ADDIS ABABA UNIVERSITY COLLEGE OF HEALTH SCIENCES

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ASSESSMENT OF MAGNITUDE OF HIV AND SYPHILIS AND ASSOCIATED FACTORS AMONG PREGNANT WOMEN ATTENDING ANTENATAL CARE IN WOLEMERA DISTRICT

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List of acronyms

AAU	Addis Ababa University
ANC	Antenatal Care
AOR	Adjusted Odds Ratio
ART	Antiretroviral Therapy
ARV	Anti-Retro viral
AZT	Zidovudine
CI	Confidence Interval
COR	Crude odd ratio
DALY	Disability Adjusted Life Year
e-MTCT	Elimination of Mother To Child Transmission
HIV	Human Immunodeficiency Virus
MTCT	Mother to Child Transmission
PMTCT	Prevention of Mother to Child Transmission
PLWHIV	People Living With HIV
RPR	Rapid Plasma Reagin
SPH	School of Public Health
STI	Sexually Transmitted Infection
SZAF	Special Zone around Finfine
VDRL	Venereal Diseases Research Laboratory
WHO	World Health Organization

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Abstract

Background

Sexually transmitted infections (STIs) are highly prevalent in Ethiopia among people who are in their reproductive and productive prime. Among STIs, syphilis and HIV are significant public health problems in Ethiopia and causes several adverse pregnancy outcomes. Thus this study aims to assess magnitude of both infections among pregnant women attending antenatal care in Wolemera District, Oromia region.

General Objective

To assess the magnitude of syphilis and HIV among pregnant women attending antenatal care services (ANC) in Wolemera district.

Method

Facility based retrospective cross-sectional study (record review) was carried out in Wolemera district public health centers stratifying facilities by place. Record of 1665 pregnant women who had attended antenatal care clinic (ANC) from January 2013 to December 2015 was extracted from individual ANC chart using structured checklist. Descriptive, binary and logistic regression analyses were conducted using SPSS version 21.

Result

The overall prevalence of HIV was 2.9% [95% CI: 2.1%-3.7%], syphilis were [1.2% 95% CI 0.33%-2%] and HIV-syphilis co-infection was, 0.3%. The prevalence of HIV was significantly higher among pregnant women living in urban setting [AOR (95% CI) 3.82 (1.445-7.448)], those who had history of stillbirth [AOR (95% CI) 4.4 (1.4-13.8)], age group 25-34 [AOR (95% CI) 3.51 (1.59-7.72)] and 35-49 years [AOR (95% CI) 4.73 (1.66-13.47)]. Having negative sexual partner protective factor for HIV [AOR (95% CI) 0.31 (0.008-0.122)]. Syphilis was highly prevalent in HIV positive pregnant women (16.7%) than HIV negative [0.8 95% CI [0.01-1.6]. This study showed declining trend of HIV and syphilis in those three years.

Conclusion

This study reveled that HIV was highly prevalent among pregnant women in Wolmera district. Low syphilis testing was seen in the study area. Intensifying syphilis screening among pregnant women attended ANC is recommended for Elimination of both infections.

1. INTRODUCTION

1.1 Background

Sexually transmitted infections (STIs) are amongst the world's most widespread diseases which rank fourth following diarrheal diseases, malaria, and lower respiratory diseases. STIs are highly prevalent in developing countries which causes significant productivity loss for individual and community especially where most of the people are less than 40 years of age (1). STIs are among the major causes of disability-adjusted life years (DALYs) lost for women of reproductive age in less developed countries. Among STIs, Syphilis is one of the significant causes of adverse pregnancy outcomes worldwide, estimated to account for up to 1.5 million perinatal deaths each year (1). This figure is estimated to be equal or exceeding the perinatal mortality associated with either HIV or malaria. In Africa and Latin America, 2 to 15% of all pregnant women live with untreated syphilis (1).

After launching the global initiative of elimination of congenital syphilis in 2007, there is 38% reduction in the number of syphilis infection in pregnant women and congenital syphilis (2). In 2012, nearly one million pregnant women had syphilis infection and 350,000 had adverse pregnancy outcome worldwide. While the maternal infection due to syphilis is high, the Africa Region represents 63.1% of global total. In 2012, 84.6% of estimated pregnant women attended ANC once, but 54.6 % were not tested for syphilis, this caused 65.1% of all adverse outcomes. Out of tested for syphilis, 5% of them were not treated, which causes 5.8% of all adverse outcomes. Furthermore, 38.6% of pregnant women tested treated less effectively (treatment given too late or oral treatment) which also contributed to 7% of all adverse outcomes. Moreover, 16% of women with syphilis had no access to ANC, this accounts for 22.1% of adverse pregnancy outcomes (2).

Syphilis is a systemic disease that is caused by the *spirochaete, Treponema pallidum* and the infection can be classified as congenital or acquired, transmitted through sex or blood transfusion (3). A study that estimated untreated pregnancy outcome of syphilis showed that 21% end up in fetal loss and stillbirth, 9.3%, in neonatal deaths and 5.8% prematurity/low birth weight compared to their uninfected counterparts.(4). Though, routine screening for syphilis is the most

cost effective method to avert mother to child transmission (MTCT) of the disease, lack of awareness to the true impact of syphilis and the extent of the problem are some of the barriers to eliminate MTCT of syphilis. In addition, low coverage of ANC, lack of information, absence of proper training and technology on the existing ANC on how to incorporate syphilis screening and treatment in their health system are among the principal barriers (5).

Worldwide, about 240 000 children became newly infected with HIV in 2013, where 90% of global total new HIV infection among children occurred in sub Sahara Africa and a large proportion of new infections are being passed on from mother to child (6, 7). Pregnant women infected with HIV has higher risk of adverse pregnancy outcome in cohort study done in 2014 where 32.9% of the HIV infected pregnant women had at least one adverse pregnancy outcome (8).

The prevalence of HIV among the general population of Ethiopian was estimated to be 1.4% in 2005 while the ANC sentinel surveillance data showed that the prevalence of HIV among pregnant women was 2.3% in 2012 (9). Studies also showed that, the prevalence of HIV seems to stabilize or even declined in most of the major urban centers of Ethiopia, while it has increased in some smaller towns where the prevalence rates remained above 5%. (6, (10). This is associated to improvement in communication and transport infrastructures which are incremented to be a vehicle for urban to rural transmission of the disease (10).

In Ethiopia, the number of PMTCT sites showed an 8 fold increment from 171 to 1,352, within five years period (2006 to 2010). However, the number of women who did not receive counseling services for HIV test decreased from 230,000 in 2006 to 85,000 in 2010, of 300,000 mothers counseled about HIV 17% were not tested. Based on the 2010 reported figure, every PMTCT site still missed an average of 63 pregnant women that present for ANC. The same study also reported that an estimated ARV coverage in the country for mothers is 11.6% and for babies 8.4%, which is below a quarter of the expected need, indicating poor service coverage (11).

Ethiopian government has launched the prevention of mother-to-child transmission (PMTCT) acceleration plan in 2012 that was followed by the national strategy for elimination of mother- to child-transmission (MTCT) in 2013 or option B+. Despite those efforts, PMTCT coverage is still low even with growing access to ANC services and increase of PMTCT sites. As a result, significant missed opportunities and loss of women and children at every step of the PMTCT cascade is observed. Therefore, despite the significant burden of these diseases in the pregnant women, key obstacle in the expansion of PMTCT services contains the need to increase the demand and quality of services (12).

1.2 Statement of the problem

Syphilis is one of the eight major STIs worldwide and it is caused by *Treponema pallidum*. It causes 1.5 million perinatal deaths each year because of its adverse pregnancy outcomes. In developing countries, like Africa and Latin America, 2-15% of pregnant women are estimated to have untreated syphilis (2).The probabilities of syphilis-related adverse outcomes occurring without effective treatment were 0.21 for stillbirth/early fetal death, 0.09 for neonatal death, 0.06 for prematurity/low birth weight, 0.16 for congenital syphilis, and 0.52 for any adverse outcome. This implies that 52% of pregnant women with untreated syphilis experience adverse pregnancy outcome compared to those without syphilis (4). The annual direct medical costs of addressing the adverse outcomes related with syphilis among pregnant women are calculated to be US$309 million globally (5).

A universal screening of syphilis and treating is a cost effective prevention measure of adverse pregnancy outcome in pregnant women (1). However, due to low coverage of ANC in our country, there is wide disparity between rural and urban areas in ANC service utilization (13). As a result, there could be discrepancy in the magnitude of the disease between urban and rural area and having district based data for local decision making is important (9).

On the other hand, an estimated 33.4 million people are living with HIV Globally. Out of this, 50% of them are women and this range varies from 28% in America to 58% in Africa. Moreover 90% of the total number of pregnant women with HIV lives in sub-Saharan Africa. The two peak

causes of death in women of reproductive age worldwide are HIV/AIDS (19%) and complications associated to childbearing (15%). Globally, between 6% and 18% of maternal deaths are attributable to HIV, and women living with HIV in sub-Saharan Africa are six to eight times more likely to die than their HIV-negative counterparts (14). Women aged 15 years and older living with HIV are 16 million and among those 80% of them live in sub-Saharan Africa(15). In this Region, an estimated 24.7 million people living with HIV, these accounts for 71% of the global total and ten countries account for 81% of all people living with HIV in this Region and half of those are found in two countries, Nigeria and South Africa. In the Region more women are living with HIV than men. Women account for 58% of the total number of people living with HIV (15). Heterosexual transmission, is the main means for the epidemic in this Region and the greater risk of HIV infection is among adolescent girls and young women(15). HIV transmission from an HIV-positive mother to her child if she is not receiving any antiretroviral medicines ranges between 30% and 45% depending on the duration of breastfeeding (15).

In Ethiopia, 55% of pregnant women positive for HIV received antiretroviral medicine to reduce the risk of mother to child transmission (MTCT) in 2013,(16). Out of this, 66% (12,308) of them were on lifelong ART at the beginning of their current pregnancy and the reaming 5,961 received AZT prophylaxis during pregnancy and delivery. In 2013, report among women attending ANC showed that less than 70% of the women were tested for HIV (13).

To reduce preventable maternal mortality and react to HIV among women, it is very important not to miss the opportunities created when women attend health services or when they seek HIV care. To tackle HIV during pregnancy for the woman's health and for PMTCT, knowledge of women's HIV status is obligatory. Prevalence of unmet need for family planning remains unacceptably high among women in sub-Saharan Africa (14). As well in Ethiopia study done among HIV positive women high prevalence of unmet need for family planning was found in Addis Ababa (32.7%) (17). The potential for contraceptives to decrease unintended pregnancies among women living with HIV (and thus contribute to PMTCT and reducing maternal morbidity and mortality) is not being realized (14).

There is decline in HIV prevalence in the country. However the epidemic is more prevalent in urban area and a substantial proportion of new infections are being passed from mother to child (7). Despite all the effort to decrease mother to child transmission of HIV In Ethiopia, final transmission rate was 25% because of the challenge to maintain ARV drug in breast feeding period (16). Therefore, to reduce preventable maternal mortality and respond to HIV among pregnant women(14), to eliminate MTCT of HIV, knowing its magnitude in pregnant women is very essential, since the burden is not uniform though the Regions as well as among districts, having district based data is recommended (10). Hence, this study was aimed to provide important information about the magnitude of HIV among pregnant women in Wolemera District.

HIV prevalence was consistently higher among Syphilis positive clients both in urban and rural settings compared to Syphilis negative clients. The overall national prevalence of HIV among Syphilis positive clients (4.3%) is twice that of Syphilis negative clients (2.2%) (9). Placental inflammation from congenital syphilis might increase the risk for perinatal transmission of HIV. Therefore, all women with HIV infection need to be evaluated for syphilis (18).

1.3 Significance of the study

Screening of HIV and syphilis is done routinely among pregnant women to avert mother to child transmission (MTCT) of the disease. However, there is inconsistency in quality of service and prevalence of these diseases between urban and rural areas. Therefore, having district based data is recommended. Moreover, the service uptake and quality of service is affected by the knowledge of the provider as well as the client. HIV and syphilis have the same way of transmission and one has an impact on the transmission of the other. Among pregnant women the presence of syphilis increases the risk of HIV to the fetus. Though, the magnitude of HIV and syphilis is declining in the country, still these diseases are public health problems. Thus, assessing the dual burden of these diseases among pregnant women is important to help the control of these diseases and aid the evaluation of effectiveness of PMTCT programs. At present, there is no information on the burden and associated factors of syphilis and HIV among pregnant women in Wolemera District. Hence, this study was conducted to provide a valuable result on

the magnitude of syphilis and HIV among pregnant women who attended ANC. The result shall be an input for policy makers and researchers in the area.

2. LITERATURE REVIEW

2.1 prevalence of syphilis

Sexually transmitted infections are among the primary causes of disability-adjusted life years (DALYs) lost for women of reproductive age. Among STIs, Syphilis is one of the significant causes of adverse pregnancy outcomes worldwide, estimated to account for up to 1.5 million perinatal deaths each year. This figure is estimated to be equal or exceeding the perinatal mortality associated with either HIV or malaria. In Africa and Latin America, 2 to 15% of all pregnant women are with untreated syphilis (1).

In eight years retrospective study done in Turkey among pregnant women, 0.0648 % (41 out of 63,276) was found to be positive for RPR test. The study recommended routine antenatal screening for syphilis, on the consideration of the serious results of not treating the disease and the cost effectiveness of screening(19). In another prospective study conducted in India from January 2012 to December 2012 on ANC clients, the prevalence of Syphilis was found to be 0.36% (10 out of 2704 samples). The result showed that, age groups of 36-40 years were the most positive segment of the study population. Although the prevalence of Syphilis in those two studies was low, the later study also came up with similar recommendation as previously (14,20).In another study conducted in Brazil among pregnant women, the magnitude of syphilis found to be 0.51% using RPR test from 3300 women (21).

Among several studies conducted in Africa, five of them were done in different parts of the Region and the prevalence of syphilis among pregnant women ranged from 0.13% to 22.1%, (17-21). The variation in those studies was mainly because of socio-economic condition of the countries, in the laboratory method and using large sample size (17-21). Of those studies high prevalence of syphilis was found in the study done in Sudan Juba and which showed that among 231 pregnant women 51 of them (22.1%) tested positive for syphilis (22). In other studies, low prevalence of syphilis was found in Zambia where 2.7% out of 4154 pregnant women showed a syphilis-reactive result. That study was conducted right after giving training on recently developed rapid syphilis test, that has high sensitivity (85.7% to 100%) and specificity (96% to 100%), and did not require the traditional laboratory infrastructure used for rapid plasma regain

(RPR) tests and penicillin treatment prescribed by the health worker (23). Out of a total 17,323 ANC attendees screened for syphilis during a surveillance 2004 in Tanzania, a total of 1,265 women tested positive, and an overall syphilis prevalence were 7.3% (95% CI = 6.9–7.7) (24).

Furthermore, another surveillance was done in Tanzania in 2011 on large sample size and found that overall syphilis prevalence among pregnant women was 2.5 % (95 % CI: 2.3, 3.6), (25). Meanwhile, in a study conducted in Nigeria seroprevalence of syphilis was found to be 0.13% (three out of 2318 pregnant women were positive for VDRL test). This study recommended a more rigorous screening program using diagnostic tests with advanced sensitivity and specificity possibly necessary (26).

Similarly, in four studies done in Gondar teaching Hospital in Ethiopia among pregnant women the prevalence of syphilis and progressive increment was found in these studies (24-27). Out of those studies conducted in 2005, the prevalence of syphilis found to be 1% (5/480) among the pregnant women. However, no significant association was found between age group of the women and prevalence of syphilis. But, the majority (4/5, 80%) of syphilitic cases were found in the age range of 20-30 years and only one syphilitic case was found in a woman over 30 years of age (27). Furthermore, in retrospective study between 2009 and 2011 in place mentioned above the seroprevalence of syphilis among pregnant women was found to be (2.9%), 69 /2385. Relatively high seroprevalence of syphilis were seen among age groups of 21-25 years old (3.4%) followed in the age group of 26-30 years old (3.1%). Still, the difference was not statistically significant ($\chi 2$= 4.36, p=0.43) (28).

On other hand, a prospective cross-sectional study conducted in 2011 found the same prevalence of syphilis as previously which was 11/385(2.9%). Unlike others, bivariate analysis revealed that elder women above the age of 30 years, house wives, multigravida and rural dwellers were more likely to be positive for syphilis infection (29). Additionally an experience of miscarriage and a history of stillbirth were associated with syphilis infection with the odds of 2.22 and 3.24 respectively (29). In most recent 2012 prospective cross sectional study done in the same area (Gondar teaching hospital) increased seroprevalence of syphilis was observed which is 3.7%

(11/300) and associated with husband illiteracy [AOR [95% CI] =7.25 [1.74, 30.30] . Syphilis was also high in women occupationally housewives (15.2%) and whose husbands were illiterate (11.5%) (30).

2.2 The burden of HIV

An estimated 33.4 million people are living with HIV Globally. Out of this, 50% of them are women and this range varies from 28% in America to 58% in Africa. Women aged 15 years and older living with HIV are 16 million and among those 80% of them live in sub-Saharan Africa. This Region is the most affected Region where two-thirds of HIV infected people are living and 59% of adult living with HIV are women (15). On the other hand, the prevalence of HIV among childbearing women in America found to be 0.51% (95% CI 0.48-0.54) (31). While the prevalence of HIV among pregnant women in Brazil found to 0.84% (28/3300) (21).

In sub-Saharan Africa, an estimated 24.7 million people were living with HIV, this accounts for 71% of the global total and ten countries accounts for 81% of all people living with HIV in this Region. Ethiopia is one of these countries and half of those are found in two countries, Nigeria and South Africa. In the Region more women are living with HIV than men. Women account for 59% of the total number of people living with HIV. Heterosexual transmission is main means for the epidemic in this Region (15). The prevalence of HIV among pregnant women in Africa regions is higher where in Tanzania found to be 5.6% in 2011 (25). As well in Nigeria in 2014 reported to be 5.8% and in Zambia in 2006 report 21.6% (32, 33). Moreover in South African in 2006 the prevalence of HIV among pregnant women was reported 23.7% (34) .

Within 43 African countries, the percentage of pregnant women who received an HIV test increased from 37% in 2008 to 43% in 2009. But in Ethiopia estimated coverage of HIV testing and counseling among pregnant women was 16% in 2009. Meanwhile in 30 countries in Africa, HIV positive pregnant women who received antiretroviral medicines to reduce the risk of mother to child transmission (MTCT) of HIV showed progress from 30% in 2007 to 39% in 2008 and 43% in 2009, (35). This coverage was lower than the average coverage rates for low- and

middle-income countries, as global estimates were reported to be 53% in 2009. Still in Ethiopia percentage of women tested positive for HIV who received ART to reduce MTCT of HIV was less than 20% in 2009 (35).

HIV transmission from an HIV-positive mother to her child if she is not receiving any antiretroviral medicines from between 30% and 45% depending on the duration of breastfeeding (15). Despite all the effort to decrease mother to child transmission of HIV in Ethiopia, final transmission rate was 25% because of the challenge to maintain ARV drug in breastfeeding period (16).

On the other hand, HIV prevalence in general population was estimated in 2005 EDHS for the first time and found to be 1.4% (36) . Before that, the HIV prevalence was estimated using ANC sentinel surveillances. For a second time HIV prevalence for general population was estimated in 2011 EDHS and the prevalence in the general population was 1.5% (37). Moreover, higher prevalence of HIV was found in women than in men, and HIV prevalence is higher in urban areas (4.2%) than in rural areas (0.6%). Furthermore, among regions HIV prevalence is highest in Gambela (6.5%) and in Addis Ababa (5.2%). The overall HIV prevalence is higher in respondents with STIs or STI symptoms in the past 12 months (4.7 percent) than of those with no STIs or STI symptoms (2%) (37).

Furthermore, in recent ANC sentinel surveillance conducted in 2014, HIV prevalence in pregnant women was 2.2% which is unadjusted as well for urban found to be 3.9% and rural 1.4%. The highest Regional HIV prevalence during this time was observed in Addis Ababa (5.5%) followed by Gambella (5.2%) and Somali (3.8%). The lowest adjusted HIV prevalence were from Oromia (1.2%) and Benishangul Gumuz (1.2%) followed by Afar (1.4%) and SNNPR (1.5%) these is consistent with the 2012 surveillance. Moreover, Women in the age groups of 25-34 years and 35-49 years have the highest overall HIV prevalence. which seems that the peak of HIV prevalence is moving towards older age group (9).

Meanwhile, in the study conducted in 2005, HIV prevalence was found to be 9.6% among pregnant mother attendants ANC at Gondar teaching hospital (27). A study done in 2011 in the same study area, it was found that HIV prevalence was 11.2% among pregnant women and the prevalence was higher because 71.7% of the respondents were urban residents (29). Similarly, in 2012 a study conducted at Gondar teaching hospital showed that HIV prevalence among pregnant women was 10.33% and similar to the previous study, 80% of the respondents were urban residents (30). A study done in Arbaminch found that maternal education has positive association with the voluntary counseling and testing for HIV. Also socioeconomic status has association with good knowledge of PMTCT. On the other hand, high loss of follow up, culture, fear of stigma and discrimination are some of the factors that have negative impact on effectiveness of PMTCT services (38).

A plan for Elimination of mother to child transmission of HIV (e-MTCT) for 2013-15 was developed and implemented since 2013,(7). Option B+ was also introduced in 2013 and currently implemented in 2495 health facilities. Furthermore, the current strategy with the vision to end HIV by 2030 in the country with the target to Identify 95% of HIV positive pregnant women and attain 95% enrolment for Option B+ (Both mother & newborn) is thought to sustain the elimination of MTCT and reduce the vertical transmission to less than 2% by 2020,(7).

2.3 Dual burden of HIV and syphilis

Every patient with syphilis should be provided HIV test of high frequency of dual infection. Pregnant women are special group that need close surveillance for HIV and syphilis to avert mother to child transmission of the diseases (3). On other hand, every pregnant woman with HIV infection should be screened for syphilis because of Placental inflammation from congenital infection due to syphilis might increase the risk for perinatal transmission of HIV (18).

In a study conducted in Malawi in 2004 among pregnant women, the prevalence of HIV and syphilis was found to be high and being HIV positive had higher risk for syphilis(39). Syphilis sero-reactivity was 8% among HIV positive women and 4% among HIV negative women. Ninety-two (2.4%) of the participants in that study were sero reactive for both HIV and syphilis. Dual infection was most prevalent among 20-25 years old clients (3.6%) (39). In the sentinel

surveillance conducted in Tanzania in 2004, co-infection of HIV and syphilis among pregnant women was found to be 130/17,813 (0.7%), (24). Unlike the previous studies, women with no education were more likely to be infected with syphilis than women with some education ($p<0.0001$) in contrast to the women with HIV (24). However, in sentinel surveillance conducted in Ethiopia, HIV prevalence was consistently higher among Syphilis positive clients both in urban and rural settings compared to Syphilis negative clients. The overall national prevalence of HIV among Syphilis positive women (4.3%) is twice that of Syphilis negative clients (2.2%),(9). On the other hand, syphilis prevalence among HIV positive individuals were 2.1% and among HIV negative individuals 1.1% nationally (9). Thus, the occurrence of syphilis favors the transmission of HIV to the pregnant mother as well as enhances the perinatal transmission of HIV. Therefore, knowing the dual burden of those diseases could help us to plan preventive program to control a vertical transmission of HIV and Syphilis.

2.4. Trend of HIV and syphilis

Trend analysis considers the magnitude of change over years of consistently collected data. To see a trend of these diseases, consistent data of at least three years is needed to conclude whether there is a declining or inclining trend. In country with general epidemic, ANC data are used to monitor the trend of HIV prevalence (40). In descriptive study done among pregnant women in Nigeria from 1st January 2010 to 31st December 2014, declining HIV prevalence was observed; which was 10.7% in 2010 to 6.8% in 2013 and 5.8% in 2014 (33). In another study done in Zambia, steady decline in trend of HIV prevalence was found among pregnant women from July 2002 to December 2006 from 24.5 % in 2002 to 21.4% in 2006 (32). Meanwhile, in sentinel survey done in Addis Ababa among pregnant women, declining trend of HIV prevalence was found between 1995 to 2003, where the prevalence of HIV was higher in 1995 at 20.8% and declined significantly to 12.9% in 2003 (41). Furthermore, in ANC surveillance in Ethiopia, a declining HIV trend was found in adjusted HIV prevalence among pregnant women from 5.8% in 2002 to 1.7% in 2014 (9).

In retrospective study done among pregnant women in Turkey inconsistent prevalence of syphilis was shown between January 2007 and June 2014; in 2007 which was found to be 0.28% while in 2012 it was 0%, but in 2014 it became 0.064% (19). Among pregnant women in Botswana deceasing trend of syphilis was found between 1992 and 2003 where it was 12.4% in 1992 and

declined to 4.3% in 2003 (42). Meanwhile, in retrospective study done between 2009 and 2011 inconsistent prevalence of syphilis was found among pregnant women in Ethiopia which was 2.9% in 2009, 1.9 % in 2010 and 3.9% in 2003% (28).

2.5. Factor associated with syphilis /HIV

In a study done in Brazil among pregnant women, prevalence of syphilis was associated with being Caucasian (white), not having a steady sexual partner, having sexual partner with history of Intra-venous drug use, having previous STI and being house wife (21). In this study, receiving regular prenatal care was found to be protective factor for syphilis (21). In a study, conducted in Tanzania among pregnant women, prevalence of syphilis was associated with having 3-4 pregnancies, >5 pregnancies, attending semirural and rural clinic (25). In this study prevalence of syphilis was not associated with age group, marital status, level of education and place of residence (25).

Moreover, in a study done in Malawi among pregnant women, the prevalence of Syphilis was associated with previous diagnosis of STI, rural residence, multi gravidity and with history of miscarriage or stillbirth (39). Syphilis was not associated with maternal employment, cost of housing material, being a Yao, or marital status. Syphilis prevalence was inversely associated with maternal education(39). In a study conducted in Southern Sudan Juba, factors associated with syphilis among pregnant women were being housewife, history of abortion and history of partner travel were found to be risk factors for getting syphilis (22). Attending antenatal clinic care for previous pregnancy, on the other hand was found to be protective factor for syphilis (22).

In a study done in Gondar teaching hospital among pregnant women the prevalence of syphilis was associated with age of pregnant women being older than 30 years and having illiterate husbands (30). In this study, syphilis seroprevalence was not associated with maternal educational status, occupation, residence, family size, family monthly income, or history of abortion (30). On the other hand, in a study conducted in the same area among pregnant women syphilis was more likely to be positive in older women above the age of 30 years, house wives,

multigravida and rural dwellers (29). On the other hand in study Malawi being HIV infected was found to be the risk factor for syphilis infection (39).

In a study conducted in Brazil among pregnant women, increased HIV prevalence was found in those having known HIV positive sexual partners, having sexual partner with previous history of STI, not having steady sexual partner and low level of education (21). In a study done in Tanzania among pregnant women, the prevalence of HIV was associated with being single, being in age group 25-34 and older than 35 years and women having 1-2 previous pregnancies (25). There is less risk of HIV in those attending ANC in rural clinics. On the other hand, there was no association found in that study between HIV, education and duration of stay in residence (25). HIV seroprevalence was also found to be high among age group 26-30, multigravid, formally-married, and urban women as well as in those formally employed and in those having most expensive houses (39). In the cohort study done in Latin American higher pregnancy related adverse pregnancy outcome was found among HIV sero positive (8).

In a study done in Ethiopia among pregnant women, the prevalence of HIV was found to be high in those women whose husbands had attended primary school and had a family size of three to four members (30). HIV infection was not associated with maternal educational status, occupation, age, residence, and history of abortion (30). On the other hand, in sentinel surveillance done in Ethiopia among pregnant women being syphilis reactive was found to be the risk factor for HIV infection (9). For optimal intervention of those two diseases among pregnant women knowing the risk factors associated were important.

The burden of STI has impact on the health of reproductive age women in Ethiopia like other developing countries. Screening to syphilis and HIV has not been practiced as intended because of late initiation of ANC follow-up by pregnant women and low coverage of ANC. Among others, lack of knowledge about the impact of these diseases on the unborn child both by health providers and pregnant women, disrupted logistic supply for diagnosis and treatment, loss of follow up and poor partner tracing has impacted the PMTCT program. Though, the health sector

in Ethiopia has documented a lot of progress in recent years, including achievement of MDG4 (a 2/3 decrement of child mortality), there is no substantial achievement in decreasing neonatal mortality mostly related to limitations in prevention of perinatal infections. Therefore, knowing the magnitude of these two diseases could help further program evaluation and appropriate planning in this area.

2.6. Conceptual Framework

The study was tried to identify factors associated with HIV and syphilis sero-status among pregnant women. Demographic factors including age, marital status and place of residence, has effect on sero- status of HIV and syphilis. Obstetric factors such as gravidity, parity, history of abortion, history of stillbirth and current symptom of STI same of them shown association with HIV and syphilis sero-status and also serve as useful associated factor for HIV and syphilis sero status among pregnant women. While each of these themes influences the sero-status of HIV and syphilis among pregnant women, the sero status of syphilis also affect the sero status of HIV, as shown in figure 1.

CONCEPTUAL FRAMEWORK

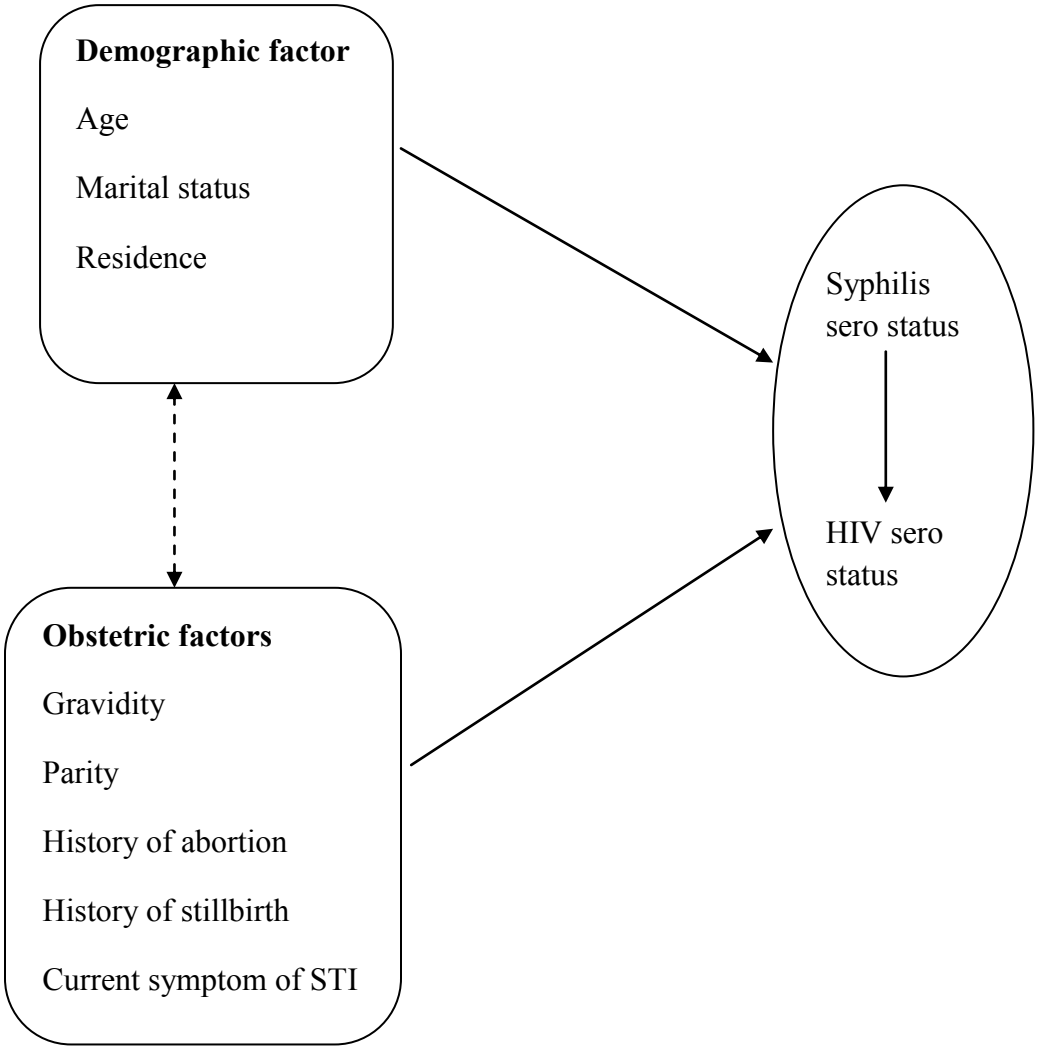

Figure1. Conceptual framework 2017

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3. OBJECTIVE

3.1. General Objective

- To assess the magnitude of HIV and syphilis among pregnant women attending ANC in Wolmera district.

3.2. Specific Objective

- To assess the magnitude of HIV among pregnant women attending ANC.
- To assess the magnitude of syphilis among pregnant women attending ANC.
- To identify dual burden of HIV and syphilis among pregnant women attending ANC.
- To assess the trend of HIV and syphilis among pregnant women attending ANC between 2013 and 2015.
- To assess factors associated with HIV and syphilis among pregnant women.

4. MATERIAL AND METHODS

4.1. Study area and period

This study was conducted in Wolemera District which is located in Oromia Special Zone surrounding Finfine and it is a part of the Oromia Region of Ethiopia. The District is bordered on the south by the Sebeta Hawas, on the west by west Shewa Zone, on the north by Mulo, on the northeast by the Sululta, and on the east by Burayu. The 2007 national census reported that the total population for this District was 83,823, of whom 42,115 were men and 41,708 were women; 3,352 or 4% of its population was urban dwellers. The majority of the inhabitants are follower of the Ethiopian Orthodox Christianity, with 86.72% of the population following this belief, while 6.36% of the population practiced traditional beliefs, and 4.61% were Protestants (43).

The government health facilities in this District are five health centers, 26 health posts and one primary hospital under construction. All five health centers give ANC service and out of those four give PMTCT services. The study was conducted from June 2016-June 2017 in those selected government health facilities having PMTCT services.

4.2 Study design

The study was conducted using facility based retrospective cross sectional study design (record review) to assess the magnitude of syphilis and HIV among women attending ANC in the public health centers in Wolemera District between January 2013 to December 2015.

4.3 Source population

All pregnant women in Wolemera District

4.4 Study population

Pregnant Women who attended ANC in selected government health centers during January 2013 - December 2015

4.5 Inclusion and Exclusion Criteria

4.5.1 Inclusion criteria

All pregnant women who had ANC records with complete information on demographic variable and other variable, test result of either syphilis or HIV was included in this study.

4.5.2 Exclusion criteria

Those pregnant women who had ANC records with incomplete information on study variables were not included in this study.

4.6 Sample size and sampling technique

4.6.1 Sample size

Single proportion population formula was used for sample size calculation

For the first objective to determine prevalence of HIV among pregnant women

$$n = \frac{Z^2 P(1-P)}{d^2}$$

Where, n = the sample size

Assumptions for the sample size determination:

Z= 1.96 at 95% confidence interval

d= Margin of error assumed to be (0.01)

P – Proportion of HIV among pregnant women assumed to be 1.2%.(9)

n=455

For the second objective: to assess the prevalence of syphilis among pregnant women.

$$n = \frac{Z^2 P (1-P)}{d^2}$$

Z= 1.96 at 95% confidence interval

d= Margin of error assumed to be (0.01)

P – Proportion of syphilis among pregnant women assumed to be 1.7% (9)

n=642

Table 1, Sample size determination using similar study for prevalence of HIV and syphilis among pregnant women.

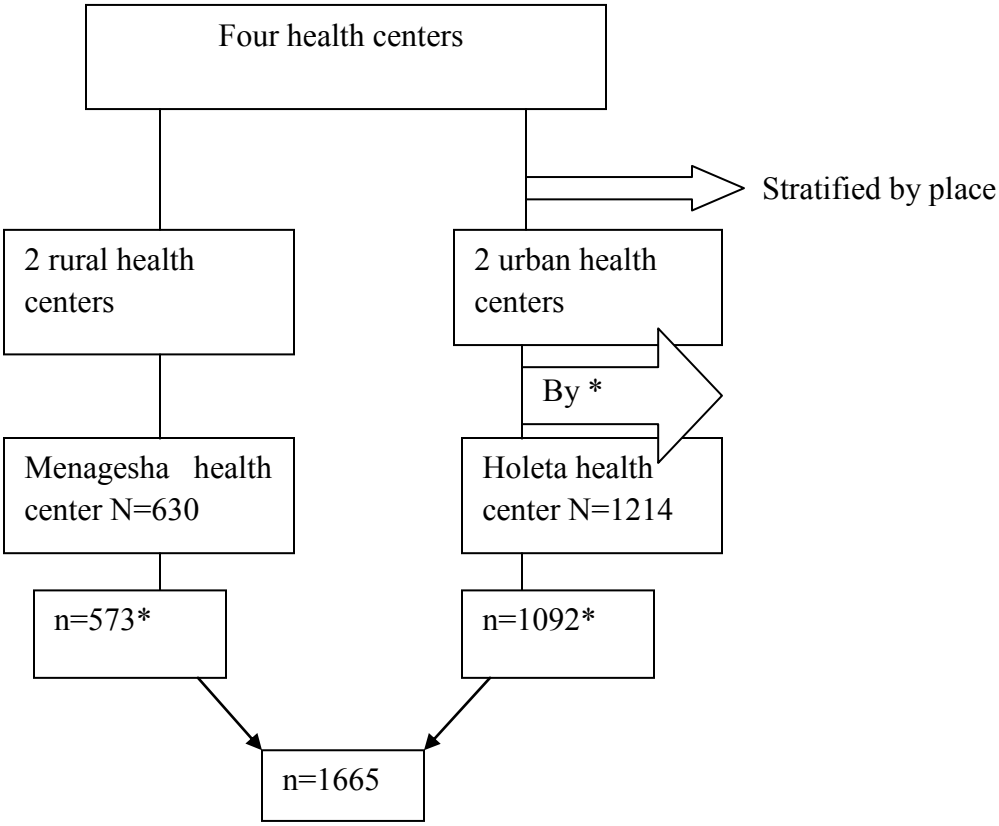
Objective	Confidence interval	Proportion	1-P=q	Margin of error	Sample size
HIV prevalence among pregnant women	95% or 1.96	1.2%	0.988	0.01	455
Syphilis prevalence among pregnant women	95% or 1.96	1.7%	0.983	0.01	642

The number of pregnant women attended ANC in Wolemera district between 2013 and 2015 was below 10,000. Therefore, the sample size correction formula was applied. This give a final sample size of 553 (n= 553) women attended ANC during January 2013-December 2015 in these public health centers was included.

However, having calculated the adequacy of the sample the study was include all women attended ANC during January 2013-December 2015 in these selected health centers since one of the aims of the study is assessing the trends of prevalence of STIs (HIV and syphilis). In addition using the three years data set was help us to compensate for missed data and incomplete information.

4.6.2 Sampling technique /procedure

Stratified random sampling method was used. There are five government health centers in Wolemera district. To select the study participant, the health centers will be first stratified by place as rural and urban. One health center from each stratum was randomly selected and the study participant was selected depending on the inclusion criteria of the study. Finally the study was included all women attended ANC between January 2013 – December 2015 and those full fill the inclusion criteria of the study. (Figure 2)



* Study participant was determined depending on the inclusion criteria.

Figure2. Sampling procedure

4.7 Data Collection method

Record review using structured checklist. The checklist was developed in English. The checklist was adopted from the integrated ANC, labor, delivery, neonatal and postnatal care card by Federal Ministry of Health. The checklist was pre-tested on the ANC chart on randomly selected non included year. A total of 28 charts (5% of sample size) were reviewed and the information was extracted. Finding was discussed among the principal investigator and adviser for better understanding of the data collection tool. Based on pre-test a checklist the inclusion criteria were revised. In addition, daily checkup and follow up was done by the supervisor and principal investigator. The checklist was used to obtain demographic and obstetric information of ANC women attendant in Wolemera District**.**

The record was reviewed in ANC registration order, starting from January 2013 to the end of December 2015 and the data were extracted from charts. All required data from January 2013 to end of December 2015 were copied to the checklist.

4.8 Study Variables

4.8.1 Dependent variables

- HIV sero-status
- Syphilis sero-status

4.8.2 Independent variables

- Age
- Marital status
- Residence
- Gravidity
- Parity
- History of abortion
- Previous history of still birth
- Current Symptom of STI

4.9 Data Analysis Procedures

Data were checked manually for completeness and then coded followed by preparation of, template in SPSS version 21 and then data entry and cleaning was conducted. Univariate analysis was done using frequency, proportion these describes the study population in relation to relevant variable. Seroprevalence of the HIV/syphilis infections was defined as the percentage of positive cases for each test, and the standard error and 95% confidence interval (95% CI) were calculated for each prevalence value. The result presented in the form of texts and tables and graphs. Logistic regression analysis was used to identify factors associated with outcome variable. Bivariate logistic regression was used to identify crude association. Then for those variables with p-value < 0.2 in binary logistic regression further analyzed using multivariate logistic regression to see independent association through controlling the confound. The degree of association between dependent and independent variables was judged using P-value of less than 0.05, adjusted odds ratio with 95% confidence interval was considered as statistically significant. All statistical analyses were using the SPSS version 21 and excel was used to do the trend graphs.

4.10 Data Quality Management

A structured pre-tested checklist was used for collection of information to assure data quality. There was monitoring and daily meeting with data collectors and principal investigator for checking the daily activity. A supportive feedback was given at the end. To maintain the quality of the data, two days training was given to data collectors on the objective of the study, ethical issues and how to use the tool for data collection. The filled checklist was checked daily for completeness and reliability by the supervisors and principal investigator.

4.11 Ethical Consideration

The study was conducted after getting an approval from the institutional review board of the School of Public Health, Addis Ababa University. An ethical clearance and official letter was obtained from the Research and Ethics Committee of School of Public Health of Addis Ababa University to Oromia regional office, the regional office Research and Ethics Committee given official later to zonal office then zonal office given us official later to Woreda health office and Woreda office given us official letter to selected health center and permission was asked from selected heath centers directors also from maternal and child health department heads. After

getting permission the information was collected from ANC charts and the information obtained from the charts were be kept confidential.

4.12 Dissemination of Results

The finding of this study was submitted to the School of Public Health, Addis Ababa University for the partial fulfillment of master of public health, finding shall be disseminated to the study health centers and respective health offices. The findings shall also be presented in relevant conferences. Finally, I will plan to publish in national as well as in regional journals.

5. RESULT

5.1 Socio-demographic characteristics:

Data were extracted from records of 1665 pregnant women who had attended ANC between January 2013 and December 2015. The age of the pregnant women attended ANC ranged from 16-49 where the median age was 25 years and the mean age was 25.77 years with standard deviations of 5.4 years. Most pregnant women were between the ages of 25 to 34 years (48.2%) and almost all 1619 (97.2%) were married, while 1082 (65%) were living in urban settings (Table 2).

Table 2. Demographic characteristic of pregnant women attended ANC in Wolmera district, SZAF, Oromia 2013-2015 (N=1665)

Variable	Number	Percent
Age group		
15-18	96	5.8
19-24	615	36.9
25-34	803	48.2
35-49	151	9.1
Marital status		
Married	1619	97.2
Single	46	2.8
Residence		
Urban	1082	65
Rural	583	35

5.2 Obstetric History

Among pregnant women attended ANC the majority of them 822 (49.4%) were multi gravidae, whereas 659 (39.6%) were primigravidae and the rest 184 (11.1%) of them were grand multi

gravidae. Moreover, 30 (1.8%) participant had pervious history of neonatal loss and 4(0.2%) of the women had history of three or more spontaneous abortion as shown in Table 3.

Table 2 Obstetric characteristic among pregnant women Attended ANC in Wolmera district, SZAF, Oromia, 2013-2015 (n=1665)

Variable	n	Percent
Gravidity		
Primigravidae	659	39.6
Multi gravidae	822	49.4
Grand multi gravidae	184	11.1
Parity		
0	694	41.7
1-4	874	52.5
>5	97	5.8
Neonatal loss or stillbirth		
Yes	30	1.8
No	1635	98.2
History of 3 or more spontaneous abortion		
Yes	4	.2
No	1661	99.8

5.3 HIV sero-prevalence and related characteristic among pregnant women with the bivariate analysis

Among the total participant 1568 (94.7%) women who were tested for HIV, 2.9% (95% CI: 2.1%-3.7%) were positive for HIV. The results also showed that, higher proportion 43 (93.5%) of HIV positive women were married but not statically significant. The magnitude of HIV sero-prevalence was also high among the age group 25-34 years where 31 of them (67.4%) had HIV infection with p-value of 0.002. Higher proportions of pregnant women 39 (84.8%) sero-positive were also found to be urban resident with p-value=0.004. Among a total of 46 sero-positive pregnant women, 30 of them (65.2%) were multi gravidae (p-value=0.02). Whereas 4 (8.7%) of the HIV sero-positive for pregnant women has history of stillbirth or neonatal loss (p-value=0.002). Out of the total HIV sero-positive pregnant women two had co-infection with syphilis. (Table 4).

Table 4. Demographic and obstetric characteristics of pregnant women in relation to sero positive for HIV in Wolmera District, SZAF, Oromia 2013-2015 (N=1568)

Variable	**HIV sero reactivity**		
Age group	**Reactive (n (%) (46)**	**Non-reactive (n (%))**	**P-value**
15-24	8(17.3%)	658(43.3%)	1
25-34	31(67.4%)	731(48%)	**0.002**
35-49	7(15.2%)	133(8.7%)	**0.005**
Marital status			
Married	43(93.5%)	1480(97.2%)	1
Single	3(6.5%)	42(2.8%)	0.145
Residence			
Urban	39(84.8%)	980(64.4%)	**0.004**
Rural	7(15.2%)	542(35.6%)	1
Gravidity			
Primigravidae	11(23.9%)	611(40.1%)	1
Multi gravidae	35(76.1%)	911(59.8%)	**0.027**
Parity			
Nulliparous	13(28.3%)	641(42.1%)	1
Multiparous	33(71.7%)	881(57.9%)	0.06
History of neonatal loss			
Yes	4(8.7%)	24(1.6%)	**0.002**
No	42(91.3%)	1498(98.4%)	1
Partner tested			
Reactive	10(71.4%)	22(6.7%)	1
Non reactive	4(28.6%)	304(93.9%)	**0.001**

Syphilis sero status			
Reactive	2(16.7%)	4(0.8%)	1
Non reactive	10(83.3%)	485(98%)	**0.001**

5.4 Multivariate analysis of factor associated with HIV sero positivity among pregnant women

Binary logistic regression was applied to identify crude association of demographic and obstetric Variables such as age, residence, marital status, gravidity, parity and history of neonatal loss or stillbirth with HIV sero-status among pregnant women attended ANC between January 2013 and December 2015. Then for those variable p-value < 0.20 with binary logistic regression further analysis using multiple logistic regression was done to see independent association and to control possible confounder. Among those variables age of respondents, residence, history of neonatal loss or stillbirth, sero status of syphilis and partner HIV status were significantly associated with HIV sero-prevalence at P<0.05 (Table 5).

Table 5 Demographic and obstetric factors associated with HIV sero prevalence among pregnant women attended ANC in Wolmera in District, SZAF, Oromia, 2013-2015

Variable	HIV sero status (N=1568)		COR(95% CI)	AOR(95%CI)
Age group	**Reactive**	**Non reactive**		
15-24	8(17.4%)	658(43.2%)	1	1
25-34	31(67.4%)	731(48%)	**3.48(1.59-7.64)**	**3.51(1.59-7.72)**
35-49	7(15.2%)	133(8.7%)	**4.33(1.54-12.14)**	**4.73(1.66-13.47)**
Residence				
Urban	39(84.8%)	980(64.4%)	**3.081(1.369-6.936)**	**3.27(1.44-7.44)**
Rural	7(15.2%)	542(35.6%)	1	1
History of neonatal loss or still birth				
Yes	4(8.7%)	24(1.6%)	**5.94(1.97-17.89)**	**4.5(1.4-13.8)**
No	42(91.3%)	1498(98.4%)	1	1
Syphilis sero status				
Reactive	2(16.7%)	4(0.8%)	**1**	**1**
Non reactive	10(83.3%)	485(98%)	**0.041(0.007-0.252)**	**0.05(0.008-0.33)**
Partner HIV status				
Reactive	10(71.4%)	22(6.7%)	1	1
Non reactive	4(28.6%)	304(93.9%)	**0.029(0.008-0.1)**	**0.31(0.008-0.12)**

Pregnant women living in urban setting has 3.27 more chance to get HIV infection than those counterparts living in rural setting [AOR (95% CI) 3.27 (1.445-7.44)]. HIV infected pregnant women have greater risk of neonatal loss when compared to their counterparts HIV negative pregnant women [AOR (95% CI) 4.5 (1.4-13.8)]. Being among the age group 25-34 [AOR (95% CI) 3.51 (1.59-7.72)] and 35-49 years [AOR (95%CI) 4.73 (1.66-13.47)] has higher likelihood of HIV prevalence compared to less than 25 years old pregnant women. Other prominent factor associated with HIV-sero positivity was syphilis infection. A pregnant woman sero-negative for syphilis has 0.05 times less likelihood to be infected with HIV [AOR (95%CI) 0.05 (0.008-0.33)]. Further associated factor with HIV sero-status is HIV status of the partner, having HIV negative partner is protective factor for HIV infection among pregnant women [AOR (95% CI) 0.31 (0.008-0.12)].

5.5 Syphilis sero-prevalence and demographic, obstetric characteristic of pregnant women

The result shows that, 598 of the total ANC attendant were tested for syphilis. The overall prevalence of syphilis was found to be 1.2% [95% CI: 0.33%-2%]. All syphilis sero-positive cases were observed among married pregnant women. In terms of age, high syphilis sero-prevalence was observed among pregnant women in the age group of between 25-34 years (71.4%). Among syphilis sero-positive women, a higher proportion (85.7%) was for urban residents. High syphilis sero-prevalence case was observed among multi gravidae pregnant women 6 (85.7%). Among syphilis positive pregnant women high proportion of them had history of neonatal loss 2 (28.6%). High HIV positive cases were also found among syphilis positive pregnant women 2(33.3%) (Table 6).

Table 6 .Demographic and obstetric characteristics of pregnant women in relation to syphilis sero positive In Wolemera District, SZAF, Oromia, 2013-2015.

	Syphilis sero reactivity (n=598)	
Variable	Reactive	Non reactive
Age group	n (%)	n (%)
15-18	0(0%)	33(5.6%)
19-24	1(14.3%)	221(37.4%)
25-34	5(71.4%)	284(48.1%)
35-49	1(14.3%)	53(9%)
Marital status		
Married	7(100%)	570(96.4%)
Single	0%	21(3.5%)
Residence		
Urban	6(85.7%)	304(51.4%)
rural	1(14.3%)	287(48.6)
Gravidity		
Primigravidae	1(14.3%)	229(38.7%)
Multi gravidae	6(85.7%)	292(49.4%)
Grand multi gravidae	0(0%)	70(11.8%)
Parity		
0	1(14.3%)	242(40.9%)
1-4	6(85.7%)	316(53.5%)
>5	0(0%)	33(5.6%)
History of neonatal loss or stillbirth		

Yes	2(28.6%)	7(1.2%)
No	5(71.4%)	584(98.8%)
HIV sero positive		
Reactive	2(33.3%)	10(2%)
Non reactive	4(66.7%)	485(98%)

5.6 syphilis sero prevalent and related factors

In this study only 598 (35.9%) of pregnant women tested were found for syphilis. Small number syphilis sero-positive pregnant women identified hence we are unable to conducted regression analysis we did descriptive analysis with 95% confidence interval.

The prevalence of syphilis among pregnant women living in urban setting is relatively higher [1.9% 95%CI [0.4%-3.4%] than their rural counterparts (0.3%). Higher magnitude of syphilis was also found among pregnant women in older age group between 25-49 years age [1.7% 95%CI [0.3%-3.1%] than those less than 25 years old pregnant women (0.4%). Moreover multi gravidae pregnant women had higher prevalence of syphilis [1.6%95% CI [0.3%-2.9%] than those pregnant women become pregnant for the first time (0.4%). The same is true for multiparous pregnant women higher prevalence found among them [1.7% 95%CI [0.4%-3%] than nulliparous pregnant women (0.4%). Furthermore pregnant women without previous history of neonatal loss had lower prevalence of syphilis [0.8%95%CI [0.08%-1.52%] than their counterpart who had previous history of neonatal loss (22.2%). Also the prevalence of syphilis among HIV negative pregnant women is lower [0.8 95%CI [0.01%-1.6%] than those HIV positive pregnant women (16.7%) this may be related to HIV infection facilitate the transmission of syphilis and both has the same ways of transmission. (Table 7). Lastly we recommend further research with large sample size to be done see associated factor with syphilis.

Table 7 Prevalence of Syphilis in relation to selected demographic and obstetric variables among pregnant women attended ANC in Wolmera district, 2013-2015

Variable	Syphilis sero positivity (n=598)		Proportion (%)	95%CI
	Non reactive n	Reactive n		
Age group				
15-24	254	1	0.4%	(0%-1.1%)
25-49	337	6	1.7%	(0.3%-3.1%)
Residence				
Urban	304	6	1.9%	(0.4%-3.4%)
Rural	287	1	0.3%	(0%-0.9%)
Gravidity				
Primigravidae	229	1	0.4%	(0%-1.2%)
Multi gravidae	362	6	1.6%	(0.3%-2.9%)
Parity				
Nulliparous	242	1	0.4%	(0%-1.2%)
Multiparous	349	6	1.7%	(0.4%-3%)
History of neonatal loss or stillbirth				
Yes	7	2	22.2%	(0%-53.2%)
No	584	5	0.8%	(0.08%-1.52%)
HIV sero positive				
Reactive	10	2	16.7%	(0%-39%)
Non reactive	485	4	0.8%	(0.01%-1.6%)

5.7 Trend analysis

5.7.1 Trend of HIV

The overall prevalence of HIV between 2013 and 2015 among pregnant women in Wolmera district found to be 2.9% [95% CI: 2.1%-3.7%]. In 2013 the prevalence of HIV was 4.03% (20/496) or 4.03 [95%CI: 2.3%-5.8%], in 2014 the prevalence of HIV was 3.2% (14/437) or 3.2% [95%CI: 1.5%-4.8%] and in 2015 the prevalence of HIV was 2.03% (12/589) or 2.03% [95% CI: 0.89% -3.2%]. There is decline in prevalence of HIV in those three years as shown in figure 3.

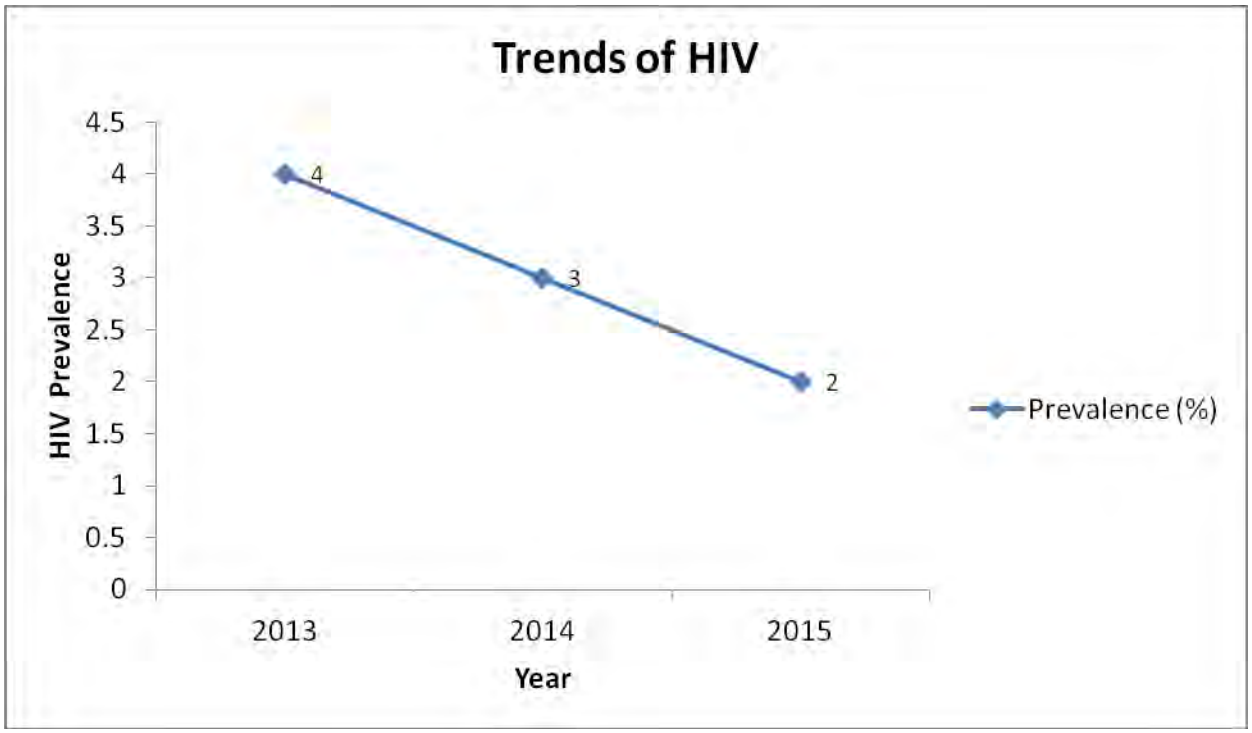


Figure 3.HIV prevalence by year from 2013-2015 in Wolmera District, SZAF, Oromia Ethiopia

5.7.2 Trend of syphilis

Among pregnant women in Wolmera district the prevalence of syphilis between 2013 and 2015 were 1.2% (7/598). When we look at each year prevalence in 2013 it was (2.56%), where as in 2014 it was (1.4%) and in 2015 it was (0.9%). There is decline prevalence of syphilis was soon (figure 4).

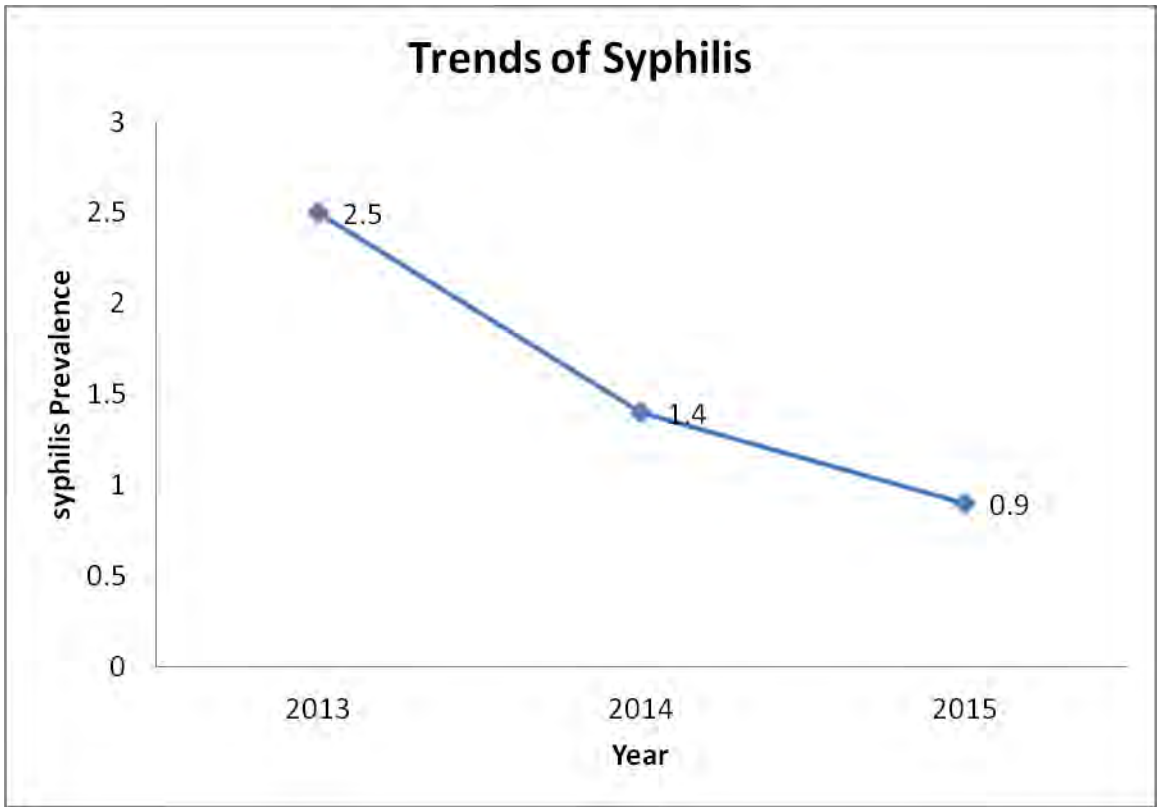


Figure 4.Syphilis prevalence by year from 20.13-2015 in Wolmera District, SZAF, Oromia Ethiopia

5.8 Co-infection of syphilis and HIV

In this study among the total pregnant women enrolled 501 them were tested both HIV and syphilis. From those tested 2 or [0.3% 95%CI [0%-0.78%] pregnant women found to be co-infected with HIV and syphilis. In this study we found low prevalence of co-infection this may be related to progress in control of STI among pregnant women. Moreover low prevalence of syphilis found among pregnant women sero-negative for HIV [0.8% 95% CI [0.01-1.6%] than those pregnant women infected with HIV.

6.DISCUSSION

This study revealed a relatively high prevalence of HIV among pregnant women in Wolmera district between 2013 and 2015. Age of pregnant women, residential setting, previous history of stillbirth or neonatal loss, HIV status of sexual partner and syphilis sero-status were contributing factors for HIV sero-status of pregnant women.

This study found relatively higher prevalence of HIV than the prevalence in Oromia region (1.2%) (9). This may be related to the fact that Wolmera is located near to Addis Ababa which is one of high hot spot in the country and many developmental schemes are active in the district (10). The prevalence of HIV among pregnant women was an indicator for the general population prevalence for several years. The prevalence of HIV is in consistence with the national sentinel surveillance which was reported in 2014, (2.2%) (9). On the other hand, the result of the present study is higher than the result of the national prevalence for the general population (1.5%) reported in 2011 (37). This may be because of the variation in the study population and the risk of HIV higher among pregnant women because of HIV epidemic in the country was heterosexual and greater number of women PLWHIV than men (15).

In contrary the prevalence of HIV in this study is lower than the report of the study conducted in 2005, (9.6%) among pregnant women attendants of ANC at Gondar teaching hospital (27). Meanwhile, the result of the present study is also lower than the report of the study done at Gondar in 2011 where the prevalence of HIV among pregnant women was 11.2% (29). Similarly, a study conducted at Gondar teaching hospital in 2012 also showed that the prevalence of HIV was 10.33% among pregnant women (30). The differences among the results of the present study and earlier reports from Gondar might be attributed to the difference of the study sites (semi rural versus urban), the study settings (health center versus tertiary hospital). Additionally in those study reports, majorities of the respondent were from urban resident (27, 29, 30) and other reports indicate that urban setting has higher prevalence of HIV (37). This prevalence found to be similar (3.5%) with median HIV prevalence for 46 African countries among pregnant women (44).

In this study, the factor significantly associated with HIV infection were residential setting [AOR (95%CI) 3.27 (1.44-7.44)]. This result is consistence with the national surveillance result, where pregnant women living in urban area has higher prevalence of HIV than their counterparts living in rural area (9). This result is also similar with the study done in Tanzania where among rural and urban women, urbane women has significant higher risk of getting HIV than rural women, since urban women more likely to have multiple sexual partner, had other STI, slept outside their home and engage in sexual activity in earlier age (45). In our study higher urban HIV prevalence may be attributed to urbane area are highly populated, poverty, population movement, harmful sexual behavior, long distance driver and commercial sex worker are more widespread in urban areas (46).

The current result also shows that the prevalence of HIV infection is significantly increased with history of neonatal loss [AOR (95% CI) 4.5 (1.4-13.8)]. This is in line with the study done in Latin America where higher magnitude of adverse pregnancy outcome associated with HIV sero positivity (8). Other factor associated with HIV prevalence is the status of sexual partner where having HIV negative sexual partner was found to be protective factor for HIV infection among pregnant women [AOR (95% CI) 0.31 (0.008-0.122)]. This finding is similar with study finding in Brazil among pregnant women (21). Majority of respondent in our study are married women and using condom among married men is much less likely practiced. As result, having HIV negative partner can be a protective factor for HIV (37).

Another prominent factor associated with HIV-sero positivity was syphilis infection. Being not infected with syphilis become a protective factor for HIV among pregnant woman [AOR (95% CI) 0.05 (0.008-0.333)]. This result is in agreement with the national surveillance where HIV prevalence was consistently higher among Syphilis positive clients both in urban and rural settings compared to Syphilis negative clients. Also this is similar with the study in Malawi (39). The overall national prevalence of HIV among Syphilis positive clients (4.3%) is twice that of Syphilis negative clients (2.2%) (9). This result is similar with general knowledge between HIV and syphilis infection share similar risk factors and syphilis facilitate the acquisition and transmission of HIV infection and successful management of STI can reduce HIV infection (47).

Higher prevalence of HIV was seen in age group of 25-34 [AOR (95% CI) 3.51 (1.59-7.72)] and 35-49 years pregnant women [AOR (95%CI) 4.73 (1.66-13.47)]. This is similar with the national surveillance done in 2014, where women with age group of 25-34 and 35-49 had higher over all HIV prevalence and the peak for HIV prevalence toward old age group (9). This is also in line with the surveillance conducted in Tanzania where the HIV prevalence was significantly higher among the age group of 25-34 and older than 35 years pregnant women (25). This also similar in the study done in Tanzania where the risk of HIV increase as age of women increases(45). This higher prevalence among pregnant women may be attributed to Knowledge About HIV prevention method higher in age between 15-24 than older age group and never married women are more likely to know about HIV prevention method than currently married women.(37) furthermore this may attributed by marital status, married women has higher risk of HIV than un married women because of repeated sexual contact, in older (25-49) age group they are more likely to engage in formal sexual activity as a result they may has higher prevalence of HIV than less than 25 years age women(45).

The prevalence of syphilis in this study was found to be 1.2% [95% CI: 0.33%-2%] and it is comparable with the prevalence in other reported studies. The national prevalence reported in 2014 among pregnant women (1.2%) is in consistence with the present study (9). our finding is also similar with the prevalence reported at Gondar in 2005 (1%, 5/480) (27) and with median prevalence of syphilis among pregnant women in WHO African (46) countries (1.9%) 2013 (44). This prevalence, on the other hand, is contrary with the prevalence reported in Zambia where 2.7% out of 4154 pregnant women showed a syphilis-reactive result (23). Similarly out of 38920 attendees 956 (2.5%) (95% CI = 2.3-3.6) women tested positive for syphilis in Tanzania (25). The difference of the results might be attributed to the method of diagnosis used, variation in sample size and socio-culture. The prevalence of syphilis in the present study was lower as compared to the result of studies conducted in Gondar University between 2009 and 2012 which found that syphilis prevalence ranged from 2.9%-3.7% and; which might be related to the differences of study setting (hospital based study) and diagnostic technology used(28, 30)

Higher magnitude of syphilis 1.7% was found among pregnant women in age group between 25-49 years of age 95% CI [0.3%-3.1%] than those less than 25 years old pregnant women (0.4%). This is similar with a study done in Gondar teaching hospital among pregnant women where the prevalence of syphilis was associated with age of pregnant women being older than 30 years (29, 30). The prevalence of syphilis among pregnant women living in urban setting is relatively higher [1.9% 95%CI [0.4%-3.4%] than their counterpart living in rural area (0.3%). This is in line with the study done in Gondar which found higher prevalence of syphilis in urban (3.2%) than in rural (2.2%) residents (28). this may be related to the higher prevalence of HIV in urban areas as those infections share the same risk factor and one facilitate the presence of other. Furthermore multi gravidae pregnant women had higher prevalence of syphilis [1.6%95% CI [0.3%-2.9%] than those pregnant women become pregnant for the first time (0.4%). Similarly with the study conducted in Malawi showed that multi gravidae women has significantly higher prevalence of syphilis (39). This may be attribute to multi gravidae women more likely to be currently in union and among married women there is least likely to believe that a women is reasonable to use condom if she know her husband has STI (37).

In the present study, low prevalence of syphilis was found among HIV sero-negative pregnant women than HIV sero-positive pregnant women [0.8% 95%CI [0.01%-1.6%]. This result is in consistence with the study conducted in Malawi (31). This may be attributed to those infection has similar risk factors (47). Syphilis is one of the significant causes of adverse pregnancy outcomes (1). A study of pregnancy adverse outcome of syphilis showed that 21% untreated syphilis case end up in fetal loss and stillbirth, 9.3%, in neonatal deaths and 5.8% in prematurity/low birth weight compared to their uninfected counterparts (4). Similarly in our study Women with history of neonatal loss had higher prevalence of syphilis (22.2%) than their counterpart who had no previous history of neonatal loss [0.08% 95%CI [0.08%-1.52%]. This may be related to the higher adverse pregnancy outcome related to syphilis and the diagnosis may be after the adverse pregnancy outcome occurred.

In country with general epidemic, ANC data are used to monitor the trend of HIV prevalence (40). The overall prevalence of HIV between 2013 and 2015 among pregnant women in Wolmera district was 2.9%. The prevalence of HIV was 4.03% (20/496), 3.2% (14/437) and

2.03% (12/589) in 2013, in 2014 and in 2015 respectively. Declining prevalence of HIV was found in the current study through those three years. This result is similar with the national surveillance report (9) and with the result of study from Nigeria which declined from 10.7% in 2010 to 6.8% in 2013 and 5.8% in 2014 (33). As well this was similar with the study in Zambia from July 2002 to December 2006 steady decline of HIV prevalence from 24.5% to 21.4% was found among pregnant women (32). This may attribute by increased knowledge of HIV prevention method among the general population, decline in new HIV infection among pregnant women and increased HIV testing and counseling service in the country (32, 36, 37).

Among pregnant women in Wolmera district the prevalence of syphilis was 1.2% during 2013 through 2015 (7/598). When we look at each year's prevalence, in 2013 it was (2.56%) where as in 2014 it was (1.4%) and in 2015 it was 0.9%. There was slight decline in prevalence of syphilis. This is similar with the study conducted among pregnant women in Botswana where deceasing trend of syphilis was found between 1992 and 2003 that declined from 12.4% in 1992 to 4.3% in 2003 (42). This may be a proxy indicator for declining HIV prevalence and can be evidence for safer sexual behavior (42).

In the present study a total of 501 pregnant women were tested for both HIV and syphilis. Among them, two pregnant women found to be co-infected with HIV and syphilis [0.3% 95%CI [0%-0.78%]. Low co-infection was found in the study area. This finding is in consistence with the report of the study conducted in Gondar in 2005 where only one pregnant woman was found to be co-infected (27). Additionally in the study done in 2011 at Gondar hospital, two pregnant women were found to be co-infected with HIV and syphilis (29). Similarly, in another study conducted in the same area, three pregnant women co-infected with HIV and syphilis were found in 2012 (30).

7.STRENGTH AND LIMITATION OF THE STUDY

7.1 Strength

- Using health service data allow identifying local problem in cost effective way and will help to influence local decision making despite its limitation; also using three years data from 2013-2015 allow us to see trend in those years and to get more sample size than calculated sample to compensate those incomplete data.

7.2 Limitation of the study

- Using secondary data since our study based on record review we encountered incompleteness with individual records and registration books, also same variable that may have association with the outcome variables are missed.
- Unable to see determinant factors associated with syphilis because of the testing coverage were low as result small number of women positive for the syphilis included in this study.

8.CONCLUSION

This study showed higher HIV prevalence in the study area and significantly higher prevalence of HIV was seen in urbane women. Of these infections HIV was significantly associated with neonatal death, as a result strong enhancement of screening and treatment of HIV infections is recommended to reduce MTCT of HIV and neonatal mortality associated with HIV infection. Among others, HIV prevalence was associated with HIV status of sexual partner and therefore, partner testing is highly recommended in order to reduce MTCT and horizontal transmission of HIV. Low syphilis testing was seen in the study area and limiting missed opportunity among pregnant women attending ANC will be important for Elimination of both infections also low co-infection of HIV and syphilis seen in this study.

9.RECOMMENDATION

Health sector

- Strengthening provider initiated HIV testing and counseling service (Opt-out strategy) for all pregnant women and their partner.
- Intensifying timely Syphilis screening and treating service to all pregnant women with considering elimination of both infections.
- Strengthen partner testing and treating for syphilis and HIV to avoid re-infection and decreasing MTCT of both disease.
- Syphilis screening for all HIV positive pregnant women with consideration of higher syphilis prevalence among them.
- Increasing training the health care provider and availing all the necessary logistics to do screening and treating both infections.
- Further research to be done on the factors associated with syphilis.
- Monitoring and evaluation to see the necessary Screening service undertaken.

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ASSURANCE OF PRINCIPAL INVESTIGATOR

The undersigned agrees to accept responsibility for the scientific ethical and technical Conduct of the research project and for provision of required progress reports as Per terms and conditions of the Research Publications Office in effect at the time of Grant is forwarded as the result of this application.

Name of the student: __Abenezer Chegen_____

Date._____ Signature _____

Approval of the primary Advisor

Name of the primary advisor: _DR Mitike Mola

Date._____ Signature _____

8. ANNEXES

Annex 1. Consent form

Good morning/afternoon/evening. My Name is _____ (data collector)

I am from the research team of SPH, AAU, which is currently carrying out study on the magnitude of HIV and syphilis among pregnant women attending antenatal care in wolemera District. As part of this study we are collecting information from individual antenatal chart and antenatal registration book, demographic and obstetric information. We need to review data starting from January 2013 to December 2015. This study finding will be used to improve the PMTCT program and evaluate the program.

Your health center been selected by means of random or chance selection process. I will like to take little information from the ANC chart and ANC registration book that help to answer research question. You can allow us or forbid us from giving ANC chart at the begging or in between if u found any discomfort. The information collected from the chart will be used for this study only.

Shall I proceed to collect data from the chart? Yes or no

Name of the data collector_____ signature _____date_____

Annex 2 . Checklist for data collection

Data collection checklist

1. Date ANC visit _____
2. Medical record number _____
3. Name of facility _____
4. Age _____
5. Gravidity _____
6. parity _____
7. Marital status a. married b. single c. widowed d. divorced
8. Residence rural ☐ urban ☐

9. Previous still birth or neonatal loss? A. Yes B. No
10. History of 3 or more consecutive spontaneous abortion? A. Yes B. No

11. Current Symptom of STI. A .Vulvar ulcer B. vaginal discharge

    C. Cervical lesion D. no symptom

12. Rapid Syphilis test result ☐ NR ☐ R

13. If positive for rapid syphilis test was she get treated? A. yes B. no C. not recorded

14. HIV test result ☐ NR ☐ R

15. If positive for HIV test was on get ARV drug? A .yes B. no C. not recorded.

D. referred to ART site

16. Partner HIV test result? A. reactive B. Non reactive C. not recorded

Annex 3 . ANC card

Federal Ministry of Health
Integrated Antenatal, Labor, Delivery, Newborn and Postnatal Care Card

Date _____ ANC Reg. No: _____ Medical Record Number (MRN): _____

Name of Client: _____ Name of Facility _____

Woreda: _____ Kebele: _____ House No: _____

Age (Years) _____ LMP ____/____/____ EDD ____/____/_____

Gravida _____ Para ____ Number of Children alive _____ Marital Status _____

INSTRUCTIONS to Fill Classifying form: Answer all of the following questions by placing a cross mark in the corresponding box.

OBSTETRIC HISTORY	No	Yes
1. Previous stillbirth or neonatal loss?		
2. History of 3 or more consecutive spontaneous abortions?		
3.Birth weight of last baby < 2500g		
4. Birth weight of last baby > 4000g		
5. Last pregnancy: hospital admission for hypertension or preeclampsia/eclampsia?		
6. Previous surgery on reproductive tract? (Myomectomy, removal of septum, fistula repair, cone biopsy, CS, repaired rapture, cervical circlage)		
CURRENT PREGNANCY	**No**	**Yes**
7. Diagnosed or suspected multiple pregnancy?		
8. Age less than 16 years?		
9. Age more than 40 Years?		
10. Isoimmunization RH(-) in current or in previous pregnancy?		
11. Vaginal bleeding?		
12. Pelvic mass?		
13. Diastolic blood pressure 90mm Hg or more at booking?		
GENERAL MEDICAL	**No**	**Yes**
14. Diabetes mellitus?		
15. Renal disease?		
16. Cardiac disease?		
17. Chronic Hypertension		
18. Known 'substance' abuse (including heavy alcohol drinking, smoking)?		
19. Any other severe medical disease or condition TB, HIV, Ca, DVT. .?		

A "Yes" to any ONE of the above questions (i.e. ONE shaded box marked with a cross) means that the woman is not eligible for the basic component of the new antenatal care mode and require more close follow up or referral to specialty care. If she needs more frequest ANC visits use and attach additional recording sheets.

II. Initial Evaluation plus Promotive and Preventive Care

General Exam	Gyn Exam			Counseling/Testing, HIV+Care and follow up	
General _____	Vulvar Ulcer	Y N	Danger signs in pregnancy & delivery advised	Y N	HIV test result received with post test counseling	Y N
pallor Y N	Vaginal Discharge	Y N	Birth Preparedness advised	Y N	Counseled on infant feeding	Y N
Jaundice Y N	Pelvic Mass	Y N	**MOTHER** HIV test accepted	Y N	Referred for care, treatment and support	Y N
Chest Abn. Y N	Uterine size(Wks)	____	HIV test result	R NR I	**PARTNER** Partner HIV test result	R NR I
Heart abnormality Y N	Cervical Lesion	Y N				

III. Present Pregnancy: Follow Up

	1st visit (better before 16 wks)	2nd visit (better 24-28 wks)	3rd visit (better 30-32 wks)	4th visit (better 36-40 wks)
Date of Visit				
Gestation age (LMP)				
BP				
Weight (kg)				
Pallor				
Uterine height (Wks)				
Fetal heart beat				
Presentation				
Urine test for infection				
Urine test for protein				
Rapid syphilis test				
Hemoglobin				
Blood Group and Rh				
TT (dose)				
Iron/Folic Acid				
Mebendazole				
Use of ITN				
ARV Px (type)				
Remarks				

	First visit	Second visit	Third Visit	Fourth Visit
Danger signs identified and Investigation:				
Action, Advice, counseling				
Appointment for next follow-up				
Name and Sign of Health care Provider				

EUROPEAN

CURRICULUM VITAE FORMAT

Personal information

Name	**Barke , <u>Abenezer</u> Chegen (First name is underlined)**
Address	**Holeta Genet Oromia ,Ethiopia**
Telephone	
Mobile	**+251911890852**
E-mail	**abenezerc@yahoo.com**
Nationality	Ethiopian
Date of birth	08/10/1986
Gender	Female

WORK EXPERIENCE

• Dates	July 2014 – current
• Name and address of employer	Ministry of health Wolemera Woreda health office
• Type of business or sector	Health sector
• Occupation or position held	Health Expert
• Main activities and responsibilities	Coordinating activity related to HIV at Woreda level, reporting to respected body, mainstreaming HIV fund to OVC and PLWHIV
• Dates	1st July 2012 – 30th June 2014
• Name and address of	**Ministry of health**

employer	Wolemera health office
• Type of business or sector	Health sector
• Occupation or position held	Public health officer
• Main activities and responsibilities	Serving as outpatient head, coordinating activates in the Departments, clinician in outpatient treating adult patients', treating STI and ART patients
• Dates	September 2009 – June 2012
• Name and address of employer	**Ministry of health** **Wolemera health office**
• Type of business or sector	Health sector
• Occupation or position held	**Junior public health officer**
• Main activities and responsibilities	Outpatient department clinician , giving clinical treatment and care in outpatient, giving treatment for < 5 pt and give follow up care, reporting OPD activates to respected body.

EDUCATION AND TRAINING

• Dates	January 1, 2006 – June 2009
• Name and type of organisation providing education and training	**Jimma University, College of health science, Department of medicine, Stream of public health officer, Jimma, Ethiopia.**
• Principal subjects/occupational skills covered	. Public Health(basic science, preclinical & clinical, public health/ community health/ courses, CBTP, Community Health Attachment, Research project, and Team Training Program)
• Title of qualification awarded	**BSc in public health officer**

PERSONAL SKILLS AND COMPETENCES

Self assessment	**Understanding**		**Speaking**		**Writing**
European level	Listening	Reading	Spoken Interaction	Spoken Production	
English	C2	C2	C2	C2	C2
Amharic	C1	C1	C1	C1	C1
Oromifa	C3	C3	C3	C3	C3

C1 and C2 = Proficient user (Excellent) ,C3 good

SOCIAL SKILLS AND COMPETENCES	Excellent ability of communication and teamwork with other people. Positive experience of living together with people from different cultures.
Research experience .	Assessment of job satisfaction of health professional in Jimma town health centres, a final year project work submitted in partial fulfilment of the requirements for the award of B.Sc. Degree in Public Health officer.
TECHNICAL SKILLS AND COMPETENCES .	Excellent knowledge of Microsoft Windows. Excellent ability to navigatine through the Internet. Text Editor Good knowledge of all Microsoft Office packages.

REFERENCES

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