SERO-PREVALENCE OF SYPHILIS AMONG PREGNANT WOMEN ATTENDING ANTENATAL CLINIC IN DOGON AGOGO PRIMARY HEALTH CARE CENTRE JOS NORTH, PLATEAU STATE, NIGERIA

ABSTRACT

Syphilis remains a public health problem in many parts of the world, including Nigeria, where is common during pregnancy. A study on seroprevalence of Syphilis among pregnant women attending the Primary health care centres in Jos North was carried out. A total of one thousand, two hundred and nineteen blood samples were screened from 2017 to 2021, using rapid diagnostic tests. The results showed that only 33 (2.7%) were positive. This includes 14,(42.4%) patients between the age of 20 – 34 years ~~as~~ with the highest frequency, followed by 12(36.4%) in 35 – 49 years of age. Most of the syphilis-positive patients are married 21,(63.6%) and had attended tertiary level of education 13(39.4%), but mostly unemployed/Housewives 11(33.3%). The clinical profile of the participants revealed that the majority 14(42.5%) of the women that attended the facility throughout this period are in their third pregnancy and above (Multigravida). They were screened during the first-time visit (72.7%) and first trimester (33.3%). The pregnancy outcome among the seropositive patients showed that many 14(42.4%) undergo normal delivery, but 10(30.3%) had miscarriages. Blood transfusion (81.8%), multiple sex partners (75.8%), unprotected sexual intercourse with a person of unknown status (57.6%), and previous exposure to sexually transmitted infections (84.8%) were the most prevalent risks factors observed. The overall prevalence of syphilis across the five years of sampling was 2.71% (33 of 1219), where the highest number of cases 57.6% was recorded in the year 2020, followed by 18.2% in 2018, with 3.0% in 2019 as the least. The prevalence of syphilis over the five-year period among pregnant women is low in this area. However, the study advocates the improvement of screening programs during pregnancy as part of routine antenatal care.

Keywords: Syphilis, Pregnancy, Antenatal, Multigravida, Miscarriage. Blood transfusion

INTRODUCTION

Syphilis is a sexually transmitted disease caused by a bacterium *Treponema pallidum*. The signs and symptoms of syphilis vary depending ~~in~~ on which of the four stages it presents (primary, secondary, latent, and tertiary) [1]. The primary stage classically presents with a single chancre (a firm, painless, non-itchy skin ulceration usually between 1 cm and 2 cm in diameter) though there may be multiple sores [1,2]. In secondary syphilis, a diffuse rash occurs, which frequently involves the palms of the hands and soles of the feet [2]. There may also be sores in the mouth or vagina [1]. In latent syphilis, which can last for years, there are few or no symptoms [1]. In tertiary syphilis, there are gummas (soft, non-cancerous growths), neurological problems, or heart symptoms [3]. Syphilis has been known to cause symptoms similar to many other diseases [1,4].

Syphilis is most commonly spread through sexual activity [5]. It may also be transmitted from mother to baby during pregnancy or at birth, resulting in congenital syphilis [5,6]. Common risk

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This is because a good abstract should give a succinct account of the objectives, methods, results and significance of the matter. The structured abstract for an Original Research article should consist of six paragraphs labelled Background, Aim, Setting, Methods, Results and Conclusion.
What this author is presenting is far short of this requirement

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The introduction must contain your argument for the social and scientific value of the study, as well as the aim and objectives:
• ` Your argument should be supported by use of evidence from the literature.
•Scientific value should make a clear and logical argument for the originality of the study. This should include a summary of what is already known about the research question (NONE HERE), and should clarify the knowledge gap that this study will address. Your argument should be supported by use of evidence from the literature.

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It is a bacterial infection usually spread by sexual contact

factors for syphilis ~~includes~~ include unprotected sexual activity involving contact with oral, genital mucosa or anus [2]. Sexual contact with a known case of syphilis, sex with someone from a country/region with a high prevalence of syphilis, previous syphilis, HIV infection or other STDs, born to a person diagnosed with infectious syphilis in pregnancy, member of a vulnerable population. Other activities that may increase potential exposure to STIs include anonymous sexual partnering, street involvement and drug abuse [2].

Syphilis can be transmitted by direct contact with an infectious lesion or through vertical transmission during pregnancy. Primary, secondary and early latent stages are considered infectious, with an estimated risk of transmission per partner of 51% to 64% [3]. Early latent syphilis is considered infectious because of the 25% chance of relapse to the secondary stage [4]. The primary mode of syphilis transmission is by vaginal, anal and oral sexual contact. Other routes of transmission (e.g. kissing and needle-sharing) are rare [5].

Transplacental transmission can occur as early as nine (9) weeks gestation [6] and throughout pregnancy. Most infants with congenital syphilis are infected in utero, but they can also be infected by contact with an active genital lesion at the time of delivery. The risk of transmission is related to both stages of syphilis as well as gestational age at the time of diagnosis and treatment, with the greatest risk of transmission in pregnant people acquiring syphilis near term [7]. The risk of transmission to the foetus is 70% to 100% in untreated pregnant people with primary or secondary syphilis and 40% with early latent syphilis [8,9]. In a recent systematic review, adverse pregnancy outcomes occurred in 76.8% of untreated pregnancies compared to 13.7% of uninfected pregnancies [10]. The clinical manifestations of syphilis are usually described according to the stage of the disease: primary, secondary, latent, congenital, neurosyphilis (which may occur at any stage and tertiary syphilis. Medical practitioners should consider syphilis in people presenting with rashes or genital ulcerative disease and/or proctitis [11].

Congenital syphilis is considered a severe public health problem because it accounts for approximately 40% of the perinatal mortality rates, 25% of stillbirths, and 14% of neonatal deaths, in addition to causing severe consequences for the foetus. Syphilis treatment is easy to access and simple to perform and therefore, it management during pregnancy should be straightforward. The diagnosis and treatment should be performed in a timely manner in the early period of pregnancy. However, being a sexually transmitted infection (STI) makes it a difficult situation to approach, especially when experienced during pregnancy [12] (Rêgo *et al.*, 2020).

Syphilis is transmitted via sexual contact or from mother to child during pregnancy or at delivery [9]. In pregnant women syphilis might also increase the risk of mother-to-child transmission of HIV in cases where mothers are coinfected [10]. Syphilis remains a major cause of reproductive morbidity and poor pregnancy outcomes in developing countries. Syphilis in pregnant women can result in adverse outcomes of pregnancy in up to 80% of cases, such as stillbirth and spontaneous abortion (40%), perinatal death (20%), and serious neonatal infections and low-birth weight babies (20%) [13] (Shazia *et al.*, 2012).

It was reported that more than ten million people are infected with syphilis worldwide; with the majority found in sub-Saharan Africa and Asia [14]. Every year around two million pregnant women are estimated to have active syphilis where only a few were diagnosed and treated. The prevalence of syphilis in pregnant women was estimated to be 2.7% in sub-Saharan Africa, which represents nearly 1 million pregnancies to be at risk annually [15]. Poor pregnancy

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outcomes were reported more than four times higher in untreated cases [16], where about 90% of these infections occur in areas with poor social amenities [17].

Information regarding syphilis infection in pregnancy in Nigeria shows a wide geographical variation in seroprevalence. Several models have been proposed to estimate adverse pregnancy outcomes in women infected with syphilis, with resulting estimates ranging from 50% to 80% [18]. Transmission occurs more commonly in the last two trimesters, but the spirochete can cross the placenta at any time during pregnancy [19]. Foetal death and morbidity due to congenital syphilis are preventable if the infected mother is identified and treated appropriately by the middle of the second trimester. Because of the serious complications of syphilis in pregnancy, WHO has recommended universal antenatal screening and recommended screening for syphilis at the first antenatal visit, as early as possible in pregnancy, repeating in the third trimester if resources permit, to detect infection acquired during pregnancy. The effectiveness of such antenatal syphilis screening and its treatment for the prevention of adverse pregnancy outcomes is of paramount importance.

Prevalence of syphilis infections among pregnant mothers in Nigeria differs between regions depending on a number of factors such as the overall HIV prevalence, culture of the general population, level of awareness and associated risk factors. To date there are few studies conducted in this region; as a result, there is scarcity of information about the true burden and determinant factors of syphilis among pregnant women in the study area. Therefore, this study was aimed to determine the seroprevalence of Syphilis among pregnant women attending Antenatal clinic at Dogon Agogo PHC, in the Northern part of Jos plateau~~North~~.

MATERIALS AND METHODS

Study Design and Population

This study is clinico-laboratory survey research involving a total of One thousand two hundred and nineteen (1219) pregnant women that attended the Antenatal clinic in Dogon Agogo PHC Centre from 2017 to 2021.

Sample and Data collection

A fingerstick blood specimen was aseptically collected from each pregnant woman. ~~Information~~ An information sheet was used to record the participant's name, age, time and date of collection/screening test. Data on patient's demographic variables, clinical profiles and information considered to be risk factors were also collected using structured questionnaires after their consent ~~were~~ was sought, with ethical approval from the health centre's management.

Screening test for Syphilis

A hanging drop of fingerstick whole blood specimen was allowed to fall into the centre of the specimen well (S), then 2 drops of buffer ~~was~~ were added ~~on~~ to it. The test kit was laid flat on a clean, dry surface and waited for the coloured band to appear, within 15-20 minutes to read the results [20].

Statistical Analysis

The chi-square test was employed to determine the relationship between the patient's socio-demographic variables and clinical profile/risk factors with syphilis infection. P values of < 0.05 were considered to be statistically significant.

ETHIC (where is the ethic consideration)

RESULTS

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The results of seroprevalence of Syphilis among pregnant women attending Primary health care centre Dogon Agogo showed that out of one thousand two hundred and nineteen blood samples tested from 2017 to 2021, only 33 (2.7%) were positive. This includes 14 (42.4%) from patients between aged of 20 – 34 years as the highest frequency, followed by 12 (36.4%) in 35 – 49 years of age. Most of the syphilis-positive patients in our study are married 21(63.6%), attended tertiary level of education 13 (39.4%), but mostly unemployed/Housewife 11 (33.3%).

Table 1: Prevalence of syphilis among pregnant women according to demographic detail Patients

Demographic profile	Number of Women Screened (N=1219)	Number of Reactive cases (n=33)	Prevalence (%)
Age (Years)			
15 – 19	143	04	12.1
20 – 34	463	14	42.4
35 - 49	486	12	36.4
50 and above	127	03	9.1
Marital status			
Married	1115	21	63.6
Single	104	12	36.4
Divorced	00	00	0.0
Widowed	00	00	0.0
Educational background			
Primary	402	11	33.3
Secondary	657	09	27.3
Tertiary	160	13	39.4
Occupation			
Civil servant	132	09	27.3
Business	82	06	18.2
House wife	384	11	33.3
Private	161	01	3.0
Daily labourer	460	06	18.2

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Table 2: Distribution of syphilis among pregnant women according to clinical profile

Clinical profile	Number of Women Screened (N=1219)	Number of Reactive cases (n =33)	Prevalence (%)

Parity			
Primigravida	395	11	33.3
Biogravida	102	08	24.2
Multigravida	722	14	42.5
Antenatal visit			
First visit	729	24	72.7
Second visit	286	07	21.2
Third visit	117	02	6.1
Fourth visit	62	00	00
Fifth and above visit	25	00	00
Gestational Period			
1st trimester	402	13	39.4
2nd trimester	621	09	27.3
3rd trimester	196	11	33.3
Pregnancy outcome			
Normal delivery	893	14	42.4
Caesarean section	87	04	12.1
Low birth weight	65	02	6.1
Pre-term delivery	26	00	0.0
Still birth	13	00	0.0
Perinatal death	22	03	9.1
Miscarriage	113	10	30.3

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The clinical profile of the participants in this study (Table 2) revealed that the majority 14 (42.5%) of the pregnant women that attended the facility throughout this period are in their third pregnancy and above (Multigravida). They were screened during the first-time visit (72.7%) and first trimester (33.3%). Analysis of pregnancy outcomes among the seropositive patients showed that the majority 14 (42.4%) undergo normal delivery, but 10 (30.3%) had a miscarriage.

Table 3: Distribution of syphilis among pregnant women according to Risk factors

Clinical profile	Number of Women Interviewed (N=1219)	Number of Reactive cases (n =33)	Prevalence (%)

History of blood transfusion			
Yes	395	27	81.8
No	824	06	18.2
Multiple sex partner			
Yes	00	25	75.8
No	1219	08	24.2
Unprotected sex with person of unknown status			
Yes	26	19	57.6
No	1193	14	42.4
History of STIs			
Yes	196	28	84.8
No	1023	05	15.2

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The distribution of syphilis based on risk factors in this study (Table 3) indicated that blood transfusion #,(81.8%), association with multiple sex partners #,(75.8%), unprotected sexual intercourse with person of unknown status #,(57.6%) and previous exposure to sexually transmitted infections (84.8%) are the most prevalent risk factors observed among the pregnant women interviewed.

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Table 4: Distribution of syphilis among pregnant women base on the year of sampling

Year	Number of Women Screened (N=1219)	Number of Syphilis cases (n=33)	Prevalence (%)
2017	78	02	6.0
2018	173	06	18.2
2019	231	01	3.0
2020	285	19	57.6
2021	452	03	15.2

In this study (Table 4), the overall prevalence of syphilis across the five years of sampling was 2.71% (33 of 1219), where the highest number of cases 57.6% (19 of 33) was recorded in the year 2020, followed by 18.2% (6 of 33) in 2018, with 3.0% (1 of 33) in 2019 as the least.

DISCUSSION

Syphilis is one of the most significant venereal diseases of public health importance, associated with poor pregnancy outcomes, such as miscarriage, low birth weight and stillbirth. In Nigeria, the prevalence of syphilis among pregnant women varies and depends on geographical locations [21]. The disease has continued to exert a high burden worldwide especially in sub-Saharan Africa, despite that its diagnosis, prevention and control pregnancy is highly recommended. Timely ante-natal visit and testing plays a vital role in the early diagnosis of syphilis [22].

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•Summarise the key findings without reiterating details of the results.
• Explain how the key findings relate to previous research or to existing knowledge, practice or policy.
• Describe the strengths and limitations of your methods and what the reader should take into account when interpreting your results.
•State the implications of your study or recommendations for future research (questions that remain unanswered), policy or practice. Make sure that the recommendations flow directly from your findings.

However, the actual burden of syphilis infection during pregnancy is not well k,known especially in developing countries where adequate health facilities are poor or unavailable, and most pregnant women attended antenatal clinics late [23, 24].

In this study, the results showed that the overall prevalence of Syphilis among pregnant women across the five years of sampling was 2.7% which is higher than the rate (2.0%) obtained by Lamidi and Gbemisola (2021) [25] in Kogi, Middle of Nigeria. The rate of infection among women was found in the active age group of 20 years and above, even in those who are single. This may be due to the fact that they have more than one sexual partner and are not aware of the preventive measures. This frequency was higher than the National Average of 0.3% for Syphilis among pregnant women in Nigeria [25]. These cases might result in a severe impact on pregnancy outcomes, such as spontaneous abortion, stillbirth and vertical transmission resulting in congenital syphilis.

The prevalence of 2.7% in our study was also higher than 0.4% reported by Olokoba *et al.* (2008) [26] in Northeastern, Nigeria; 0.13% by Ozumba *et al.* (1999) [27] in Enugu, Southeastern, Nigeria; 1.7% obtained by Aboyeji and Nwaburi (2003) [28] in Ilorin, North Central, Nigeria. A lower prevalence of 0.10% and 0.98% was reported by Shazia *et al.* (2012) [29] among pregnant women in a rural area of India and Mbamara *et al.* (2011) [30] respectively, A 1.9% was also found by Isa *et al.* (2014) [31] in Maiduguri and 0.2% by Gao *et al.* (2009) [32] in China.

The higher rate of syphilis reported in this study may be associated with a lack of awareness among pregnant women. In contrast, the prevalence of 2.7% reported in this study is lower than the 2.97% reported by Taiwo *et al.* (2007) [33] in Osogbo, Southwestern, Nigeria; 5.8% reported by Buseri *et al.* (2010) [34] in South-South, Nigeria; 4.3% reported by Creek *et al.* (2005) [35]4 in Botswana; 2.2% reported by Kirakaya, *et al.* (2010) [36], 8.0% in Ouagadougou; 12.5% reported by Ratnam, *et al.* (1982) [37] among pregnant women in Zambia; 18.3% by Lindstrand *et al.* (1993) [38]10.0% among antennal women in Mozambique and 5.0% reported by Kwiek *et al.* (2008) [39] in Malawi. In the present study, the Seropositive prevalence in the active age groups, indicated that these groups are actively reproductive as such have high risk of infection. Therefore, routine screening for syphilis during an antenatal visit is hereby encouraged.

A 20 years systematic review and meta-analysis of syphilis in sub-Saharan Africa among 175,546 pregnant women, from January 1999 to November 2018 using different data sources was conducted by Hussen and Tedesse (2019) [40]. The pooled prevalence of syphilis among pregnant women in the region was 2.9%. East and Southern African regions had a higher syphilis prevalence among pregnant women (3.2%) and (3.6%), respectively) [40]. The prevalence of syphilis among pregnant women in most parts of the region seemed to have decreased over the past 20 years except for the East African region [40]. However, prevalence did not significantly differ by region and time period [41].

In our study, blood transfusion, multiple sex partners, unprotected sexual intercourse with a person of unknown status, and previous exposure to sexually transmitted infections are the most frequent risk factors observed in the area. This can be attributed to cultural practice and diversity in the area, where marriage is not strictly a pre-requisite to bearing pregnancy/child. Some of the women give birth with profuse loss of blood or being anaemic, due to improper prenatal care. This result is contrary to the findings of Isa *et al*. (2014) [31] Maiduguri, where zero prevalence of Syphilis was recorded among pregnant women having a history of blood transfusion.

A study by Lumbiganon *et al*. (2002) [42] in Thailand evaluated the magnitude, risk factors and outcomes of syphilis in pregnancy. All women attending the first antenatal care at each selected

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clinic were enrolled. The women attending prenatal care for the first time after the date of the start of the study at each of the 53 selected clinics, regardless of their gestational age, medical or obstetrical characteristics or previous ANC, were enrolled in the trial. Screening at the first antenatal visit was routinely performed. AII women also had the same syphilis tests after delivery. The initial prevalence, the incidence during pregnancy and the overall prevalence of syphilis at delivery were 0.9%,0.4% and 1.3% respectively [42]. Risk factors for syphilis during pregnancy were found in younger age for the incidence and older age and those with a history of stillbirth for the prevalence. Women with syphilis during pregnancy had significantly more adverse outcomes [43]. The present study also recommended that in addition to the initial testing, a second routine test for syphilis should be established early even in the third trimester in this area.

A prospective cross-sectional study in three teaching hospitals in Addis Ababa was carried out by Kebede and Chamiso (2000) [44] on a total of 410 pregnant women attending antenatal care within six months. The main outcome measures considered were seropositivity for syphilis and socio-demographic factors related to it. Among the study population, twelve women (2.9%) positive for the disease were found among those with lesser monthly income, as observed in our study, where the past history of abortion was significantly associated with seropositive cases ($p<0.05$). It is, therefore, necessary to conduct a large-scale study to evaluate if screening is cost-effective and establish risk scoring methods.

The rates of sexually transmitted infections have increased since the turn of the millennium in many countries, often in association with HIV/AIDS [45]. This rise has been attributed partly to unsafe sexual practices among homosexuals, increased rate of promiscuity, prostitution, and inconsistent use of condoms. In the present study, the highest cases of 57.6% (19 of 33) of syphilis were recorded in the year 2020. This was ascribed to the COVID-19 pandemic, resulting in lock-down, and posing challenges in securing means of livelihood. During this period, there are many cases of sexual abuse, that can increase the rate of STIs in the area. Adverse effects on the foetus and infant due to maternal syphilis were among the complications reported in many studies [46,47,48]. The incidence of such outcomes is more severe in areas of a high prevalence of the infection, where latent or early syphilis is likely to be common among women.

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CONCLUSION

This study revealed that the prevalence of syphilis over the five-year period among pregnant women is low in this area. However, the findings advocate improving the screening program during pregnancy as part of the routine antenatal care schedule. Primary prevention of syphilis in pregnant women should also be highly encouraged.

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