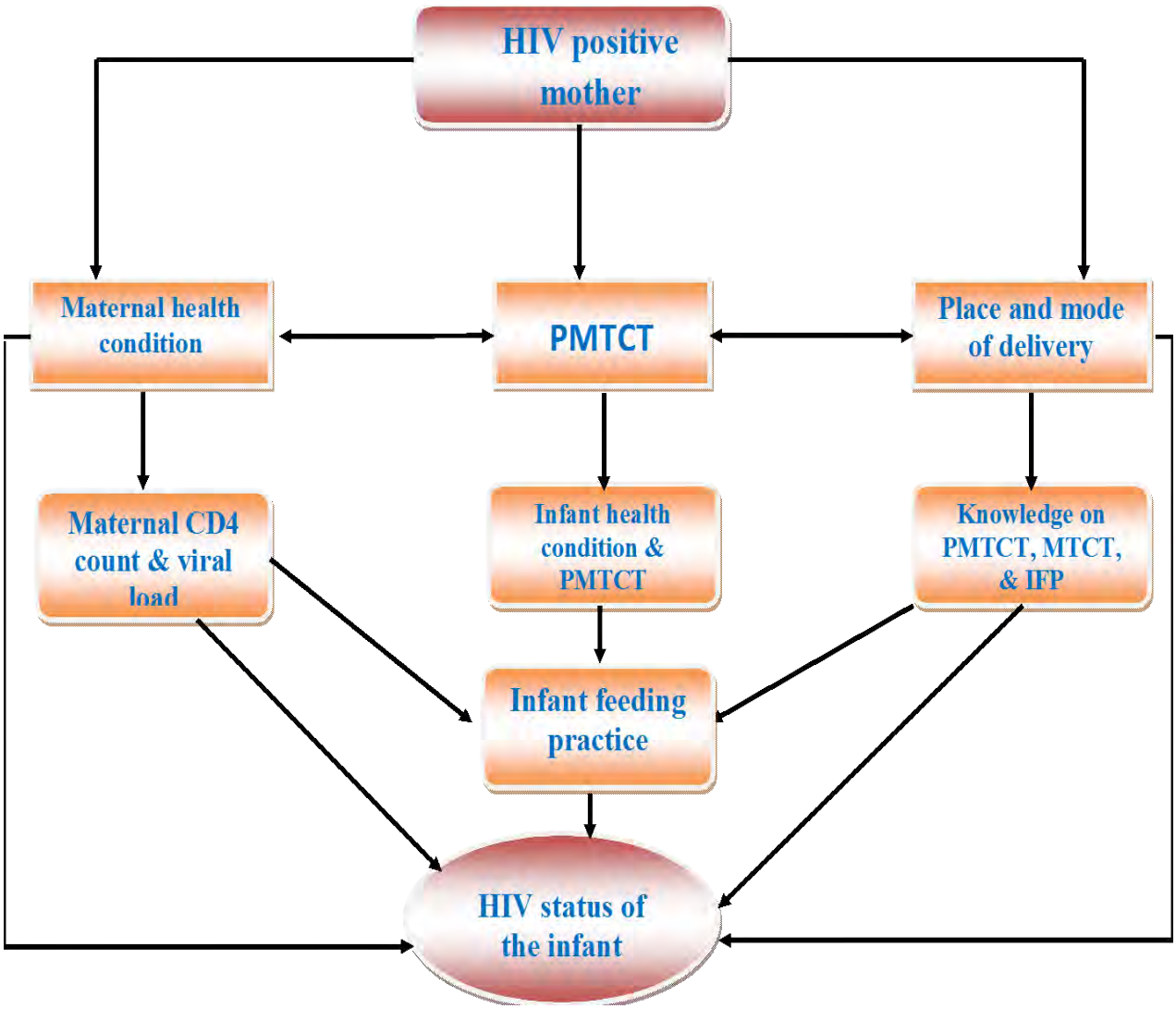

Figure 1: Conceptual frame work on Infant Feeding Practices among HIV Positive Mothers Receiving ARV/ART and HIV Status of Their Infants with its determinants, in South and North Wollo Zone, Amhara Region, Ethiopia.

3. Objective

3.1. General objective

To assess 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.

3.2. Specific objectives

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

4. Methods

4.1. Study design

Institution based Cross-sectional descriptive study was conducted in all health institutions providing ART, PMTCT and care for HIV exposed infant in South and North Wollo Zones, Amhara regional state. The quantitative study was supported by qualitative methods with in-depth interview to assess knowledge of mothers about PMTCT, their infant feeding practice and benefits of infant feeding counseling.

4.2. Study area

The study was conducted in South and North Wollo Zones, Amhara regional state. South and North Wollo are parts of the 11 Zones in Amhara Regional State. The capital city of South Wollo Zone is Dessie, which is about 400 kilo meters to the North of Addis Ababa and for North Wollo Zone is Woldiya which is about 520 kilo meters to the north of Addis Ababa. The two Zones were divided into 31 districts. Based on the 2007census report it had an estimated total population of 4,022,733 of which 2,001,347 were males and 2,019,416 were females; 458,320 (11.4%) of population were urban dwellers.

There were 1049 governmental, private and NGO health institutions. Out of these institutions, five of them were governmental hospitals, three private hospitals, 188 government health centers and 749 governmental health posts, 99 private clinics (9 higher, and 90 medium private clinics) and 5 NGO clinics are found in the zones of which only 35 are ART site (5 government and 3 private hospitals, 26 government health centers, and 1 private higher clinic) which Provide PMTCT and ART services for the mothers and their exposed infants. There were also 58,046 pregnant women attending PMTCT service and 1393 mothers were tested positive for HIV of which 1091 mothers were HIV positive and were receiving full course of ARVP/ART (South and North Wollo Zone health report 2003).

4.3. Study period: The study was conducted from January to April 2012.

4.4. Study Population

Source Population: All reproductive age greater than 18 years HIV positive mothers receiving ARV/ART and having infants less than 12 months of age in South and North Wollo Zones.

Study Subjects: All reproductive age greater than 18 years HIV positive mothers receiving ARV/ART and having infants less than 12 months of age tested for HIV with DNA PCR (polymerize chain reaction antigen test), in South and North Wollo Zones.

For Qualitative Study: key informants for in-depth interview include HIV positive mothers having infant less than 12 months of age and attending in ARV/ART clinic during the study period and were not included in quantitative study.

Inclusion Criteria: HIV positive mothers receiving ARV/ART and having HIV exposed infants less than 12 months of age who were tested for HIV with DNA PCR test.

Exclusion Criteria: HIV positive mothers were not receiving ARV/ART and having HIV exposed infant less than 12 months of age who were not tested for HIV with DNAPCR test.

4.5. Sample Size Determination

Sample size was determined by calculating sample for each objective and taking the highest sample size from the three objectives to increase representativeness and it was calculated by using EPI Info version 3.5.1 statistical software using the following assumptions.

Assumptions: For the first objective, the sample size was calculated by using single population proportion to calculate for the three types of feeding practices and taking the highest prevalence from mixed feeding practice among HIV positive mothers which was 15.3% from a study conducted in Addis Ababa (10). For the second objective the sample size was calculated by using single population proportion with the prevalence of HIV 13.4% from a study done in Gondar university hospital (25). Using 3% marginal error with 95 % confidence of certainty of any outcome was used, Z =Critical value at 95% certainty (1.96) and Size of the target population (N) = 1091 mothers receiving ARV/ART in South and North Wollo Zones. (The 2003 South and North Wollo Zone health report).

$$n_o = (Z_{\alpha/2})^2 \frac{P(1-P)}{d^2} \qquad n = \frac{no}{1 + \frac{no}{N}}$$

For the third objective the sample size was calculated by using double population proportion with the assumption of prevalence of HIV at birth 2.5%(p_0) (non exposed to breast feeding) and the maximum result was found after one year exposure of mixed feeding 10.5% (p_1) prevalence.

$$n = \frac{[(Z\alpha/2 \sqrt{P_0(1-P_0)} + Z\beta \sqrt{P_1(1-P1)}]^2}{P_1-P_0}$$

Using the above assumptions and 10% non response rate, the calculated sample was 404, 375,369 mothers receiving ARV/ART with their infants for the first, second and third objective respectively. The general assumptions were shown in the table below.

Table 1: Sample size determination from source population, South and North Wollo Zone, January – April 2012.

Objective	Population proportion	A	B	Marginal error (d)	P	q (1-p)	N	Sample size
1.Infant feeding practice	Single	0.05at 95%CI=1.96	-	0.03	0.153 (10)	0.847	1091	404
2.prevalence of HIV among infant	Single	0.05at 95%CI=1.96	-	0.03	0.134 (25).	0.866	1091	375
3.determining the risk factor for MTCT of HIV	double	0.05at 95%CI=1.96	0.84 at 80% power		P_0= 0.025 (21)P_1 = 0.105 (5)	q_0=0.975 q_1=0.895	-	379

In general, from the above calculated sample sizes the largest number which was 404 from the first objective with single population proportion was used for this research.

4.6. Sampling Procedures

4.6.1. Sampling Procedures for Quantitative Study

Selection of health institution: Twenty one (21) health institutions were selected from 35 ART sites based on provision of PMTCT and ART service for the mothers and their exposed infants and sending dry blood sample (DBS) to regional laboratory from South and North Wollo Zones. 11ART sites do not fulfill the criteria, do not have pediatric ART service and not send DBS (dry blood sample) for PCR test and were excluded. Another three ART sites were also excluded for pre test purpose. From 21 ART sites a total of 373 study participants who fulfilled inclusion criteria and were visiting the health institutions during the study period were selected based on their order of arrival and the selection were continued until the required sample size was obtained.

4.6.2 Sampling Procedures for Qualitative Study

A total of 10 key informants for in- depth interview were selected from HIV positive mothers having infants less than 12 months of age attending in ART clinic during the study period and who were not participated for the quantitative study were purposively selected from 10 health institutions till reached to a point of redundancy of information.

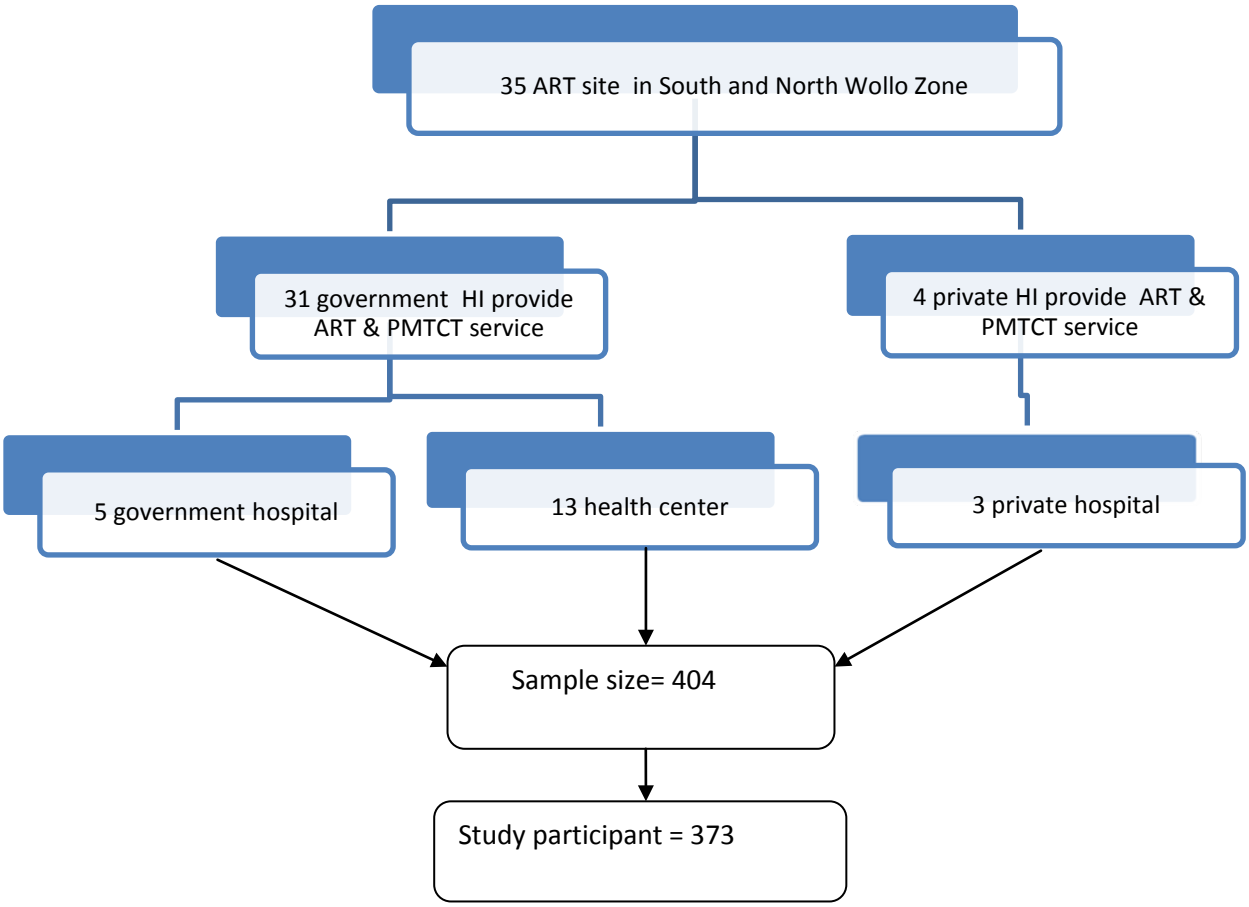

Figure 2: Schematic Presentation of the Sampling Procedure

4.7. Data Collection Procedures

4.7.1 For the Quantitative Study: Data on socio-demographic variables, infant feeding practice, mothers' PMTCT intervention, infant ARV prophylaxis, maternal and infant health condition, maternal CD4count and infants' HIV DNA PCR test results were collected from January to April 2012 by using a pre-tested standardized and structured questionnaire prepared by reviewing prior studies and other materials on the topic with some modification.

The questionnaires were prepared with an aim to answer the main study question of the research in English language and were translated into Amharic language and back to English by principal investigator and other personnel who are fluent on both languages to prevent possible misunderstanding and misinterpretation. The questionnaires contain mainly close ended questions, and also few open ended questions. The interview was conducted by 6 health officers 4 midwife and 11 nurses working in the ART clinic of the health facility and 3 health officers. The principal investigator was supervising them and onsite training was given on the objective, type of the questionnaire, eligibility of the women, confidentiality and other ethical issues to all prior to data collection by the principal investigator. Data collectors approached mothers by introducing themselves, and then they collected information after explaining the purpose of the study by reading the information sheet.

4.7.2 For the Qualitative study: A semi-structured interview guide containing questions to explore infant feeding practice, feeding counseling, and knowledge on PMTCT was designed in English and translated into Amharic and used by the principal investigator to conduct in-depth interview from key informants. The interviewer (PI) took notes through writing, and recorded using tape-recorder. The questionnaires for both study methods were prepared by adapting relevant and standard questionnaires from different published articles and from master's thesis with some modification mainly from a study conducted in Addis Ababa by Maru Y and Haidar J(17) and some from other (6, 10, 31, and32).

4.8. Study Variables

4.8.1. Dependent Variable: HIV status of exposed infant

8.2. Independent Variables: includes educational back ground, 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.

4.9. Operational Definitions

Exclusive breast feeding - Giving infants breast milk only including expressed breast milk not other food or drink even water, with the exception of drops or syrups consisting of vitamins, mineral supplements or prescribed medicines (17).

Predominantly breast feeding – Feeding infants breast milk and other fluids like tea, water and juice but not other milk products (17).

Mixed feeding- Giving baby breast milk and milk products such as formula milk and cow milk including solid and semisolid foods (31).

Replacement feeding- The process of feeding a child with formula or other nonhuman milk or any home prepared fluid (a diet that provides all the nutrients to the infant's needs) for the infants who is not receiving breast milk until the child is fully fed on family foods (17).

Formula feeding- refers to use of commercial infant formula that is formulated from food factories (31).

Complementary feeding- Giving other fluid, solid or semisolid foods in addition to breast milk (17).

Literate -Those individuals learned formal education and able to read and write (6).

Illiterate -Those individuals who were not learned formal education but can read and write or unable to read and write (6).

Sufficient knowledge - Those who mentioned 2 and above transmission methods and, 2 and above prevention method out of four knowledge questions (17).

Insufficient knowledge -Those mothers who mentioned less than two transmission methods and less than 2 prevention method out of four knowledge questions (17).

4.10. Data Processing and Analysis

4.10.1 Data processing

Data entry: Coding, template preparation, entering and cleaning of data were done by the principal investigator using Epi Info 3.5.1 software program. The data were checked and cleaned up by running frequencies, sorting and listing variables for consistency, recoding and the analysis was done by SPSS version 16 soft ware. Missing values were properly handled and three incomplete data were discarded.

Data analysis

Quantitative data

The quantitative data were analyzed using SPSS software version 16 by the principal investigator. Descriptive and summary statistics with frequency, proportion and odds ratio were used to describe the study population in relation to relevant variables and to assess the presence and degree of association between dependent and independent variables. P-Values less than 0.05 were used to decide whether observed differences in proportions were statistically significant or not.

The knowledge of the participants regarding mother to child transmission of HIV/AIDS (MTCT) and prevention of mother to child transmission (PMTCT) was assessed with multiple response analysis. A total of four closed ended questions were forwarded for each to assess the knowledge of mothers about MTCT and its prevention methods. Accordingly, those who mentioned 2 and above transmission methods and 2 and above prevention methods were considered as having sufficient knowledge.

Logistic regression for bivariate and multivariate analysis with COR and AOR with 95% CI was done to see the effect of independent variables on the outcome variables and to control the possible confounding effects.

Qualitative data

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.

4.11. Data quality management

- Data quality assurance was in place during questionnaire designing, data collection, entry and analysis.
- The questionnaires were objective based, logically sequenced, free of scientific terms, and non-leading.
- The questionnaire were pretested for clarity, flow, cultural, moral fitness and time requirement for 5% of the sample size in unselected health institutions before the actual data collection was started.
- The data collectors and supervisors were given an intensive training and each data collector checked the questionnaires for completeness before winding up the visit to each study participant. The supervision was undertaken on weekly bases and the principal investigator follows them on site for the nearby place and with cell phone for distance health institutions.
- The collected data were checked by the Principal investigator for any incompleteness and/or consistency.
- The data were entered to Epi Info version 3.5.1 for validation then cleaning by using simple frequency, listing and sorting and analyzed with SPSS version 16 software.

4.12. Ethical Consideration

The study was conducted by obtaining ethical clearance and approval from Addis Ababa University, School of public health, Ethical committee. Permission was obtained from South and North Wollo Administrative Zone Health Bureau and from respective health institutions, and informed consent was obtained from individual respondents. All the interviews with subjects were made with strict privacy after getting informed consent from the respondents and assuring the confidential nature of the responses and name and other identifiers were not written in the questionnaire. The right of the respondents to refuse answer for few or all of the questions was respected and they were interviewed based on their willingness to participate in the study.

4.13 Dissemination of the Results

The output of this study will be submitted to Addis Ababa University, College of Health Sciences/ School of Public Health as partial fulfillment of master's degree in public health. It will also be disseminated to South and North Wollo Zone Health Bureau, Amhara Regional State Health Bureau, and other concerned governmental and non-governmental organizations. Attempts will be made to publish the article in peer reviewed journal and to make presentations in scientific conferences.

5. Results

The study took place between January and April 2012 in South and North Wollo Zone. A total of 373 mothers receiving ARV/ART were interviewed with the response rate of 92.3%.All mothers had a history of antenatal and postnatal follow up and have received ARV prophylaxis during antenatal and postnatal period.

5.1 Socio-demographic Characteristics of the Mothers

The mean age (SD) was 28.97(5.92) years, ranging from 19 to 45 years. About 60% of the respondents were in the age group 25-34 years. Majority of the participants 232(62.2%) were from the urban areas of South and North Wollo Zone, 71% of the mothers were married. Almost all of the respondents were from Amhara ethnic group, 353(94.6%). About 58.4% of the mothers were house wives with monthly household income of less than 500 ETB. About 54.4% of the respondents were Muslims followed by Orthodox Christians which constituted nearly 42.9% of the overall study subjects. About 31.9% of the mothers were illiterate (Table 2).

Table 2: Socio-demographic characteristics of mothers, South and North Wollo Zone, Ethiopia, January -April 2012

Variable	No. of participants (n=373)	%
Age		
15-24	72	19.3
25-34	224	60.1
≥35	77	20.6
Residence		
Urban	232	62.2
Rural	141	37.8
Marital status		
Married	265	71
Currently unmarried	108	29*
Educational status		
Illiterate	119	31.9
Literate	82	22
Grade 1-8	108	29
Grade 9.10+2	42	11.3
12^{th} and above	22	5.9
Religion		
Muslim	203	54.4
Christian	170	45.6
Ethinic group		
Amahara	353	94.6
Tigrie	18	4.8
Oromo	2	0.5
Occupation		
Gov't employed	38	10.2
Private employed	42	11.3
House wife	218	58.4
Other	75	20.1
Monthly income		
< 500	220	59
500-1000	81	21.7
>1000	72	19.3

N.B * currently unmarried includes single, divorced, widowed and separated.

5.2 Socio-demographic Characteristics of the Infants

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. (Table3).

Table 3: socio-demographic characteristics of infants, South and North Wollo Zone, January - April 2012

Variable	**Frequency(n=373)**	**%**
Age		
2-6 months	115	30.8
7-11 months	258	69.2
Sex		
Male	182	48.8
Female	191	51.2
Birth weight	n=247	
<2.5 kg	57	23.07
≥2.5kg	190	76.9
Age at 1st HIV test		
At 6 weeks	293	78.6
2-6 month	70	18.7
7-11 months	11	2.7
Age at second PCR test		
2-6 months	6	8.7
7-9 months	50	72.4
10-11 months	13	18.8

5.3 Obstetric and ARV Prophylaxis History of Mothers and their Infants

All of the mothers had attended ANC follow up 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 postpartum 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 (Table 4).

Table 4: Obstetric and ARV prophylaxis history of mothers and their infant, South and North Wollo Zone, January - April 2012

Variable	Frequency (n = 373)	%
Time of first ANC visit		
First trimester	89	23.9
Second trimester	250	67
Third trimester	34	9.1
Frequency of ANC visit		
One time	12	3.2
Two times	42	11.3
Three times	139	37.3
Four or more times	180	48.3
Type of ARV/ART during pregnancy		
On ART	172	46.1
AZT(ARV prophylaxis)	201	53.9
Duration of ARV during pregnancy		
≥ 4 wks before delivery	359	96.2
< 4 wks before delivery	14	3.8
Infant feeding counseling during pregnancy		
Yes	216	57.9
No	157	42.1
Place of delivery		
Home	39	10.5
Health institution	334	89.5
Mode of delivery		
SVD	314	84.2
C/S	27	7.2
Episiotomy/ vacuum	32	8.6
ARV prophylaxis at the onset of labour		
Yes	177	47.5
No	196	52.5
Type of ARV/ART during postpartum		
On ART	178	47.7
AZT+3TC(ARV prophylaxis)	195	52.3
Initial time for infant ARV		
Immediately after birth	306	82
Within 24hr	60	16.1
Within 72 hr after birth	7	1.9
Type of ARV for the infant		
AZT+3TC+sdNVP for 7days	334	92.2
AZT+3TC+sdNVP for 4 wks	29	7.8
Infant feeding counseling during postnatal		
Yes	294	78.8
No	79	21.2

5.4. 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 respectively (Table 5).

Table 5: Maternal knowledge on MTCT and PMTCT, South and North Wollo Zone, January - April 2012

Variable	Frequency (n=373)	%
Possibility of MTCT		
Yes	364	97.6
No	9	24
Knowledge on MTCT		
Sufficient	286	76.7
Insufficient	87	23.3
Knowledge on PMTCT		
Sufficient	217	58.2
Insufficient	156	41.8

5.5 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 (Table 6).

Table 6: Infant feeding practices among mothers receiving ARV/ART, South and North Wollo Zone, January - April 2012

Variables	**Frequency (n= 373)**	**%**
Ever breast fed		
Yes	323	86.6
No	50	13.4
Duration of breast feeding(n=179)		
0-3 Month	43	24
4-6 Month	59	32.9
7-11 Month	77	43
Complimentary feeding		
Yes	267	71.6
No	106	28.4
Age of infant at complementary feeding		
At 6 month	211	79
4-5 month	14	5.2
7-11month	42	15.7

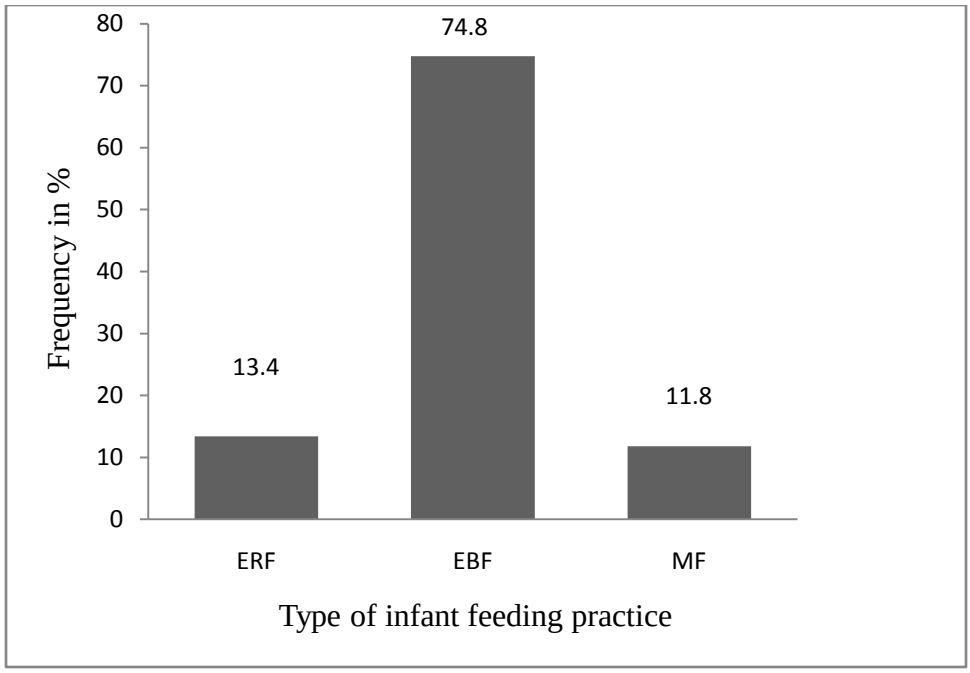

Figure 3: Infant feeding practices of mothers receiving ARV/ART in South and North Wollo Zone, January-April 2012.

ERF – Exclusive replacement feeding, EBF – exclusive breast feeding and MF – mixed feeding

5.6 Maternal and Infant Health Conditions

Out of the 373 respondents, 46(12.3%) encountered health problems; the problems mentioned were breast and nipple problems in 16(34.8%). And the rest 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%) reported that their 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 (Table 7).

Table 7: Maternal and infant health condition among mothers receiving ARV/ART, South and North Wollo Zone, January - April 2012

Variables	Frequency	%
Maternal illness(n=373)		
Yes	46	12.3
No	327	87.7
Type of maternal illness(n=46)		
Breast related	16	34.8
Non breast related	30	65.2
Change of feeding style during illness(n=46)		
Yes	21	45.6
No	25	54.4
Infant illness(n=373)		
Yes	78	20.9
No	295	79.1
Type of infant illness(n=78)		
Fast/difficulty of breathing	17	21.7
Mouth sore	27	34.6
Diarrhea	34	43.6
Change of feeding style during illness(n=78)		
Yes	35	44.9
No	43	55.1

5.6 Maternal CD4 Count

Majority 200(60.8%) of mothers' CD4 count lies between 200- 500cell/mm^3 whereas 15(4.5%) of the mothers' CD4 count were less than 200cell/mm^3 (Figure 4).

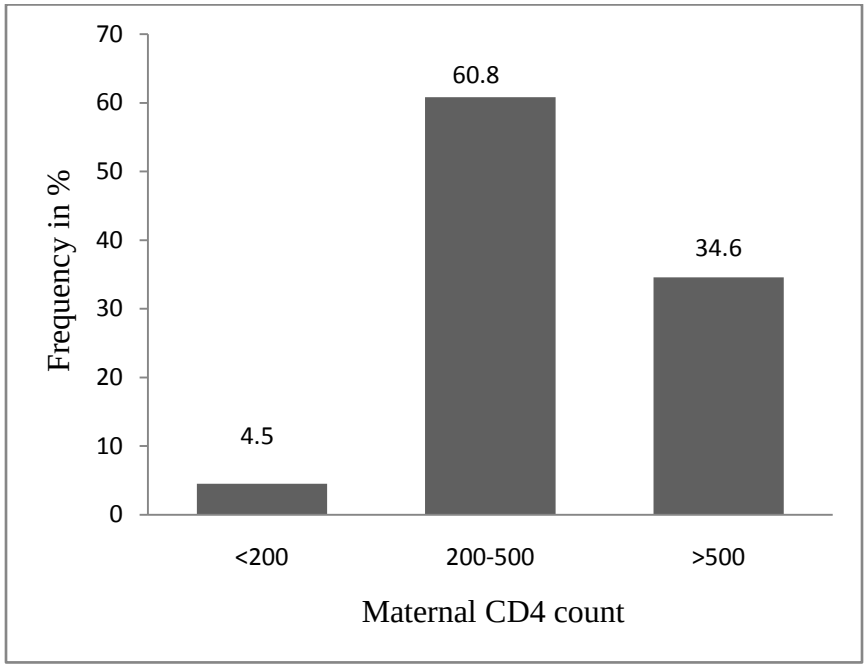

Figure 4: CD4 count of HIV positive mothers receiving ARV/ART in South and North Wollo Zone, January- April 2012

5.7 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.

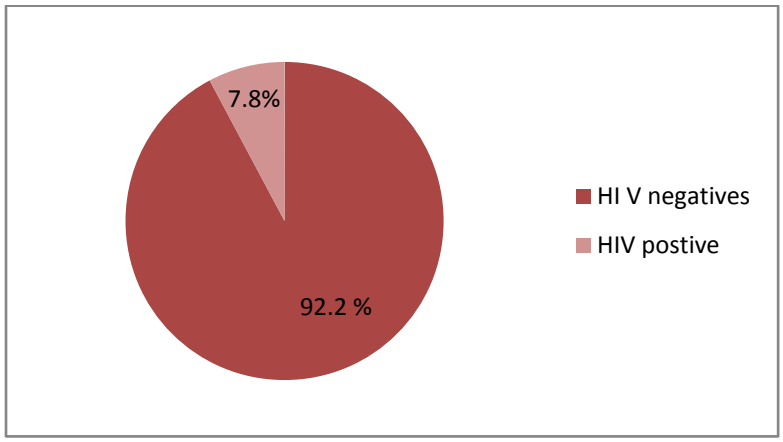

Figure 5: HIV status of infants, South and North Wollo Zone, January - April 2012

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%).

5.8 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 the case of replacement 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 pregnancy (Table 8). -

Table 8: Age specific HIV transmission rate by infant feeding practice and type of ARV/ART prophylaxis during postnatal period, South and North Wollo Zone, January – April 2012.

Variable	Number	Transmission rate at 6 weeks (95%CI)	2-6 month transmission rate (95%CI)	7 - 11month Transmission rate (95% CI)
Infant feeding practice				
ERF	50	2.3 (0.12, 10.94)	0	0
EBF	279	4.1 (2.02, 7.41)	9.6(3.60, 20.03)	12.5 (0.63, 48.03)
MF	44	22.5 (10.45, 39.64)	50 (23.38,76.62)	0
Mothers ARV during postnatal				
On ART	178	3.55(1.31,7.68)	9.1(2.36,22.78)	0
ARV prophylaxis	195	7.90(4.35,13.03)	21.6(10.58,36.96)	16.7(0.83,59.09)
Infant ARV status				
SdNVP+AZT+3TC for 7 days	344	5.2 (3.02, 8.44)	14.7 (7.72, 24.65)	11.1 (0.56, 43.86)
SdNVP+AZT+3TC for 4 wks	29	11.5(3.02, 28.27)	50 (2.5, 97.5)	0

ERF (exclusive replacement feeding), EBF (exclusive breast feeding), MF (mixed feeding)

HIV Transmission Rate by Type of ARV Prophylaxis to Mothers and Infants and Age of Infant

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%) (Figure 6).

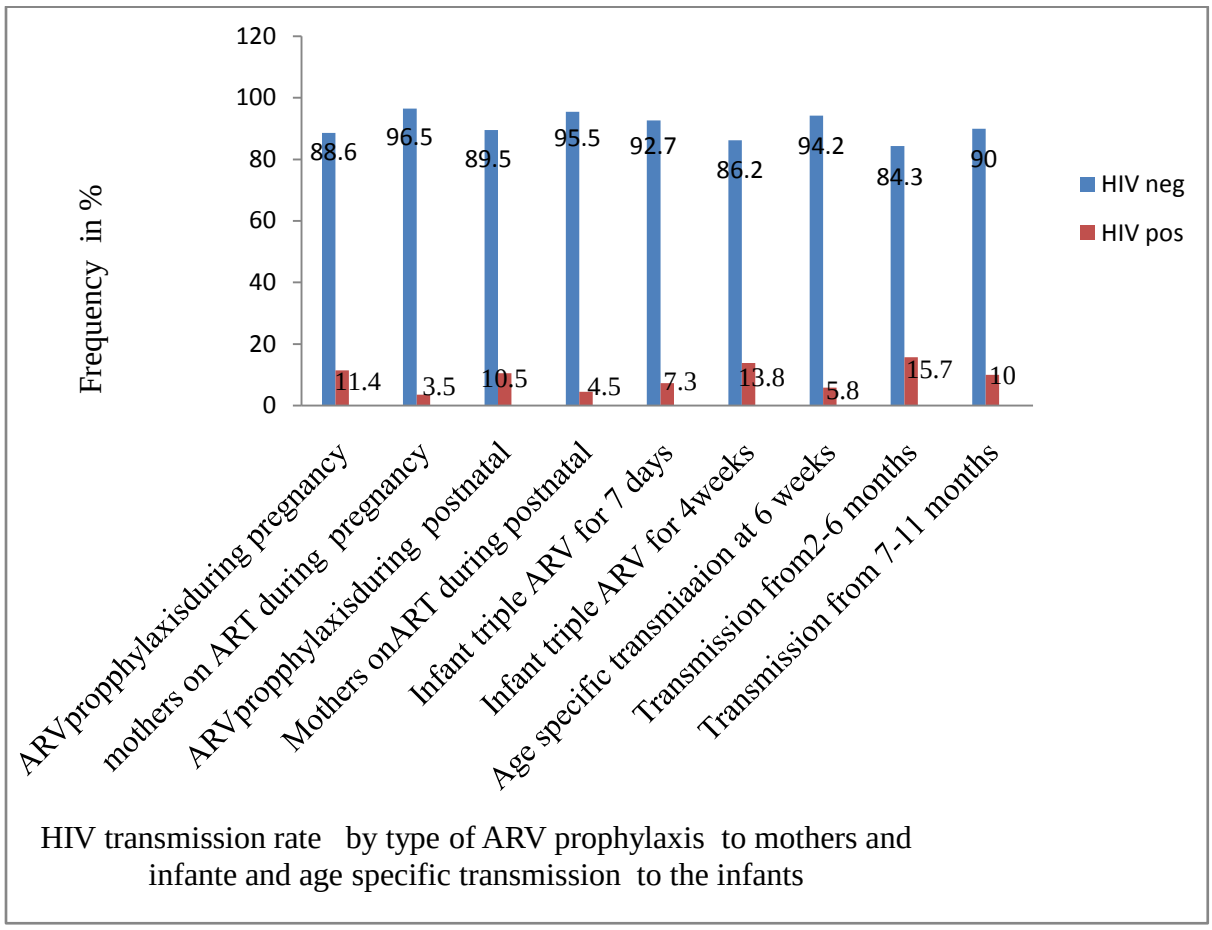

Figure 6: HIV transmission rate by type of ARV prophylaxis to mothers and infant and age specific transmission to the infants, South and North Wollo Zone, January – April 2012.

5.9 Factors Associated with HIV Status of the Infant, Bivariate Analysis

In this study different independent factors were tested for their association with HIV status of infants, and this is shown in the tables below.

Table 9 presents selected socio-demographic variables and their relation to HIV status of infants. Based on bivariate analysis only place of residence shows significant association. 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.

Table 9: socio demographic factors in relation to HIV status of the infant whose mothers were receiving ARV/ART in South and North Wollo Zone, Ethiopia, January – April 2012

Variables	HIV status(n=373)		COR (95% CI)
	Positive	Negative	
Age			
15-24 years	7	65	1.0
25-34 years	15	209	0.67 (0.26, 1.71)
≥35 years	7	70	0.93 (0.31, 2.79)
Residence			
Urban	12	220	1.0
Rural	17	124	2.51 (1.16, 5.43)*
Marital status			
Married	18	247	1.0
Currently unmarried	11	97	1.56 (0.71,3.42)
Educational status			
Literate	17	155	1.73 (0.80, 3.70)
Illiterate	12	189	1.0
Occupation			
House wife	18	200	1.0
Employed	4	76	0.58 (0.19, 1.78)
Other	7	68	1.14 (0.46, 2.86)
Monthly income			
<500	15	205	0.81 (0.3,2.16)
500-1000	8	73	1.21 (0.32, 3.65)
>1000	6	66	1.0

*significant at p-<0.05

Table 10 indicates socio-demographic factors of the infants with respect to their HIV status. Infant's birth weight has an association with HIV status. 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.

Table 10: Socio demographic characteristics of HIV-exposed infants in relation to their HIV status, North Wollo Zone, January - April 2012

Variables	**HIV Status**		**COR (95%CI)**
	Positive	**Negative**	
Age of infant			
2-6 Month	13	102	1.0
7-11Month	16	242	0.52 (0.24,1.12)
Sex			
Male	13	169	1.0
Female	16	175	1.19 (0.55,2.55)
Birth weight			
<2.5kg	7	50	3.66 (1.23, 10.9)*
≥ 2.5 kg	7	183	1.0
Age at first PCR test			
At 6 Wk	17	276	1.0
2-6 month	11	59	3.02 (1.35, 6.8)**
7-11 month	1	9	1.8 (0.22, 15)
Age at second PCR test			
3-6 month	2	4	1.0
7-9 month	4	46	0.17 (0.02, 1.26)
10-11 m0nth	3	10	0.6 (0.07, 5.1)

*****Significant at p-value < 0.05 ** Significant with Fisher's exact test

Table 11 indicates obstetric and ARV prophylaxis history of mothers and their infants in relation to HIV status of infants. Except ARV prophylaxis at the onset of labor and type of ARV prophylaxis for the infants, other variables show significant association with HIV status of infants. Based on this analysis, 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: Obstetric and ARV prophylaxis history of mothers and their infants in relation to HIV status of infants, South and North Wollo Zone, Ethiopia, January - April 2012

Variables	HIV status(n=373)		COR(95% CI)
	Positive	**Negative**	
Time of first ANC visit			
First trimester	5	84	1.0
Second trimester	17	233	1.23 (0.44,3.43)
Third trimester	7	27	4.36 (1.28,14.8)*
Type of ARV during pregnancy			
On ART/HAART	*6*	166	1.0
ARV prophylaxis (AZT)	23	178	3.58 (1.42,8.99)*
Duration of ARV During pregnancy			
≥ 4wks before delivery	25	334	1.0
< 4wks before delivery	4	10	5.34 (1.56, 18.26)*
Place of delivery			
At home	10	29	5.7 (2.43,13.4)*
Health institution	19	315	1.0
Mode of delivery			
SVD	20	294	1.0
Operational D	9	50	2.65 (1.14,6.14)*
ARV at onset of labor			
Yes	14	163	1.0
No	6	152	0.46 (0.17,1.23)
Type of ARV at postpartum			
On ART	8	170	1.0
ARV prophylaxis (AZT+3TC)	21	174	2.57 (1.11,5.95)*
Duration of ARV/ART at Postpartum period			
For 7days	23	173	3.79 (1.51,9.54)*
Continuous/ART	6	171	1.0
Type of ARV for the infant			
AZT+sdNVP+3TCfor 7days	25	319	1.0
AZT+sdNVP+3TCfor 4wks	4	25	2.04 (0.66,6.33)

*****significant at p-value < 0.05

Infant Feeding Practice in Relation to HIV Status of the Infants

Bivariate analysis of infant feeding practice in relation with HIV status of the infant, 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 (Table 12).

Table 12: Infant feeding practice in relation to HIV status of the infants, South and North Wollo Zone, January - April 2012

Variables	HIV status(n=373)		COR (95%CI)
	positive	Negative	
Infant feeding practice			
ERF	1	49	0.049(0.006, 0.39)**
EBF	15	264	0.135(0.059, 0.311)*
MF	13	31	1.0
Duration of breast feeding			
0-3 Month	5	38	1.0
4-6 Month	7	52	1.02 (0.32,3.47)
7 – 11 Month	12	65	1.40 (0.46, 4.29)
Complementary feeding			
Yes	18	250	1.0
No	11	94	1.63 (0.74, 3.57)
Age at complementary fed			
At 6 month	14	197	1.0
4-5 months	2	12	2.35 (0.48, 11.52)
7- 11 months	2	40	0.70 (0.15, 3.22)
Infant feeding counseling at pregnancy			
Yes	15	201	1.0
No	14	143	1.31 (0.61, 2.80)
Infant feeding counseling at postnatal			
Yes	16	278	1.0
No	13	66	3.10 (1.43, 6.98)*
PMTCT Knowledge of mother			
Sufficient	8	209	1.0
Insufficient	21	134	6.55 (2.59, 16.5)*
MTCT Knowledge of mother			
Sufficient	20	266	1.0
Insufficient	9	78	1.54 (0.67,3.50)

*Significant at P<0.05, **Significant with Fisher exact test

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

In crude analysis of maternal and infant health condition in relation to HIV status of infants shown in table 13, mothers with CD4 count below 200cell/mm^3 were more than eight times more likely to have HIV positive infant than those mothers who have CD4 count >500cell/mm^3 [COR=8.83, 95% CI=(2.51, 31.0)]. The likelihood of infants to become HIV positive were more than four times from mothers who were experiencing illness than those infants whose mothers who did not experiencing any of illness [COR=4.50, 95%CI=(1.94, 10.4)]. And infants' illness have also significant association [COR=7.70, 95% CI= (3.48, 17.2)] with their HIV status. Types of maternal and infant illness were not significantly associated.

Table 13: Maternal and infant health condition in relation to HIV status of the infant, South and North Wollo Zone, Ethiopia, January - April 2012

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<0.0 5%

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)] (Table 14).

Table 14 Determinant factors associated with HIV status of the infant among HIV positive mothers, South and North Wollo Zone, Ethiopia, January -April 2012.

Variables	HIV Positive	HIV Negative	COR (95%CI) (n=373)	AOR (95%CI)
Place of residence				
Urban	12	220	1.0	1.0
Rural	17	124	2.51 (1.16, 5.43)*	1.56 (0.54, 4.51)
Place of delivery				
Home	10	29	5.7 (2.43,13.4)*	5.00 (1.45, 17.17)*
Health institution	19	315	1.0	1.0
Maternal illness				
Yes	10	36	4.5 (1.94, 10.4)*	4.61(1.52, 13.96)**
No	19	308	1.0	1.0
Infant illness				
Yes	18	60	7.7 (3.48, 17.2)*	7.23(2.64, 19.78)**
No	11	284	1.0	1.0
Time of first ANC visit				
First trimester	5	84	1.0	1.0
Second trimester	17	233	1.23 (0.44,3.43)	0.72 (0.17, 3.00)
Third trimester	7	27	4.36 (1.28,14.8)*	1.30 (0.21, 7.85)
Type of ARV at postnatal				
On ART	8	170	1.0	1.0
ARV prophylaxis	21	174	2.57 (1.11,5.95)*	1.81 (0.60, 5.58)
Mode of delivery				
SVD	20	294	1.0	1.0
Operational/instrumental	9	50	2.65 (1.14,6.14)*	5.20(1.60,16.95)**
Mothers knowledge on PMTCT				
Sufficient	8	209	1.0	1.0
Insufficient	21	134	6.55 (2.59,16.5)*	3.35 (1.22, 9.15)*
Infant feeding practice				
ERF	1	49	0.049(0.006,0.39)***	0.12 (0.012, 1.29)
EBF	15	264	0.135(0.059,0.311)*	0.23(0.08, 0.68)**
MF	13	31	1.0	1.0
Feeding counseling at postnatal				
Yes	16	278	1.0	1.0
No	13	66	3.1(1.43,6.98)*	1.80 (0.63, 5.13)
Age at first PCR test				
At 6 Wk	17	276	1.0	1.0
2 - 6 month	11	59	3.02 (1.35, 6.8)**	2.31(0.74, 7.20)
7-11 month	1	9	1.8 (0.22, 15)***	1.82(0.18, 18.53)

*Significant at $p < 0.05$ ** Significant at $p < 0.001$, ***Fisher's Exact Test

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 includes voluntary counseling and testing, ANC follow up, taking ARV/ART prophylaxis for the mother and for the infant, getting counseling on infant feeding, counseling on transmission, attending safe delivery in health institutions and disclosing the status to partner and to others.

A 28 years old HIV positive mother said that

"If the mother is once infected with HIV; it is better not to have a child (baywlede yeshalale). But if so, let's prevent an innocent child. we should attend all follow up during pregnancy, taking preventive medicine, immunization and advice, disclosing HIV status to others, not to deliver at home, not only for me, all HIV positive mothers should not deliver at home since during delivery the blood and other fluid can contaminate the baby and this can increase transmission. In addition to this, exclusive breast feeding till six months can prevent transmission".

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.

A 26 years old mother said that

"after I knew my HIV status, I was confused but the presence of preventive service and mother to mother support groups gave me full of hope and I had received preventive medicine and follow the advice from health professionals and mothers support group in order to save my baby from HIV".

Concerning the benefit they get, almost all mothers said that getting HIV negative infant was the great issue for them.

A32 year's old mother said that

"getting HIV negative child is a great gift from my God in order to replace myself through this preventive service and thanks to my God and the government to provide such service, it's good for me and the coming generation".

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 (to give breast milk for the first six months) and replacement feeding (giving formula milk as a method of infant feeding for HIV positive mothers).

A 24 years old HIV positive interviewee said that

"babies should be feed only breast milk for the first six months but if the mother is capable to use other replacement foods like cow milk, NIDO or buy powder milk (formula milk), the mother should continue with it".

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.

A 25 years old mother said that

"*Health professionals gave us provides advice starting from pregnancy to practice breast feed only or replacement feed till six months then to continue breast feeding till one year with complementary feeding. But they couldn't show us about the preparation of replacement food or other formula"*.

Another 32 years old mother said that

"*Infant feeding counseling for me has equivalent value with preventive medicine, even more than that to save our infants. Even though health professionals were too busy to convince us, they have tried to solve the problem. And thanks to my God and the government for the presence of mother to mother support, they over took the responsibilities of health professionals and becomes more convincing in giving infant feeding counseling".*

Infant Feeding Practices and Benefits

Among the 10 participants involved for in-depth interview, six of them were practicing EBF; two of them practiced replacements and the other two practiced mixed feeding.

A 26 years old HIV positive interviewee said that

"*I have practiced replacement feeding, cow milk for the first two months and home prepared formula ("abesh") till six months, it is preventive, my child was tested three times and become HIV negative in all the tests. What I would like to say that taking preventive drug during pregnancy and after delivery with exclusive replacement or breast feeding can prevent 100% since I have confirmed it with my child".*

Another 35 years old mother said that

"I have practiced exclusive breast feeding, nothing to give to him through mouth except bacterium, I have tried to give special care during bathing from any water entering to his mouth. A very surprising thing what I tell you is that I believe in orthodox Christian, and the age of my child is five months. But he is not being baptized till now due to the fear of entrance of any fluid through his mouth and HIV transmission since I knew a woman who mixed fed her child and then become HIV positive".

Another 23 years old participant said that

"I made a mistake for the second time on the health of my child during breast feeding. That was practicing mixed feeding because of my breast problem and that caused my child to become HIV positive. And because of that I feel guilty. But I am hopeful and pray for my God to save my child again and advise others on not to use mixed feeding".

Challenges on Infant Feeding Practice and PMTCT

Majority of the mothers explained that financial problem is one of the challenges for ERF as well as EBF.

A24 year's old participant said that

"In the case of HIV infection including me the challenge is economic problem; job insecurity in the case of private employment after knowing HIV status. I had one experience in private institution, my employers gave me job release after they know my HIV status, due to fear of loss of customers, now stigma and discrimination seems to be improved but some problems may persist".

Another 25 years old participant said that

"*Let alone replacement feeding, exclusive breast feeding from yourself needs financial support or food since without food you couldn't produce breast milk. Scarcity of drug particularly bacterium and side effect of preventive drug were also challenging for us".*

Suggestion on the Improvement of PMTCT Service

Almost all participants said that mothers should attend follow up during pregnancy, labor and postnatal period, receive ARV prophylaxis and health professional advice. On the other hand the government should also support us and be involved in giving food, enabling the women to have their own income source, increasing availability of drug supply, providing opportunistic infection treatment free of charge and improving quality of service.

A28 year's old participant said that "*It is nice to have preventive care in health institutions, getting such service and preventing our child from HIV is our responsibility. And the government should improve the availability of drug supply, improve the quality of care and help the women by enabling them to have their own income source through small business enterprises.*"

Another participant said that

"We need to have support whether we are poor or not, support with advice, preventive medicine and financial support for food makes a change in our life.

6. Discussion

The study presented here elucidates the prevalence of infant feeding practice and determinant factors on HIV status of infants among HIV positive mothers receiving ARV/ART in South and North Wollo Zones.

The result of this study revealed that majority (74.8%) of the participants experienced exclusive breast feeding, 13.4% and 11.8 % experienced exclusive replacement feeding and mixed feeding respectively. This finding is almost 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 which shows (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 which shows (80%) (6), and two studies conducted in Nigeria which show (70.45) (15), and (18%) (14). The prevalence of ERF (13.4%) in this study is comparable with a study in Gondar which shows 10% (25) but it is much higher than a study conducted in Jimma which shows 0.4% (6) and much lower than a study conducted in Cameroon which shows 85% (13), Addis Ababa which shows 46.8% (10) and the two studies conducted in Nigeria which show 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 MSG (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.

"*Let alone replacement feeding, exclusive breast feeding from yourself needs financial support or food since without food you can't produce breast milk*".

It is convincing that mother to mother support group advice/service makes a great change on infant feeding practices in relation to prevention of MTCT of HIV. Therefore, it should be availed and sustained in all health care facility, and also economical support is also necessary to improve maternal life, PMTCT of HIV and child survival.

The overall prevalence of HIV which is 7.8% in the study area is comparable with the finding in Addis Ababa which is (9.1%) (17), and in Nigeria which is (7.4%) (9). But it is much lower than the finding in Gondar which is 13.4% (25) and in South East Nigeria which is 16.4% (23). This is due to the reason that all (100%) of 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 and it should be promoted in PMTCT program.

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 which shows 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

This study presents that 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 due to the reason that 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.

From these we can 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 postnatal 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. Therefore, more advocacy work is needed to encourage more on adherence of exclusive breast feeding.

Determinant Factors for HIV Status of the Infants

As described above, 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 [AOR=0.23,95%CI=(0.08, 0.68)]. This is consistence with WHO guidelines, and with studies done in Zimbabwe, Gondar and South- Nigeria (1, 5, 25, 34) respectively. This may be due to exclusive breast-feeding for the first 6 months with ARV/ART assumed to be preventive. However, the mechanism of exclusive breast-feeding protection is un-known; but is hypothesized to be mediated through reduced mastitis, viral load in breast milk and the chance of gastrointestinal infection to the infant (5).

Infant illness was found to be a significant predictor of HIV status in infants who have an illness during breast feeding period were 7 times more likely to become HIV positive than infants who did not have an illness [AOR =7.23, 95%CI = (3.42, 23.24)], which is comparable with a cohort study in Kenya, which shows that oral thrush is associated with an increased risk of postpartum transmission of HIV-1 [OR=2.8, CI 95%=(4.9, 7.5)]. Thrush and mastitis both result in immune activation and oral thrush is associated with inflammation of the infant's oral and gastrointestinal tract and it also interrupts the mucosal barrier to transmission (33). A similar study in Cameroon reveals mouth sore (oral thrush), fast or difficulty of breathing, fever, diarrhea, malnutrition, and poor defenses against HIV are the risk factor for MTCT of HIV (13). This can reduce body defense against HIV by infection and the preference of mothers to change their feeding style to mixed feeding at a time of infant illness may increase the chance of transmission.

In this study, 20.9% of infants had encountered at least one illness since birth through the time of breast feeding commonly diarrhea (43.6 %), of all infant illness 45% of mothers change their feeding style to mixed feeding during infant's illness. Similar finding reported by a study done in Addis Ababa shows that one third of the infant (42.2%) had encountered at least one illness since birth and infant illness was one of the determinants for mixed feeding accounts (6%) (10).Therefore, it is important to encourage mothers to seek prompt treatment at a time of any infant illness rather than to change their feeding practice.

Maternal illness was also significant factor for HIV status of the infant. In this study the odds of infants being HIV positive were 4.6 times higher for those whose mothers had breast related problem than for those whose mothers had no such problem. This is similar with other study done in Addis Ababa the odds of HIV positive result on infants were 6 times higher in mothers having breast related problem (17) and also consistent with longitudinal cohort study in Kenya were the odds of HIV positive result among infant with whose mother having maternal nipple lesions were 2 times, mastitis 3 times, and maternal CD4 cell count < 400 mm3 more than 4 times higher than those whose mothers had not (33). This is because of engorged breast cracked nipple and low maternal CD4count which increase viral load in breast milk (5, 13, 16, 21), cracked nipples becomes frequently bleed at the time of infant feeding, thereby probably increasing the exposure to plasma as well as cell-associated virus (33).

Another speculation to explain this association could be that immune activation associated with mastitis, which resulting in an increased circulating activated HIV-1-infected CD4 cells, may also potentially increase maternal plasma viral load, resulting in higher levels of virus in breast-milk (33), and direct transmission of virus from cracked/sore nipple during breast feeding. And the change of mothers' feeding practice (45.6%) to mix at a time of illness also increases the risk of transmission. It is also supported a case in the qualitative study on the causes of mixed feeding with breast related problem resulted in HIV infant. Therefore it is important to give more advice for mothers to get timely treatment whenever they experience illness.

This study reveals that maternal knowledge on PMTCT was significantly associated with HIV positive status of the infants. Mothers who have insufficient knowledge of PMTCT were three times more likely to have HIV positive infants (AOR=3.35, 95%CI= (1.22, 9.15)]. This is comparable with a study done in Tanzania which shows that HIV status of infants was associated with maternal knowledge on PMTCT ($p<0.05$) (29). This is due to the mother's choice of infant feeding practice was strongly associated with her PMTCT knowledge ($p < 0.001$) (29). This is also supported by key informants from qualitative study; majority of them mentioned option of PMTCT, practiced most of the preventive methods and they had HIV negative infants. Therefore it is important to expand infant feeding counseling, PMTCT and ART service at least in all health centers.

In this study, place of delivery was also found to be a significant factor for HIV status of the infants. Infants born at home were 5 times more likely to become HIV positive those who were born in health institution (AOR= 5.00, 95%CI = (1.45, 17.17)], or the transmission rate for mothers who deliver at home were 25.6 % as compared with 5.7% for whom deliver in health institution. This was supported by a study done in London which shows that the rate of MTCT from mothers who deliver in health institutions with C/S, avoid breastfeeding, and/or practice exclusive breastfeeding was less than 2%. Infants who were born at home were more likely to become HIV positive due to the reason that the birth was handled by unskilled birth attendant and hence the risk of contamination was high. It was supported with qualitative study on not to deliver at home.

A 28 years old participant from in- depth interviewer explained that

"Delivering at home is not good, not only for me but for all HIV positive mothers, they should not deliver at home since during delivery the blood and other fluid can contaminate the baby and this increases the probability of transmission".

Mode of delivery had also a significant association with HIV status of infants. Operational and instrumental delivery had more than 5 times more likely to have HIV positive result of the infant than SVD, and this is due to contamination or direct contact of maternal blood with infant blood (26).HIV positivity rate in this study was 6.4% for normal delivery (SVD) and 15.3% in case of instrumental and operational delivery and also 7.4% with C/S. This is inconsistent with a study done in London with MTCT rates of less than 2% (2). This is due to the reason that 86.6 % of the infants in this study were exposed to breast feeding and C/S was not elective whereas in the case of the study in London mothers were taking antiretroviral prophylaxis, elective Caesarean section and refrained from breastfeeding. In this study, SVD with ARV/ART prophylaxis had shown relatively low risk and hence should be encourage in health care facilities.

7. Strengths and limitations

7.1 Strengths of the study

- Quantitative method was triangulated with qualitative method
- Data collection tool was pre tested prior to the actual data collection time.
- It covers large study area

7.2 Limitations of the study

- Due to the reason that the study was cross sectional, it doesn't show temporal relationship.
- There were re-call biases because the study assessed feeding practices and illness history since birth.
- Social desirable biases since data were collected by health professionals working on ART clinic.

8. Conclusions and recommendations

8.1 Conclusions

The findings of the study demonstrate that the prevalence 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.

- The major predictor for HIV status of infants include: infant and maternal illness during postnatal period, mother's knowledge on PMTCT, place and mode of delivery and infant feeding practice which were significantly associated with HIV status of the infants.
- Exclusive breast feeding practice with ART/ARV prophylaxis was more preventive as compared with mixed feeding and mixed feeding is major determinant factor for MTCT of HIV.
- Mother to mother support group advice/service makes a great change on infant feeding practice in relation to prevention of MTCT of HIV.
- HAART/ART management starting from late pregnancy till cessation of breast feeding is more preventive than ARV prophylaxis.
- SVD with ART/ARV prophylaxis had relatively low risk as compared with operational and instrumental delivery.

8.2 Recommendations

Based on the findings of the study, the following recommendations have been sated

- The findings have important policy implication for improving infant and maternal health condition by improving mothers' knowledge on PMTCT through infant feeding counseling during pregnancy and postnatal period.
- It is convincing that mother to mother support group advice/service makes a great change on infant feeding practice in relation to prevention of MTCT of HIV and hence, it should be availed and sustained in all health care facilities.
- More advocacy work is needed on the options of infant feeding practices to encourage more on adherence of exclusive breast feeding, and economical support also 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 were more effective in a resource-limited program setting than ARV prophylaxis and, hence it 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.
- It is important to give more advice for mothers to get a timely treatment whenever the mothers or their infants develop illness.
- SVD with ART/ARV prophylaxis had relatively low risk as compared with C/S and other instrumental delivery. Therefore, the government should encourage to practices SVD in the health care facility but it need further research whether the C/S is elective or not.
- Further studies should be conducted to identify the effect of infant feeding practice on postnatal transmission of HIV with large sample size.

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Annex I Study Information sheet

Addis Ababa University College of health science school of public health

This study was done on infant feeding practice among HIV positive mothers receiving PMTCT and HIV status of their infant in South Wollo Zone, Amhara Region. Postnatal MTCT of HIV through infant feeding practice represents the most common means by which children acquire HIV infection and it was major public health problem, to ensure the health development of infant, the understanding of the major health problems of this group of population is important for proper provision of PMTCT. In line with this a study was proposed to assess the infant feeding practice of HIV Positive mothers receiving PMTCT and HIV status of their infant. The study was institution based survey and information was collected from all women fulfilling inclusion criteria during the study period and health institution record by using structured questionnaire, to supplement quanitative finding in-depth interview among HIV positive mother coming for PMTCT was conducted.

Benefit of the study: -the participant were not get any direct benefit for being participant except advice on infant feeding practice during the interview but the information obtained through survey were help the individual women in child bearing age and her infant for proper utilization of infant feeding practice in order to prevent postnatal MTCT of HIV, for health worker to improve provision of PMTCT and infant feed counseling and for government and NGOs for allocation of resource and providing important opportunities for research, programming and designing strategies to improve the welfare of HIV-infected women and their children.

Harm of the study: the study has no any harm except those participants were spend up to 30 minutes in the interview.

Rights of the participant: participant has full right to participate, discontinue at any time or not to participate and also they can skip or ask question which are not clear.

Confidentiality: - the secrecy of any information forwarded was maintained.

ANNEX II: Consent form

Good morning/afternoon, my name is ---------- (interviewer) and I am from the research team of SPH,AAU which is currently carry out survey on assessment of infant feeding practice of HIV Positive mothers receiving PMTCT and HIV status of their infant. As part of this survey you are selected scientifically to be participant of this study, if you give me consent after you have understood the above information sheet and I am collecting your information on infant feeding practice and PMTCT history. I would like to ask you for a few question which lasts about 30 minute and you have a right to participate or not, or discontinue at any time , but your honest participation have a great contribution in order to effectively attain the goal, we are kindly asking you for your generous response to the questions. The secrecy of any information forwarded was maintained and the information was used for this study purpose only. If there is anything that requires clarification please don't hesitate to ask the facilitator for clarification.

Do you wish to participate in the study?

Yes, I want to participate in the study (please go to the next page) ☐

No, I don't want to participate. (Stop) ☐

Thank you very much!!

Questionnaire identification number _____

Name of the Interviewer _____Signature_____ ate _____

Name of the supervisor _____Signature _____date _____

Address of the investigator:

If you have any question about this study you can contact us at the address listed below.

- Mob. = 0921275158

Email =yma.bent@yahoo.com

AAU, SPH, IRB address

Phone number= 011-5-53-87-34

Email= aaumfirb@yahoo.com

አባሪ 1፡የጥናቱመግለጫ

በአድስአበባ ዩኒቨርሲቲ የጤና ሣይንስ ኮሌጅ በህብረተሰብ ጤናትምህረት ክፍል የጥናት መግለጫ ይህጥናት የሚከናወነው በደቡብና ሰሜን ወሎ ዞን ውስጥ በሚገኙ ከኤችአይቪቫይረስ ጋር የሚኖሩ እናቶች ወደ ልጃቸው እንዳይተላለፍ የሚወስዱትን መድሀኒትና የህፃናት አመጋገብ ሁኔታን ከኤችአይቪ ከእናት ወደ ልጅ የመተላለፍ ሁኔታ ጋር በተያያዘየ ሚያጠናነው፡፡ በመሆኑም ከወሊድ በኋላ ያለው የኤችአይቪ ቫይረስ ከእናት ወደ ልጅ መተላለፊያ ዋነኛው መንገድ ከህፃናትአመጋገብ ጋር የተያያዘ በመሆኑና ይህም ዋነኛ የህብረተሰብ ጤናችግር በመሆኑ የህጻናቱን ጤናማ አስተዳደግ ለማወቅ በዙሪያቸው ያሉትን ችግሮች መረዳት በጣምአስፈላጊ ከመሆኑም በላይ የኤችአይቪ ቫይረስ ከእናት ወደ ልጅ እንዳይተላለፍ መከላከያ ዴዎችን በትክክል ለመተግበር ይረዳናል፡፡ በዚህም መሰረት ይህ ጥናት ስለህጻናት አመጋገብና በኤችአይቪቫይረስየመያሁኔታ ላይ ያተኮረ ጥናት ነው፡፡ጥናቱም የሚካሄደው በዞኑ ባሉት ጤናድርጅቶች ሲሆን መረጃው የሚሰበሰበው በጥናቱ ጊዜ የመመልመያ መስፈርቱን ከሚያሟሉትእናቶችና በጤና ድርጅቱ መዝገብ ከሚገኘው መረጃ ላይደረጃውን በጠበቀ መጠይቅ መሰረትይሰበሰባል፡፡የዚህንአሃዛዊ መረጃውጤት ለመደገፍለክትትልከሚመጡእናቶችጋር ቃለመጠይቅይካሄዳል፡፡

የጥናቱጥቅም፡-ተሳታፊው በመሳተፉ በመጠይቁ ጊዜ ስለህፃናት አመጋገብ ምክር ከመስጠት ውጭ የሚያገኘው ምንም ጥቅም የለም፡፡ነገርግን የሚሰጡን መረጃ በመውለድ እድሜ ክልል ውስጥ ላለች እናትና ለልጇ የአመጋገብ ሁኔታውን በማስተካከል ከወሊድ በኋላ ያለውን ከእናት ወደ ልጅ የሚተላለፈውን የኤችአይቪ ቫይረስ ሁኔታ ለመቀነስ፤ለጤና ባለሙያዎች የሚሰጡትን የህጻናት የአመጋገብ ምክርና ከእናት ወደ ልጅ እንዳይተላለፍ የሚሰጡትን ህክምና ለማሻሻል እንድሁም መንግስታዊና መንግስታዊ ላልሆኑ ድረጅቶች ሀብት አጠቃቀማቸውን ለማሻሻል ፤ለጥናትና ምርምር በተጨማሪም አድስ የአሰራር ሁኔታን በመቅረጽ ከኤችአይቪ ቫይረስ ጋር የምትኖር እናትና የልጇን ደህንነት ለማሻሻል ይረዳል፡፡

የጥናቱ ጉዳት፡- የጥናቱ ተሳታፊ እስከ 30 ደቂቃ የሚደርስ ጊዜ ከማባከን ውጭ በጥናቱ ተሳታፊ በመሆናችው የሚደርስባቸው ምንም አይነት ጉዳት የለም፡፡

የጥናቱ ተሳታፊ መብቶች፡-

በዚህ ጥናት መሳተፍም ሆነ ያለመሳተፍ ሙሉ መብት ነው፤በመሳተፍ ላይ እያሉ በማንኛውም ጊዜ ማቋረጥ ይችላሉ፤ከጥያቄው ውስጥ መመለስ ያልፈለጉትን ማለፍ ወይም ያልገባቸውን መጠየቅ ይችላሉ፡፡

የጥናቱ ሚስጥራዊነት፡-የተሳታፊው ማንነት በሚስጥር ይያዛል፤የተሰበሰበውም መረጃ ለዚህ ጥናት ብቻ የሚውል ይሆናል፡፡

አንዳንድ ጥያቄ ከለዎት መረጃ፤

የተመራማሪው አድራሻ

ሞባይል፡- 0921275158

ኢ-ሜል፡- yma.bent@yahoo.com

ለበለጠ መረጃ የሚከተለውን የተቋሙን ገምጋሚ ቦርድ አድራሻ ይጠቀሙ

አዲስ አበባ ዩኒቨርሲቲ ጤና ሳይንስ ኮሌጅ

ስልክ፡ 011-5-53-87-34

ኢ-ሜል፡-aaumfirb@yahoo.com

Annex III: Questionnaire in English

Identification no _____

001. Id number of Questionnaire_____ health facility _____ _____

Patient ID number _____ woreda _____ kebele _____

Part I socio demographic data

Se.NO.	Questions	Response and coding	Skip to
101	How old are you?	_____age in completed years	
102	Place of residence	urban 1 Rural 2	
103	What is your current marital status	single 1 married 2 Divorced 3 Widowed 4 Separated 5	
104	What is the highest level of education you completed?	Unable to read and write 1 Able to read and write 2 Grade 1-8 3 Grade 9 – 10+2 4 12 completed and above 5	
105	What is your religion?	Muslim 1 Orthodox Christian 2 Other specify 3	
106	What ethnic groups do you belongs to?	Amhara 1 Tigre 2 Oromo 3 Others (specify) 4	
107	What is your current occupation?	Government employee 1 Private employ 2 House wife 3 Others (specify) 4	
108	What is your family monthly income?	_____ Ethiopian birr	

Part II: obstetric and ARV prophylaxis history

Sr No	Questions	Response and coding	Skip
201	Did you attend antenatal care follow-up during your last pregnancy?	Yes 1 No 2	If' no' skip to Q 204
202	At what gestational age you started ANC follow up?	___ week _____ month	
203	For how many times did you attend ANC follow-up	One 1 Tow 2 Three 3 Four 4 More than four 5	
204	Did you receive ARV prophylaxis during pregnancy	Yes 1 No 2	If 'no' skip to Q 208
205	At what gestational age you started ARV prophylaxis?	_____ week _____month Other specify----------	
206	Which type of ARV prophylaxis was given to her (PMTCT) intervention	**Look and record from client card** HAART 1 AZT + sdNVP 2 AZT 3 Other specify 4	
207	For how long did you take ARV prophylaxis during pregnancy	<4 weeks before delivery 1 >4weeksbefore delivery 2 From28wks of pregnancy till delivery 3 other (specify)_____ 4	
208	Did you receive infant feeding counseling during pregnancy	Yes 1 No 2	If 'no' skip to Q 210
209	What type of advice did you gate from the councilor	**More than one answer is possible** Not remembering the advice 1 To practice exclusive breast feeding 2 To feed formula milk only 3 To practice mixed feeding 4 Other (specify) _____ 5	

210	Where did you deliver?	Home 1 Health institution 2	If '1' skip to Q 213
211	Did you receive any ARV prophylaxis at the onset of labor?	Yes 1 No 2	If no skip to Q213
212	Which type of ARV prophylaxis was given to her?	**Look and record from client card** _____	
213	What was your type of delivery?	SVD 1 C/S 2 Forceps 3 Vacuume 4 Episotomy 5 Other specify _____6	
214	Did you attend post natal care	Yes 1 No 2	If 'no' skip to Q,218
215	Did you receive ARV prophylaxis During postnatal period?	Yes 1 No 2	If 'no' skip to Q 218
216	Which type of ARV prophylaxis was given to her during postnatal period?	**Look and record from client card** HAART 1 sdNVP 2 AZT + sdNVP 3 AZT + 3TC 4 Other specify 5	
217	For how long did you take ARV prophylaxis during postnatal period?	Single dose immediately after birth 1 For the first seven day after birth 2 For the first 4 week after birth 3 For the first six month after birth 4 For 12 month(1year) after delivery 5 other (specify)_____ 6	
218	Did you receive infant feeding counseling after birth	Yes 1 No 2	If 'no' skip to Q 220

219	What type of advice did you get from the councilor on infant feeding practice	**More than one answer is possible** Not remembering the advice 1 To practice exclusive breast feeding 2 To feed formula milk only 3 To practice mixed feeding 4 Other (specify) _____ 5	
220	Did your new born received ARV prophylaxis during postnatal period?	Yes 1 No 2	If 'no' skip to Q 301
221	When did your new born start ARV prophylaxis?	Immediately after birth 1 With in 24 hour after birth 2 With in 72 hour after birth 3 If other specify_____4	
222	Which type of ARV prophylaxis with duration was given to the new born?	**Look and record from client card** AZT 1 sdNVP 3 AZT + sdNVP + 3TC for 7 days 4 AZT + sdNVP + 3TC for 4 weeks5 Other specify 6	

Part III knowledge about MTCT of HIV, PMTCT and infant feeding practice

Sr.NO.	Question	Response and coding	Skip
301	What are the routes of HIV transmission From one person to another?	**(More than one answer is possible)** By having unsafe sexual intercourse 1 From mother to child 2 During blood transfusion 3 Using contaminated sharp objects 4 If others(specify) 5	
302	Can HIV positive woman transmit HIV to her child?	Yes 1 No 2	If no skip to Q 304?

303	When does HIV transmission occur from infected mother to her child?	(**More than one answer is possibleanddon't read the option (probe)** During pregnancy 1 During labor 2 During breast feeding 3 Idon't know 4 Other specify 5	
304	What are the preventive methods for transmission of HIV from mother to child?	(**More than one answer is possible, prob**) By taking medicine 1 By safe delivery 2 By not breast feeding 3 By exclusive breast feeding 4 If other specify 5	
305	From where you gate information about MTCT, PMTCT in relation to breast feeding practice.	Neighbors 1 Health professional 2 Husband 3 MSG 4 Others (specify) 5	
306	What kind of infant feeding option recommended for HIV positive mother?	**More than one answer is possible** Exclusive replacement feeding 1 Exclusive breast feeding 2 Feeding by other HIV negative mother 3 Heat treated expressed breast milk 4 Mixed breast feeding 5 Other specify 6	Probing
307	Has your husband been tested for HIV?	Yes 1 No 2 I don't know 3	
308	When did you have your HIV test?	Before marriage 1 During this pregnancy 2 During delivery 3 If other specify 4	

Part IV: Infant feeding practice

No	Question	Response and coding	Skip
401	What is the age of your child?	_____days _____weeks _____months	
402	Sex of your child?	Male 1 Female 2	
403	What was the weight of your infant at birth?	_____in gm/kg	
404	Did you ever breast feed your child?	Yes 1 No 2	If 'no' skip to Q410
405	How long after birth did you first put your new born to the breast?	Within the first hour 1 Within first eight hours 2 After eight hours 3	
406	Did your infant receive any thing to drink or eat before first put to the breast?	Yes 1 No 2	If no' skip to Q 408
407	What type of food or fluid was provided?	More than one answer is possible, don't read the choices, probe for more) Butter 1 Water 2 Tea 3 Water and sugar solution 4 Others (specify)_____ 5	
408	Have you give any food/fluids other than breast milk for your child since birth (with in the first six month for older child?)	Yes 1 No 2	If no skip to Q410
409	Why did you provide these foods or fluids?	**(Probe for more)** Infant illness 1 Mother illness 2 Both infant and mother illness 3 Advised by husband 4 Advised by family and others 5 It is a norm of the society 6 Other specify 7	

410	Which types of fluids or foods other than breast milk was provided for your infant starting from yesterday?	**(probe for more, don't read the choice)** Plain water or tea 1 Infant formula 2 Powdered milk 3 Fresh animal milk 4 Fruit juice 5 Adult food 6 Breast feed only 7 If other specify 8	
411	Have you ever expressed your breast?	Yes 1 no 2	If' no 'to Q415
412	Why did you express the milk?	To relive breast pain/engorgement 1 To relived pain due to cracked nipples 2 To heat threat before feeding 3 To wean or stop breast feeding 4 The infant was unable to suck 5 Other specify 6	
413	Have you given the expressed breast milk to your child?	Yes 1 No 2	If no ski to Q415
414	Have you treated the expressed milk with heat prior to giving for your child	Yes 1 No 2	
415	Have you ever practiced exclusive replacement feeding	Yes 1 No 2	If'no skp to Q420
416	Why do you prefer exclusive replacement feeding	Fear of HIV transmission 1 I have get advice from health professional 2 If other specify 3	
417	What kind of replacement food you are giving to your child	Commercial infant formula 1 Home prepared formula 2 packed cow/powdered milk 3 Alternating one another 4 If other specify it 5	

418	Have you seen demonstration about preparation of replacement feeding	Yes 1 No 2	
419	Do you have an ability to follow instruction on the tin for mixing the formula	Yes 1 No 2 If other specify 3	
420	What kind of utensil you uses to feed the child	Bottle 1 Cup with spoon 2 Other specify it 3	
421	Have you washed your hand prior to prepare your infant fed?	1 Yes 1 2 No 2	
422	Have you started complementary food	Yes 1 No 2	Ifno'skip to 424
423	At what age of the child did you start complementary food	_____ months	
424	Did you start any mixed feeding (complementary fed) before 6 months of age	Yes 1 No 2	
425	Have you completely stopped breast feeding	Yes 1 No 2	If'no'skpto Q501
426	How old was your infant when you completely stopped breast feeding	---------- days ----------weeks ---------- months	
427	Why did you stop breast feeding	Infant no longer wanted to breast fed 1 To encourage infant to eat solid food 2 Fear of HIV transmission 3 Pregnancy 4 If other specify 5	

Part V: Maternal health

No	Question	Response and coding	Skip to
501	Maternal CD4 count after delivery within the recent 6 month	Look and record CD4 count from mother card _____	
502	Have you ever had breast related or other illness since your last delivery?	yes 1 no 2	If "no" skip to Q601
503	What was your illness	Breast problem 1 Nipple problem 2 Other specify 3	
504	Did you seek treatment?	Yes 1 No 2	
505	How long did the disease last	---------- days ---------- weeks ---------- months	
506	Did you change the way you feed your child during that time	Yes 1 No 2	If 'no' skip toQ601

Part VI: infant health

No.	Question	Response and coding	Skip to
601	Has the infant ever been sick?	Yes 1 No 2	If no' skip to Q701
602	Has the infant shown any of the following sign of illness	Mouth sore 1 Fast or difficulty of breathing 2 Fever 3 Diarrhea 4 Other specify 5	
603	Was your infant receiving treatment?	Yes 1 No 2	
604	Did you change the way you fed your infant during the illness	Yes 1 no 2	

Part VII: - Infant HIV test result

701	Record infant card number	Card number ----------	
702	Age of the infant during HIV testing	Age at first test ---------- Age at second test----------	
703	HIV DNA PCR first test result	HIV Positive 1 HIV negative 0	
704	HIV DNA PCR second test/antibody test result	HIV Positive 1 HIV negative 0	

Thank you

Name of the interviewer _____signature _____date_____

Name of the supervisor _____signature _____date_____

Annex- IV. Amharic questionnaire

<u>የፈቃደኝነት መጠየቂያ ቅጽ</u>

እኔእንደምን አደሩ/ዋሉ ስሜ ---------- ይባላል (ዳታ ሰብሰቢው / ። በአዲስ አበበ ዩኒቨርስቲ ህክምና ፋካሊቲ በህብረተሰብ ጤና ትምህርት ቤት ውስጥ የሚሰራው ጥናት አባል ስሆን በአሁኑ ሰዓት ከኤች.አይ.ቪ ቫይረስ ጋር የሚኖሩ እናቶች ወደ ልጃቸውእ እዳይተላፍ የሚወስዱትን መድሀኒትና የህፃናት አመጋገብ ሁኔታን ከኤች አይ ቪ ቫይረስ ከእናት ወደ ልጅ የመተላለፍ ሁኔታጋር በተያያዘ ለሚጠናው ጥናት መረጃ በመሰብሰብ ላይ እገኛለሁ ። ስለሆነም እርስዎ ለጥናቱ ተሳታፊ እንድሆኑ ሳይንሳዊ በሆነ መንገድ ተመርጠዋል ። ከላይ የተዘረዘረለዎትን መገለጫ በመረዳት በጥናቱ ለመሰተፍ ፈቃደኛ ከሆኑ የእርሰዎን የኤች አይ ቪ ከእናት ወደ ልጅእ እንዳይተላለፍ ስለወሰዱት ህክምናና ስለ ልጅዎ የአመጋገብ ሁኔታታ በተመለከተ መረጃ እሰበስባለሁ ። አሁን ፈቃደኛ ከሆኑ ጥቂት ጥያቄዎችን እጠይቃዎታለሁ መጠይቁ የሚፈጀው ጊዜ በግምት 30 ደቂቃ ይሆናል ። ነገር ግን ጥያቄዎችን በከፊልም ሆነ ሙሉ በሙሉ ያለመመለስ መብትዎ የተጠበቀ ነው ። ደግሞም በማንኛውም ጊዜ መጠይቁን ማቋረጥም ይችላሉ ። ነገር ግን የእርስዎ ቅን ተሳትፎ በጥናቱ ላይ ድርሻእ እንዳለው በመገንዘብ ይህን መጠይቅ ለመሙላት እእንዲተባሩን በትህትና እንጠይቀዎታለን። የተሳታፊው ማንነት በሚስጥር ይያዛል ፤የተሰበሰበውም መረጃ ለዚህ ጥናት ብቻ የሚውል ይሆናል። ማብራሪያ የሚያስፈልገው ጉዳይ ካለ አስተባባሪውን መጠየቅ ይችላሉ።

በጥናቱ ለመሳተፍ ፈቃደኛ ነዎት?

1/ አዎ ከሆነ ወደሚቀጥለው ገጽ በማለፍ መጠይቁን ይሙሉ

2/ አይደለሁም ከሆነ አመስግነው ይሸኙአቸው ።

የአማርኛ መጠይቅ

መለያ ቁጥር ----------

01. የጥያቄው መለያ ቁጥር ---------- የጤና ድርጅቱ ስም ----------
የበሽተኛ ካርድ ቁጥር ---------- ወረዳ ---------- ቀበሌ ----------

ክፍል አንድ፡ - ማህበራዊና ግላዊ መረጃ

ቁጥር	ጥያቄ	ኮድ	ወደ ጥያቄ .ቁ እለፍ
101	ስንት አመተ ም ነው ?	---------- በሙሉ አመት	
102	የመኖሪያ ቦታ	1/ ከተማ 2/ ገጠር	
103	አሁን ያሉበት የትዳር ሁኔታ ምን ይሰላል?	1/ ያላገባች 2/ ያገባች 3/ የተፈታች 4/ ባሏ የሞተባት 5/ የተለያየች	
104	ያጠናቀቁት ከፍተና ትምህርት ደረጃ ስንት ነው ?	1/ ማንበብ መፃፍ የማትችል 2/ ማበብ መፃፍ የምትችል 3/ ከ1-8ኛ ክፍል 4/ ከ9-10ተ2ኛ ክፍል 5/ 12ኛ ክፍልና ከዚያ በላይ	
105	ሀይማኖትዎ ምንድን ነው ?	1/ ሙስሊም 2/ ኦርቶዶክስ ሃይማት 3/ ሌሎች ካሉ ይጠቀስ ----------	
106	ብሄርዎ ምድን ነው ?	1/ አማራ 2/ ትግሬ 3/ ኦሮሞ 4/ ሌሎች ካሉ ይጠቀስ ----------	
107	አሁን የሚሰሩት ሥራ መንድን ነው ?	1/ መንግስት ሰራተኛ 2/ የግል ተቀጣሪ 3/ የቤት እመቤት 4/ ሌላ ካለ ይጠቀስ ----------	
108	የቤተሰብዎ አጠቃላይ ወርሃዊ ገቢ ስንት ነው ?	---------- የኢትዮጲያ ብር	

ክፍል ሁለት፡- የጽንስና ከእናት ወደ ልጅ እንዳይተላለፍ መከላከያ ዘዴ

ቁጥር	ጥያቄ	ኮድ	ወደ ጥያቄ .ቁ እይለፉ
201	በመጨረሻውእርግዝናዎ የጽንስ ክትትል አድርገው ነበር?	1/ አዎ 2/ የለም	የለም ከሆነ ወደ ጥ.ቁ 204 ይለፉ እ
202	በስንተኛው የእርግዝና ጊዚያት የጽንስ ክትትል ጀመሩ?	--------- ሳምንት ---------- ወራት	
203	ለምን ያክል ጊዜ የነፍሰጡር ምርመራ አደረጉአደረጉ?	1/ አንድ ጊዜ ብቻ 2/ ሁለት ጊዜ 3/ ሶስት 4/ አራት ጊዜ 5/ ከአራት ጊዜ በላይ	
204	በእርግዝና ወቅት የፀረ- ኤች አይ ቪ መድሀኒት ተሰጥቶዎታል ?	1/ አዎ 2/ የለም	የለም ከሆነ ወደ ጥ.ቁ.208
205	በስንተኛው የእርግዝና ጊዜዎት መድሀኒቱን መውሰድ ጀመሩ? እ	---------- ሳምንት----------ወር ሌላ ካሉ ይጥቀስ ----------	
206	ምን አይነት የፀረ- ኤች አይ ቪ መድሀኒት ነበር የተሰጠዎት ?	ከእናትዩዋ ካርድ ላይ ታይቶ የሚሞላ 1/ የፀረ ኤች አይ ቪ መድሀኒት / ART/HAART/ እየወሰዱ ነበር 2/ /ኔቨራፒን ለአንድ ጊዜ ብቻ 3/''AZT" 4/ ''AZT +sdNVP''+3TC'' 5 /ሌላ ካለ ይፎቀስ	SdNVP(Single dose neverapine
207	ነፍሰጡር በነበሩበት ወቅት ለምን ያህል ጊዜ የፀረ ኤች አይ ቪ መድሀኒት ወስደዋል ?	1/ ከመወልደዎ በፊት ከ 4ታሳምት ያነሰ 2/ ከመውለድዎ በፊት 4 ሳምት በላይ 3/ ከሃያ ስምንተኛው ሳምንት ጀበሮ እስከወለዶበት ጊዜ ድረስ 4/ ሌላ ካለ ይጠቀስ ----------	
208	በነፍሰጡርነትዎ ጊዜ ስለ ህፃናት አመጋገብ የምክር አገልግሎት ተሰጥቶዎት ያውቃል?	1/ አዎ 2/ የለም	የለም ከሆነ ወደ ጥ.ቁ/210 ይለፉ
209	ምን ዓይነት የምክር አገለግሎት ተሰጥቶዎት ነበር?	ከአንድ በላይ መልስ መስጠት ይቻላል 1. አላስታውሰውም 2. የእናት ጡት ወተት ብቻ ስለመመገብ 3. በፋብሪካ የተመረተ ወተት ብቻ ስለመመገብ 4. የእናት ጡትና ሌላ ስለመመገብ 5. ሌላ ካለ ይጠቀስ----------	

210	ምጥ ሲይዝዎትየት ነው የወለዱት?	1/ እቤት 2/ በጤና ድርጅት	መ.1 ከሆነ ወደ ጥ.ቁ 213 ይለፉ
211	ምጥ ሲጀምርዎት የፀረ- ኤች አይ ቪ መድሀኒት ተሰጥዎት ነበር ?	1/ አዎ 2/ የለም	መ.የ.ከሆነ ወደ ጥ.ቁ 213 ይለፉ
212	ምን ዓይነት የፀረ- ኤች አይ ቪ መድሀኒት ነበር የተሰጣቸው?	ከካርድ ላይ በማየት የሚሞላ ----------	
213	በምን ዓይነት ሁኔታ ነው የወለዱት?	1/ በማህፀን 2/ በቀዶ ጥገና 3/ በማዋለጃ ፎርሴፕስ 4/ በመሳቢያ (ቫኪውም) 5/ በማህፀን ቀዶ ጥገና 6/ ሌላ ካሉ ይጠቀስ ----------	
214	ከወለዱ በኋላ የህክምና ክትትል አድርገው ነበር?	1/ አዎ 2/ የለም	
215	ከወሊድ በኋላ የፀረ- ኤች አይቪ መድሀኒት ተሰጥዎታል?	1/ አዎ 2/ የለም	መ.የ ከሆነ ወደ ጥ.ቁ 218 ይለፉ
216	ምን ዓይነት የፀረ ኤች አይ ቪ መድሀኒት ነበር የተሰጠዎት?	ከናትየዋ ካርድ ላይ ታይቶ የሚሞላ 1/ የፀረ-ኤች አይ ቪ መድሀኒት (ART/HAART) እየወለዱ ነበር 2/ ኔቨራፒን ለአንድ ጊዜ ብቻ 3/ « AZT+sdNVP“ 4/ « AZT +3TC“ 5/ ሌላ ካስ ይጠቀስ ----------	
217	ከወሊድ በኋላ የፀረ- ኤችአይቪ መድሀኒት ለምን ያህል ጊዜ ወሰዱ?	1/ ወዲያው እንደወለደ ለአንድ ጊዜ ብቻ 2/ ከወለደ በኋላ ለመጀመሪያዎቹ 7 ቀናት 3/ ከወለደ በኋላ ለመጀመሪያዎቹ 4 ሳምት 4/ ከወለደ በኋላ ለመጀመሪያዎቹ 6 ወራት 5/ ለ12 ወራት ያህል 6/ ሌላ ካለ ይጠቀስ ----------	
218	ከወለዱ በኋላ ስለ ህፃናት አመጋገብ የምክር አገልግሎት ተሰጥቶዎት ያውቃለወ?	1/ አዎ 2/ የለም	የለም ከሆነ ወደ ጥ/ቁ 221 ይለፉ
219	ምን ዓይነት የምክር አገልግሎት ተሰጥቶዎት ነበር	ከአንድ በላይ መልስ መስጠት ይቻላል 1/ አላስታውሰውም 2/ የእናት ጡት ወተት ብቻ ስለመመገብ 3/ በፋብሪካ የተመረተ ወተት ብቻ ስለመመገብ 4/ የእናት ጡትና ሌላም ስለመመገብ 5/ ሌላ ካለ ይጠቀስ ----------	

220	ህፃኑእእንደተወለደ የፀረ ኤችአይቪ መድሀኒት ወስዶ ነበር?	1/ አዎ 2/ የለም	መ.የ ከሆነ ወደ .ጥ.ቁ.301 ይለፉ
221	ለህፃኑ ከመቼ ጀምሮ የፀረ-ኤችአይ ቪ መድሀኒት ተሰጠው ?	1/ ወዲያው እንደተወለደ 2/ በመጀመሪዎቹ 24 ሰዓት ወስጥ 3/ በመጀመሪያዎቹ 72 ሰዓት ውስጥ 4/ ሌላ ካለ ይጠቀስ ----------	
222	ለህጻኑ ምን አይነት የፀረ ኤች አይ ቪ መድሀኒት ተሰጠው?	ከህፃኑ ርድ ላይ ታይቶ የሚሞላ 1/ ምንም አልወሰደም 2/ ኔቨራፒን ለአንድ ጊዜ ብቻ 3/ « AZT+sdNVP“ +3TC“ ስ7 ቀን 4/ « AZT+sdNVP“ +3TC“ ስ 4 ሳምንት ያህል 5/ ሌላ ካስ ይጠቀስ ----------	

ክፍል ሶስት ህፃን ስመጋገብና ከእናት ወደ ልጅ የኤችአይቪ የመተላፍ ሁኔታታመሰረታዊ እእውቀት

ቁጥር	ጥያቄ	ኮድ	ወደ ጥያቄ .ቁ እለፍ
301	ኤችአይቪ ከአንዱ ወደ ሌላው ሰው የሚተላለፍ መንገድ ምንድን ነው ?	1/ ጥንቃቄ በጎደለው የግብረ ሥጋ ግንኙነት 2/ ከእናት ወደ ልጅ 3/ በደም ልገሳ 4/ በስለታም ነገሮች 5/ ሌላ ካለ ይጠቀሱ ----------	
302	ከኤች አይ ቪ ጋር የምትኖር እእናት ቫይረሱ ወደ ህፃኑ ልታስተላልፍ ትችላለች ?	1/ አዎ 2/ የለም	
303	ከኤች አይ ቪ ጋር የምትኖር እናት ቫይረሱን ወደ ህፃኑ የምስተላልፈው መቼ ይመስሎታል?	(ከአንድ በላይ መልስ መስጠት ይችላል) 1/ በእርግዝና ጊዜ 2/ በወሊድ ጊዜ 3/ በጡት በማጥባት ጊዜ 4/ አላውቅም 5/ ሌላ ካለ ይጠቀስ ----------	
304	ኤች አይ ቪ ከእናት ወደ ልጅ እእንዳይተላፍ የሚደረግበት መከላከያ መንገድ ምንድን ነው?	(ከአንድ በላይ መልስ መስጠት ይቻላል) 1/ መድሀኒት መውሰድ 2/ ጥንቃቄ የተሞላበት ወሊድ አገልግሎት በማግኘት 3/ ጡት ባለማጥባት 4/ ጡት ብቻ በማጥባት 5/ ሌላ ካለ ይጠቀስ ----------	

305	ስለ ህፃን አመጋገብ መጀመሪያ የሰሙት ከየት ነው?	1/ ከጎረቤት 2/ ከጤና ባለሙያ 3/ ከትዳር ጓደኛ 4/ ሌላ ካለ ይጠቀስ ----------	
306	ኤች አይ ቪ በደሚ ውስጥ ላላት እእናት ምን አይነት የህፃን አመጋገብ ዘዴ ይመክራሉ	1/ የእናት ጡትን የሚተካ ብቻ 2/ የእናት ጡት ወተት ብቻ 3/ ከቫይረሱ ነፃ ከሆነች እናት ጡት ማጥባት 4/ የጡት ወተት አልቦ ማጠጣት 5/ የእናት ጡትና ሌሎች ምግቦችን ቀላቅሎ መመገብ 6/ ሌላ ካለ ይጠቀስ ----------	
307	የትዳር ጓደኛዎ የኤች አይ ቪ ምርመራ አድርገዋል ?	1/ አዎ 2/ የለም 3/ አላውቅም	
308	እርስዎ በቅርቡ የኤች አይ ቪ ምርመራ ያደረጉት መቼ ነው?	1/ ከጋብቻ በፊት 2/ በዚህ እርግዝና ጊዜ 3/ በወሊድ ጊዜ 4/ ሌላ ካለ ይጠቀስ ----------	

ክፍል አራት፡ የህፃት አመጋገብ ሁኔታ

ቁጥር	ጥያቄ	ኮድ	ወደ ጥያቄ .ቁ እለፍ
401	የልጅዎ እዕድሜ ስንት ነው?	-------- ቀኖች --------- ሳምንት ---------- ወራት	
402	የልጅዎ ጾታታ	1/ ወንድ 2/ ሴት	
403	ልጅዎ ሲወለድ ክብደቱ ስንት ነበር?	---------- ግራም ኪ/ግ	
404	ለልጅዎ ጡት አጥብተው ያውቃሉ ?	1/ አዎ 2/ የለም	መልሱ የለም ከሆነ ቁጥር 410 ይለፉ
405	መጀመሪያ ለልጅዎ ጡት ያጠቡት ከወለዱ ከምን ያህል ጊዜ በኋላ ነበር ?	1/ በመጀመሪያ አንድ ሰዓት ውስጥ 2/ በመጀመሪያው ስምንት ሰዓት ውስጥ 3/ ከስምንት ሰዓት በኋላ	
406	ልጅዎ መጀመሪያ ጡት ከመጥባቱ በፊት ማንኛ ወንም የሚጠጣ ወይም ሌላ ምግብ ወስዷልን ?	1/ አዎ 2/ የለም	መልሱ የለም ከሆነ ወደ ቁጥር 408 እይለፍ

407	ምን አይነት ምግብ ወይም መጠጥ ሰጥረተውታል?	(ከአንድ በላይ መልስ መስጠት ይቻላል ምርጫውን አታንብብ) 1/ ቅቤ 2/ ውሃ 3/ ሻሂ 4/ ውሃና ስኳር 5/ ሌላ ካለ ይጠቀስ ----------	
408	ለልጆዎት ከተወለደ ጀበሮ ከ ናት ጡት ወተት በተጨማሪ ሌላ ምግብ ወይም መጠጥ ሰጥተውት ያውቃሉ? (ትልቅ ከሆነ ለመጀመሪዎቹ 6 ወራት)	1/ አዎ 2/ የለም	መ.የለም ከሆነ ወደ ቁጥር 410 እለፍ
409	ተጨማሪ ምግብ ወይም መጠጥ የሰጡበት ምክንያት ምን ነበር ?	1/ ልጁ ስለታመመ 2/ እእናቱ ስለታመመች 3/ እእናትየዋና ህፃኑ ስለታመው 4/ በባል ምክር 5/ በሌሎች የሰው ምክር 6/ በአካባቢው የተለመደ ስለሆነ 7/ ሌላ ካለ ይጠቀስ ----------	
410	ከትላንት ጀበሮ ለልጅዎት ስለሰጡት የምግብ ዓይነት ይንገሩን?	ከአንድ በላይ መልስ መስጠት ይቻላል 1/ ውሃ ብቻ 2/ የህፃናት ምግብ ከገበያ እሚገዛ 3/ የዱቄት ወተት 4/ እየእንስሳት ወተት 5/ ጭማቂ 6/ የትልቅ ሰው ምግብ 7/ ጡት ብቻ 8/ ሌላ ካለ ይጠቀስ ----------	
411	ጡትዎን አልበው ወይም ጨምቀውት ያውቃሉ?	1/ አዎን 2/ የለም	መ. የለም ከሆነ ወደ ጥ.ቁ.415 እይለፍ
412	ለምንድን ነው ጡትዎን ያለቡት	1/ የጡት ህመምን ለማስታገስ 2/ የቆሰለ የጡት ጫፍን ለማስታገስ 3/ ከመመገብ በፊት ለማሞቅ 4/ ጡት ወተት ለማስቆም 5/ ልጁ ለመጥባት አለመቻል 6/ ሌላ ካለ ይጠቀስ ----------	
413	የታለበውን ወተት ለልጅዎ ሰጥተውት ውቃሉ?	1/ አዎ 2/ የለም	የለም ከሆነጥ. ቁ 415 ይለፉ
414	የጡት ወተቱን ለልጅዎ ከቋስጠተዎ በፊት በሙቀት አክመው ያውቃሉ?	1/ አዎ የለም	

415	ልጅዎትን ለመመገብ የእናት ጡት ወተት የሚተካ ብቻ ተጠቅመው ያውቃሉ ?	1/ አዎ 2/ የለም	የለም ከሆነጥ. ቁ 419 ይለፉ
416	ለምን የእናት ጡት የሚተካን ብቻ መረጡ ?	1/ ለልጂ ኤችአይ ቪ እንዳይተላለፍበት በመፍራት 2/ ጤና ባሙያዎቹ ስለመከሩን 3/ ሌላ ካለ ይጠቀስ ----------	
417	ምን ዓይነት የእናት ጡት ወተት የሚተካ ወተት ሰጥተው ያውቃሉ?	1/ ከገበያ የሚገዛ የህፃናት ወተት 2/ ቤት ውስጥ የሚዘጋጅ ወተት 3/ የከብት/ዱት ወተት / ታሽጎ የሚሸጥ ወተት 4/ በማቀያየር 5/ ሌላ ካለ ይጠቀስ ----------	
418	ስለ ህፃናት ምግብ አዘገጃጀት በተግባር አይተው ያውቃሉ?	1/ አዎ 2/ የለም	
419	በተገቢው መመሪያ መሰረት የህፃናት ምግብ መጥነው መስጠት ይችላሉ ?	1/ አዎ 2/ የለም 3 ሌላ ካለ ይጠቀስ ----------	
420	ህፃኑ /ኗን ለለመገብ የሚጠቀሙት የመመገቢያ ዕቃ ምንድን ነው?	1/ ጡጦ 2/ ኩባያና ማኪያ 3/ ሌላ ካለ ይጠቀስ ----------	
421	ህፃኑ /ኗን ምግብ ከማዘጋጀትዎ በፊት እእጅዎን ይታጠባሉ ?	1/ አዎ 2/ የለም	
422	ተጨማሪ ምግብ ለልጅዎ ጀምረዋል?	1/ አዎ 2/ የለም	የለም ከሆነጥ. ቁ 424 ይለፉ
423	እእድሜው ስንት ሲሆን ለልጅዎ ተጨማሪ ምግብ ጀመሩ ?	---------- ወራት	
424	ልጅዎ 6 ወር ከመሙላቱ በፊት ጠጨማሪ ምግብ ሰጥተውት ያውቃሉ?	1/ አዎ 2/ የለም	
425	በአሁኑ ሰዓት ጡት ማጥባት አቁመዋል?	1/ አዎ 2/ የለም	የለም ከሆነጥ. ቁ 501 ይለፉ
426	ልጅዎት የስንት ወር እእያለ ነበር ጡት ማጥባት ያቆሙት?	---------- ቀን ---------- ሳምንት ---------- ወር	

427	በምን ምክንያት ነበር ጡት ማጥባት ያቆሙት?	1/ ልጁ መጥባት ስላልፈለገ 2/ ሌላ ተጨማሪ ምግብ እእንዲበላልኝ ስለፈለግሁ 3/ ኤች አይ ቪ ይተላለፍበታል ብዩ ስለፈራሁ 4/ በእርግዝና ምክንያት 5/ ሌላ ካለ ይጠቀስ ----------	

ክፍል አምስት የፅናት ጤንነት ሁኔታ

ቁጥር	ጥያቄ	ኮድ	ወደ ጥያቄ .ቁ እይለፍ
501	ከወሊድ በኋላ በቅርብ ጊዜ የተሰራ የእናትዩዋ " CD4 Coum t" (ከ6 ወር ወዲህ)	የእናትዩዋን ካርድ በማየት የሚሞላ ----------	
502	የመጨረሻ ልጅዎትን ከወለዱ በኋላ ታታመው ያውቃሉ?	1/ አዎ 2/ የለም	የለም ከሆነጥ. ቁ 601 ይለፉ
503	ምን አይነት ህመም ነበር የታመሙት?	1/ የጡት ህመም 2/ የጡት ጫፍ ህመም 3/ ሌላ ካለ ይጠቀስ ----------	
504	ህክምና ወስደው ነበር?	1/ አዎ 2/ የለም	
505	ህመሙ ለምን ያክል ጊዜ ቆየበዎት?	---------- ቀን ---------- ሳምንት ---------- ወር	
506	በህመም ጊዜ የልጅዎትን የአመጋገብ ሁኔታ ቀይረውት ነበር ?	1/ አዎ 2/ የለም	

ክፍል ስድስት የህፃናት የጤንነት ሁኔታ

ቁጥር	ጥያቄ	ኮድ	ወደ ጥያቄ .ቁ እለፍ
601	ህፃኑ/ኗ ታሞበዎት ያውቃሉ?	1/ አዎ 2/ የለም	የለም ከሆነጥ. ቁ 701 ይለፉ
602	ህፃኑ/ኗ የሚከተሉትን ምልክት አሳይቶ ያውቃል?	ከአንድ በላይ መልስ መስጠት ይችላሉ 1/ የአፍ ቁስለት 2/ መተንፈስ አለመቻል / በፍጥነት መተንፈስ/ 3/ ትኩሳት 4/ ተቅማጥ 5/ ሌላ ካለ ይፎቀስ	
603	ህፃኑ/ኗ ህክምና ወስዶ/ዳ ነበር?	1/ አዎ 2/ የለም	
604	ህፃኑ/ኗ በታመመ ጊዜ የአመጋገብ ሁኔታውን ቀይረው ነበር?	1/ አዎ 2/ የለም	

ክፍል ሰባት የህፃኑ/ኗ የኤች አይ ቪ ምርመራ ውጤት

ቁጥር	ጥያቄ	ኮድ	ወደ ጥያቄ .ቁ እይለፍ
701	ህፃኑ/ኗ ካርድ ቁጥር	ቁጥር ----------	
702	የኤች አይ ቪ ምርመራ ሲደረግ የህፃኑ/ኗ እእድሜ	በመጀመሪያው ምርመራ ጊዜ የህፃኑ/ኗ እእድሜ---- በሁለተኛው ምርመራ ጊዜ ህፃኑ/ኗ እእድሜ ------	
703	የመጀመሪያውየኤች አይ ቪ “ DNA PCR” ምርመራ ውጤት	1/ የኤች አይ ቪ ቫይረስ በደሙ ውስት የተገኘበት 0/ የኤች አይ ቪ ቫይረስ በደሙ ውስት ያልተገኘበት	
704	የሁለተኛውየኤች አይ ቪ “ DNAPCR“	1/ የኤች አይ ቪ ቫይረስ በደሙ ውስት የተገኘበት 0/ የኤች አይ ቪ ቫይረስ በደሙ ውስት ያልተገኘበት	

አመሰግናለሁ

መጠይቁን የሞላው ስም ---------- ፊርማ ---------- ቀን----------

የተቆጣጣሪው ስም ---------- ፊርማ ---------- ቀን ----------

Annex V. Guide for in depth interview

Introduction and consent form

Greeting: my name is _____ I ‘am a student of Addis Ababa University, school of public health. I ‘am doing study on infant feeding practice among HIV positive mothers receiving PMTCT and HIV status of their child, this interview is being conducted to get your input about the feeding practice and PMTCT knowledge among HIV positive mothers. The result of the study will be used for decision making purpose at government level to help HIV positive mothers on strictly practicing preventive feeding option. You have been invited to participate in this interview due to your involvement and knowledge on the issues. Your participation is entirely voluntary and you will not receive a direct benefit for participating**.** I am especially interested in any problems you have faced or are aware of and recommendations you have. If it is okay with you, I will be tape recording our conversation. The purpose of this is so that I can get all the details but at the same time be able to carry on an attentive conversation with you. I assure you that all your comments will remain confidential. If you agree to this interview and the tape recording, please sign this consent form.

I agree to be interviewed and to have the interview audio tape recorded.

Respondent signature_____ Date_____

If person is an able to read and sign but agree to be a participant:

I [the interviewer] will sign here indicating that the information above was read to you, that you agree to participate in this interview and that your consent is given voluntarily.

Interviewer_____ Date_____

If they agree to participate continue discussion, but if not stop here.

Starting time ----------; ---------

Guide line for in-depth interview

Woreda _____ Kebele _____

Place of interview _____

Time and Date _____I'm now going to ask you some questions that I would like you to answer to the best of your ability. If you do not know the answer, please say so."

1 Please tells me about the options of PMTCT of HIV for HIV positive mothers?
2 How do you understand those PMTCT options mentioned by you(please explain)
3 Did you attend any of the prevention methods? If so what advantage did you got from that?

(Now let's talk about infant feeding counseling your experience on infant feeding practice for your current child)

4 Would you tell me about the feeding options for HIV positive mothers to feed their infant?
5 Did you attend any infant feeding counseling? What type of infant feeding option was offered for you during antenatal and postnatal visit? (Please explain more)
6 Are women choosing replacement feeding shown or demonstrate on how to prepare formula feed.
7 Could you explain more on your infant feeding choose and practice with its benefit?
8 What was the great challenge for HIV positive mother in relation with infant feeding practice? (Please explain more from your feeding experience).
9 What is your suggestion be done to help mothers to adhere their infant feeding choice and PMTCT? (please explain more)

We have finished the Interview.

Thank you very much!!!

Time end of the interview: _____:_____

Hour Minute

<u>የቃለ መጠይቅ መግለጫና መተማመኛ</u>

አንደምን አደራችሁ/ዋላችሁ ስሜ----------ይባላል የአዲስአበባ ዩኒቨርስቲ የህብረተሰብ ጤና ትምህርት ክፍል ተማሪ ነኝ የመመረቂያ ጥናት ከኤችአይቪ ጋር የሚኖሩ እናቶች ወደ ልጃቸው እንዳይተላለፍ የሚወስዱትን መድሀኒትና የህፃናትአመጋገብ ሁኔታን ከኤችአይቪ ከእናት ወደ ልጅ የመተላለፍ ሁኔታ ጋር በተያያዘ የሚያጠና ነው፡፡የጥናቱ ውጤት ለልጆች የአመጋገብ ሁኔታን በማስተካከል ከወሊድ በኋላ ያለውን ከእናት ወደ ልጅ የሚተላለፈውን የኤችአይቪ ቫይረስ ሁኔታን ለመቀነስ፤የሚሰጠውን ህክምና ለማሻሻልና መንግስታዊና መንግስታዊ ላልሆኑ ድረጅቶች አድስ የአሰራር ሁኔታን በመቅረጽ ከኤችአይቪ ቫይረስ ጋር የምትኖር እናትና የልጇን ደህንነት ለማሻሻል ይረዳል፡፡ እርሰዎ በዚህ ጥናት ላይ እንዲሳተፉ ሲመረጡ በጉዳዩ ላይ ያለዎትን ቀጥተኛ ተሳታፊነት እና እውቀት ከግምት በማስገባት ነው፡፡ለመወያየት የሚሆኑ ጥያቄዎች ተዘጋጀተዋል በውይይቱ ወቅት የሚሰጡን መልሶች ለጥናቱ አላማ በጣም ስለሚጠቅመን መልሶቹን መቀበላችንን ለማረጋገጥ ቴፕ ሪከርደር/መቅረጸድምጽ/ እንጠቀማለን፤ ሆኖም የሚሰጡን መልሶች በሚስጥር የሚያዙና የተቀረጸው ንግግር ለማንም እንደማይሰጥ ሰመዎም በመጠይቁ ሰአት ፊጽሞ እደማይጠቀስ ልገልጽሎት እወዳለሁ፡፡

ለመሳተፍ ፈቃደኛ ነዎት? ሰለፍቃደኝነተዎ ከልብ አመሰግናለሁ፡፡

የተሳታፊው ፊርማ ---------- ቀን----------

እኔምይህ መጠይቅ የተካሄደው ከላይ የተዘረዘሩት መግለጫዎች ከተነበበለዎት በኋላ በእርሰዎ ሙሉፈቃደኝነት መሰረት መጠይቁን ያከናወንኩ መሆኑን በፊርማ የአረጋግጣለሁ፡፡

የጠያቂውስም ---------- ፊርማ---------- ቀን----------

ተሳታፊዋ ፈቃደኛ ከሆኑ መጠይቁን ቀጥል ፈቃደኛ ካልሆኑ መጠይቁን አቁም፡፡

የተጀመረበት ሰአት ----------፣------

የቃለ መጠይቅ መመሪያ ጥያቄዎች

ወረዳ ----------

ቀበሌ ----------

መጠይቅ የተደረገበት ቦታ ----------

1. **ከኤችአይቪ ጋር የምትኖር እናት ቫይረሱን ወደ ልጇእእንዳታስተላልፍ የሚረዱ የመከላከያ አማራጮች ሊነግሩኝ ይችላሉ?**
2. **እነዝህን አማራጮች እእንደት ነው የተረዷቸው? እባክዎትን ትንሽ ቢያብራሩልኝ?**
3. **ከነዚህ አማራጮች የተጠቀሚቸው መንገዶች አሉ? ከሉ ያገኙትን ጥቅም ቢነግሩኝ?**

አሁን ስለህጻናት አመጋገብ ሁኔታታ ያገኙትን የምክር አገልግሎት በተመለከተእ እንወያያለን የሚያውቁትን ያክል ያብራሩልኛል

4. **ከኤችአይቪ ጋር ለምትኖር እናት የሚሆን የህጻን አመጋገብ ዘዴዎችን ሊነግሩኝ ይችላሉ?**
5. **እእርሰዎ ስለህጻናት የአመጋገብ ሁኔታ የምክር አገልግሎት አገኝተው ያውቃሉ? (ምን አይነት የአመጋገብ ዘዴ ተመክሮዎት ነበር? በነፍሰጡርነተዎ ጊዜ? ከወለዱ በኋላስ ?እባክ መልሱን ያብራሩልኝ)**
6. **ተለዋጭ/ተተኪ ወተት ለመጠቀም የሚፈልጉ እናቶች ስለአዘገጃጀቱ ምክርና በተግባር እያዩ የጤና ባለሙያ ምክር ያገኛሉ?እ**
7. **ከእርሰዎ ተሞክሮ ምን አይነት የአመጋገብ ዘዴ እንደተጠቀሙና ያገኙትን ጥቅም ቢያብራሩልኝ?**
8. **ከኤችአይቪ ጋር የሚኖሩ እናቶች ጡትን ብቻ ለማጥባት ወይም ተተኪ ምግብ ለመጠቀም ከወሰኑ በኋላ ተግባራዊ የማያደርጉበት ዋነኛ ችግር ምን ይመስለዎታል?ከእርሰዎ ተሞክሮ ቢያብራሩልኝ?**
9. **እናቶች የመረጡትን የአመጋገብ ዘዴ በትክክል እንድጠቀሙና ከእናት ወደ ልጅ የሚተላለፈውን የኤችአይቪ ቫይረስ ሁኔታን ለመቀነስ ምን መደረግ አለበትይላሉ?**

መጠይቁን ጨርሰናል ስለትብብረዎ በጣም እናመሰግናለን!!!

የተጨረሰበት ሰዓት ----------:---------

Declaration

I, the undersigned, declare this thesis is my original work in partial fulfillment of the requirement of the Degree of Master of Public Health and has not been presented in this or other University. All sources of materials used for this thesis have been acknowledged.

Name: **Yeshimebet Ali Dawed** Signature _____

Place Addis Ababa Ethiopia

Date of Submission June, 2012

This thesis has been submitted for examination with my approval as the university advisor.

Name of the advisor Signature

Dr. Abera Kumie _____

Annex VI: Name of health institution used for this study

Includes:-

Government health institution

- Dessie Zonal Referral Hospital
- Boru meda Hospital
- Lalibela Hospital
- Woldyia Hospital
- Hidar 11 Hospital/Akesta Hospital
- Dessie Health Center
- Wuchalie H/C
- Haik H/C
- Bistima H/C
- Kombolcha H/C
- Harbu H /C
- Mekanselam H/C
- Wgedi H/C
- Wreilu H/C
- Masha H/C
- Tenta H/C
- Kobo H/C
- Woldyia H/C

Private health institution

Selam General Hospital

Ethio General Hospital

Bati General Hospital