

Prevalence of Chlamydia Trachomatis in the Four Primary Health Care Centres in Ukwuani L.G.A, Delta State

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ABSTRACT

Chlamydia trachomatis is a major public health concern and is one of the leading causes of sexually transmitted infections (STIs) and infertility worldwide. A community-based cross-sectional study was used to determine the prevalence of Chlamydia trachomatis infection among patients attending selected Primary Health Care facilities in Ukwuani Local Government Area, Delta State, Nigeria from January 2023 to February 2025. Venous blood and Endocervical swab samples were collected from consenting male and female patients. Giemsa staining technique was used to observe chlamydia and chlamydia inclusion bodies under the oil immersion objective lens (x100). Out of a total 2456 participants, 820 (33.4%) was positive for Chlamydia trachomatis infection. Infection was highest (39.6%) at Amai PHCC, female infection was higher (37.8%) and recorded a significant difference in infection ($p < 0.05$). age related infection was significant (< 0.05) with the age group 21-25 yrs old recording a higher prevalence (46.0%). Single participants recorded high prevalence (53.5%) with significant association ($p < 0.05$). chlamydia trachomatis infection among infertile males was significant ($p < 0.05$) with male within ages 26-30 yrs recording a high prevalence 85.9%). The results of the current study demonstrate that Chlamydia trachomatis is a significant public health problem that causes infertility problems. This underscores the need for targeted screening, health education, and control measures in rural communities. Seasonal trends and antibody titre distribution highlight the importance of continuous surveillance to prevent long-term complications.

Keywords: Chlamydia trachomatis, Trachoma, prevalence, infection, primary health care

INTRODUCTION

Chlamydia trachomatis is a Gram-negative, obligate intracellular bacterium and one of the leading causes of bacterial sexually transmitted infections (STIs) worldwide. It is a major public health concern due to its high prevalence, asymptomatic nature, and association with serious reproductive health complications. Globally, the World Health Organization (World Health Organization, 2021) estimates that over 129 million new cases of *C. trachomatis* infections occur annually, with the highest burden reported in low-income and middle-income countries (World Health Organization, 2021). The infection primarily affects sexually active individuals, particularly adolescents and young adults, and often remains undiagnosed due to its non-specific or silent clinical presentation (Rowley *et al.*, 2019).

Trachoma is considered the prototype *Chlamydia* infection, with its recognition dating back to ancient Greece and Egypt. In the early 20th century, it was identified in individuals with trachoma and subsequently in infants with conjunctivitis and their family members (Strickland, 2022). *Chlamydia* organisms were first cultured successfully in the 1950s, and the significance of genital tract infections caused by *Chlamydia* began to be widely recognized in the 1960s. Initially, *Chlamydia* species were believed to be viruses due to their small size and intracellular lifestyle, and were once referred to as "large viruses" (Prescott *et al.*, 2016). However, they possess bacterial characteristics, including a cell wall though lacking muramic acid and the ability to pass through filters like viruses (Strickland, 2022).

In Nigeria, available studies have reported varying prevalence rates of *C. trachomatis* across different regions and population groups, ranging from 2% to over 20% depending on the study design, diagnostic methods, and sample population (Olawuyi et al., 2020; Akinola et al., 2019). However, national surveillance data remains limited, and many infections go undiagnosed and Ukwuani Local Government Area (LGA), located in Delta State, South-South Nigeria, is a semi-rural region with a growing population. Primary health care (PHC) facilities in this area serve as the first point of contact for most healthcare needs, yet they are poorly equipped for STI screening and management. Socioeconomic challenges, limited access to accurate diagnostic tools, and cultural barriers further exacerbate the spread of STIs, including *C. trachomatis*, within the community. There is currently a paucity of data on the prevalence of *C. trachomatis* infection in Ukwuani LGA, particularly among clients attending PHC facilities.

Despite the global and national burden of *Chlamydia trachomatis*, many infections remain undetected, particularly in rural and semi-urban communities in Nigeria. The asymptomatic nature of the infection in many individuals contributes to continued transmission and long-term reproductive complications. The absence of routine screening and limited diagnostic capacity in PHC centers pose serious challenges to the early detection and management of the disease. In Ukwuani LGA, Delta State, there is currently no documented evidence on the prevalence of *C. trachomatis*, hindering local public health efforts and policy development.

Aim of the Study

The aim of this study was to determine the prevalence of *Chlamydia trachomatis* infection among women and men attending selected primary health care facilities in Ukwuani Local Government Area, Delta State, Nigeria.

Objectives of the Study

- i To determine the overall prevalence of *Chlamydia trachomatis* infection among participants attending selected primary health care facilities in Ukwuani Local Government Area, Delta State, Nigeria.
- ii To determine the prevalence of *Chlamydia trachomatis* infection according to socio-demographic profile among participants in the primary health facilities in the Ukwuani LGA, Delta State.

MATERIALS AND METHODS

Study Area

The study area for this research was the Primary health Care centers (PHCC) in Amai, Umutu, Obiaruku and Obinomba in Ukwuani Local Government Area of Delta State, Nigeria.

Research Design

This community-based, cross-sectional study was to determine the prevalence of *Chlamydia trachomatis* infection among women and men attending selected Primary Health Care facilities in Ukwuani Local Government Area, Delta State, Nigeria.

Research Instrument

Self-structured questionnaire was used to collect information of the age, gender, occupation and education of the target subjects.

Informed consent

In compliance with the Helsinki declaration and guidelines for human experimentation, each person is asked for their informed consent before participating.

Study Population

Patients who register at the designated Primary Health Care centres and are willing to participate in the test were allowed to participate in the study. The research was conducted between January 2023 to January, 2025.

Sample size determination

The Fischer method (2006) was used to determine the sample size at 0.05 significant. The sample size determination was for each of the PHCC in Ukwuani L.G.A, Delta state.

levels.

$$N = z^2pq/d^2$$

Where:

N= Desired sample size

z= Standard normal deviate set at 1.92

P=Proportion in the target population estimated to have a particular characteristic.

q= 1-p (either the patient has or does not have the characteristics)

d= Degree of accuracy set at 0.05.

Substituting the numbers into the formula

$$N = 1.92 \times 820 \times 0.5$$

$$0.52$$

$$= 3.61 \times 830 \times 0.5$$

$$0.0025$$

$$= 1498.15$$

$$0.0025$$

$$= 499.260$$

The calculated sample size N was approximately 500 participants each from Amai, Umutu, Obiaruku and Obinomba PHCC. Hence, the total participants were 2000.

Ethical Consideration

Ethical permission was obtained from the ethical committee of the Delta State Ministry of Health and the directors of the health facilities where specimens were collected (see appendix).

Sample Collection

A total of 2,456 blood and endocervical samples were randomly collected from patients visiting the Primary health Care centers in Amai, Umutu, Obiaruku and Obinomba in Ukwuani Local Government Area of Delta State, Nigeria. The samples were collected in two (distinct) different seasons (dry and wet season) zone. Self-structured questionnaire was used to collect the patients socio-demographic profile.

Blood Sample Collection

Venous blood samples were collected (according to the method described by Cheesbrough, 2006) from consenting male and female participants attending selected Primary Health Care facilities within the study area. The procedure was conducted by trained laboratory scientists in accordance with standard biosafety and ethical guidelines.

Endocervical Sample Collection

Endocervical swab samples were collected (according to the method described by Cheesbrough, 2006) from consenting female participants attending the selected primary health facilities. The procedure adhered to standard clinical and biosafety guidelines to ensure accuracy and participant safety. Participants were informed of the procedure, and informed consent was obtained prior to sample collection. Women were asked to avoid vaginal douching, sexual intercourse, or the use of intravaginal medications for at least 24 hours before sampling. Sampling was done mid-cycle, avoiding menstruation whenever possible.

Giemsa Staining Technique

Smears were made from the endocervical swabs and materials collected from yolk sac of embryonic eggs. The smears were allowed to dry in open air and fixed for 3 minutes using methyl alcohol. The smears were again air dried and stained with the Giemsa stain. The stain was left on the smears for one hour after which they were washed, air dried and observed for chlamydia and chlamydia inclusion bodies under the oil immersion objective lens (Krivoshein, 1989).

Chlamydial Rapid Test

Commercially available chlamydia rapid test kit (Immunocomb, New york, USA) was used. The principle of the test is based on immunochromatographic assay, which utilizes a unique combination of monoclonal antibodies (IgM) to selectively identify *Chamydia trachomatis*

Statistical Analysis

The collected data was entered into Microsoft excel spread sheet and exported into SPSS version 30. Statistical analysis (Chi-square test) was used to determine the degree of association between infection and participant demographic profiles and seasonal variation of *Chlamydia trachomatis* infection.

RESULTS

Table 1 shows the overall prevalence of Chlamydia trachomatis in the four Primary Health Care Centres in Ukwuani L.G.A, Delta State. A total of 820 (33.4%) prevalence was recorded. Amai PHCC recorded 198 (39.6%), Umutu PHCC recorded 196 (31.4%), Obiaruku PHCC recorded 193 (30.6%) while Obinomba PHCC recorded 233 (33.2%). Chi-square analysis differed significantly ($\chi^2= 42.6$, $df=3$ $p<0.05$).

Table 1: Overall prevalence of *Chlamydia trachomatis* infection in selected PHCC in Ukwuani.

Names of selected PHCCs	Total Examined	No. positive (%)
Amai PHCC	500	198 (39.6)
Umutu PHCC	625	196 (31.4)
Obiaruku PHCC	630	193 (30.6)
Obinomba PHCC	701	233 (33.2)
Total	2456	820 (33.4)

($\chi^2= 42.612$, $df=3$ $p<0.05$).

Table 2 show the sex-related prevalence of *Chlamydia trachomatis* infection in selected PHCCs in Ukwuani L.G.A. in Amai PHCC, prevalence was 67 (31.3%) male and 131(45.8%) among female participants. Umutu PHCC recorded 81(29.6) male and 115(32.8) female. Obiaruku PHCC recorded 77(24.8) male and 116(36.4) females. *Chlamydia trachomatis* infection was higher among female participants than their male counterparts. Chi-square analysis was significant different ($\chi^2= 233.6$, $df=3$ $p<0.05$).

Table 2: Sex-related prevalence of *Chlamydia trachomatis* infection in selected PHCCs in Ukwuani L.G.A.

Name of Hospital	Sex	No. Examined	Sex of positive cases	No. Positive (%)
Amai PHCC	M	214	M	67(31.3)
	F	286	F	131(45.8)
Umutu PHCC	M	274	M	81(29.6)
	F	351	F	115(32.8)
Obiaruku PHCC	M	311	M	77(24.8)
	F	319	F	116(36.4)
Obinomba PHCC	M	309	M	85 (27.7)
	F	392	F	148 (37.8)
Total	M	1108	M	310 (28.0)
	F	1348	F	510 (37.8)
	M + F	2456	M + F	820 (33.4)

($\chi^2= 42.612$, $df=3$ $p<0.05$).

Table 3 shows low prevalence of *Chlamydia trachomatis* infection at age 36-40 years (24.6%) which increased to 28.6% among age group 31 – 35. The highest prevalence (46.0%) was recorded in age group 21 – 25, while slightly high prevalence was recorded in 16-20 years (31.9%) and 41-45 years (31.0%). Chi square analysis reveals that the association between prevalence of *Chlamydia trachomatis* infection and age group was significant ($\chi^2 = 26.04$; $P<0.05$).

Table 3: General pattern of distribution of *Chlamydia trachomatis* infection by age and sex among participants in selected PHCCs in Ukwuani L.G.A, Delta State

AGE	Male		Female		Total examined	Total positive (%)
	No. examined	No. positive (%)	No. examined	No. positive (%)		
16 – 20	173	41 (23.7)	188	74 (39.3)	361	115 (31.9)
21 – 25	222	96 (43.2)	239	116 (48.5)	461	212 (46.0)
26 – 30	224	66 (29.4)	241	96 (39.8)	465	162 (34.8)
31 – 35	210	51 (24.3)	238	77 (32.3)	448	128 (28.6)
36 – 40	195	39 (20.0)	281	78 (27.8)	476	117 (24.6)
41 – 45	84	17 (20.2)	161	63 (39.1)	245	76 (31.0)
Total	1108	310 (28.0)	1348	510 (37.8)	2456	833 (33.4)

($\chi^2 = 26.04$; $P<0.05$).

Table 4 shows the prevalence of *Chlamydia trachomatis* Infection according to marital status among participants in selected PHCCs in Ukwuani L.G.A, Delta State. High prevalence (53.5%) was recorded among the single unmarried participants. A slightly high prevalence (33.1%) was recorded among the separated/divorced participants while low prevalence (24.9%) was recorded among the married participants. Chi-square analysis showed significant association between marital status and *Chlamydia trachomatis* infection ($\chi^2 = 41.23$; $P<0.05$).

Table 4: Overall prevalence of Chlamydia trachomatis Infection according to marital status among participants in selected PHCCs in Ukwuani L.G.A, Delta State.

Marital status	No. Examined	No. positive (%)
Single	639	342 (53.5)
Married	1506	375 (24.9)
Separated/divorced	311	103 (33.1)
Total	2456	820 (33.4)

DISCUSSION

The study revealed that 33.4% prevalence of *Chlamydia trachomatis* infection was recorded in selected PHCCs in Ukwuani L.G.A, Delta State. Ikeme et al. (2011), in their study on 'Seroprevalence of Chlamydia trachomatis in Enugu' however reported an overall prevalence of *C. trachomatis* in the population studied was 29.4%. Which is less than the level reported in the present study. Bamikole et al. (2020) in their study on 'The prevalence of chlamydia trachomatis amongst asymptomatic pregnant women in four local government areas of delta state' reported that the prevalence was highest in the subjects from Warri North LGA (29.03%), while the least prevalent was the subjects from Warri South (20.04%). Wariso et al. (2012) also reported that of the 400 sexually active participants, 44 tested positive (prevalence rate of 11%) for Chlamydia trachomatis. Some of the associated risks factors identified were, having multiple sexual partners especially in the last 90 days, irregular contraceptive usage and past history of sexually transmitted infections. Ikeme et al. (2011) also reported an overall prevalence of *C. trachomatis* in the population studied was 29.4%. Danagogo et al. (2023), the overall sero-prevalence of *C. trachomatis* in the among healthy volunteers was 10%, while that of HIV patents was 12.7%. Fagbolagun et al. (2025), also reported the prevalence of chlamydia trachomatis infection was 10% in infertile participants. Also, Bamikole et al. (2020) in their study on 'The prevalence of chlamydia trachomatis amongst asymptomatic pregnant women in four local government areas of delta state' reported that the prevalence was highest in the subjects from Warri North LGA (29.03%). This reported prevalence is also less than that reported in the present study. The variation observed between the present study and others could be as a result of difference in locations. Having a high prevalence value here is Delta state is similar to the observation in the current report. This probably suggest that Chlamydia infection is endemic in Delta State of Nigeria.

The current study also that demographic variables have influence on the prevalence of Chlamydia infections. The study revealed that Sex-related prevalence was 31.3% for male and 45.8% for female participants. *Chlamydia trachomatis* infection was higher among female participants than their male counterparts. This disagrees with the findings of Yunusa et al. (2025), who reported that *C. trachomatis* infection rate was higher among fertile men (66.7%) than among fertile women (23.1%). They further added that infertile divorced patients (14.3%) had a higher rate of infection than the single fertile patients (8.8%) and married patients (5.2%). The variations observed among the reports might be as a result of location difference. High prevalence (53.5%) was recorded among the single unmarried participants, while low prevalence (24.9%) was recorded among the married participants. This contradicts the findings of Nwankwo & Sadiq (2014) who reported that married patients were associated with higher infection rate than single, and divorced patients (Nwankwo & Sadiq, 2014).

The study further revealed that a low prevalence of *Chlamydia trachomatis* infection at age 36-40 years (24.6%) which increased to 28.6% among age group 31 – 35. The highest prevalence (46.0%) was recorded in age group 21 – 25. This is in agreement with the findings of Nwankwo & Sadiq (2014), who reported in their study revealed that the highest prevalence was found in 25 – 29 yrs (17.1%). Ikeme et al. (2011) reported that the highest percentage of seroprevalence was 28 (33.3%) in the age group of 20-24 years for the student population and 18 (21.4%) in the age group of 25-29 years for the non-student population. Bamikole et al. (2020) in their study Women aged 26 – 30 had the highest prevalence (38/93) (40.86%), while prevalence was least in women aged 41 – 45 (3/93) (3.23%). There was no significant difference in number of infected pregnant women in the four Local Government Areas.

CONCLUSION

In conclusion, the study revealed that 33.4% prevalence of *Chlamydia trachomatis* infection was recorded in selected PHCCs in Ukwuani L.G.A, Delta State. It also showed that demographic variables have influence on the prevalence of Chlamydia infections, and that a low prevalence of *Chlamydia trachomatis* infection was recorded at age 36-40 years 24.6% which increased to 28.6% among age group 31 – 35. The highest prevalence (46.0%) was recorded in age group 21 – 25.

RECOMMENDATIONS

The local Government authorities should help improve the healthcare system of the LGA so as to assist in lowering the prevalence. The understanding of the demographic factors that influence the prevalence of the infection should be further studied so as to make policies that can help control the prevalence of Chlamydomonas.

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