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# Mortality and Associated Factors among Children Born to Human Immunodeficiency Virus-infected Mothers in Public Hospitals in North Gondar, Northwest Ethiopia

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**Abstract**
**Background:** HIV has become one of the world's most serious public health problems. Mother to child transmission of HIV/AIDS during pregnancy, deliver and breast feeding are major sources of HIV-infection in children. Without treatment, one third of children with HIV will die of AIDs before their first birthday; half of them die before celebrating their second birthday. Hence, assessing mortality and associated factors among children born to HIV-infected women is of paramount importance.**Objective:** To assess mortality and associated factors among children born to HIV-infected women in public Hospitals in North Gondar, Northwest Ethiopia.**Methods:** Institutional based cross-sectional study was conducted from March to May, 2013 in Public hospitals in North Gondar Zone. Data were collected from 422 HIV-positive mothers by face-to-face interview. The entire 422 younger child born from these mothers within five years were included in the study and analysis. Data were entered into Epi-Info and exported to SPSS for further analysis. Bivariate analysis was employed to see relationship between variables. Predictors having p–value ≤ 0.2 in bivariate analysis were included in the multivariate model. Odds ratios and their 95% confidence intervals were calculated. A p-value of ≤ 0.05 was considered as statistically significant in multivariate model.**Results:** Of the total 422 children, 292 [69.2%] were 24 months and above aged. The overall mortality was, 75 [17.8%]. Early age at weaning [AOR=5.16;95%CIs; 1.67-15.97], early age of child [AOR=67.51;95%CIs; 21.38-213.12], second and third birth order [AOR=8.32;95%CIs:2.62-26.44], fourth and above birth [AOR=17.43;95%CIs:3.86-78.71], preterm gestational age [AOR=4.32;95%CIs:1.01-18.42], having history of previous child loss [AOR=5.89;95%CIs:1.44-24.18], Child HIV test [AOR=7.14;95%CIs:2.79-18.28], mixed child feeding for the first six month [AOR=6.64] were significantly associated with mortality of children.**Conclusion:** The prevalence of mortality was high among children born to HIV-infected mothers and it may indicate a hidden burden in children. Therefore, weaning child according to the WHO recommendations was good protector of child mortality.
**Keywords:** Mortality, HIV-infected, Weaning, child loss, North Gondar

## Introduction

Globally, HIV pandemic created an enormous challenge to the survival of humankind. HIV/AIDS is a major cause of infants and childhood mortality and morbidity in developing countries like Africa. There are estimated of 34 million people currently living with HIV/AIDs and around 30 million people have died of AIDS-related causes since the beginning of the epidemic **[1-3].** Study shown that, in under-five children, HIV/AIDS accounts for 7.7% of mortality worldwide and AIDS already accounts for a rise of more than 19% in infant mortality and a 36% rise in under five mortality **[4].** WHO estimated more than nine million infants die before birth or in the first few weeks of life each year, and nearly all of these deaths occurred in developing countries **[5]** and 43% of worldwide mortality among under 5 years was currently occurs in Africa **[6].** More than one-half of HIV-infected infants will die within the first 2 years of life without ARV treatment **[7].** The major source of HIV infection in children is MTCT during pregnancy, labour, delivery, or breastfeeding **[8-9].**

In 2008, sub-Saharan Africa accounted for 91% of new HIV infections among children as a result of MTCT. Many of these children were never diagnosed with HIV and did not receive proper treatment **[10].** All HIV-exposed infants are at risk for HIV infection and opportunistic infections. Without treatment an infant infected with HIV in Africa has a 35% chance of dying by his or her first birthday, and a 53% chance of dying before the age of two **[7].** The transmission risk for HIV-exposed children in African setting is 30–40% without interventions for PMTCT and other 60–70% of children not HIV-infected have high risk of mortality **[4]**.

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The study revealed mortality rate related to HIV exposure was at least 3-fold higher in Zimbabwe and 2-fold higher in Uganda among HIV-uninfected infants born to HIV-infected mothers **[11, 12].** HIV-exposed but uninfected infants, who represent 30% of all children born in some areas of southern Africa, have higher mortality rates **[6, 11- 13].** Other different studies also revealed that infants born from HIV-infected mothers had high lost to follow up and high chance of mortality rate **[14-20].**

Ethiopia is among the countries most severely hit by the epidemic and vertical virus transmission from MTCT which accounts for more than 90% of pediatrics AIDS. There were an estimated 79,183 HIV -infected pregnancies and 14,093 HIV-positive births in 2008 **[21- 23].** According to EDHS 2011 infant mortality rate was 59 per 1,000 live births, the child mortality rate was 31 per 1,000 children surviving to age 1 year, and the under-five mortality rate was 88 per 1,000 live births. Neonatal mortality was 37 per 1,000 live births, and post neonatal mortality was 22 deaths per 1,000 live births **[24].** One national study conducted in Ethiopia in 2009 revealed, in the general population receiving ART, 7.8% had died, 16.9% lost to follow up (LTFU) and there was 24.9% attrition rate from the program and particularly in Amhara region, 9% were died, 17.45 were LTFU, there was 26.6% attrition from the program and 73.5% retention rate. However, it was not for specific age group to analyze mortality and retention rate of under five children age group **[25].** Other study conducted on 475 HIV infected children starting ARV treatment at Zewditu memorial hospital, Addis Ababa, Ethiopia from March 21 2005 to 30 April 2008 showed 42 (8.8%) died during a median study follow up of 12 months **[26].**

Other many studies revealed that several factors were related to death in children. It was caused by infectious diseases, maternal Factors like pregnancy, labour, delivery-related problems **[7],** high maternal viral load (HAART), low CD4 count, age, occupation, residence, time of breastfeeding, ARV prophylaxis, PMTCT services, maternal Hgb, parity, history of previously child lost, infant feeding, maternal STIs, clinical stage of disease and Infant factors like type infant feeding, HIV test status, birth order, ARV prophylaxis, HIV-status of the infant, gender, small for gestational age, obstetric and delivery Practices for more than four hours, mode of delivery ,appropriate medical care and Provision of safe water among HIV-exposed infants at the time of weaning **[5,11,13,15,16, 18,19, 26-43]**. Although, evaluation of mortality and associated factors among children born to HIV-infected mother is essential for program effectiveness and program planners, there are no researches conducted regarding the topic in Ethiopia and in the study area.

## Materials and Methods

### Study design and area

Institution based cross-sectional study design was carried out among HIV-infected mothers who delivered in the last five years in between September, 2006 and July, 2011.The study was conducted in Hospitals in North Gondar administrative Zone, Amhara National Regional State, Northwest Ethiopia from March 05, 2013 to may 30, 2013. Its capital city is Gondar which is one of the historical towns in the country and located at 727km Northwest of Addis Ababa. According to the North Gondar health bureau, It has total population of 3,050,486, of 2,721,921(84%) are living in rural areas and 1,497,943 women; women in reproductive age group are estimated 719,304 (23.58%). It also has three public hospitals (Debark, Metema and Gondar university hospital), 124 health centers, and 489 health posts under supervision of north Gondar health bureau**.** All children born to HIV-infected women in the last five years who are found in North Gondar were taken as target population for the study. Those younger or recent births that were born from HIV-infected mothers between September, 2006 and July, 2011 in North Gondar were included in the study. A total of 422 mothers were interviewed about themselves and their children health status.

### Data collection procedures and Analysis

In North Gondar zone, all HIV-infected mothers were identified through available registers from ART clinic in three public health hospitals and mothers were waited at ART clinic and asked by ART trained nurses while she had come for ART follow up within data collection period. All HIV-infected mothers who gave birth in the last five years were included for interview. Data were collected by using a semi-structured and pre-tested questionnaire using a face -to -face interview technique from mothers. The questionnaire was developed from existing literature in English and translated to local language Amharic by language experts. Three nurses working in the ART clinic collected data and supervised by three BSc holders' public health officer. Principal investigators and supervisors did spot-checking and reviewing the completed questionnaires on daily bases to ensure completeness and consistency of the information collected. Moreover, all complete responses were recorded or coded before entry. Finally, double data entry was made into EPI INFO version 3.5.3 statistical software by the principal investigators to keep accuracy of the data. Data were then exported to SPSS version 20.0 and cleaned, edited and recoded in to SPSS for further analysis. Descriptive statistics of the collected data was done for most variables using statistical measurements and displayed using tables, graphs, charts. Bivariate logistic regression model were fitted for all explanatory variables to identify which variables have significant association with outcome variable. Finally, those variables with p-value ≤0.2 in the bivariate analysis were fitted

to the multivariate logistic model. Odds ratios with 95% confidence intervals were calculated. P-values ≤0.05 were considered statistically significant and used to measure strength of association as cut off point in multivariate analysis.

**Ethical Considerations**

The study was carried out after getting ethical clearance from the Institutional Review Board of Institute of Public Health, University of Gondar. Later on, a letter was sent to North Gondar public hospitals. Permission letter was obtained from hospitals administrations. A verbal informed consent was obtained from each study participants. Those mothers who refused to participate in the study were not forced. Each respondent was informed about the objective of the study. Confidentiality was guaranteed for information to be collected by keeping the privacy of the respondents while filling the questionnaire.

**Results**

**Socio-demographic characteristics of HIV positive mothers and their children**

Out of the total 422 mothers interviewed at the three public hospitals in North Gondar zone, 349 (82.7%) and 73 (17.3%) were urban and rural dwellers respectively. The mean (standard deviation) age of the mothers was 29.5 ± 4.7 years ranging from 20 to 45. More than half of the mothers, 268 (63.5%) were married and the mean age of the mother at the first marriage was 18.3 ± 3.8 years. Majority of the respondents, 359 (85.1%) were Orthodox Christian religion followers and 383 (90.8%) were Amhara by ethnicity. More than half of mothers, 250 (59.2%) were house wives and 164 (38.9%) were not educated. Majority, 368 (87.2%) of respondents husbands were alive and 169 (40.1%) of their husbands' were primary education, 156 (37%) was employed in different institutions. More than half, 300 (71.1%) of the respondents had less than five family member and 122 (28.9%) had more than five family member in the household. Out of the total 422, 104 (24.6%), 237 (56.2%) and 81 (19.2%) had got low, middle and high level income per month respectively (**Table 1**). Out of the total 422 younger child included in the analysis, 226 (53.6%) were males and 196 (46.4%) were females. Two third, 292 (69.2%) were aged 24 months and above.

**Medical and obstetric characteristics of HIV positive mothers and their children**

The mean age of mothers at birth was 21 with standard deviation ± 4.2 years and 254 (60.2%) of them were married at 18+ years. More than half 273 (64.7%) were multi-parous and the left 149 (35.3%) were a primi-parous. Out of the total 422 mothers, 40 (9.5%) of them had history of past child loss before the last five years and three quarters or 323 (76.5%) of the mothers attended PMTCT services. Three hundred seven (72.7%) deliveries were done at health facilities, 304 (72%) were assisted by health professionals and 368 (87.2%) were through vaginal or normal mode of delivery. Three hundred one (71.3%) were attended PNC follow up and 93 (30.9%) of them were followed from 1-2 times and 207 (69.1%) were followed three and above visits (**Table-2).** Out of the total 422 children included in analysis, the mean (standard deviation) gestational age of child at birth was 37 ± 1.4 weeks. More than half of the child, 221 (52.4%) were born at ≥24 months birth interval with the previous child and half of them, 214 (50.7%) were the second and third birth order. Two hundred thirteen (50.5%) children took ARV prophylaxis after birth and 388 (91.8%) of them were immunized. Most of the children took routine immunization like BCG, 396 (93.8%), Polio, 404 (95.7%), DPT, 394 (93.4), measles, 356 (84.4%). Majority of the children, 318 (75.4%) were fed with exclusive breast feeding for the first six months, other 22 (5.2%), 82 (19.4%) were fed with replacement and mixed feeding respectively. Two hundred eighty six (61.5%) were initiated weaning for 12 months. (**Table 3**)

**Behavioral and hygiene characteristics of mothers**

Out of the total 422 mothers, 5(1.2%), 28(6.6%), and 70(16.6%) of them had Cigarettes smoking, Khat chewing, Alcohol drinking behavior respectively. Majority of the mothers, 357 (84.6%) and 342 (81%) reported they had tap (protected source) water supply and latrine access **(Figure 2**). Almost all, 420 (99.5%) of them reported they had habit of washing their hands before preparing meals and 311 (73.7%) had reported habits to wash hands always before feeding child. Out of 391 (92.7) had behavior of washing their hands after toilet visit, only 152 (36%) were reported that they were wash their hands always after toilet visit.

**Mortality among children born to HIV-positive mothers in the last five years**

Out of the total 580 children born from 422 HIV positive women within the last five years, only 422 younger children were included in the analysis because of those previous birth may had similar characteristics and recall bias may other problem. Out of the total 422 younger child included in the analysis, 347 (82.2%) were still alive and 75 (17.8%) were died. More than half, 184 (53%) of child currently alive were males, 163 (47%) were females. Two hundred twenty two (64%) of alive children were 24-48 months aged and 63 (18.2%) were less than 24 months. More than half, 42 (56%) of died child were males, 33 (44%) were females. Forty four (58.7%)

of died children were 12 month and less aged and 31(41.3%) were more than twelve months aged. Majority, 67 (89.3) were died before age of 24 months and 52 (69.3%) were died at home.

**Factors associated with mortality among children born to HIV-positive mothers**

Socio-demographic, behavioral, medical and obstetric factors of mothers and children in relation to mortality among children were analyzed by bivariate and multivariate logistic regression model. On Bivariate analysis current age of mothers, marital status, age at first marriage, education, occupational status, father education and occupation, family members per household, family monthly income, parity, history of previous child loss, ANC visit, and age of child, gestational age of child, child ARV treatment, child immunization status, age at weaning, child follow up, child feeding style for first six month, child HIV-test, child HIV result, birth order, birth intervals were significantly associated with children mortality. However, by multivariate analysis, maternal history of previous child loss, age at weaning, age of child, birth order, child HIV test, gestational age at birth, child feeding style for the first six month were independently and significantly associated with children mortality. Those mothers with history of previous child loss had 5.89 times more likely to experience mortality of their children when compared to mothers who had no history of previous child loss [AOR =5.89: 95%CI: 1.44-24.18]. Those children who were weaning for ≤12 months had 5.16 times more likely to have mortality compared to those who were weaning for more than twelve months [AOR =5.16: 95%CI: 1.66-15.97]. Among the total younger children, those aged less than twenty four months had the likelihood of mortality with an AOR = 67.51 [95%CI: 21.38-213.12], compared with ≥24 months age. That means, those younger children who were less than 24 months aged have 67 times more likely to experience mortality compared to those children whose aged more ≥24 months [AOR = 67.51 [95%CI: 21.38-213.12]. This was because of the sample in the outcome were more likely large in those categories in less than twenty four months. Children who had born gestational age less than 37 weeks or preterm had 4.33 more likely to experience mortality when compared with those who had gestational age of ≥37 weeks [AOR = 4.33 ; 95%CI: 1.01-18.43].

Those the second and third birth were 8.32 times more likely to experience mortality when compared to those first birth with an AOR= 8.32 [ 95%CI, 2.62-26.44] and those fourth and above birth order had 17.43 times more likely to experience mortality compared to the those first birth [AOR= 17.43 [95%CI, 3.86-78.71]. Those younger children who were not tested for HIV had 7.14 times more likely to experience mortality compared to those child who were tested HIV on time with an AOR=7.14 [95%CI: 2.79-18.28]. Among younger children those who were mixed feeding style within the first six months of age have 6.64 times more likely to experience mortality compared to those who were exclusively breast feeding for the first six month [AOR=6.64 [95%CI: 2.10-20.93] (**Table 4).**

**Discussion**

This study revealed that women with advanced HIV disease are not only more likely to transmit HIV/AIDS but it has increased the risk of early child mortality. This study disclosed mortality and its associated factors among children born to HIV infected mothers in North Gondar. Child survival is influenced by HIV epidemic through several mechanisms during pregnancy, delivery and breast feeding. High rates of child mortality are primarily attributable to child factors like age, gestational age at birth, birth order, HIV test, age at weaning and maternal factors like history of previous child loss, child feeding style for the first six months.

In this study, mortality rate among children was 17.8% in last five years. This is lower when compared to the study conducted at pediatric center in North India which is 21% **[14].** But, this result is higher than study done in Boston which was 13.6% **[15]**. The discrepancy may be the data collected were that of five years in this study but, that of Boston was only that of two years. Other five years follow up studies done in developing country revealed mortality rate among children born to HIV infected mother was 15.2% which was consistent with this study **[16]**. This study is similar with study done in Kenya which revealed 18.7% mortality among of exposed children **[19].** The reason for their similarity May mortality among less than five was still high in both countries because of care and support given for these vulnerable groups were lack at different levels like mothers, health facilities and care and support givers.

In this study, Mortality was higher among children less than 24 months; 89.3% which is the highest when compare to study conducted in Abidjan, Cote d'Ivoire 52% deaths at age less than two years **[20].** The discrepancy between these studies may be because of the sample taken and the care and support given for children were different in the two countries and this study was included all children born to HIV infected mother within five year but that of Abidjan was only less than two years. Also the other reason may be cultural differences between the two countries when providing the care and support for children. Other case control study done in Botswana showed 24-month mortality was 36.2% which is less than this study **[15].** The reason for this was also similar with the above case. Other studies done in Kenya and South Africa also reported that age of child was essential predictor of mortality **[18, 38]**.

In this study, another factor associated with mortality was weaning period. Breast feeding up to twelve

month increase the mortality of children five-folds, 87.5% compared to longer breast feeding more than twelve months. This result was consistent with the study conducted in Boston, Zambia, Botswana **[15, 29, 30].** This was because of breast-feeding may promote mother-to-child transmission of HIV, early cessation or shortening the normal duration of breast-feeding for children born to HIV-infected mothers can promote higher rates of other childhood illnesses and can increase mortality. Therefore, when the mother initiate weaning for twelve months, the child was increased the risk of getting HIV transmission and result in mortality. The other reason may becoming a target for stigma and discrimination that mothers must be able to cope with this problem and resist pressure from friends and relatives to breastfeed.

In this study, HIV test status of children born to HIV positive mothers was another significant factor of causing mortality among children. The result revealed that those children not tested on time were 7.14 times more likely have the chance of death compared to those children tested on time. This result was also positively supported by the study done in Northern Nigeria and West Africa **[33, 34]** which revealed that early child HIV test was very poor in the study area, and increased the risk of mortality among children born from HIV positive mothers. This may because of late HIV test increases the mortality from unknown cases among children.

In this study, decrease with child gestational age was observed significantly associated with children mortality. Child with lower gestational age (less than 37 weeks) or preterm had 4.33 times more likely to have chance of mortality when compared to those who were 37 and more weeks. The result was consistent with Study done among children less than five in Ethiopia which indicated gestational age less than 37 weeks (preterm) was significantly associated with mortality **[24, 40,44].** This may because of prematurity of the children and unable to develop the immunity which helps them to protect from external exposures and other consequences.

Those the second and third birth were 8.32 times more likely to experience mortality when compared to those first birth with an AOR= 8.32 [95%CI, 2.62-26.44] and those fourth and above birth order had 17.43 times more likely to experience mortality compared to the those first birth [AOR=17.43 [95%CI, 3.86-78.71]. This is similar with study conducted in Ethiopia which indicated birth order was found to affect child mortality **[40, 44].** This may be because of these children were the middle birth and they couldn't get equal care and support when compare to others with the first birth.

The younger children those who were mixed feeding style within the first six months of age have 6.64 times more likely to experience mortality compared to those who were exclusively breast feeding for the first six month [AOR=6.64 [95%CI:2.10-20.93]. A Retrospective analysis of data among HIV exposed infants in North India revealed mortality among those children with mixed feeding within the first six months had higher chance of mortality **[14],** study done in Kenya, and South Africa also showed Mortality was higher among mixed Infant-feeding style **[18, 38]** compared to the others.

Another factor associated with child mortality in this study was history of previous child loss which had significant impact on child mortality. Those mothers with history of previous child loss were 5.89 times more likely to experience mortality of their children when compared to mothers who had no history of previous child loss [AOR =5.89: 95%CI:1.44-24.18]. Child loss has a great impact on any woman that need psychosocial support at this time because of cultural practices and religious influences. This may be because of social discriminations. This result was consistent with study conducted in developing country setting and Malawi which stated that child mortality was higher among those who have previous child loss **[16, 19].** Study conducted in Ethiopia among current birth also reported being having history of past child loss is predictor of mortality among children **[41].**

## Conclusions

In conclusion, this study showed high prevalence of mortality among children born to HIV infected mothers. Both maternal and child factors were significantly associated with mortality of children. Children born to HIV infected mothers were at particular risk of death less than 24 months. Breastfeeding was considered to be a strong protector of infant and child survival. Early child follow up and providing ARV treatment was very crucial elements of child care and support for their survival and decrease the burden of mortality and other consequences. Those HIV-positive mothers with more advanced disease are not only more likely to infect their children, but their infants are also more likely to die at their childhood age.

## Authors' contributions

Abera Shibru Tulu designed the study, data collection, data entry, performed the statistical analysis, drafted and wrote the manuscript. Berihun Megabiaw Zeleke, and Digsu Negese Koye, participated in the study design, data collection, data analysis, manuscript writing, reading, and approved final manuscript.

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**Tables**

**Table-1:-**Socio-demographic characteristics of HIV positive mothers at public Hospitals in North Gondar zone march-May, 2013 (n=422)

| Variable | Frequency | Percent (%) |
|---|---|---|
| **Residence (n=422)** | | |
| **Urban** | 349 | 82.7 |
| **Rural** | 73 | 17.3 |
| **Religion** | | |
| **Orthodox** | 359 | 85.1 |
| **Muslim** | 49 | 11.6 |
| **Protestant** | 14 | 3.3 |
| **Marital status** | | |
| **single** | 23 | 5.5 |
| **Married/living together** | 268 | 63.5 |
| **Divorced** | 83 | 19.7 |
| **Widowed** | 31 | 7.3 |
| **Separated** | 17 | 4.0 |
| **Occupational status of mother** | | |
| **House wife** | 250 | 59.2 |
| **Employed** | 65 | 15.4 |
| ****Others** | 107 | 25.4 |
| **Educational status of mother** | | |
| **Cannot read and write** | 164 | 38.9 |
| **Read and write** | 48 | 11.4 |
| **Primary education** | 91 | 21.6 |
| **Secondary education** | 88 | 20.8 |
| **Tertiary education** | 31 | 7.3 |
| **Fathers' health status** | | |
| **Alive** | 368 | 87.2 |
| **Not alive** | 54 | 12.8 |
| **Educational status of father (n=368)** | | |
| **Cannot read and write** | 68 | 18.5 |
| **Read and write** | 75 | 20.4 |
| **Primary education** | 94 | 25.5 |
| **Secondary education** | 91 | 24.7 |
| **Tertiary education** | 40 | 10.9 |

- ****Others**=merchant, daily labors, housemaid, student

 

**Table-2:-** Medical and obstetric characteristics of mothers at public Hospitals in North Gondar zone March-May, 2013 (n=422)

| Variable | Frequency | Percent (%) |
|---|---|---|
| **Age at first birth** | | |
| **≤20 years** | 229 | 54.3 |
| **≥21 years** | 193 | 45.7 |
| **Parity** | | |
| **1-2 child** | 297 | 70.4 |
| **3-4** | 103 | 24.4 |
| **≥5** | 22 | 5.2 |
| **PMTCT status** | | |
| **Attended** | 323 | 76.5 |
| **Nor attended** | 99 | 23.5 |
| **Opportunistic infections(OIs)** | | |
| **Yes** | 201 | 47.6 |
| **No** | 221 | 52.4 |
| **Type of OIs (n=201)** | | |
| **Malaria** | 49 | 24.4 |
| **Tuberculosis** | 71 | 35.3 |
| **STIs** | 81 | 40.3 |
| **ANC follow up** | | |
| **Yes** | 356 | 84.4 |
| **No** | 66 | 15.6 |
| **Place of delivery** | | |
| **At home** | 115 | 27.3 |
| **Health facility** | 307 | 72.7 |
| **Delivery assistance** | | |
| **Health professionals** | 304 | 72.0 |
| **HEWs** | 15 | 3.6 |
| **TBA** | 59 | 14.0 |
| **Relative/by herself** | 44 | 10.4 |

**Table-3:-** Medical and obstetric related factors of children born to HIV positive mothers at Hospitals in North Gondar zone March-May 15, 2013(n=422)

| Variable | Frequency | Percent (%) |
|---|---|---|
| **Gestational age at birth** | | |
| **<37 weeks** | 33 | 7.8 |
| **37+ weeks** | 399 | 92.2 |
| **Birth interval** | | |
| **<24 months** | 201 | 47.6 |
| **24+ months** | 221 | 52.4 |
| **Birth order** | | |
| **1st** | 150 | 35.6 |
| **2nd-3rd** | 214 | 50.7 |
| **4rth+** | 58 | 13.7 |
| **ARV prophylaxis** | | |
| **Taken** | 213 | 50.5 |
| **Not taken** | 209 | 49.5 |
| **PNC follow up** | | |
| **Yes** | 393 | 93.1 |
| **No** | 29 | 6.9 |
| **Feeding status firs six month** | | |
| **Exclusive** | 318 | 75.4 |
| **Formula** | 22 | 5.2 |
| **Mixed** | 82 | 19.4 |
| **Age at weaning** | | |
| **≤12 months** | 286 | 61.5 |
| **>12** | 114 | 28.5 |
| **HIV test** | | |
| **Tested** | 319 | 75.6 |
| **Not tested** | 103 | 24.4 |
| **HIV result (n=319)** | | |
| **Positive** | 44 | 13.8 |
| **Negative** | 275 | 86.2 |

 

**Table 4:-** Bivariate and multivariate logistic regression model of factors associated with Mortality among children born to HIV-positive mothers in North Gondar zone (n=422), March-May 2013

| Variables | Mortality No | Yes | Crude (95% CI) | OR | Adjusted OR (95% CI) | p-value |
|---|---|---|---|---|---|---|
| **Gestational age at birth** | | | | | | |
| **<37 weeks** | 19 | 14 | 8.07 (3.83-17.02) | | 4.32(1.02-18.43) | 0.048 |
| **≥37 weeks** | 56 333 (96) | 333 | 1.00 | | 1.00 | |
| **Age of child** | | | | | | |
| **<24 months** | 67 | 63 | 37.03(16.95-80.93) | | 67.51(21.4-213.1) | <0.001 |
| **≥ 24** | 8 | 284 | 1.00 | | 1.00 | |
| **Birth order** | | | | | | |
| **1st** | 8 | 142 | 1.00 | | 1.00 | |
| **2nd-3rd** | 47 | 167 | 4.99(2.29-10.92) | | 8.32(2.62-26.44) | <0.001 |
| **4rth+** | 20 | 38 | 9.34(3.82-22.86) | | 17.43(3.86-78.71) | <0.001 |
| **Child feeding style** | | | | | | |
| **Exclusively breast** | 52 | 266 | 1.00 | | | |
| **Formula** | 3 | 19 | 0.81(0.23-2.83)* | | | |
| **Mixed** | 20 | 62 | 1.65(0.92-2.96) | | 6.64(2.10-20.93) | 0.001 |
| **Child weaning period** | | | | | | |
| **≤12 months** | 63 | 223 | 3.29(1.58-6.88) | | 5.16(1.67-15.97) | 0.004 |
| **>12 months** | 9 | 105 | 1.00 | | 1.00 | |
| **Child HIV test** | | | | | | |
| **Tested** | 27 | 292 | 1.00 | | 1.00 | |
| **Not tested** | 48 | 55 | 9.45(5.43-16.40) | | 7.14(2.79-18.28) | <0.001 |
| **Parity** | | | | | | |
| **1 child** | 8 | 141 | 1.00 | | | |
| **≥2 child** | 67 | 206 | 5.73(2.67-12.30)* | | | |
| **History of past child lost** | | | | | | |
| **Yes** | 20 | 20 | 5.95(3.00-11.76) | | 5.89(1.44-24.18) | 0.014 |
| **No** | 55 | 327 | 1.00 | | 1.00 | |
| **Household family member** | | | | | | |
| **<5 person** | 42 | 258 | 1.00 | | | |
| **≥5 person** | 33 | 89 | 2.28(1.36-3.82)* | | | |

*Statistically insignificant at p-value ≤0.05 on multivariate analysis, Forward LR was used for the multivariate model.

 

**Figure Legends**

Figure-1:-Conceptual frame work for mortality and associated factors among children born to HIV-infected women

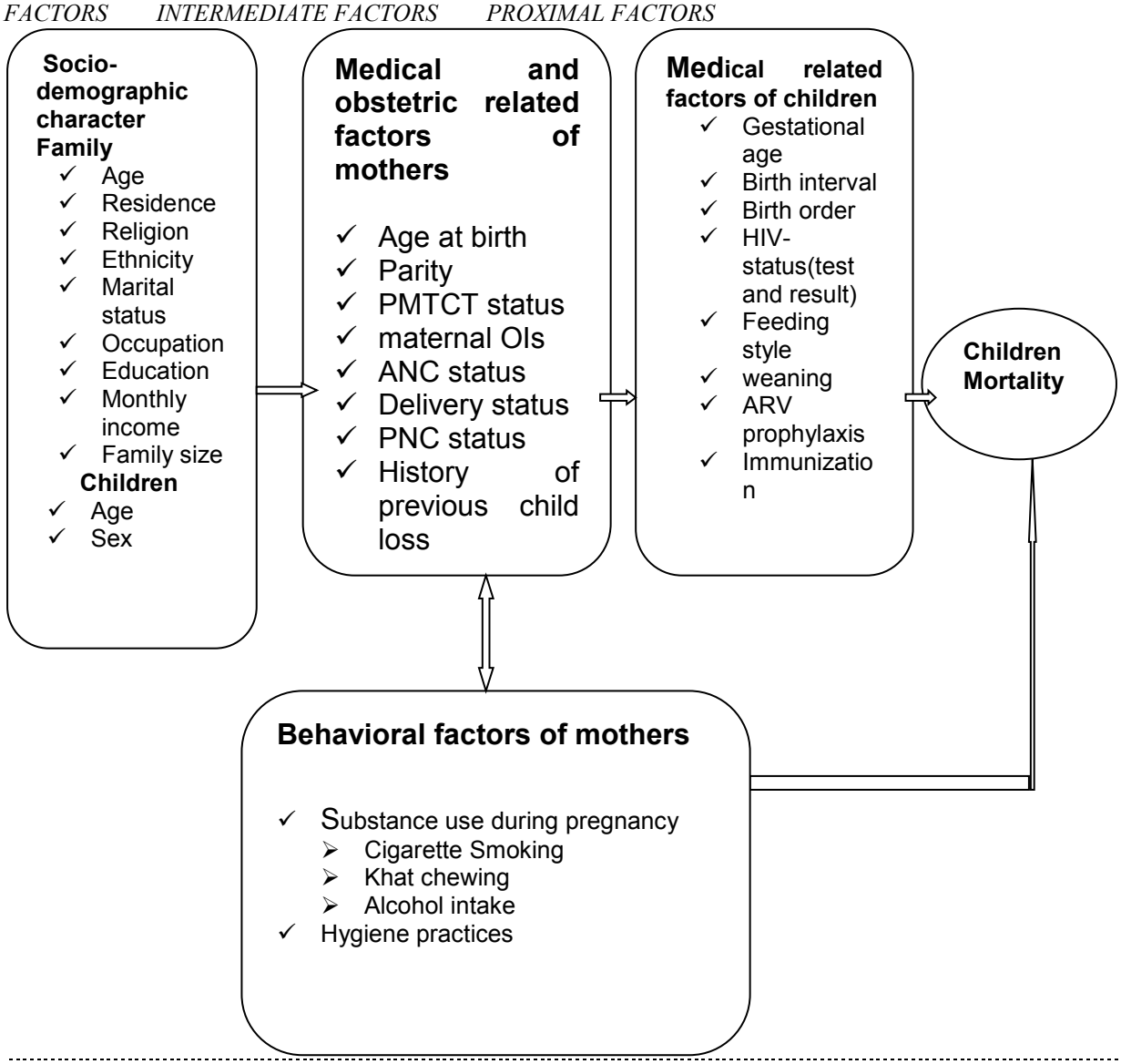

Figure 2:-Water supply source of the mothers the last five years in North Gondar zone