

Seroprevalence of Syphilis among Pregnant Women Attending Antenatal Care in Kogi West, Nigeria

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Abstract

This research was carried out among two hundred (200) pregnant women attending Maria Goretti Hospital, Anyigba and Holley Memorial Hospital, Ochadamu both in Kogi West of Kogi State, Nigeria. The research determined the prevalence of syphilis among the antenatal patients. On each, 4 ml of blood sample was collected intravenously in EDTA bottles and the samples were examined with VDRL test kit, a one-step Anti-TP Rapid Screen Test (a chromatographic immunoassay) for qualitative detection of antibodies to TP in human serum. Two purified recombinant antigens of TP are used in test band as capture materials and gold conjugates. It was observed that only 2.0% were positive to syphilis. The results from this finding were related to the patient's social demographic variables such as age, occupational status, level of education and marital status. Of all these, patients occupational status attending the Maria Goretti Hospital was statistically associated with syphilis sero-positivity ($P < 0.05$). Age related sero-prevalence showed that only those under 20 yrs of age were seropositive for syphilis infection and this is suggestive of high sexual activity among these age bracket. Therefore routine screening for *Treponema pallidum* during antenatal care should be strengthened to reduce the risk of mother to child transmission.

Keywords: Antenatal, Intravenously, Pregnant Women, Prevalence, Syphilis, *Treponema Pallidum*

1. Introduction

Venereal syphilis (Greek *Syn*, together, and *philein*, to love) is a contagious, ulcerative sexually transmitted disease caused by spirochete *Treponema pallidum* subsp. *Pallidum* is a thin helical cell approximately 0.15 nm x 6.50 nm.

Treponema pallidum, subsp. *pallidum* is the causative pathogen of syphilis. Treponemes feature 10-20 primary spiral windings and can be viewed using dark field microscopy. They cannot be grown on artificial nutrient culture mediums. Syphilis affects only humans. The pathogens are transmitted by direct contact, in most cases during sexual intercourse. They invade the subcutaneous and subserous connective tissues through microtraumata in skin or mucosa.

The genus *Treponema* belongs to the family of Spirochaetaceae and includes several significant human

pathogen species and subspecies. *T. pallidum*, subsp. *pallidum* is the syphilis pathogen. *T. pallidum*, subsp. *endemicum* is the pathogen that causes a syphilislike disease that is transmitted by direct, but not sexual contact. *T. pallidum*, subsp. *pertenue* is the pathogen that causes yaws, and *T. carateum* causes pinta, two nonvenereal infections that occur in the tropics and subtropics.

The incubation period is two to four weeks. If left untreated, the disease manifests in several stages:

- **Stage I (primary syphilis):** Hard, indolent (painless) lesion, later infiltration and ulcerous disintegration, called hard chancre. Accompanied by regional lymphadenitis, also painless. Treponemes can be detected in the ulcer.
- **Stage II (secondary syphilis):** Generalization of the disease occurs four to eight weeks after primary syphilis. Frequent clinical symptoms include

micropolylymphadenopathy and macular or papulosquamous exanthem, broad condylomas, and enanthem. Numerous organisms can be detected in seeping surface efflorescences.

- **Latent syphilis:** Stage of the disease is which no clinical symptoms are manifested. But the pathogens are present in the body and serum antibody tests are positive divided into early latency (less than four years) and late latency (more than four years).
- **Stage III (tertiary or late syphilis):** Late gummatous syphilis: manifestations in skin, mucosa, and various organs. Tissue disintegration is frequent. Lesions are hardly infectious or not at all. Cardiovascular syphilis: endarteritis obliterans, syphilitic aortitis. Neurosyphilis: two major clinical categories are observed: meningovascular syphilis, i.e., endarteritis obliterans of small blood vessels of the meninges, brain, and spinal cord; parenchymatous syphilis, i.e., destruction of nerve cells in the cerebral cortex (paresis) and spinal cord (tabes dorsalis).

Laboratory diagnosis includes both isolation and identification of the pathogen and antibody assays. Antibody assays include the VDRL flocculation reaction, TP-PA particle agglutination, and the indirect immunofluorescence test FTA-ABS. The therapeutic of choice is penicillin G. The disease Preventive measures concentrate on protection from exposure.

Transmission of the pathogen from mother to fetus after the fourth month of pregnancy leads to miscarriage or birth of severely diseased infant with numerous treponemes in its organs is known in all parts of the world.

Because of the serious complications of syphilis in pregnancy, World Health Organization (WHO) (2001)¹⁹ has recommended universal antenatal screening. WHO further 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 has been well documented^{16,18}.

2. Materials and Methods

2.1 Study Area

Study was carried out at Maria Goretti Hospital in Anyigba, a town under Dekina Local Government Area

of Kogi State and Holley Memorial Hospital Ochadamu a town under Ofu Local Government. Anyigba is situated on latitude 7° 15' – 7° 29' N and longitude 7° 11' – 7° 32' E with an estimated population of 71,323 from the 2006 population census⁶ and Ochadamu is in Ofu Local Government Area in the central part of Kogi State, Federal Republic of Nigeria, the Niger River forming its western boundary. Its headquarters are in the town of Ogowolawo to the south of the Area at 7°14'09"N 6°55'32"E/7.23583°N 6.92556°E.

2.2 Study Population

The target are pregnant women, who are attendees of the antenatal clinic of St. Maria Goretti Hospital Anyigba and Holley Memorial Hospital Ochadamu. Accordingly, a total of 200 pregnant women were screened. One hundred pregnant women were sampled each in both hospitals.

2.3 Sample Collection and Storage

About 4 mls of blood was withdrawn aseptically from each of the pregnant women. The site for venipuncture was determined on the arm and tourniquet was applied to palpate the vein, the surface was swabbed with an alcohol swab and the blood was obtained with 5 ml syringe via venipuncture and transferred into EDTA bottle. The participant's name, age, time and date of collection was labelled on the sample bottle. Each of the samples was centrifuged at 300RPM in 5mins and serum portion was used on the test strip.

Data on patient's demographic variables and information considered to be risk factors were collected at the time of sample collection using structured questionnaires.

2.4 Principle of the Tests

One step Anti-TP Rapid Screen Test is a chromatographic immunoassay for qualitative detection of antibodies to TP in human serum. Two purified recombinant antigens of TP are used in test band as capture materials and gold conjugates. If the antibody of anti-TP is present in the concentration above the labelled, complex will be formed. This complex is then captured by antigens immobilized in the test zone of the membrane, producing a visible pink-rose colour band on the membrane. The colour intensity will depend on the concentration of the anti-TP present in the sample. This one step test is very sensitive and

Table 1. Age distribution of syphilis infection among pregnant women attending St. Maria Goretti Hospital Anyigba (A) and Holley Memorial Hospital, Ochadamu (B)

Age group	No. tested		No. of positive (%)		No. of negative (%)		P-value A	P-value B
	A	B	A	B	A	B		
Years								
Under 20	14	14	2 (14.3)	2 (14.3)	12 (85.7)	12 (85.7)		
20-25	11	22	0	0	11 (100)	22 (100)		
26-30	47	31	0	0	47 (100)	31 (100)	0.18	0.28
31-35	15	17	0	0	15 (100)	17 (100)		
36-40	13	12	0	0	13 (100)	12 (100)		
> 40	00	04	0	0	00	04 (100)		
Total	100	100	2	2	98	98		

Table 2. Prevalence of syphilis according to marital status of pregnant women attending St. Maria Goretti Hospital Anyigba (A) and Holley Memorial Hospital, Ochadamu (B)

Marital Status	No. tested		No. of positive (%)		No. of negative (%)		P-value A	P-value B
	A	B	A	B	A	B		
Years								
Single	20	22	2 (10)	2 (9.1)	18 (90)	20 (90.9)		
Married	73	71	0	0	73 (100)	71 (100)		
Divorced	03	05	0	0	03 (100)	05 (100)	0.53	0.31
Widowed	04	02	0	0	04 (100)	02 (100)		
Total	100	100	02	02	98	98		

Table 3. Prevalence of syphilis according to level of education attending St. Maria Goretti Hospital Anyigba (A) and Holley Memorial Hospital, Ochadamu (B)

Level of Education	No. tested		No of positive (%)		No. of negative (%)		P-value A	P-value B
	A	B	A	B	A	B		
Year								
No formal Education	20	12	2 (10)	0	18 (90)	12 (100)		
Primary	17	40	0	2 (5)	17 (100)	38 (95)		
Quranic	23	19	0	0	23 (100)	19 (100)	0.4	0.82
Secondary	26	13	0	0	26 (100)	13 (100)		
Tertiary	14	16	0	0	14 (100)	16 (100)		
Total	100	100	02	02	98	98		

only takes about 15 minutes. Test results are read visually without any instrument.

2.5 Test Procedure

The patient's blood was centrifuged to get the plasma or serum after which the sealed pouch of the strip be opened. The test strip was immersed into the sample container with the arrow head pointing towards the container ensuring that it does not pass the MAX (maximum line).

The strip was taken out after 8-10 seconds, laid flat on a clean, dry, non-absorbant surface and waited for the coloured band to appear. The result was read after 10 minutes.

2.6 Interpretation of Results

- **Negative:** Only one coloured band appeared on the control region (C). There was no apparent band on the

Table 4. Occupational distribution of syphilis infection among pregnant women attending St. Maria Goretti Hospital Anyigba (A) and Holley Memorial Hospital, Ochadamu (B)

Occupational Status	No. tested		No. of positive (%)		No. of negative (%)		P-value A	P-value B
	A	B	A	B	A	B		
Year								
Self employed	27	49	0	0	27 (100)	49 (100)		
Student	06	11	2 (33.3)	0	04 (66.7)	11 (100)		
House-wife	23	14	0	0	23 (100)	14 (100)	0.007	0.10
Civil servant	03	02	0	0	03 (100)	02 (100)		
Farming	26	14	0	0	26 (100)	14 (100)		
Unemployed	15	10	0	2(20)	15 (100)	08 (80)		
Total	100	100	2	2	98	98		

test region (T). This indicates that there is no anti-TP in the serum.

- **Positive:** Two distinct coloured bands appeared on the membrane, one the test region and another one at the control region. This indicates that the specimen contains detectable amount of anti-TP.
- **Invalid:** There would be no visible band at all on the strip or only one coloured band appears on test region, this is an indication of a possible error in performing the test. Test should be repeated using a new device.

3. Results

A total of 200 blood samples were analyzed for the seroprevalence of syphilis in pregnant women attending anti-natal clinic in two hospitals in Kogi West. From the 200 samples collected, 4(2.0%) of the pregnant women were positive to syphilis, two from each hospital. Table 1-4, shows the prevalence of syphilis with respect to socio-demographic factor. According to age, marital status, occupational status and their level of education.

4. Discussion, Conclusion and Recommendation

In this study, two hundred (200) pregnant women were examined for the presence of Syphilis infection. The result showed that the prevalence rate of Syphilis infection among pregnant women attending Maria Goretti Hospital and Holley Memorial Hospital was 2.0%. The rate of syphilis infection among women under the ages of 20 in both

hospitals was 14.3% which is higher than the other age groups (Table 1). Result from (Table 2), shows that those who are single also have a higher prevalence of syphilis infection of 10.0% which may be due to the fact that they have more than one sexual partners and are not exposed to the infection and its preventive measures. Women who have no formal education also have a higher rate of syphilis infection of 10.0% compared to those who have formal education whom might have been exposed to this infection and its preventive measures (Table 1). This figure is higher than the National Average of 0.3% for Syphilis among pregnant women in Nigeria⁵.

The implication of this finding is that Syphilis infection in pregnant women might result in severe impact on pregnancy outcome, primarily as spontaneous abortion, stillbirth and vertical transmission resulting in congenital syphilis¹².

The prevalence of 2.0% in this study is higher than 0.4% reported by Olokoba, *et al.* (2008)¹³ in Northeastern, Nigeria; 0.13% reported by Ozumba, *et al.* (1999)¹⁴ in Enugu, Southeastern, Nigeria; 1.7% reported by Aboyeji and Nwaburi (2003)¹ in Ilorin, North Central, Nigeria; 0.10% reported by Shazia, *et al.* (2012)¹⁶ among pregnant women in rural area of India; 0.98% reported by Mathai, *et al.* (2001)¹¹ also in India; 1.9% reported by Isa, *et al.* (2014)⁷ in Maiduguri and 0.2% reported by Chen, *et al.* (2006)³ in China.

Higher prevalence of syphilis infection reported in this study may be pertinent with lack of awareness among pregnant women to be screened for syphilis. In contrast, the prevalence of 2.0% reported in this study is lower than the 2.97% reported by Taiwo, *et al.* (2007)¹⁷ in Osogbo,

Southwestern, Nigeria; 5.8% reported by Buseri, *et al.* (2010)² in South-South, Nigeria; 4.3% reported by Creek, *et al.* (2005)⁴ in Botswana; 2.2% reported by Kirakaya, *et al.* (2010)⁸ in Ouagadougou; 12.5% reported by Ratnam, *et al.* (1982)¹⁵ among pregnant women in Zambia; 18.3% reported by Lindstrand, *et al.* (1993)¹⁰ among antenatal care attendees in Mozambique and 5% reported by Kwiek, *et al.* (2008)⁹ among pregnant women in Malawi. The limitation of this study may be the use of rapid test strip which are specific for *Treponema* antigen test irrespective of active or inactive infection. Some positive case may be previously treated infection and not active infection. However, among the different age groups, those under the age of 20 years were found positive for syphilis infection, indicating these groups are sexually active therefore they have high risk of contracting the disease. Therefore, routine screen for *Treponema pallidum* during antenatal care is encouraged in this study.

5. Conclusion

This study demonstrated considerably a low prevalence of syphilis among pregnant women attending the antenatal clinics of the aforementioned Hospitals in Kogi East, Nigeria. However, proper management of maternal syphilis during prenatal phase ensures better outcomes in the infant. Therefore screening of pregnant women for syphilis is highly necessary in order to identify those neonates at risk of transmission, to whom preventive intervention can be instituted irrespective of maternal syphilis carriage status, this may be the most effective approach to syphilis prevention and control.

6. Recommendation

The prevalence rate obtained in this study calls for general surveillance, public health education to enlighten the general population of the possible risk factors and route of acquisition of syphilis infection. Also routine syphilis infection should be advocated to ensure early detection which is important as it will enable prompt intervention.

7. References

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