HIV SERO STATUS AND ASSOCIATED FACTORS AMONG HIV-EXPOSED INFANTS' IN SELECTED HEALTH FACILITIES IN SIDAMA ZONE, SOUTHERN ETHIOPIA, 2019.

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List of Abbreviation /Acronym

AIDS:	Acquired immune deficiency virus
ART:	Ant retro viral therapy
CD4+	Cluster of differentiation four plus
HIV:	Human immunodeficiency virus
IRV	Institutional review board
JU	Jimma university
MTCT:	Mother to child transmission o
PMTCT:	Prevention mother to child transmission
PCR	Polymerase chain reaction
SVD	Spontaneous vaginal delivery
UNSAID:	Unitized state aid for international development
WHO:	World health organization
SNNPR:	South nation nationality and people region

Abstract

***Back ground**: MTCT of HIV is transmission of human immunodeficiency virus from a women living with virus towards her baby during pregnancy, childbirth and during post-natal period. Mother to Child Transmission of HIV is a major public health challenge in Ethiopia, but there were a shortage of evidence on HIV sero status of exposed infants.*

***Objective:** To assess HIV sero status and Associated Factors Among HIV-exposed infants in Sidama zone health facility, southern Ethiopia.*

***Method:** A cross-sectional study was conducted in 14 health facilities at Sidama zone, SNNPR state, Ethiopia from May 1/2019 to May 30/2019. Medical records of HIV-exposed infants and their mothers enrolled from January 2014 to January 2018 in the study institutions was extracted using data extraction checklist. Prevalence and associated factors of HIV sero status of exposed infants was computed using SPSS version 21.0 software.*

***Result**: A total of 203 HIV-exposed infants who had HIV DNA/PCR test results were included in the study. The overall prevalence of HIV among HIV exposed infants was 8.86%. Baseline CD4+ counts of mother less than 350, (AOR = 5.629; 95% CI: 1.454, 21.79), Mothers who had WHO clinical stage I and II, (AOR=4.975; 95% CI: 1.342, 18.446), and Poor ART adherence (AOR =4.302; 95% CI: 1.100, 16.823) had an increased odds of HIV infection comparing to their counterpart among infants born to HIV infected mothers.*

***Conclusion and recommendation**: The prevalence of HIV infection among infants born to HIV infected mothers was high in the study area. Therefore, Stakeholders should be make an effort to reduce poor ART adherence and further study should be done.*

***Key words**: HIV sero status**,** HIV Exposed infants, DNA/PCR test, OPTION B+ strategy*

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CHAPTER ONE: INTRODUCTION

1.1 Background

"Human immunodeficiency virus is a virus that declines the immunity of an individual through revealing the body to numerous opportunistic infections. The virus outbreaks the immune system of human body CD4 lymphocyte and frequently originate in human body fluids and spreads from infected individual to health person through dissimilar means of transmission". Even though the main means of HIV transmission is through unprotected sexual contact, and also substantial number of vertical transmission likewise occurs from mother to child during pregnancy , childbirth and during post-natal period through breast feeding (1, 2).

From infected mother to exposed infants transmission of "human immunodeficiency virus is transmission of HIV from a women living with virus towards her baby throughout pregnancy, labour and delivery, or throughout post-natal period through breastfeeding"(3). HIV infected infants results in premature mortality for numerous or generates a lifelong chronic condition that critically curtails life anticipation and subsidizes to extensive human, social and economic expenditures(4).

For HIV exposed infants there are accidental of mother to exposed infants' transmission of HIV during labour and delivery despite the fact mother is not recognized her serostatus and without interference of Prevention of mother-to-child transmission of HIV. Without management, just about 15–30% of infants born to HIV-positive women were come infected with HIV during gestation and delivery, with a further 5–15% becoming infected through breastfeeding(5).

"Prevention of mother-to-child transmission of HIV is an energetic and rapidly changing field. Up-to-date World Health Organization Prevention of mother-to-child transmission antiretroviral guidelines on treating pregnant women and preventing infection in newborns(6).Prevention of mother-to-child transmission programs makes available 'antiretroviral' treatment to HIV-positive pregnant women to discontinue their infants meanwhile acquiring the virus. ART and other effective Prevention of mother-to-child transmission participation can reduction this risk to below 5%"(7). Quality health care service station availability is significant to the accomplishment of Prevention of mother-to-child transmission of HIV/AIDS (3, 7-9).

1.2 Statements of the problem.

Worldwide, according to "United Nations Programmer on HIV/AIDS reported that in 2016 an estimated 160,000 children were newly infected, and an projected 3.1 million children were living with HIV worldwide and there were nearby to 500 000 children infected with HIV through infected mother to exposed infants transmission each year"(4). And also According to USAID2017 report, there were just about 1.4 million pregnant women, and 1.8 million children were livelihood with HIV/AIDS. A projected 1.8 million individuals turn out to be newly infected, and 180,000 were under 15years old children(10).

The Plan in the direction of Eradicating new HIV Infections among children by 2015 and provide an ultimate care to their Mothers launched in 2011, as well as set a sequences of determined targets for 2015 including the reduction of new HIV infections among children through 90% in 2015. The successful international pressure groups to start all pregnant and breastfeeding women have to on antiretroviral therapy nevertheless of CD4 T-cell count or clinical staging established the phase for the World Health Organization's properly named "Treat All" guidelines, which eradicated numerous longstanding obstacles to treat HIV/AIDS(11).

In Ethiopia there were nearly 90,000 HIV positive pregnant women who live with HIV AIDS and a projected 14,000 HIV positive births in 2017(12). In similar years the pooled prevalence of mother to child transmission of HIV was 9.93%(3).

To eradicating new HIV Infections among children Ethiopia MOH adopted PMTCT shift. In "August 2012, the country adopted WHO Prevention of mother to child transmission programmatic shift, option B+ strategy. The program recommends lifelong antiretroviral therapy (ART) for all HIV-positive women who are pregnant and breastfeeding, nevertheless of a group of differentiations CD4 count or clinical stage (13). The post-2015 HIV priorities were high impact interventions that radically reduce the annual new infection and save many lives"(14).Studies conducted in Ethiopia have also shown that the magnitude of HIV-positive children in Ethiopia is still high (8).So this study was conducted to determine the HIV sero status of infants and associated factors among HIV-exposed infants in selected health facilities in Sidama zone south Ethiopia.

1.3 Significance of the study

Decreasing infant death due to infected mother to exposed infants' transmission of HIV has been the matter of concern for Ethiopian Ministry of health for years. Although Ethiopia have adopted PMTCT programmatic shift, option B+ strategy from World Health Organization (WHO) as a comprehensive approach for reduce infected mother to exposed infants transmission of HIV/AIDS during pregnancy labour and delivery and through breast feeding(13). But, detailed information on rate of Mother to child transmission of HIV/AIDS after end of follow up of exposed infant remains in short in Ethiopia, in spite of its harmful effects on child health(15). HIV sero status and the factors were not well studied in Ethiopia particularly in Sidama zone. Therefore, the main aim of this study was to assess HIV sero status and Associated Factors Among HIV-Exposed Infants in Sidama zone health facility southern Ethiopia. The study was provide helpful information on HIV sero status and associated factors among exposed infant in Sidama zone. In addition it had contribution to reduce infant and maternal morbidity and mortality associated with HIV/AIDS. And also provide helpful information to modify and design nursing intervention for HIV exposed infants to eliminating new HIV infection among children and keeping children living with HIV alive and well. It was also give a base line data for interested researchers, policy makers and scientific knowledge.

CHAPTER TWO: LITERATURE REVIEW

2.1 MTCT of HIV in global

For children delivered from HIV positive pregnant women, HIV might be transmitted during pregnancy, labour and delivery and during postnatal period through breast-feeding. According to WHO 2017 report there were millions of pregnant women and children livelihood with HIV/AIDS and there where high number of newly infected under 15years old children(5).

According to retrospective cohort study conducted in Brazil, 2013 revealed that 101 (18.9%) infants were HIV-infected(1). A systematic review and meta-analysis study conducted in China revealed that HIV vertical transmission rate substantially decreased from 31.8% in 2011, during 2003–2011, among 25 312 infants born to 3.9% (3.2% to 4.6%)(16).

2.2 In sub saran AFRICA

MTC transmission of HIV is one of health problem in Sab saran Africa. A retrospective cohort-study conducted in Cameroon, as expected, HIV-1 transmission also varied with PMTCT-interventions1.7% (10/566) from ART-group, 1.9% (8/411) from AZT-group, and 19.2% (21/109) from ARV-naïve group(17).Other Study conducted in Kenya infants whose mothers received no PMTCT intervention, infants receiving no prophylaxis, and infants mixed breastfed significantly associated with MTCT of HIV(18). Other study conducted in Zimbabwe, indicated mixed feeding of the child during first six months of life and maternal CD4 count of less than 200 during pregnancy had an increased odds of HIV infection comparing to their counterpart among infants born to HIV infected mothers(19). So, PMTCT intervention, infants receiving prophylaxis, and infants feeding practice were significantly associated with MTCT of HIV

2.2 MTCT of HIV in Ethiopia

According to WHO 2018 report in Ethiopia there were nearly 90,000 HIV positive pregnant women who live with HIV AIDS and an estimated 14,000 HIV positive births and high rate mother to child transmission of HIV(3). A systematic review and meta-analysis study

conducted in Ethiopia, 2018 revealed that the estimated pooled prevalence of mother-to child transmission of HIV was 11.4% (9.1–13.7)(20). Another study conducted in Ethiopia,2018 revealed that the estimated pooled prevalence of infected mother to exposed infants transmission of HIV was 9.93% (7.29,12.56)(3). Similarly, a retrospective institutional cohort study conducted in selected health facilities of East and West Gojjam Zones, Northwest Ethiopia revealed that the rate of HIV transmission at the end of 24 months were 5.9% (3.9%–7.9%), the number of HIV positive children was reduced from 14 (10.29%) to 4(2.37%) due to the program shift from option A to option B+(21). Similar study conducted in Dire Dawa City, Eastern Ethiopia, 2015 revealed that 382 HIV-exposed infants enrolled into care, 60 (15.7%) became HIV positive(22). Similar study conducted in Oromia Regional State,2018 revealed that the overall prevalence of HIV among HIV exposed infants was 7.70%(23).

Another institutional based retrospective cohort study conducted in southwest Ethiopia, 2014 revealed that Two hundred fifty-four (59.6%) of mothers had attended antenatal care (ANC) Of all participants, 234(54.9%) mothers did not receive any Prevention of mother to child transmission prophylaxis during ANC, while only 104(24.4) received antiretroviral (ART) as Prevention of mother to child transmission prophylaxis and 163(38.3%) claimed that did not observe any infant Prevention of mother to child transmission interventions while 135(31.7%) of the infants received single-dose NVP + AZT. About 385(90.4%) infants were not infected at their final infection status. Those mothers who did not attended ANC follow-up, infants on mixed and complementary feeding and infants weaned off and mothers who were in WHO clinical stage III and IV were more likely to have HIV sero positive infant(24).

Descriptive cross-sectional study conducted in selected hospitals of Ethiopia showed of Infants and children exposed to HIV diagnosed for HIV infection 68(69.4%) initiated ART. Twenty-four (35.3%) initiated ART one month after HIV screening results. Thirty-three (50.0%) and 23(35.3%) infants and children dropped from and adhered to ART respectively and 11(16.2%) of them who initiated ART died within the study period(25).

2.3 Factors associated with the MTCT of HIV

Study conducted in Ethiopia across country indicate that socio-demographic factors, clinical characteristics of exposed infants and clinical characteristics of the mother and obstetric care related factors were contributing to HIV transmission from infected mother to exposed infants' during pregnancy, labour and delivery and during postnatal period.

2.3.1 Socio-demographic factors

Study conducted in East and West Gojjam Zones showed that children who were born from older mothers and study conducted in Dire Dawa City rural residence had an increased odds of HIV infection comparing to their counterpart among infants born to HIV infected mothers respectively.(16, 21)

2.3.2 Characteristics of exposed infants

Study conducted in Zimbabwe, in Ethiopia across country, in Addis Ababa, in Dire Dawa City, and in Oromia region indicated mixed feeding of the child during first six months of life had an increased odds of HIV infection comparing to their counterpart among infants born to HIV infected mothers respectively(16, 21, 25-29). Studies conducted in Brazil, Ethiopia across the country, in Dire Dawa City, , in Oromia region, indicated infants not receiving ARV prophylaxis at birth had an increased odds of HIV infection comparing to their counterpart among infants born to HIV infected mothers respectively(16, 21, 25-29).Studies conducted In Oromia region Infant did not receive co-trimoxazole preventive therapy, associated with an increased odds of perinatal transmission(23).Another study conducted in Mekele Age less than 18 months, CD4 percentage <10, WHO clinical stage (III&IV), chronic diarrhea] and hemoglobin < 8 g/dl were independently associated with infant with mother to child transmission of HIV(26).

2.3.3 Clinical characteristics of the mother

Study conducted in East and West Gojjam Zones showed that children born from mothers who became pregnant after showing that they knew they were HIV positive, Study conducted in Ethiopia across country, in East and West Gojjam Zones, in Dire Dawa City, maternal Prevention of mother to child transmission intervention had an increased odds of HIV infection

comparing to their counterpart among infants born to HIV infected mothers respectively (3, 8). Other study conducted in Zimbabwe maternal CD4 count of less than 200 during pregnancy, In Oromia region whose mothers received Antiretroviral Therapy (ART) treatment for less than 4 weeks had increased odds of HIV infection comparing to their counterpart among infants born to HIV infected mothers respectively(16, 17, 19, 21, 28).

2.3.4Obstetrics characteristics of the mother

According to study conducted on Mode of delivery in HIV infected pregnant women and prevention of mother to-child transmission: practices in Western Europe, revealed that elective CS was associated with 80% decreased mother to child transmission risk (8). Other study conducted in Ethiopia across country, in Dire Dawa City and in Addis Ababa, home delivery had an increased odds of HIV infection comparing to their counterpart among infants born to HIV infected mothers respectively(27). So place of delivery and mode of delivery were significant factors for Mother to child transmission of HIV/AIDS

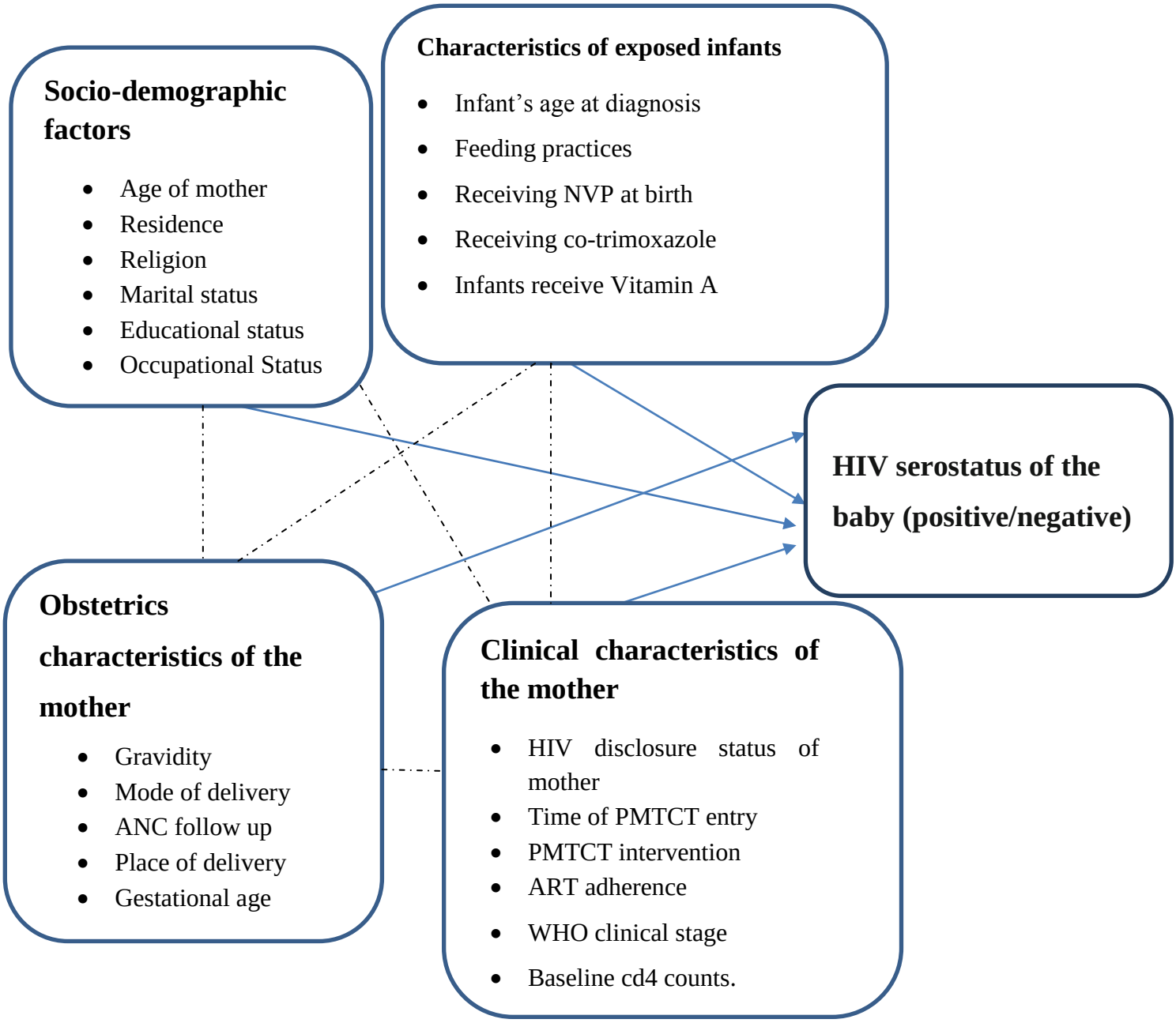

Figure 1: Conceptual frame work of HIV sero status and Associated Factors Among HIV-Exposed Infants modified from literature review (10, 19,20,25,28, 29, 30, and 31)

CHAPTER THREE: OBJECTIVES

3.1 General objective

- To assess HIV sero status and Associated Factors Among HIV-Exposed Infants' in Sidama zone health facility, SNNPR, Ethiopia, from May 1 /2019 – May 30/ 2019

3.2 Specific objectives

- To determine HIV sero status among HIV-Exposed Infants' in Sidama zone health facility, SNNPR, Ethiopia.
- To identify factors associated with HIV sero status among HIV-Exposed Infants' in Sidama zone health facility, SNNPR, Ethiopia.

CHAPTER FOUR: METHODS AND MATERIALS

4.1 Study area and period

The study was done in governmental health facilities found in Sidama zone, SNNPR, in the southern part of Ethiopia from May 1/2019 to May 30/2019Gc.Sidama Zone, located in the eastern part of SNNPR covers about 6,538 km2. Sidama zone is one of 15 zones found in SNNPR, Ethiopia. In 2017 Total population of Sidama zone around 3.5 million and there are around 0.5 million house hold. It is located between 3° 14' N latitude and 33° 48' E. Sidama zone has 33 districts and two self-administration town and this zone is bordered on the south by the Oromia Region (except for a short stretch in the middle where it shares a border with Gedeo zone), on the west by the Bilate River, which separates it from Wolieta zone, and on the north and east by the Oromia Region(24). Hawassa is the capital city of Sidama and SNNPR, and situated 220 km from Addis Ababa capital city of Ethiopia. Sidama zone is the largest most populous and urbanizing zone in the SNNPR state of Ethiopia. Among adults ages 15-64 years HIV prevalence in urban area of SNNPR was 1.8%(2). Sidama zone is one of the HIV/AIDS-affected regions in SNNPR state. In this zone there were total 361 HIV exposed infant and 203 infants who had DNA/ PCR test results from January 2014 to January 2018Gc. Sidama zone has 667public health institutions (124 health centers, 14 hospitals and 529 health posts)(30). Sidama zone has fourteen health facilities which have ART clinic started from 2014Gc. For this study all fourteen health facilities were included in the study.

4.2 Study period

- The study was conducted from- May 1/2019 to May 30/2019Gc.

4.3 Study Design

- Institution based retrospective cross- sectional study was conducted.

4.4 Source population

- Medical records of HIV-exposed infants and their mothers enrolled from January 2014 to January 2018 in the study institutions.

4.5 Study population

- All HIV-exposed infants' medical records Card which had DNA/ PCR tested result and enrolled in selected health facilities from January 2014 to January 2018Gc

4.6 Eligibility criteria

4.6.1 Inclusion criteria

- All HIV-exposed infants medical registration card which had HIV PCR test result were included in the study.

4.6.2 Exclusion criteria

- Exposed infants transfer out, lost and those who were stopped treatment excluded from the study.

4.7 Sampling technique and procedure

Sampling technique was censes. Participants for this study were HIV-exposed infants MR Card which had DNA/ PCR tested result enrolled from January 2014 to January 2018.Study was conducted in selected health facilities which had been providing PMTCT service. From total health facilities found in Sidama zone, fourteen (14) health facilities had ART clinic and had been providing PMTCT service linked with other health facilities to address services for whole catchment area. Health facilities that had no ART clinic might be provided delivery service in case of emergency could be referred to nearest health facility which had ART clinic to follow up of exposed infants and mothers immediately after delivery in general. In Sidama zone there were 12 primary hospitals, one (1) zonal hospital and one (1) general hospital had ART clinics. In this zone from 2014 to 2018 203 HIV positive women and exposed infants pair (mother –infant pair) who had PCR test were enrolled in PMTCT of selected health facilities. The data was extracted retrospective from PMTCT log book and maternal medical registration card by using data extraction checklist.

4.8Study Variables

4.8.1 Dependent variable

- HIV sero status of Baby (positive/negative)

4.8.2 Independent variable

- ❖ Socio-demographic factors
- ❖ Clinical characteristics of the mother
- ❖ Obstetrics characteristics of the mother
- ❖ clinical Characteristics of exposed infants

4.8 Operational definition.

- Exposed infants HIV status: If the DNA/PCR test result indicated positive or negative for HIV during the follow-up period of 18 months as indicated by the infant registration card(15).
- HIV Positive**:** The DNA/PCR test result for exposed infants indicated positive for HIV during the follow-up period of 18 months.
- HIV Negative**:** The DNA/PCR test result for exposed infants indicated negative for HIV during the follow-up period of 18 months.
- Option B+ strategy: All HIV-positive pregnant and breastfeeding women were given lifelong antiretroviral therapy, irrespective of the CD4+ count and clinical stage of the disease(1).
- Rate of MTCT of HIV: Total number of exposed infant PCR test result positive divided by total number of exposed infant PCR test result (Positive +negative) multiplied by 100 in a given period of time".
- ART adherence: Measured based on number of missed doses within 60 days. Three or less doses, four and or more doses rated as good poor respectively.

4.9Data collection instruments and procedures

The data were extracted from PMTCT registration log book through using ,data extraction format adopted from the national standard HIV exposed infant follow up formats(24). All HIV-exposed infants and their mothers who started the Prevention of mother to child transmission service in selected health facilities during the study period were included in the study. HIV exposed infants and their mothers with incomplete data because of transfer out, lost and stopped treatment were excluded from the study. Some important variables incomplete in registration logbook during filtration of data were counted as missing variable.

Data was collected by trained and experienced clinical nurses and diploma midwifes who had at least 2 years of work experience in ART clinic.

4.10 Data quality management

Data quality assurance mechanisms was carefully developed and implemented at various stages of the study. The quality of data may be affected at different points unless proper measures were taken throughout the study time. For all study areas, three data collectors and two supervisors who had ability to communicate in Amharic and local language were recruited after one day training about data collection technique. To ensure data quality, preliminary assessment was done to include all variables registered in infants PMTCT follow up log books and maternal medical registration card in similar health facility. At the end of the day filled questionnaires were checked for completeness and consistency of information by the supervisor and errors were manually edited. Any ambiguity and other problems of data collectors were addressed. Cronbach's alpha and collinearity was checked.

4.11Data Processing and analysis procedures

Data cleaning was performed to check for accuracy, consistencies, and values. The data was undertaken rigorous daily checking to identify and correct errors. The investigator was enter the data using Epi Data version 3.1 and exported to SPSS 21 statistical package for analysis. Descriptive statistics (frequency and percentage) were used to describe sero status of exposed infants and associated factors. Then bivariate logistic regression techniques were done to see the crude association between the independent variables and the dependent variable and the strength of association were expressed in odds ratio (OR). Eventually, results from bivariate analysis of $p<0.25$ were moved to multivariate analysis and done through backward variable selection logistic regression methods to control the effects of confounding and to identify predictors of HIV sero status of exposed infants. A P value of< 0.05 will as the criterion for statistical significance.

4. 12 Ethical consideration

After approval of the proposal, Ethical clearance and formal letter were obtained from JU IRB (Institutional review board) of Jimma University Ethical Review Board. The necessary

permission letter was obtained from SNNPR Health bureau and Sidama zone health bureau administrative office. Confidentiality was assured by excluding their name during the period of data collection.

4.13 Dissemination of Plan

The research report will be disseminated to Jimma University institute of health faculty of health science school of nursing and midwifery through Presentation to JU staffs and invited guests. Furthermore, it will be disseminated to Sidama zone health bureau .A written document will be submitted to Jimma University institute of health faculty of health science school of nursing and midwifery. Finally I will be publishing on scientific journal.

CHAPTER FIVE: RESULTS

5.1 Socio Demographic characteristics of study participants

The participants of this study were included from fourteen governmental hospitals found in Sidama zone SNNPR regional state of Ethiopia. A total of 203 HIV exposed infant who had DNA /PCR test results and maternal Medical follow up card, were included in this study. The slightly more than half of mothers 106 (52.2%) were 25 to 34, years old. One hundred and eighteen (58.1%) mothers resided in urban areas and the remaining 85 (41.9%) lived in rural areas. The slightly more than half of HIV infected mothers, 107 (52.7%) were primary school and 122 (60.1%) mothers were House wife (Table 1).

Table 1: Socio Demographic characteristics of HIV exposed infants and mothers in Sidama zone, SNNPR state, southern Ethiopia 2014-2018Gc.

Variables		Frequency	Percentage
Age of Mother	15-24yr	46	22.7%
	25-34	106	52.2%
	35-44	51	25.1%
Residence of Mother	Urban	118	58.1%
	Rural	85	41.9%
Educational status of the Mother	Illiterate	54	26.6%
	Primary	107	52.7%
	Secondary	37	18.2%
	College and above	5	2.5%
Occupation of Mother	Farmer	12	5.9%
	Merchant	59	29.1%
	Government worker	10	4.9%
	House wife	122	60.1%
Religion of mothers	Orthodox	63	31.0%
	Muslim	84	41.4
	Protestant	35	17.2
	Catholic	21	10.3
Marital status of Mother	Single	16	7.9
	Married	178	87.7
	Divorced	5	2.5%
	Windowed	4	2%

Magnitude of HIV among exposed infants: The finding of this study show that among infants who had DNA/PCR test results, HIV sero status positive were 18 (8.9%) CI: (4.4,12.8) and HIV sero status negative were 185(91.1%) during the study period. The overall magnitudes of DNA/PCR HIV positivity among children born to HIV positive mothers was 8.9%.

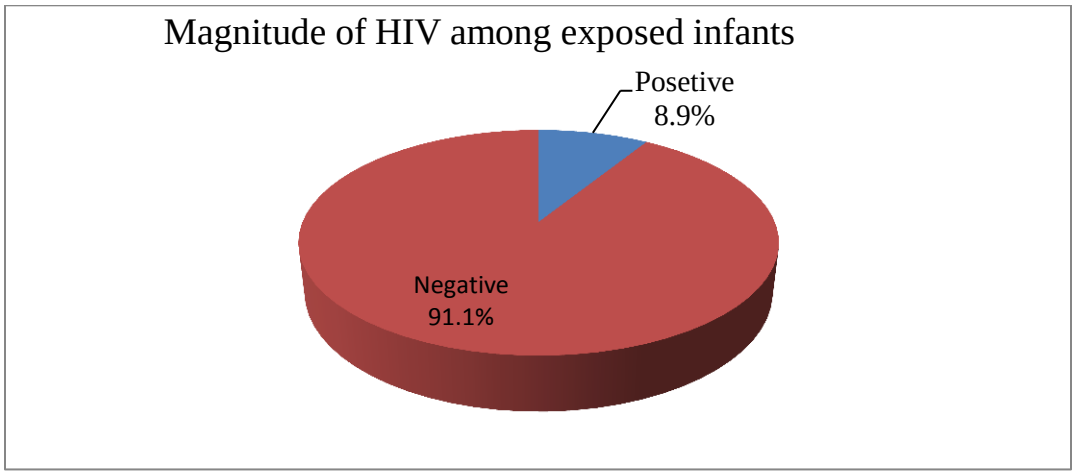

Figure 2: Magnitude of HIV among exposed infants in Sidama zone SNNPR Ethiopia, from 2014 -2018Gc.

5.2 Obstetric care and support service.

All mothers of HIV exposed infants were enrolled in obstetric care and support service during the last pregnancy. Among this 164(80.8%) women had attended ANC during Pregnancy, and slightly more than half 108(53.2%) had not completed TT5 immunization. Related to labour and delivery care service, 164(80.8%) of them were gave birth at health facility, majority of women 198(97.5%) had gave birth through spontaneous vaginal delivery (SVD), and 161(79.3%) had gave birth at term for last pregnancy. (Table2)

Table 2: Obstetric care and support service for HIV exposed infants and mothers in Sidama zone, SNNPR state, southern Ethiopia 2014-2018Gc

Variables	Frequency	Percentage
Mother attend ANC during Pregnancy		
Yes	164	80.8%
No	39	19.2%
Place of delivery		
Health facility	146	71.9%
Home delivery	57	28.1%
Mode of delivery		
SVD	198	97.5%
Cs	5	2.5%
Give birth at term pregnancy		
Yes	161	79.3%
No	42	20.7%
TT vaccination		
Complete (TT5)	95	46.8%
Not complete	108	53.2%

5.3 Clinical Characteristics of HIV exposed infants and mothers.

All HIV exposed infants who had DNA/PCR test results were enrolled in PMTCT of HIV care and support service during the follow -up period included in the study. From the study participants majority 162(79.8%) of HIV-exposed infants were enrolled into HIV care within six weeks of life. And also, 150 (73.9%) of the infants were given ARV prophylaxis to prevent MTCT of HIV at birth. Most of HIV-exposed infants received co-trimoxazole preventive therapy (CPT), and 162 (79.8%) of infants started CPT at six weeks of being born. Regarding to infant feeding practice, 163 (80.3%) infants were exclusive breastfed before six months. Regarding to EPI (expanded programs of immunization) all HIV exposed infant were immunized. The majority of this149 (73.4%) Infants were received Vitamin A. In this study all of HIV exposed infants mothers were enrolled in HIV care and support service during the last pregnancy. Out of these, 203(100%) of them were taking highly

active treatment, 146(71.9%) of were known HIV status before PMTCT program Entry, 117 (57.6%) baseline CD4 count were 350 and above, 134(66.0%) WHO clinical stages were Stage 3 and four during last pregnancy (Table 3).

Table 4: Clinical Characteristics of HIV exposed infants and mothers at PMTCT follow-up clinics in Sidama zone, SNNPR state, southern Ethiopia, 2014 to 2018Gc**.**

Variables		Frequency	Percentage
Infant's age at diagnosis	At 6 weeks	162	79.8%
	After 6 weeks	41	20.2
Infants received NVP at birth	Yes	150	73.9%
	No	53	26.1%
Infant received CPT at 6 weeks	Yes	162	79.8%
	No	41	20.2%
Feeding practice before six months	EBF	163	80.3%
	Mixed feeding	40	19.7%
Infants received Vitamin A	Yes	149	73.4%
	No	46	22.7%
DBS(DNA/PCR) test result	Positive	18	8. 86%
	Negative	185	91.13%
Mother were on ART during labour	Yes	128	63.1%
	No	75	36.9%
HIV disclosure status of mother	Yes	146	71.9%
	No	57	28.1%
Entry to PMTCT	During ANC	75	36.9%
	During labour	64	31.5%
	During PNC	64	31.5%
Baseline CD4 count of mother	Less than 350	86	42.4%
	350 and above	117	57.6%
Maternal WHO clinical stage	Stage 1 and 2	69	34.0%
	Stage 3 and four	134	66.0%
PMTCT intervention	HAART	203	100%
	None		
Duration of mother on ART treatment	> 4 weeks	46	22.7%
	≤4weeks	157	77.3%
ART adherence	Good	180	88.7%
	Poor	23	11.3%

Factors associated with MTCT of HIV: HIV disclosure status of mother, HIV Clinical stage of mother, Baseline CD4 count of mother, ART adherence, Mother attend ANC during Pregnancy, Place of delivery, Infant's age at diagnosis, Infants received Vitamin A, Infants received NVP at birth, Infant feeding practice before six months have shown a significant association with HIV sero status of Baby in the Bivariate analysis at P-value <0.25. After adjusting for other confounders, in the multivariate analysis Baseline CD4+ count of mother were less than 350, Maternal WHO clinical stage I and II, Poor ART adherence and Infants were didn't received Vitamin A had significant association to HIV sero status of Baby at P-value of < 0.05.Baseline CD4 count of mother less than 350 were six times (AOR = 5.629; 95% CI: 1.454, 21.79) more likely to be MTCT of HIV when compared with CD4 count greater than 350. Regarding to maternal WHO clinical stage , Mothers who had WHO clinical stage I and II were 80% (AOR=0.201; 95% CI: 0.054, 0.745) less likely to be MTCT of HIV when compared with who had stage III and IV. According to ART adherence, mothers Poor adherence were four times (AOR =4.302; 95% CI: 1.100, 16.823) more likely to be MTCT of HIV when compared with who had good ART adherence. Infants not receiving Vitamin A at nine month were seven times (AOR=7.184; 95% CI: 1.795, 28.759) more likely to be MTCT of HIV when compared with Infants received Vitamin A at nine month of life. (Table 5)

Table 5: Factors associated with HIV positivity among infants born to HIV mothers, in selected health facility of Sidama zones northern Ethiopia 2014 to January 2018Gc.

Variables	DBS PCR/DNA Result		COR (95%CI)	P-Value	AOR(95%CI	P-Value
	Negative	Positive				
HIV disclosure status of mother						
Yes (Ref)	137(93.8%)	9(6.2%)				
No	48(84.2%)	9 (15.8%)	2.854(1.07,7.61)	0.036		
HIV Clinical stage of mother						
WHO stage I and II(Ref)	59(85.5%)	10(14.5%)	0.375(.141, 0.998)	0.050	0.201(0.054, 0.745)	0.016*
WHO stage III and IV	126(94.0%)	8(6.0%)				
Baseline CD4 count of mother						
Less than 350	74(86.0%)	12(14.0%)	3.00(1.078,8.346)	0.035	5.629(1.454, 21.79)	0.012*
350 and above (Ref)	111(94.9%)	6(5.1%)				
ART adherence						
Good (Ref)	168(93.3%)	12(6.7%)				
Poor	17(73.9%)	6(26.1%)	4.94(1.645,14.84)	0.004	4.3(1.100, 16.82)	0.036*
Mother attend ANC during Pregnancy						
Yes(Ref)	153(93.3%)	11(6.7%)				
No	32(82.1%)	7(17.9%)	3.043(1.096,8.45)	0.033		
Place of delivery						
Health facility (Ref)	153(93.3%)	11(6.7%)				
Home delivery	32(82.1%)	7(17.9%)	3.043(1.096,8.45)	0.033		
Infant's age at diagnosis						
At 6 weeks	43(81.1%)	10(18.9%)	4.128(1.533, 11.1)	0.005		
After 6 weeks(Ref)	142(94.7%)	8 (5.3%)				
Infants received Vitamin A						
Yes (Ref)	140(94.0%)	9(6.0%)				
No	38(82.6%)	8(17.4%)	3.275(1.184, 9.06)	0.022	7.184(1.795, 28.759)	0.005**
Infants received NVP at birth						
Yes (Ref)	151(93.2%)	11(6.8%)				
No	34(82.9%)	7(17.1%)	2.83(1.021, 7.82)	0.045	3.43(0.96, 12.263)	0.058
Infant feeding practice before six months						
EBF (Ref)	152(93.3%)	11(6.7%)				
Mixed feeding	33(82.5%)	7(17.5%)	2.93(1.057, 8.13)	0.039	3.30(0.855, 12.77)	0.083

COR, Crude Odds Ratio; AOR, Adjusted Odds ratio; CI, Confidence interval; * statistically significant at 95% CI, P value less than 0.05.

CHAPTER SIX: DISCUSSION

Prevention of Mother to child transmission of HIV is needs early HIV diagnosis and timely preventive management. Polymerase chain reaction (PCR)-based HIV DNA and HIV RNA assays have become the most widely used, even in resource-limited settings, for both diagnostic and monitoring purposes(31). This study was conducted to find out the magnitude of HIV and associated factors among HIV-Exposed Infants' in Sidama zone, SNNPR state, southern Ethiopia.

In this study, the prevalence of HIV infections among exposed infants was 18(8.9%) CI: (4.4-12.8). This reflects that the morbidity and mortality of the children high due to this diseases condition. If appropriate preventive measures are not taking place, the risk of HIV among exposed infants might be ranked as tope five of infants' mortality. This finding was slightly higher than compared to the global target in 2015, which was 5% among breastfeeding women(7) and also study conducted in East and West Gojjam Zones, Northwest Ethiopia shows that the prevalence of MTCT of HIV was 5.9% (3.9–7.9), (32) and study conducted in Oromia Regional State 7.70 %(23).The possible explanation for this difference might be the difference in study design which most of them used cohort study design, sample size and study area. In addition to this, the gap might be due to current health policy of the country which was focused on implementation of option B+ and free PMTCT service for infected mother and exposed infants might be increases the health care seeking behavior of infected mother and exposed an infant which increases the recognition of the case. Otherwise an increment of the prevalence of MTCT of HIV might be related to decrease awareness creation through mass media in our country.

On the other hand, the prevalence of MTCT of HIV in this study was lower than the systematic review and meta-analysis was conducted in Ethiopia (9.93%)(7.29,12.56)(3). This gap might be due to the differences in the study period, sample size, geographical difference of the study areas and health seeking behavior of the HIV infected mother and exposed infants in the area.

This study also revealed that factors associated with HIV sero status Among Infants; Baseline CD4 count, Clinical stage of mother, ART adherence, and received Vitamin A are statistically significant association with MTCT of HIV.

Baseline CD4+ count less than 350 were six (AOR = 5.629; 95% CI: 1.454, 21.79) times more likely to had an increased MTCT of HIV compared to those of Baseline CD4+ count greater than or equal to 350. This reflects that maternal CD4+ counts decrease might be lead to MTCT of HIV. This finding was in line with the study conducted at Zimbabwe which showed that maternal CD4 count less than 200 were more likely affect MTCT of HIV than counterpart (AOR = 7.1; 95% CI: 2.6-17)(19). The discrepancy might be due to the difference in the study area, health polices of the country, health seeking behavior of women's of Zimbabwe.

According to this study mothers who had WHO clinical stages I and II were 80% (AOR=0.201; 95% CI: 0.054, 0.745) less likely to be MTCT of HIV when compared with clinical stages III and IV. This reflects that clinical stages I and II of mother have minimum chance of MTCT of HIV in the study. This finding was lower than the study conducted at northwest Ethiopia which showed that maternal clinical stages I and II were four (AOR = 4.4 (CI: 1.5, 12)times more likely prevent mother to child transmission of HIV compared with clinical stages III and IV(33). This observation difference might be due to the difference in the study area, study design and sample size of the study.

As this study showed poor ART adherence during last pregnancy of mothers four (AOR =4.302; 95% CI: 1.100, 16.823) times more likely affect MTCT of HIV compared to good ART adherence during last pregnancy of mothers. This may indicate that there were significant numbers of women who might loss four and more doses within 60 days which could lead to poor ART adherence. This was incomparable with the study conducted in other area (23, 26) .The inconsistency might be due to the difference in the study area, study design, and health seeking behavior of the mothers.

6.1 Strengthens and Limitation

6.1.1 Strengthens

- This study identified the factors contributing MTCT of HIV and gave baseline data for different stakeholders.

6.1.2 Limitation

- This cross-sectional study has possible limitations that may arise from missing data in logbook, since data was extracted from secondary data retrospectively and it's difficult to infer due to sampling technique.

CHAPTER SEVEN: CONCLUSION AND RECOMMENDATION

7.1 Conclusion

The prevalence of mother to child transmission of HIV was 18(8.9%). ART poor adherence, clinical stages I and II and low maternal CD4+ counts were the associated factors with MTCT of HIV among exposed infants. Therefore, different stakeholders together should make efforts to reduce the magnitude of MTCT of HIV through strengthening the prevention of mother-to-child transmission (PMTCT) of HIV, and health education for infected mother on the importance of ART adherence by undertaking further study.

7.2 Recommendation

7.2.1 For Sidama zone health bureau.

According to this study there were significant number of pregnant mothers with poor ART adherence which also shows significant association with increased number of MTCT of HIV, so you should be make an effort to reduce poor ART adherence.

7.2.2 For Researchers

In spite of, high magnitudes of MTCT of HIV /AIDS few study has been done in study area therefore further study should be done on HIV Sero status and risk factors among exposed infants.

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Annex 1: English version of questionnaires

Information sheet and informed consent

Questionnaire identification number -----

Study area: - Town…….

Keble…

Name of hospital …

My name is ……., I am going to collect data for Mr Yirgalem Yosef, He is MSC maternity health nursing student in Jimma university. We are going to extract data from PMTCT logbook of exposed Infants and from MMRC to assess HIV sero states and associated factors among exposed infants in Sidama zone health facility. Confidentiality of Health facility and patient will be respected and never will be for other purpose. We would appreciate your help in data extraction.

Signature of PMTCT focal person: ---------- Signature----------Date----------

Name of Data collector ---------- ---------- Signature ----------Date----------

Name of supervisor ---------- ---------- Signature ----------Date----------

Q. No	Question	Response	Skip to
Part one: Socio-demographic data			
SD1	Age of Mother.	1. 15-24yr 2. 25-34 3. 35-44	
SD2	Residence of Mother	1. Urban 2. Rural	
SD3	Marital status	1. Single 2. Married 3. Divorced 4. Widowed	
SD4	Educational status of the Mother	1. Illiterate 2. Grade 1–8 3. Grade 9–12 4. Collage and Above	
SD5	Occupational Status of the Mother	1. Farmer 2. Merchant 3. Government worker 4. No Job	
Part two: Clinical characteristics of the mother			
SD6	Opportunistic infection at baseline	1. Yes 2. No	
SD7	Disclosure status of the mother	1. Disclosed 2. Not Disclosed	
SD8	Baseline WHO clinical stage	1. stage 1 and 2 2. stage 3 and 4	

SD9	Baseline CD4 count (cell/dl)	1. Less than 200 2. 200–350 3. 351–500 4. >500	
SD10	Entry to PMTCT	1. During ANC 2. Postpartum 3. Known positive	
SD11	PMTCT intervention	1. None 2. HAART	
SD12	Duration of mother ART treatment	1. > 4 weeks 2. ≤4weeks	
SD13	Change in treatment regimen	1. Yes 2. No	
SD14	ART adherence	1. Good 2. Poor	
Part three: Obstetrics characteristics of the mother			
SD15	Did attend the ANC clinic during last pregnancy?	1. Yes 2. No	
SD16	Gestational age	1. Delivered at term 2. Preterm babies	
SD17	Place of birth	1. Home 2. Health institution	
SD18	Mode of delivery	1. SVD 2. CS	
SD19	TT vaccine	1. Completed	

		2. Not complete	
Part four : Characteristics of exposed infants			
SD20	Infant's age at diagnosis	1. At 6 weeks 2. After 6 weeks	
SD21	Infant received CPT at 6 weeks birth	1. Yes 2. No	
SD22	DBS(DNA/PCR) test result	1. Positive 2. Negative	
SD23	Time first DBS taken after birth	1. ≤6 weeks 2. > 4 6 weeks	
SD24	Infants received Nevirapine prophylaxis at birth	1. Yes 2. Not	
SD25	Immunization status of the infant for routine EPI	1. Immunized 2. Not immunized	
SD26	Birth weight	1. 2.5–4.0 kg 2. less than 2.5 kg	
SD27	Infant feeding practice <6 months	1. Exclusive breast feeding 2. Mixed feeding 3. Replacement feeding	
SD28	Vitamin A for infant.	1. Received. 2. Not received	

Annex 2: **እዝል 1 -አንድ የእንግሊዝኛ ቅጅዎች**

የመረጃ ማሰባሰቢያ እና የተረጋገጠ ፍቃድ

ስሜ ……..….. ይባላል እኔ በጅማ ዩኒቨርሲቲ ውስጥ MSC የወሊድ ነርሶች ጤና አጠባበቅ ተማሪ ለሆኑተ ይረጋለም ዮሴፍ ለመመረቅያ ጹፍ እያዘጋጀ ስለሆነ መረጃ ልሰበስብለት ነዉ የመጣሁት፡፡ ከዝ ሆስፒታል ከART ክሊኒክ ውስጥ መረጃ ለመዉሰድ እንፈልጋለን የምንፈልገዉ መረጃ , በኤች ኣይቪ ከተያዙ እናቶች የተዎለዱ እና ዲ ኤን ኤ / PCR ምርመራ ዉጠት ያላቸዉን ህጻናት ይመለከታል፡፡ የታካሚ ስም በዚህ ዓይነት መልክ ኣይፃፍ እና ከመዝገብ ውስጥ ከተገኘው መረጃ ጋር በተያያዘ ፈጽሞ ለሌላ አላማ አንጠቀምም፤

የመረጃ ሰጪው ስም ---------- ---------- ----------ፊርማ----------ቀን ----------

መረጃ ሰብሳቢ ስም ---------- ፍርማ ----------ቀን ----------

የሥራ ተቆጣጣሪ ስም---------- ፊርማ ---------- -----ቀን ----------

ተራ ቁጥር	ጥያቄ	ምላሽ	ወደ ሂድ
ክፍል አንድ-ማህበራዊ-demographic data			
SD1	የእናት ዕድሜ.	1. 15-24yr 2. 25-34 3. 35-44	
SD2	የእናት መኖሪያ	1. ከተማ 2. ገጠር	
SD3	የጋብቻ ሁኔታ	1. ነጠላ 2. ያገባች 3. ፍቺ 4. ባለ የሞተባት	
SD4	የእናትነት የትምህርት ሁኔታ	ማንበብና መጻፍ የምትችል ክፍል 1-8 9-12 ኮሌጅ እና በላይ	
SD5	የሙያው የስራ ሁኔታ	ገበሬ ነጋዴ የመንግሥት ሠራተኛ የቤት እሜቤት	
ክፍል ሁለት-የእናት ጤንነት ጠባዮች			
SD6	በተጋዳኝ እንፈክሽን የመያዝ ሁኔታ	አዎ አይ	
SD7	ለእናት ይፋ የማድረግ ሁኔታ	ታቃለች አታቅም	
SD8	WHO clinical ደረጃ	1. ደረጃ 1 እና 2 ደረጃ 3 እና 4	
SD9	መሰረታዊ የሲዲ 4 ቁጥር (ሕዋስ / dl)	ከ 200 በታች 200-350 351-500	

		> 500	
SD10	ወደ PMTCT መች ነዉ የገባችበት ጊዜ	በ ቅድመ ወልድ ዲሬ ወልድ 3. በመጀመር ታቅ ነበር	
SD11	የ PMTCT ጣልቃ ገብነት(መጠቀም)	ምንም HAART	
SD12	እናት የሕክምና ጊዜ ቆይታ	> 4 ሳምንታት ≤4 ሳምንቶች	
SD13	በሕክምና በሽታን መለወጥ ላይ	አዎ አይ	
ኤስዲ 14	ART መከበር	ጥሩ ደካማ	
ክፍል ሶስት የእናቶች የእንስትስትነት ባህሪያት			
SD15	ባለፈው እርጊዝና ወቅት በኤንሲ ክሊኒክ ውስጥ ተገኝቷል?	አዎ አይ	
SD16	የእርግዚና አድሜ ህጻን ሲወለድ	ጊዜዉን ጤብቆ ከጊዜ ቀድሞ	
SD17	የትዎለደበት ቦታ	ቤት ጤና ተቋም	
SD18	የመዎለጃ መንገድ	SVD CS	
SD19	የክትባት ሁኔታ	ተጠናቅቋል አልተጠናቀቀም	
ክፍል አራት: የተጋለጡ ሕፃናት ባህሪያት			
SD20	በምርመራ ውጤት የሕፃን እድሜ	በ 6 ሳምንቶች	

		ከ 6 ሳምንታት በኋላ	
SD21	ህፃን በ 6 ሳምንታት ጊዜ ውስጥ CPT ይቀበላል	አዎ አይ	
SD22	DBS (ዲኤንኤ / PCR) የምርመራ ውጤት	አዎንታዊ አሉታዊ	
SD23	መጀመሪያ ከተወለደ በኋላ የዲ ቢ ኤስ የተላከበት ጊዜ	≤6 ሳምንታት > 4 6 ሳምንታት	
SD24	ሕጻናት ሲወለዱ የኒቫሪን መዉሰዱ	አዎ አይደለም	
SD25	የሕፃናት ክትባት EPI	ክትባት የተደረገ ክትባት አይሰጥም	
SD26	የልደት ክብደት	2.5-4.0 ኪግ ከ 2.5 ኪ.ሜ በታች	
SD27	የህፃናት አመጋገብ ልምምድ <6 ወር	የጡት ማጥባት ብቻ ድብልቅ ምግቦች ምትክ መመገብ	
SD28	ሕፃን Vitamin A	ወስደዋል. አልወሰደም	

Declaration by researcher

I, the undersigned, MSC Maternity health nursing Student declare that this report is me Original work in partial fulfillment of the requirements for Master's degree in Maternity health nursing

Place of submission: school of nursing and midwifery, faculty of health science, institute of health, Jimma University.

Date of submission: Date -----/-------/----

Researcher Name; YirgalemYosef signature: ---------- Date -----/-------/--------

Approved by my advisors and Examiners

Advisors

1. Name:----------Date -----/-------/---- Signature: ----------

2. Name:----------Date -----/-------/---- Signature: ----------

Examiners

1. Name ----------Date -----/-------/---- Signature: ----------

2. Name ---------- Date -----/-------/---- Signature: ----------