Prevalence and Associated Factors of HIV among Infants Born to HIV Positive Women in Asella Town Government Health Facilities, Ethiopia, 2018. A Facility Based Cross sectional Study.

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Abstract

Background: *Globally there are 3.3 million Children under fifteenyears of age living with human-immune virus infection each year. Itcan be transmitted from human-immune virus positive mothers to her child during pregnancy, childbirth and breast feeding. Without treatment, the likelihood of itstransmissionfrom mother-to-child is fifteen toforty five percent. Therefore, the purpose of this study was to reveal theitsprevalence among infants born to sero positive mothers.*

Method: *Facility based cross-sectional study was employed among 220human-immune virusexposed infants enrolled from July 1, 2014- June30, 2018 in Asella town Health facilities. Data werecollected from all exposed infant having human-immune virus Deoxyribonucleic Acid polymerase chain reaction test. The collected data was coded and entered in to EPI info version 7.0, then cleaned and exported to SPSS version 21. Descriptive statistics were used to describe findings, both binary and then multiple logistic regressions were used to identify the associated factors. A 95% confidence intervalwith Adjusted odd ratiowas used to measure the strengths of association and a p-value $\leq$0.05 was used to determine the statistical significance in the final model.*

Result: *The study revealed that 2.3% of the infants born from human-immune virus seropositive mothers were found to be human-immune virus positive. Infants whose mothers started Antiretroviral at post-partum period*

were significantly associated with human-immune virus infection (AOR 46.794, 95%CI (6.521, 321.590)).

Conclusion:*The prevalence of human-immune virus infection among exposed infants was less than globally expected for mothers only breastfeed their infants to acceptable level. Initiating Antiretroviral during post-partum period was the factor associated with mother-to-child transmission. Therefore, mothers should start Antiretroviral early to bring mother-to-child transmission to zero level and further investigations are recommended to identify more predictors.*

Keywords: *Antiretroviral, human-immune virus, human-immune virus Exposed infant, mother-to-child transmission*

Introduction

The main mode of transmission of Human immune virus (HIV) from the mothers to their infants are during pregnancy, at the time of delivery, or during breastfeeding. As a result of scale-up HIV preventions services there was a 70% decline in the number of new human immune virus HIV infections among children between 2000 and 2015. Despite of this significant progress,the number of children becoming newly infected with HIV remains unacceptably high (CDC, 2016). About 150,000 children became infected with HIV in 2015 (UNAIDS, 2016) and 2.1 million children living with HIV in 2016 (Mary M., 2016) in the world.

In 2011, 92% of pregnant women living with HIV resided in Sub-Saharan Africa and each day, 1500 children under 15 years become infected. In 2015, 1.4 million children aged under 15 years were estimated to be living with HIV which include, 170,000 infants born in 2015, of whom more than 90% of children who acquired live in Sub-Saharan Africa (UNAIDS, 2012; WHO, 2016;Diallo .et al., 2016).

Global target for elimination of Mother to child transmission (MTCT) by the end of 2015 was to reduce the number of new HIV infections among children by 90 % and MTCT is <5% (WHO, 2012).Without intervention, the risk of MTCT ranges from 20% to 45%.With specific interventions in non-

breastfeed infants, the risk of MTCT can be reduced to less than 2% and in breastfeeding populations to 5% or less (WHO, 2010).

According to the study conducted indifferent countries, the prevalence of HIV infection among infant born from HIV sero-positive mothers who are utilizing prevention of mother to child transmission(PMTCT) service was in Kenya 13.5%; in Uganda 6.5%; Yakatit 12 Hospital, Addis Ababa 32.1%, Dire-Dawa 15.7% (Abere MN,2013;Amare H. et al.,2014;Wudineh F, Damtew B, 2016;Kahungu M. et al.,2018).

In early 2013, the Ethiopian government launched the country's Option B+ implementation toall PMTCT facilities which will substantially increase provision of antiretroviral treatment to pregnant women living with HIV and aims to eliminate new HIV infections in children (UNICEF, 2018).Ethiopian Government align nation goals with the national and global initiative and plan to achieve virtual elimination (e-MTCT) by 2015,reduce the overall MTCT rate of HIV to less than 5% at population level (FMOH, 2014; Asefa Y, et al.,2007).

But as shown in literatures, there is high transmission of HIV from Mother to their infants. So, this study aims to assess the prevalence of HIV infection and its correlates among infants born to HIV infected mothers in Asella town governmental health facilities.

Objectives

General Objectives

- To assess the prevalence of HIV positive infant born from HIV seropositive mothers and identify factors associated with it

Specific Objectives

- To determine prevalence of HIV positive infants born from HIV positive mothers, in government Health facilities, Asela town.
- To identify associated factors for HIV positive infants born from HIV positive mothers in government Health facilities of Asela town.

Method and Materials

Study Design, Period and Study

Institutional based cross-sectional study was conducted from July 1, 2014 to June 30, 2018 G.C. to collect the data from the registration and follow up log books in the PMTCT and HIV exposed infants (HEI) follow up units.This study was conducted in Asella town which is found in 175 KM distance far from Addis-Ababa the capital city of Ethiopia. The town has a total population of 101,739 (males- 51159, females-50580) and hasone teaching and referral hospital and twogovernmental Health Centers.There are also Private Health facilities: - one Hospital, 18 medium clinics, 27 drug shops in Asella town. The PMTCT service is only given in governmental Health Facilities, in Asella referral and teaching hospital, Asella Health Center and Halila Health Center.

Source and Study Population

The source populations were all infants born from HIV seropositive mothers in Asella referral and teaching hospital, Asella and Halila Health Center. All infants born from HIV seropositive mothers and DNA/PCR tested for HIV status from July 1, 2014 to June 30, 2018 G.C. were the study population.

Inclusion and exclusion criteria

Infant born from HIV positive women who receiving nevirapinein the first 72hrs of life and was subsequently tested for HIV status by DNA-PCR were included in the study.Documents/records that had no information about mothers taking option B+/ART or incomplete documentation were excluded.

Sample Size and sampling technique

Single population proportion formula was used to calculate the sample size.

Based on the study conducted in Yekatit 12 Hospital, Addis Ababa Ethiopia 2014, prevalence (32.1% and two associated factors (45.4%, 58.5%) (FMOH. (2014).),

- Confidence level (Z=1.96) and
- margin of error(d=0.05),
- Adding 10% to control bias.

Since the population (N) is less than 10,000 final population correction was used,N=464 (from data of three institution, July 1, 2014 G.C. to June 30, 2018)

Finally, the sample size was n=**220**

A systematic sampling technique was used after identifying all infants registered on baby mother documents from July1, 2014 to June 30, 2018. The required number of infants from each health facilities was proportionally allocated. In this way, a total 165 participants from ASRTH, 53 from AHC and 2 from Halila health center took part in the study.

Operational definitions

ARV prophylaxis: Infant obtained ARV drugs immediately after birth.

Exclusive breast feeding: Number of infants documented only breast feed for the first six months.

Exclusive formula feeding: Number of infants documented feed only commercial infant formula milk for the first six months of life.

Mixed breast feeding: Number of infants documented feed on both breast milk and other fluids and solids before 6 months of age.

Data collection, quality control and assurance

A structured check list was adopted from Mother Baby Registration book and clients' Medical record. The structure data sheet includes, socio-demographic characteristics (mother age, marital status, level of education, infant age, sex of infant, birth weight),the PMTCT interventions offered to the mother and her infant, DNA/PCR test done, test results and the first six months feeding option of HIV positive mothers for her infant.

Training was given on how to collect data for five BSc midwifery health professionals working in MNH/PMTCT unit.At the end of each day the completed structured data sheet was checked to ascertain that all questions were answered correctly and consistently.Besides, the data extraction sheet was pretested in a neighboring health facility(Sagure health center).Data cleaning and checking of the total sample size were implemented.

Data processing and analysis

The collected data was coded and entered in to EPI info version 7.0, then cleaned and exported to SPSS version 21 for analysis. Cross-checking was done for inconsistencies by running frequencies of each variable. Similarly, frequency distribution, percentage, tables and charts were used to present results of univariate analysis. Cross tabulation, and odds ratio (OR) using 95% confidence interval (95% CI) was done. Independent variables with less than 0.2 p-values during binary logistic regression were enrolled to multiple logistic regressions to adjust confounding variables. Multivariate binary logistic regression model was done to control for possible confounders. Variable showed statistical significance at $p<0.05$ was declared as significant predictors.

Ethical Consideration

Ethical clearancewasobtained from Arsi University Ethical Review Committee (ERC). Confidentiality of client's information was ensured as the name or identification number of study participant's was not included in the data collection format.

Results

Socio-Demographic characteristics of the study subjects

All 220 sampled baby mother registration data were reviewed for HIV exposed infants' (HEI) and found to have complete information. Female HIV exposed infant constitute 51.8%, whereas the remaining 48.2% were males.The majority of the women,93.6%, were married at the time of enrollment to HIV care and support service and the mean age of mothers were 28.8 years. 54.5%of the enrolled HIV positive pregnant women have attended primary level of education and 91.4% of the mothers were housewives. .(Table 1).

Table 1:Socio–Demographic characteristics of HIV Exposed infants and their mothers,Asella town Government Health facilities, Ethiopia (n=220), July 2018

Variables		Frequency	Percentage
Infants's sex	Male	106	48.2

	Female	114	51.8
Age of mother	15-24	41	18.6
	25-34	145	65.9
	≥ 35	34	15.5
Marital status	Married	206	93.6
	Single	6	2.7
	Divorced	5	2.3
	Widowed	3	1.4
Educational status	Illitrate	27	12.3
	Primary education	120	54.5
	Secondary education	67	30.5
	Tertiary education	6	2.7
Occupational status	House wife	201	91.4
	Governmental employe	10	4.5
	Daily laborer	9	4.1
Residency	Urban	128	58.2
	Rural	92	41.8
Number of children	1-3	180	81.8
	≥ 4	40	18.2

HIV care and support

All women were enrolled to chronic HIV care and Support. Among these 77.3% of women were on ART before pregnancy and the rest were on ART during pregnancy, during labor & delivery and post-partum (14.1%, 4.1%, 4.5%) respectively. All mothers, 100%, attended at least first round ANC and enrolledon ART. All mothers, 100%, had good ART adherence. Regarding place and mode of delivery,98.6% of the Women were delivered in health institution and 99.5% were delivered normal. All infants were given exclusive Breast feeding during the first six months and were received ARV prophylaxis and of whom 95% tested DNA/PCR at 6weeks.

Result of HIV testing among HIV exposed infant

The prevalence of HIV positive infants born to HIV positive mothers were 2.37%. Most (> 77%) of the mothers were enrolled for ART before they became pregnant and more than 98% gave birth at health facility (Table 2)

Table 3: HIV care and Support of HIV exposed infants and their mothers, Asella town Governmental Health facilities, Ethiopia (n=220), July 2018

Variable		Frequency	Percentage
ANC Visit	1-3	85	38.6
	≥4	135	61.4
ART enrollment	Before pregnancy	170	77.3
	During pregnancy	31	14.1
	During L&D	9	4.1
	During post-partum	10	4.5
WHO clinical stages	Stage 1	157	71.4
	Stage 2	15	6.8
	Stage 3	48	21.8
Functional status of mother	Working	171	77.7
	Ambulatory	48	21.8
	Bed ridden	1	0.5
CD4 count	< 350	85	38.6
	≥350	135	61.4
OIs during pregnancy	Yes	62	28.2
	No	158	71.8
Kinds of OIs (n= 62)	Herpes zoster	45	72.6
	TB	5	8.1
	Chronic Diarrheal disease	2	3.2
	Oral candidacies	6	9.7
	Bacterial pneumonia	4	6.4
Place of delivery	Health facility	217	98.6
	Home	3	1.4
Mode of delivery	Normal VD	219	99.5
	CS delivery	1	0.5
Newborn received ART prophylaxis at birth	Yes	219	99.5
	No	1	0.5
Age at DBS done	At 6 weeks	209	95.0
	After 6 weeks	11	5.0
DBS result	Negative	215	97.7
	Positive	5	2.3

Table 4 : Bivariate and multivariate logistic regression analysis of factors associated with HIV status of infant born to HIV positive mothers, Asella town Governmental Health facilities, Ethiopia (n=220), July 2018

Characteristics		HIV Status			
		Positive	Negative	COR (95% C.I)	AOR (95% C.I)
Age of mother	15-24	2	39	1	1
	25-34	2	143	0.215 (0.057, 1.820)	0.192 (0.031, 1.202)
	≥35	1	33	0.000*	0.000**
ART initiation Time	Before pregnancy	1	169	1	1
	During pregnancy	1	30	1.826 (1.187, 17.823) *	0.000**
	During labor and Delivery	1	8	7.477(0.730, 73.314)	9.562 (0.711, 128.665)
	During post –partum	2	8	**44.500 (10.195, 194.246) ***	**45.794 (6.521, 321.590) ****
Age at DBS Done	At 6 weeks	4	205	1	1
	After 6 week	1	10	0.230 (0.047, 1.127)	0.134(0.004, 4.392)

*** Significant at p value of less than 0.2** **** Significant at p value less than 0.05**

Discussion

According to this study, the magnitude of HIV transmission from Mother to Child was found to be 2.3%**.** This result is in line with the global plan that was aim to reduce the MTCT rate to 5% or less among breast feeding women (Tom L, Henry JH,2010). This study finding was similar with study done in East and West Gojjam, Amahara Region, Northwest Ethiopia(2.37%) (Abebe M, Mullu Kassa G, Jara Boneya D. 2017).The reason for similarity of both studies could be because of PMTCT strategy from A+ to Option B+-test and treatment,government policies, system strengthening and other interventions that might have the same contribution.

The prevalence HIV transmission of this finding is lower than a study done in Uganda (6.5%), Kenya(8.9%) and Togo(5.6%)(Asefa Y.et al.,2007; Eunice WN et al.,2015;Adama-Hondegla AB, et al.,2016), the study conducted in Amahara Region (10.1%) and Dire Dawa City (15.7%) (FMOH,2014), study conducted at Yekatit 12 Hospital, 32.1% (UNICEF,2018). Thereason of this difference might be due to the time difference between studies in which this study was conducted at a time of option B+ erathat contribute for reduction of MTCT rate and also the difference in the socio-demographic characteristics of different study area could also contribute to the variation in finding between these studies.

In this study, infants of those mothers who were started ART during post-partum infected with HIV 46 times more likely than infants from mothers who had started ART duringpregnancy ((AOR: 45.794, 95% CI (6.521, 321.590)). This study finding was consistent with study done in East and West Gojjam Zones, Amahara Region which identified the mothers who were started antiretroviral treatment during Post-partum had significant association of HIV transmission from mother to their child (Abebe M, Mullu Kassa G, JaraBoneya D, 2017).This might be due to the fact that the mother with HIV positive started ART medication earlier duringpregnancy, there would be low viral load in the maternal blood which will lead to less chance of infecting their infants. Thus, infants of mother who started duringpregnancy will acquire HIV virus at lower rate than mother started ART during post-partum period.

Conclusion

The prevalence of HIV infection among HIV exposed infants was less than globally expected for mothers who only breast feed their infants to acceptable level. Initiating ART during post-partum period was the factor associated with MTCT.Therefore, mothers should start ART early to bring MTCT to zero level and further investigations are recommended to identify more predictors.

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