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Full-Length Research Article

Prevalence of Syphilis and Human Immunodeficiency Virus Among Pregnant Women Attending Antenatal Care Clinic In Jinka General Hospital, Southern Ethiopia from 2015-2017.A Retrospective Study

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ABSTRACT

Sexually transmitted infections are a major public health issue. Syphilis and HIV are the leading STIs highly prevalent in sub-Saharan African countries including Ethiopia, which can have a critical impact on reproductive, maternal, and newborn health such as stillbirth. Therefore, this study was aimed to assess the seroprevalence of syphilis and HIV among pregnant women who attended antenatal care clinics in Jinka General Hospital, South Omo, Ethiopia. A retrospective cross-sectional study was carried out in Jinka General Hospital from 2015 to 2017. Data were obtained from individual charts and laboratory logbooks using a structured checklist. Statistical package for social sciences version 21 was used to analyze the data. Finally, the results were presented in text, tables, and graphs. A total of 1712 pregnant women attended antenatal care clinics between 2015 and 2017. The seroprevalence of

syphilis and HIV were found to be 18 (1.05%) and 70(4.0%) respectively. Most of the syphilis seropositive cases were observed among married pregnant women 13(72.22%) in the age group of 20-30 14(77.78%). Syphilis and HIV co-infection was found in 14 (0.82%) subjects. The trend of syphilis infection peaked from 0.41% in 2015 to 1.48% in 2016 but declined to 1.16% in 2017. A downward trend has been observed in the case of HIV infection, where the prevalence rate fell steeply from 5.9% in 2015 to 1.46% in 2017. The seroprevalence of HIV and syphilis among pregnant women showed slightly high, which needs due attention with special consideration for active childbearing age women.

Keywords: HIV; Jinka; Pregnant women; Seroprevalence; Syphilis

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1. INTRODUCTION

Sexually transmitted infections (STIs) are the most common contagious diseases that disproportionately affect developing countries, particularly in sub-Saharan Africa. STIs are among the top five reasons for consultation in general health services in many African countries including Ethiopia (Carley S, 2006). It causes substantial productivity loss for individuals and communities, especially where most of the people are less than 40 (Kamb ML, 2016). Nevertheless, both sexes are at high risk for acquiring STIs, however, females are more frequently and severely affected. Among the diverse STIs, syphilis, and human immunodeficiency virus (HIV) constitutes a significant part of the total disease burden globally (Nakashima A K, et al, 2009). HIV and syphilis infections are epidemiologically interrelated, and co-infection is quite rampant (Melku M, et al, 2015). Syphilis is a first-generation STI caused by the spirochete *Treponema pallidum* subspecies *pallidum* that can inflict very serious complications when left untreated (Schmid G, 2004). Despite the existence of effective preventive and treatment measures, annually 12 million people are infected and a considerable proportion of these infections occur in countries with limited resources of sub-Saharan Africa and Asia (Hussain et al, 2014; Lynn et al., 2004). In pregnant women, this teratogenic pathogen crosses the placenta and infects the fetus during the early period of gestation (Wijesooriya et al., 2016). Published literature indicates that syphilis is considered as the second most leading cause of stillbirth worldwide and also results in prematurity, low birth weight, neonatal death, and infections in newborns (Radolf J D, et al, 2016, Mani B S, et al, 2017 Lawn JE, et al, 2016). Several studies documented that globally nearly one million pregnant women contract syphilis annually and 355,000 had adverse pregnancy outcomes (De Santis M, et al, 2012, Korenromp EL, et al, 2019). HIV during pregnancy is also associated with various undesirable consequences for the mother, fetus, and neonates such as maternal death, abortion, stillbirth, and low birth weight (Melku et al, 2015, Radolf et al., 2016).

In a recent report of world health organization (WHO), the prevalence of syphilis infection among pregnant women in sub-Saharan Africa is estimated to be 2.7% (WHO, 2013), and 4–15% of women attending antenatal clinics are infected with syphilis

(Gloyd S, et al, 2001). According to antenatal care clinic (ANC)-based sentinel surveillances, in Ethiopia, the prevalence of syphilis showed an upward trend of 1%, in 2012 to 1.2%, in 2014 (Ethiopian Public Health Institute, 2015). Besides, the seroprevalence for syphilis in pregnant women who attended antenatal screening clinics in different provinces of Ethiopia ranged between 2.6% to 13.7% (Tareke K, et al, 2019, Yitbarek GY, et al, 2019, Zinabie S, et al, 2018). Moreover, syphilis has been considered as a risk factor of HIV acquisition, transmission, and also it aggravates the progression of HIV towards acquired immunodeficiency syndrome (AIDS) (Melku et al, 2015; Radolf et al., 2016; Holmes K, et al., 2008). According to the Global Burden of Disease report, in 2015, HIV and AIDS were the leading cause of mortality among women of reproductive age (Pandey et al, 2019). It has been reported that every year, globally, an estimated 1.4 million women living with HIV become pregnant and 90% of them are residing in Sub-Saharan Africa (WHO, 2016). A recent meta-analysis study envisaged that 25% of pregnancy-related deaths in sub-Saharan Africa are attributable to HIV and AIDS (Calvert C, et al, 2013). Besides, the same study proposed that women living with HIV and AIDS in sub-Saharan Africa are at 6-8 times greater risk of dying during pregnancy or postpartum than their HIV-negative counterparts (Calvert C, et al, 2013). It has been reported that maternal syphilis can increase HIV transmission during sexual intercourse, in utero, or at delivery by up to five-fold. Patients with concurrent HIV infection are thought to be at increased risk of neurological complications and treatment failure (Mwumvaneza et al, 2016).The prevalence of HIV among the general population of Ethiopia was estimated to be 2.4% in 2018 (WHO, 2018) while the ANC Sentinel Surveillance Data showed that the prevalence of HIV among pregnant women was 2.3% (EPHI, 2015). Certain risk factors implicated in connection with the prevalence of syphilis include maternal age, husband's occupation, late antenatal care, illiteracy, unemployment, habitual drug use, unscreened blood transfusions, riskier sexual habits like unprotected sex and having multiple partners (Hussain L A, et al, 2014). As per our knowledge, no study has been conducted regarding the prevalence of syphilis and HIV among pregnant women in the study area, South Omo. Therefore, the aim of this study was to assess the seroprevalence of syphilis and HIV among pregnant women attendeding antenatal care in Jinka General Hospital, south Omo, southern Ethiopia.

2. MATERIALS AND METHODS

2.1. Study design, area, and population

A retrospective cross-sectional study was conducted on 1712 pregnant women who attended the antenatal care clinic Jinka General Hospital between January 2015 to December 2017 from May 5 to 20, 2018. The hospital is located in Jinka town and is giving services to more than 200,000 patients annually. The hospital provides major services including surgical, pediatrics, gynecology, and obstetrics. There is one main laboratory that contains OPD, MCH, Emergency, and Microbiology. All pregnant

women who had ANC records with complete information on demographic data, other study variables, and the test results of syphilis and HIV were included. Data from pregnant women with incomplete information were excluded from the study.

2.2. Sampling procedure

Convenience sampling technique was employed to collect the data.

2.3. Data collection tool and procedure

Data pertaining to the socio-demographic characteristics, clinical, and other information of patients were reviewed from medical records of pregnant women using a structured checklist. The checklist was perceived from the integrated ANC, labor, delivery, neonatal, and postnatal care card in the Federal Ministry of Health and ANC registration logbook. The record was reviewed in the ANC registration order, starting from 2015 to the end of 2017. All required data from January 2015 to the end of December 2017 were copied to the checklist.

2.4. Laboratory investigation

A 3-5ml blood sample was drawn from pregnant women for HIV and syphilis testing. HIV infection was investigated following the national testing algorithm currently in use (KHB Shanghai Kehua Bio-engineering Co, LTD) as a screening tool, Stat-PAK (Chembio Diagnostic Systems, Inc., New York, NY, USA) as a confirmatory one for positive samples, and Uni-Gold™ (Trinity Biotech Plc, Bray, Ireland) as a tie-breaker test when samples gave discordant results in the first two tests. Syphilis seroreactivity was tested using the rapid plasma reagin (RPR) test (Human GmbH-Wiesbaden, Germany).

2.5. Data processing and data analysis

Data entry and analysis were done using statistical package for social science (SPSS) version-21 software (IBM, Armonk, NY, USA). A descriptive analysis was used to determine the socio-demographic characteristics and seroprevalence of syphilis and HIV. Chi-square ($\chi 2$) test was used to determine the association between the prevalence of syphilis and HIV and associated factors. A P-value less than or equal to 0.05 was considered statistically significant. The results were presented in texts, tables and graphs.

2.6. Ethical consideration

The study has been ethically approved by the review board of the College of Medicine and Health Sciences, Arba Minch University. Formal permission was also accorded from Jinka General Hospital. All data were kept confidential. The anonymity of patients was maintained by using client ANC registration and unique code numbers recorded on the logbook.

3. RESULTS

3.1. Socio-demographic characteristics

A total of 1712 pregnant women attended ANC between 2015 and 2017. The age of the pregnant women who attended ANC ranged from 16 to 46 and the mean age of the study participants was26.5
years ±5.3 (± SD). The majority of the pregnant women 1105 (64.54%) were within the age range of 20 to 30 years and 1258 (73.48%) of them were married. Most of the participants, 1026 (59.93%) were urban residents. The highest numbers of ANC attendees 689(40.24%) were observed in the year 2017 (Table 1).

3.2. Obstetric characteristics

It has been identified that the majority of ANC attendees 1416(82.71%) were multigravida and 252 (14.72%) were primigravida. The previous history of neonatal loss was noted in 147 (8.6%) participants and 143(8.4%) had a history of spontaneous abortions (Table 1).

Table1. Demographic and obstetrics characteristics of pregnant women attended ANC in Jinka General Hospital 2015-2017

Variables	Frequency	Percent
Age group		
<20	269	15.71
20-30	1105	64.54
30-40	314	18.34
> 40	24	1.41
Marital status		
Married	1470	85.9
Single	164	9.5
Divorced	29	1.7
Withdrew	49	2.9
Resident		
Urban	1216	71
Rural	496	29
Gravidity		
Primigravidae	252	14.7

Variables	Frequency	Percent
Multi gravidae	1416	82.7
Grand multi gravidae	44	2.6
Parity		
0	255	14.9
1—4	1408	82.2
>5	49	2.9
Neonatal loss or stillbirth		
Yes	147	8.6
No	1565	91.4
History of abortion		
Yes	143	8.4
No	1569	91.6

3.3. HIV seroprevalence and demographic, obstetric characteristic of pregnant women

A total of 1712 pregnant women attended ANC in Jinka General Hospital from 2015-2017. The overall seroconversion of pregnant women was 79(4.61%). Of these 70(4.0%) [95% CI 3.1-5.0] were seropositive for HIV. A higher proportion of 64 (91.43%) HIV positive women was married but it is not statistically significant. Moreover, the HIV seroprevalence was also higher among the age group 20-30 years 51(72.86%). Higher proportions of seropositive pregnant women 53 (75.71%) belonged to urban areas. Among the 70 seropositive pregnant women, 60 (85.71%) were multigravida, and 11 (15.71%) of the HIV seropositive pregnant women had a history of stillbirth or neonatal loss (Table 2). The overall prevalence of syphilis - HIV co-infection was found to be 14(0.82%).

Table 2 Demographic and obstetric factors associated and HIV seroprevalence among pregnant women attended ANC in Jinka General Hospital 2015-2017

Variable	HIV seroreactivity		
	Reactive n(%)	Chi-square	p-value
Age group			
<20	4(5.71)		
20-30	51(72.86)	5.883	0.11
30-40	13(18.57)		
>40	2(2.86)		
Marital status			
Married	64(91.43)	1.313	0.77
Single	4(5.71)		
Divorced	1(1.43)		
Widowed	1(1.43)		
Residence			
Urban	53(75.71)	0.779	0.422
Rural	17(24.29)		
Gravidity			
Primigravidae	10(14.29)		
Multi gravidae	60(85.71)	1.965	0.376
Grand gravid	0		
Parity			
0	10(14.29)		
1-4	60(85.71)	2.214	0.53
>5	0		
History of neonatal loss			
Yes	10(14.29)	3.02	0.122
No	60(85.71)		
History of abortion			
Yes	1(1.43)	4.119	0.52
No	69(98.57)		
Syphilis result			
Reactive	14(20)	0.776	0.636
Non-reactive	56(80)		

3.4. Syphilis seroprevalence and demographic, obstetric characteristics of pregnant women

The overall prevalence of syphilis was 18 (1.05%) [95% CI 0.29-3.90]. Most of the seropositive cases were observed among married pregnant women 13(72.2%), in the age group of 20-30 18 (77.78%). Moreover, a majority of the positive results were recorded among multigravidae pregnant women 15 (83.33%) and women who were urban dwellers 14(77.78%) (Table 3).

Table3. Demographic and obstetric characteristics of pregnant women and syphilis seroprevalence in Jinka General Hospital from 2015-2017.

Variables	Syphilis seroreactivity		
	Reactive N(%)	Chi-square	P-value
Age group			
<20	2(11.11)	1.54	0.245
20-30	14(77.78)		
30-40	2(11.11)		
>40	0		
Marital status			
Married	13(72.22)	5.619	0.096
Single	3(16.66)		
Divorced	1(5.56)		
Widowed	1(5.56)		
Resident			
Urban	14(77.78)	0.403	0.526
Rural	4(22.22)		
Gravidity			
Primegravida	3(16.67)	0.51	0.51
Multigravida	15(83.33)		
Grandgravida	0		
Parity			
0	3(16.67)	0.562	0.926
1-4	15(83.33)		
>5	0		
Previous history of neonatal lose			
Yes	4(22.22)	4.309	0.526
No	14(77.78)		
Previous history of abortion			
Yes	2(11.11)	0.106	0.47
No	16(88.88)		

Variables	Syphilis seroreactivity		
	Reactive N(%)	Chi-square	P-value
Partner HIV result			
Reactive	0	0.458	0.499
Non reactive	18(100)		

3.5. Three years prevalence of HIV

The overall prevalence of HIV during 2015 and 2017, among pregnant women in Jinka General Hospital was 4.08%. In fact, there has been a consistent downward trend in the prevalence rates of HIV for three consecutive years (Figure 1). In 2015 the prevalence of HIV was 29/484 (5.9%) and in 2016 it declined to 31/539 (5.75%) whereas, in 2017, the corresponding rate fell drastically to 10/689 (1.46%).

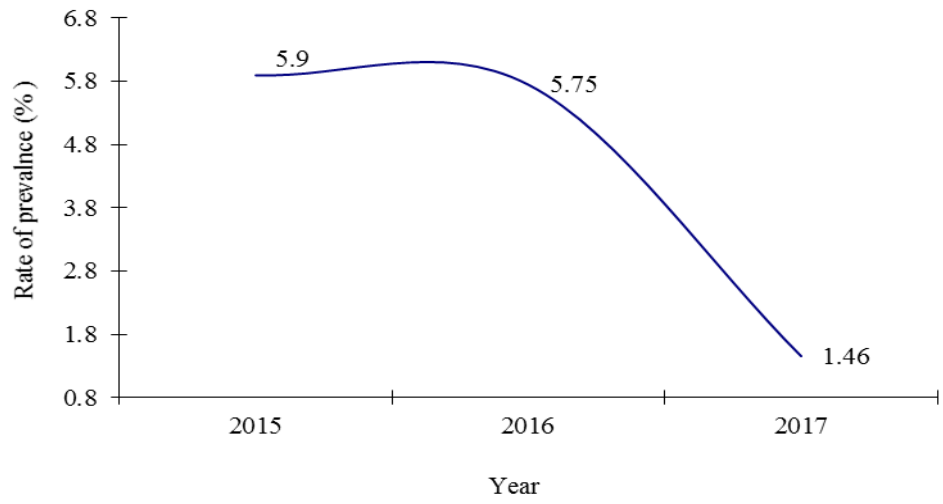

Figure 1. Trend analysis of HIV among pregnant women who attended ANC in Jinka General Hospital from 2015-2017.

3.6. Three years prevalence of syphilis

The overall prevalence rate of syphilis during 2015 and 2017 among pregnant women in Jinka General Hospital was found to be 18/1712 (1.05%). The prevalence rates of syphilis fluctuated during three consecutive years. The trend of syphilis infection in 2015 increased from 2/484 (0.41%) to 8/539 (1.48%) in 2016 but declined to 8/689 (1.16%) in 2017 (Figure 2).

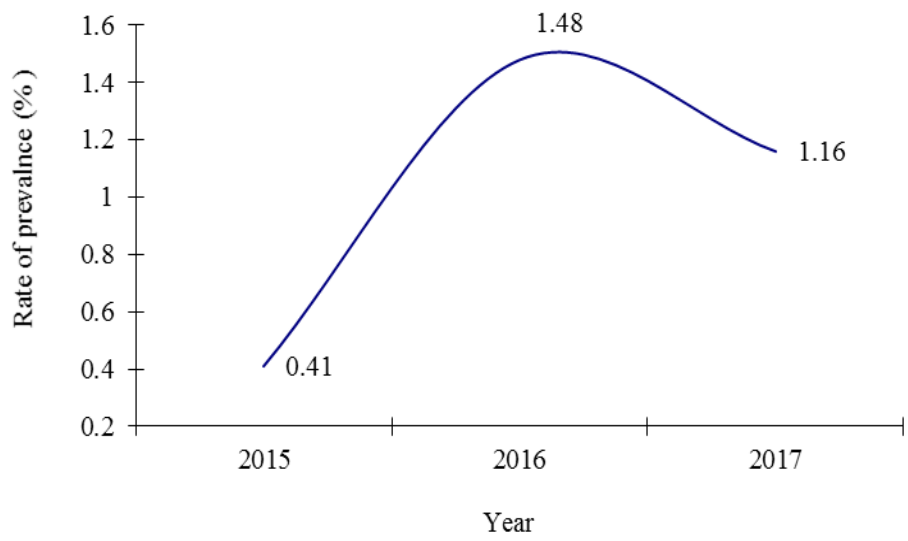

Figure 2. Trend analysis of syphilis among pregnant women who attended ANC in Jinka General Hospital from 2015 -2017.

4. DISCUSSION

STIs such as HIV and syphilis are the commonest contagious diseases that disproportionately affect developing countries, particularly in sub-Saharan Africa like Ethiopia (Carley S, 2006). They aimed to assess the seroprevalence of syphilis and HIV among pregnant women who attended antenatal care clinics in Jinka General Hospital, South Omo, Ethiopia. In the present study, the prevalence of HIV among pregnant women was found to be 4.08%. This finding is higher than that of the results published by the National Sentinel Surveillance (2.2%) (EPHI, 2017) and the pooled prevalence rate among the general population of Ethiopia (1.5%) (CSA, 2011). However, it is lower as compared with the reports of a couple of studies conducted in different provinces of Ethiopia (5.5%) (Kassa D, et al, 2019) (5.74%) (Geremew D, et al, 2018). Furthermore, the prevalence rate observed from this study is lower than the results of a couple of previous studies conducted in other parts of Ethiopia (9.6%)

(EPHI, 2017) (11.2%) (Merdekios B, et al, 2011). Similarly, studies conducted at Gondar teaching hospital and Yirgalem General Hospital in Ethiopia also reported a higher prevalence of HIV among pregnant women 9.6% and 10.3% respectively (Mulu A, et al, 2007, Kwiek JJ, et al, 2008). These discrepancies in the seroprevalence rate could be attributed to the difference in the socioeconomic status of the study population, study design, degree of awareness regarding the disease, its mode of transmission, and the infection prevention strategies (Geremew et al., 2018; Biadgo et al., 2019).

The prevalence rate of syphilis in this study was found to be 1.05%. This is comparable with the results of several studies reported in Rwanda 0.9% (Mwumvaneza M, et al, 2016), and Ethiopia 1% (Mulu A, et al, 2007), Ethiopia 1.9% (Amsalu A, et a1, 2018), Zambia 2.7% (Bonawitz RE, et al, 2015) 2.9% (Endris M, et al, 2015, Asefa A, 2014), (3.7%) (Melku M, et al, 2015), 2.9% (Kebede E, et al, 2000). However, lower than the results from northern regions of Ethiopia 5.1% (Kwiek JJ, et al, 2008), Congo 3.92% (Roch F N, et al, 2017), Tanzania 7.3% (Swai R O, et al, 2006), and Brazil 7.8% (Domingues R M S M, et al, 2017). At the same time, our findings related to the prevalence rate of syphilis were comparatively higher than the results obtained from other studies done in Brazil 0.22% (Oliveiraa B C A, et al, 2016) and India <0.1% (Ebenezer E D, et al, 2018). These variations in the prevalence rates might be attributed to the differences in diagnosis used, sample size, study setting and increased access to healthcare facilities for pregnant women for sexually transmitted disease screening at the ANC clinic. Other factors for these variations may be due to the differences in the level of awareness and sexual behavior among different populations included in the study (Biadgo et al, 2019).

In the present study, the prevalence of HIV and syphilis co-infection was 0.82% and this is comparable with the value of a couple of studies reported from Ethiopia (0.66%) (Amsalu A, et al, 2018), (0.5%) (Endris et al, 2017) and Congo (0.73%) (Roch et al, 2017). It was found that women in the age group of 20-30 showed higher seropositivity for both HIV and syphilis, ie., 62% and 78% respectively. However, the age group and seropositivity were not statistically associated with each other. This finding is comparable with the results of previous studies done in other regions of Ethiopia (Melku M, et al, 2015, Mulu A, et al, 2007, Amsalu A, et al, 2018). Nevertheless, our findings are in contrast with the results of another study done in Ethiopia that showed women with age greater than 30 were highly prone to syphilitic infection (Endris M, et al, 2017). In our study, women aged 36 and above were the least affected group. The variations in the prevalence of syphilis with age group may be attributed to the differences in sexual habits prevailing in participants in different areas. Hence, the findings of this study infer that younger age groups are relatively vulnerable to contracting syphilis infection due to the habit of unsafe and riskier sexual practices (Yitbarek GY, et al, 2019). The majority of HIV and syphilis positive women came from urban areas even though there exists higher accessibility for screening and treatment options. But the trend was not statistically significant with the infection. This trend was similar to the results of several studies conducted locally and abroad (Asefa A, 2014, Roch F N, et al, 2017). This may

be due to problems of accessibility and or lack of awareness of services faced by the rural population. In the present study, the seroprevalence of syphilis showed a lower level of activity in the year 2015 0.41%. However in 2016, the seroprevalence reached 1.48%, and in the subsequent year, it slightly decreased (1.16%). This finding is discordant with the results of a study done in Ethiopia (Amsalu A, et al, 2018). A downward trend of seroprevalence of HIV from 5.9% in 2015 to 5.75% in 2016 and to 1.46% in 2017 was also observed in the present study. Also, this is consistent with the results of a study done in Ethiopia (Amsalu A, et al, 2018). This may be correlated to the integral testing availed for the diagnosis of sexually transmitted diseases and early treatment in the case of positive results done during the ANC follow-up employed by the government.

5. CONCLUSION

In conclusion, the overall seroprevalence of HIV and syphilis was found to be higher among pregnant women who can serve as a source of infection for both vertical and horizontal transmission. Therefore, the concerned local bodies should give due attention to the management of STIs by reinforcing the prevention and control strategies by promoting early screening, treatment, and strict follow up among childbearing women. Since this study is a retrospective study, the main limitation was the incompleteness of information.

Conflict of interest

The authors declared no conflict of interest.

Author’s Contribution

All authors have contributed to designing, data analysis, drafting, or revising the article, given final approval of the version to be published, and agree to be accountable for all aspects of the work**.**

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