

DETECTION OF SYPHILIS AMONG PATIENTS ATTENDING A GENERAL HOSPITAL IN OGBAKIRI, RIVER STATE, NIGERIA

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Received: 18-03-2024

Accepted: 28-03-2024

<https://dx.doi.org/10.4314/sa.v23i2.16>

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Journal Homepage: <http://www.scientia-african.uniportjournal.info>

Publisher: *Faculty of Science, University of Port Harcourt.*

ABSTRACT

The syphilis-causing agent, Treponema pallidum, has long posed a threat to public health. In sub-Saharan Africa, it is a significant public health issue and is common in developing nations. This study looked into the syphilis prevalence among patients at Rivers State's Ogbakiri General Hospital. Eighty-nine samples were used in total for this investigation after haemolysing; those with fibrin and heavy particles were discarded. For these samples, stratified socio-demographic data were used. In the population, 31 (34.8%) patients were males and 58 (65.2%) were females. Ages ranged from 18 to 75, individuals between the ages of 18 and 30 made up 56.2% of the population; patients between the ages of 31 and 40 made up 10.1% patients between the ages of 41 and 60 made up 21.4% and patients aged 61 and beyond made up 12.4%. Also, 38 (42.7%) and 51 (57.3%) of the population, respectively, were singles and married, 13 (14.6%) of the study population had primary education, 45 (50.6%) had secondary education, and 23 (25.8%) had postsecondary education, according to the results of the educational status analysis. Based on occupational status, there were 8 (8.9%) nurses. According to the study, 2.2% of those who tested were positive for syphilis. Syphilis was found to be more common in people aged 61 to 75 (9.1%), males (3.2%), singles (5.3%) and higher educational status (4.3%). According to this report, Ogbakiri, Nigeria's Rivers State has a relatively low syphilis prevalence compared to other areas in the country.

Keywords: Syphilis, *Treponema pallidum*, Ogbakiri, Prevalence, Nigeria

INTRODUCTION

One of the main causes of illness worldwide, particularly in poor nations, is sexually transmitted diseases (STDs), which are a

class of infectious or communicable diseases whose main route of transmission is through sexual contact (Usanga et al., 2010; Alli et al., 2012; Geremew et al., 2017; Okonko et al., 2020a,b). Numerous organisms have been

implicated as the etiological agents of sexually transmitted diseases (STDs), including *Neisseria gonorrhoea*, *Chlamydia trachomatis*, *Gardnerella vaginalis*, *Treponema palladium*, and *Trichomonas vaginalis* (Alli et al., 2012; Okonko et al., 2012a, 2020a,b).

The CDC (2022) states that syphilis is a sexually transmitted illness (STI) that can cause serious health problems if left untreated. Sexual activity, including vaginal, oral, and anal intercourse, is the primary means of spreading the highly contagious disease syphilis (Schwartz, 2024). *Treponema pallidum* is the bacteria that causes syphilis (Schwartz, 2024). It may take a long time for your body to experience symptoms from it (Schwartz, 2024). Primary, secondary, latent, and tertiary are the four phases in the development of an infection. Different signs and symptoms may be present at each stage (CDC, 2022). Sexually active individuals may contract the treatable STD syphilis (CDC, 2022).

Several tests, including VDRL, TPHA, and RPR, have been developed in the past for the immunological detection of *T. pallidum* infection and are still in use in diagnostic laboratories. Clinicians can now use automated analytic tools and optical reading records for syphilis antibody screening in blood banks and infectious disease departments thanks to the recent application of ELISA techniques. Finding *Treponema pallidum* (TP) antibodies in human plasma from patients undergoing treatment at a general hospital in Ogbakiri, Rivers State, Nigeria, is the aim of this study.

MATERIALS AND METHOD

Study area and design

The study's design called for a descriptive cross-sectional analysis of syphilis in patients presenting at General Hospital, Ogbakiri, Rivers State, Nigeria. In all, 89 individuals—58 females and 31 males—of various ages (ages 4 to 75 years), educational backgrounds, and marital statuses who

present for medical examinations in the hospital were included in this study. However, those receiving antibiotic medication within the seven days before enrollment and female patients who were menstruating at the time of the examination were not allowed to participate in the study.

Sample Size and Sampling Technique

Using a purposive sample technique, we included eighty-nine (89) consenting patients who visited a General Hospital in Ogbakiri, Rivers State, and had one or more of the complaints listed by the World Health Organization (WHO, 1991) in its syndrome approach for the diagnosis of sexually transmitted infections.

Specimen Collection and Preparation

Using conventional sample preparation methods for clinical laboratory analysis, blood samples were extracted aseptically into K3 ethylenediaminetetraacetic acid (EDTA) anticoagulant non-vacuum collection bottles via venepuncture (Unitek College, 2022). After allowing the blood to retract, the plasma was extracted by centrifugation (Geremew et al., 2017) and stored at 4 degrees Celsius for further laboratory analysis. The blood samples were kept cold throughout the investigation and brought out to ambient temperature to acclimatise them before usage.

Serological Analysis

All plasma samples were tested for *T. pallidum* (Cheesbrough, 2006). Using an enzyme-linked immunosorbent assay (ELISA), the presence or absence of *Treponema pallidum* antibodies in human plasma was made. Serological analysis was employed to detect the presence or absence of syphilis with an ELISA kit. The qualitative measurement of antibodies to *Treponema pallidum* in human plasma was carried out using Syphilis Ab version ULTRA ELISA kits (REF: SIABULTRA.CE made by Dia. Pro, Milano, Italy). All analysis was done and the test findings were interpreted following the manufacturer's instructions.

Ethical Considerations

Ethical approval was obtained from the University of Port Harcourt Research Ethics Committee. We also got administrative approval from the medical facility. Before gaining their informed consent for the collection of specimens, each study participant was informed about the purpose and specifics of the investigation. By employing codes rather than the names of the study participants, confidentiality was preserved throughout the entire investigation. Participants gave their consent to participate in the study voluntarily. Individuals who expressed a desire to withdraw from the study at any point or who were hesitant to participate were advised that they could do so without facing any consequences.

Data Analysis

Microsoft Excel was used to input the data from the questionnaire and the test procedures. To look for statistically significant variations in the prevalence rates of syphilis, chi-square was computed at a 95% confidence range, and a p-value < 0.05 was deemed significant to determine the relationship between syphilis and other variables. Tables were used to display the statistical results.

RESULTS

Study Population

Table 1 presents the stratified socio-demographic information for samples from study participants. Of the 89 participants who made up the population; 31 (34.8%) of the total, were males, and 58(65.2%) of them were females. There were 51 (57.3%) married participants and 38 (42.7%) unmarried participants in the population. Also, 8.9% of the population had never attended school, 13.6% had attended elementary school, 45.6% had attended secondary school, and 25.6% had attended a university. Fifty (56.2%) people were between the ages less than thirty, nine (10.1%) were between the ages of thirty and forty, nine (19.4%) were between the ages of forty-one and sixty, and eleven (12.4%) were between the ages of sixty-one and seventy-five.

Overall Prevalence of Syphilis (*Treponema pallidum*)

Figure 1 illustrates that of the 89 individuals tested at General Hospital, Ogbakiri Rivers State, Nigeria, 87 (97.8%) tested negative for *Treponema pallidum* (syphilis) and 2 (2.2%) tested positive for *Treponema pallidum* (syphilis).

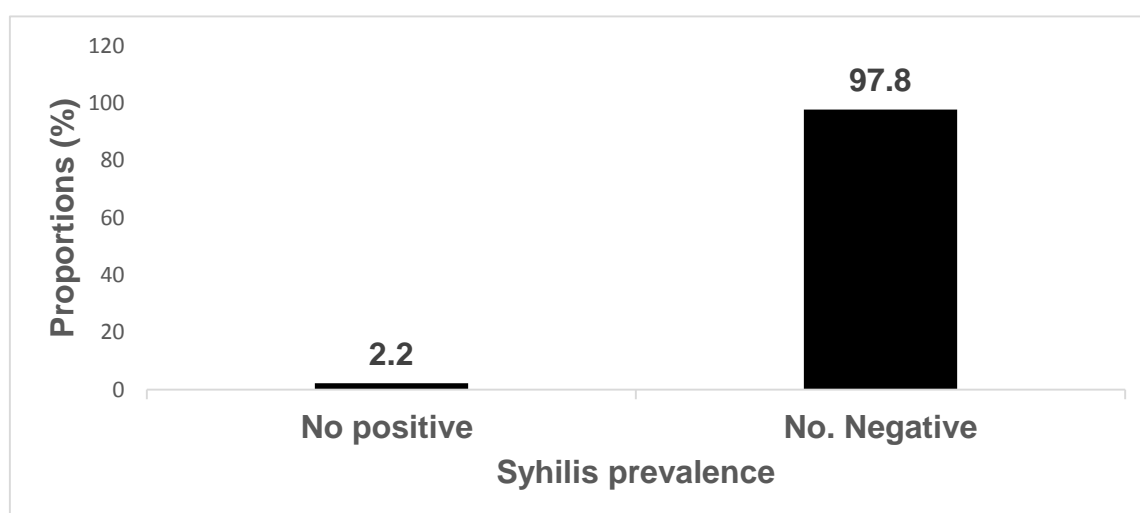


Figure 1: Overall Prevalence of Syphilis (*Treponema pallidum*)

Prevalence of *Treponema pallidum* with sociodemographic characteristics

Table 1 also illustrates the syphilis seropositivity rate as a function of age. The younger age group exhibited reactivity (2.0%) and older age groups (9.1%). As illustrated in Table 1, the prevalence of syphilis was 1 (1.7%) in females and 1 (3.2%) in males. Only the unmarried (single) group had a syphilis prevalence of 2 (5.3%), as Table 1 illustrates. The largest occurrence was observed among participants with secondary school education (12.2%) and university education (14.3%), as Table 1 illustrates.

Table 1: Analysis of the Study Population and the Syphilis (*Treponema pallidum*) Seropositivity

Characteristics	No. Tested (%)	No. Positive (%)
Age groups (years)		
18-30	50 (56.2)	1 (2.0)
31-40	9 (10.1)	0 (0.0)
41-60	19 (21.4)	0 (0.0)
61 and above	11 (12.4)	1 (9.1)
Sex		
Males	31 (34.8)	1 (3.2)
Females	58 (65.2)	1 (1.7)
Marital Status		
Unmarried (Singles)	38 (42.7)	2 (5.3)
Married	51 (57.3)	0 (0.0)
Education		
None	8 (8.9)	0 (0.0)
Primary	13 (14.6)	0 (0.0)
Secondary	45 (50.6)	1 (2.2)
University	23 (25.8)	1 (4.3)
Total	89 (100.00)	2 (2.2)

DISCUSSION

According to the study, 2.2% of those who tested positive had syphilis. This observation is similar to the 1.5% of Lead City University Medical Center attendees in Ibadan, Nigeria, that Okonko et al. (2012b) recorded, the 1.5% of patients at the University of Port Harcourt Teaching Hospital in Rivers State, Nigeria, that we previously studied (Okonko et al., 2020a), and the 1.7% reported in another of our previous study in Uyo, Nigeria (Okonko et al., 2020b). This observation differs from that of some prior studies in Nigeria (Sule et al., 2010; Okonko et al., 2012b,c). Sule et al. (2010) reported an overall prevalence of 19.3% in Abuja, Nigeria.

The 2.2% reported here is lower than the 6.6% reported by Adewuyi-Oseni et al. (2019) in Port Harcourt, Nigeria. According

to Forbi et al. (2009), 3.3% of HIV-positive individuals in Keffi, Nasarawa State, North Central Nigeria, also had syphilis. In Abakaliki, Ebonyi State, Nigeria, Uneke et al. (2006) reported that the prevalence of HIV-positive patients was 14.0%. According to Iyalla et al. (2016), 25.3% of patients at the Rivers State University Teaching Hospital in Port Harcourt, Nigeria, have this condition. It also differs from that of Okonko et al. (2012b,c) who reported 0.0% and 0.8% for syphilis, respectively, in Ibadan, Nigeria; the 0.0% reported by Okonko et al. (2013) in two health facilities in Ibadan, Nigeria and the 0.32% reported by Ogiogwa et al. (2012) in Abeokuta, Nigeria. These varying prevalence rates can be attributed to variations among the study population (Geremew et al., 2017) and several factors affecting syphilis distribution, including condomless sex (Arando et al.,

2019), environmental elements (such as dry hot climates), poor economic status, education and personal hygiene (Clyti & Santos, 2007; Getaz et al., 2016; Galadari & Galadari, 2020).

The study showed that 9.1% of people in the age range of 61 to 75 had the greatest frequency of syphilis. This is consistent with reports by Okonko et al. (2012c, 2020a) that the older age group (>41 years) had a greater prevalence of syphilis. Ogiogwa et al. (2012) in Abeokuta, Nigeria reported the prevalence of syphilis among the age group 30-35 and 36-40 years only. According to Adewuyi-Oseni et al. (2019), there is a greater incidence of syphilis in the 31–40 age group in Port Harcourt, Nigeria and that observation deviated from the present study. Okonko et al. (2020b) study indicated higher occurrence rates among age groups 36-67 years.

Males (3.2%) had the highest prevalence regarding sex and this agrees favourably with some previous studies in Nigeria. In Okonko et al. (2020b) study, males had the highest prevalence of syphilis among hospital attendees. Although, among HIV-infected patients, females had a higher prevalence (Okonko et al., 2020b). The findings of this current study deviated from the observations made in some previous studies in Nigeria. It deviated from the studies by Sule et al. (2010) in Abuja, Nigeria and Okonko et al. (2012b,c, 2020a) studies where females had the highest prevalence of syphilis.

Singles (5.3%) had the highest prevalence regarding marital status, and this agrees favourably with the study by Okonko et al. (2012b) study where singles had the highest prevalence of syphilis. The findings of this current study deviated from the observations made by Okonko et al. (2012c) in Ibadan, Nigeria and Okonko et al. (2020a) in Uyo, Nigeria where a higher prevalence of syphilis occurred among the married group.

The University students (4.3%) had the highest prevalence regarding educational status. This is not the case with Okonko et al. (2020a), who observed a higher incidence of

syphilis among individuals who had no formal education, or Adewuyi-Oseni et al. (2019), who reported a higher prevalence of syphilis among those with only a basic school education.

CONCLUSION

The findings of the evaluation of the seropositivity of syphilis among patients at General Hospital, Ogbakiri, Rivers State, Nigeria indicate that syphilis is present, primarily in males and females, younger and older age groups, unmarried groups, secondary and university educations. This calls for prompt treatment without being overemphasised.

Compliance with ethical standards

Acknowledgement

The General Hospital's administration in Ogbakiri, Rivers State, Nigeria, and everyone who consented to participate in the study is appreciated by the authors for their approval.

Disclosure of conflict of interest

There are no competing interests, according to the writers.

Statement of ethical approval

Every author certifies that the University of Port Harcourt Research Ethics Committee reviewed and approved every experiment. As a result, the 1964 Declaration of Helsinki's ethical guidelines are adhered to throughout the study.

Statement of informed consent

"All authors affirm that every individual participant in the study gave their informed consent."

REFERENCES

- Adewuyi-Oseni, S., Frank-Peterside, N., Otokunefor, K., Abeni, B. A., Cookey, T. I. & Okonko, I. O. (2019). Transfusion Transmitted Syphilis Among Potential Male Blood Donors in Some Hospitals in Port Harcourt Town,

- Rivers State, Nigeria. *Biomedicine and Nursing*, 5(3): 90-96
- Alli, J. A. O., Okonko, I. O., Odu, N. N., Kolade, A. F. & Nwanze, J. C. (2011). Detection and prevalence of genital pathogens among attendees of STI clinic of a tertiary care hospital in Ibadan, Southwestern Nigeria. *World Journal of Medical Sciences* 6(3): 152-161
- Arando, M., Fernandez-Naval, C., Mota-Foix, M., Martinez, D., Armengol, P., Barberá, M. J., Esperalba, J., & Vall-Mayans, M. (2019). Early syphilis: risk factors and clinical manifestations focusing on HIV-positive patients. *BMC Infectious Diseases*, 19(1), 727. <https://doi.org/10.1186/s12879-019-4269-8>
- Centers for Disease Control and Prevention (CDC, 2022). Sexually Transmitted Diseases (STDs): Syphilis – CDC Basic Fact Sheet. Available from <https://www.cdc.gov/std/syphilis/stdfact-syphilis.htm>. Accessed on March 18, 2024.
- Cheesbrough, M. (2006). *District laboratory practice in tropical countries*. Cambridge University Press. <https://books.google.com/books>.
- Clyti, E. & dos Santos, R. B. (2007). [Endemic treponematoses in Maputo, Mozambique]. *Bull Soc Pathol Exot.*, 100(2):107-108.
- Forbi, J., Pennap, G., Obinyelaku, A., Iperepolu, O. & Agwale, S. (2009). Seroprevalence of syphilis among a cohort of HIV-infected subjects in North Central Nigeria. *Journal of Health, Population and Nutrition*, 27(5): 704-706.
- Galadari, I. H. & Galadari, I. (2020). Endemic Syphilis. Available from <https://emedicine.medscape.com/article/1952297-overview?>. September 14, 2020. Accessed on March 24, 2024.
- Geremew, R. A., Agizie, B. M., Bashaw, A. A., Seid, M. E., & Yeshanew, A. G. (2017). Prevalence of Selected Sexually Transmitted Infection (STI) and Associated Factors among Symptomatic Patients Attending Gondar Town Hospitals and Health Centers. *Ethiopian Journal of Health Sciences*, 27(6), 589–600. <https://doi.org/10.4314/ejhs.v27i6.4>
- Getaz, L., Da Silva-Santos, L., Wolff, H., Vitoria, M., Serre-Delcor, N., Lozano-Becerra, J. C., et al. (2016). Persistent infectious and tropical diseases in immigrant correctional populations. *Rev Esp Sanid Penit.* 18 (2):57-66.
- Iyalla, C., Omunakwe, H. & Okoh, D. A. (2016). A retrospective study of the seroprevalence of antibodies to HBsAg, HIV-1/2 and syphilis amongst pregnant women at booking in a tertiary hospital in Port Harcourt, Southern Nigeria. *IOSR Journal of Dental and Medical Sciences (IOSRJDMS)*, 15(6):86-92.
- Ogiogwa, J. I., Akingbade, O. A., Aboderin, B. W., Okerentugba, P. O., Innocent-Adiele, H. C., Onoh, C. C., Nwanze, J. C. & Okonko, I. O. (2012). Prevalence of *Treponema pallidum* in Serum of Pregnant Women in Abeokuta, Ogun State, Nigeria. *Nature and Science*, 10(6):91-94
- Okonko, I. O., Akinpelu, A. O. & Okerentugba, P. O. (2012a). Prevalence of Sexually Transmitted Diseases among Attendees of AFRH Centre in Ibadan, Southwestern Nigeria. *Middle-East Journal of Scientific Research* 11(1): 24-31
- Okonko, I. O., Okerentugba, P. O., Adejuwon, A. O. & Onoh, C. C. (2012b). Prevalence of sexually transmitted infections (STIs) among attendees of Lead City University Medical Centre in Ibadan, Southwestern, Nigeria. *Archives of Applied Science Research*, 4 (2):980-987
- Okonko, I. O., Adejuwon, O. A., Okerentugba, P. O. & Frank-Peterside, N. (2013). Detection of *Treponema pallidum* (Syphilis) Antibodies, HIV, HBV, and HCV co-infections among attendees of Two Health Facilities in

- Ibadan, Southwestern Nigeria. *Nature and Science*; 11(3):92-101
- Okonko, I. O., Anugweje, K. C., Adeniji, F. O. & Abdulyekeen, R. A. (2012c). Syphilis and HIV, HCV and HBsAg coinfections among Sexually Active Adults. *Nature and Science*; 10(1):66-74
- Okonko, I. O., Cookey, T. I., Adewuyi-Oseni, S., & Awanye, A. M. (2020a). Detection of *Treponema pallidum* (Syphilis) Antibodies among HIV-Infected Individuals and Sexually-active Attendees of Two Health Facilities in Port Harcourt, Nigeria. *International STD Research & Reviews*, 9(2), 17-23.
- Okonko, I. O., Innocent-Adiele, H. C., Awanye, A. M., Cookey, T. I., & Onoh, C. C. (2020b). Human Immunodeficiency Virus (HIV) and *Treponema pallidum* (Syphilis) Co-infection in Uyo, Nigeria. *International STD Research & Reviews* 9(2):33-42
- Schwartz, A. A. (2024). Syphilis. Available from <https://www.webmd.com/sexual-conditions/syphilis>. Medically Reviewed by Zilpah Sheikh, MD on February 18, 2024. Accessed on March 18, 2024.
- Sule, W. F., Okonko, I. O., Sunday, A., Adewale, O. G., Amande, J. T., Babalola, E. T. & Abubakar, M. J. (2010). Prevalence of *Treponema pallidum* specific antibodies among sexually active attendees of Fereprod Medical Centre in Abuja, Nigeria. *Journal of Applied Biosciences* (28):1731-1735
- Uneke, C. J., Ogbu, O., Alo, M. & Ariom, T. (2006). Syphilis serology in HIV-positive and HIV-negative Nigerians: The public health significance. *Online Journal of Health and Allied Sciences*, 2:5.
- Unitek College (2022). Step-by-Step Guide to Specimen Collection. Available on <https://www.unitekcollege.edu/blog/a-step-by-step-guide-to-specimen-collection/>. March 16, 2022. Accessed on March 23, 2024.
- Usanga, V. U., Abia-Basse, L., Inyang-Etoh, P. C., Udoh, S., Ani, F. & Archibong, E. (2010). Prevalence Of Sexually Transmitted Diseases in Pregnant And Non-Pregnant Women In Calabar, Cross River State, Nigeria. *The Internet Journal of Gynecology and Obstetrics* 14(2).
- World Health Organization (WHO), others, author. (1991). *Management of patients with sexually transmitted diseases. Report of a WHO Study Group [meeting held in Geneva from 3 to 6 July 1990]* 1991. *World Health Organization technical report series*, 810, 1–103. Available on <http://apps.who.int/iris/handle/10665/40873>. Accessed on March 23, 2024.

