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Prevalence of genital chlamydia trachomatis infection in females of reproductive age in a tertiary health centre in Nigeria

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ABSTRACT

Introduction: Chlamydia trachomatis infection is one of the commonest sexually transmitted infections that cause pelvic inflammatory disease. While more than 50% of women with Chlamydia cervicitis are asymptomatic, the long-term sequelae on the reproductive potential of the population are enormous. Chlamydia infection can be effectively treated with antibiotics but there is no screening programme to identify infected individuals in Nigeria.

Materials and Methods: A descriptive cross-sectional study to determine the prevalence and pattern of Chlamydia trachomatis infection and its relationship with infertility among 420 women of reproductive age seen at the Department of Obstetrics and Gynaecology, National Hospital, Abuja, Nigeria. Sociodemographic information of the women was obtained after which their endocervical specimens were taken and tested for the presence of Chlamydia trachomatis using the Onsite Chlamydia Antigen Rapid Test. Results were analyzed using SPSS version 21.0. Student's t-test and Chi-square test were used as appropriate. P value < 0.05 at 95% Confidence Interval was regarded as statistically significant.

Results: The prevalence of genital Chlamydia trachomatis was 11.4% with the highest rate (12.9%) among women between the ages of 30 to 39 years. Although higher genital Chlamydia trachomatis infections exist among women with the history of infertility, multiple sex partners, early coitarche and married marital status, these findings were not statistically significant.
Conclusion: Community health education and development of routine screening and treatment of genital Chlamydial infection is important to reduce the enormous burden of this disease, and is hereby recommended.

KEYWORDS: Genital Chlamydia infection, Reproductive age, endocervical smears, Abuja, Nigeria.

Introduction

Chlamydia infection can cause disease in many systems, including the genitourinary tract [1]. The commonest infection in humans is caused by Chlamydia trachomatis, while Chlamydia pneumoniae causes atypical pneumonia; the third species, Chlamydia psittaci causes zoonotic disease in birds [1, 2]. Chlamydia trachomatis is an obligate intracellular parasite that affects columnar cells of the cervix, urethra and the rectum as well as non-genital organs like the lungs and the eyes [1, 3]. It is the commonest cause of sexually transmitted infections (STIs) worldwide, responsible for over 1 million infections annually in USA [3, 4]. It affects women in the younger reproductive age group between 15 and 29 years. It is mostly asymptomatic in up to 80% of the women infected, hence it can pass undetected. When it affects the salpinges, it can lead to pelvic inflammatory disease (PID) and infertility [1, 5-7].

Adolescent females are three times more vulnerable to Chlamydia trachomatis infection than adult women because their squamocolumnar junction (SCJ) is on the ectocervix [8]. The bacterium spread through sexual contact with 25% chance per coitus to an uninfected female [1-3]. Vertical transmission among 50 – 60% infected women results in conjunctivitis (most cases) or pneumonia in 10 – 20 % of cases. The incubation period is 1 – 3 weeks and largely asymptomatic but when symptoms occur, it includes mucopurulent vaginal discharge, vaginal bleeding, post-coital bleeding and dysuria [1, 3].

Screening for Chlamydia trachomatis is therefore recommended for the following high-risk groups including women in the age group of 25 years and below, those with the history of previous Chlamydia trachomatis infection and/or other STIs, those with the new sex partner or multiple sex partners, single marital status and those in poor socio-economic conditions. In addition, other risk

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factors for Chlamydia trachomatis are inconsistent condom use and non-white race [1, 3, 5].

In the last two decades, diagnosis of Chlamydia infections has evolved from the antigen-antibody reaction and cell culture, both of which have low sensitivity to a sophisticated nucleic acid amplification tests (NAATs) which has high sensitivity and specificity of 90% and 99% respectively irrespective of sampling source - cervical swab or urine[3, 4]. The latter tests remain the mainstay nowadays due to ease of specimen collection and management, as well as the ease of screening sexually active men and women.

The prevalence of this largely asymptomatic disease varies from one environment to the other. In Calabar, a prevalence rate of 22% among infertile women was reported [7]. It was very high in the age range of 18 – 25 years [7] and this compares well with 22.5% found among gynaecological patients in Khartoum Teaching Hospital, Sudan [8]. The high prevalence of 56.1% reported in Jos [5] was similar to 51% found among pregnant and non-pregnant women and their spouses attending prenatal and antenatal clinics at the College of Medicine, University of Lagos [9]. In actual fact, there is a wide geographical variation in the reported prevalence rates of Chlamydia infections in Nigeria, with authors reporting rates between 22% - 56.1% [5, 7, 11-13].

Chlamydia infections are treated with tetracyclines (doxycycline and tetracycline) in non-pregnant women; and clindamycin and azithromycin during pregnancy [8].

Screening for Chlamydia trachomatis infection is generally not routinely done in Nigeria which has contributed to the paucity of data about information on the burden of this infection [10]. This study, conducted among the attendees of the gynaecological clinic of the National Hospital, Abuja, North Central Nigeria, determined the prevalence and pattern of Chlamydia trachomatis infection. The study also determined the relationship between infertility and Chlamydia infections among the attendees.

Materials and Methods

This descriptive cross-sectional study was carried out at the Gynaecological Department of the National Hospital Abuja (NHA). The NHA is a 500 – bed capacity hospital, with an annual gynaecological clinic attendance of approximately 3500 patients. The NHA is a tertiary health centre equipped with the state-of-the-art laboratory units and services that include In-Vitro Fertilization and reproductive health services. Permission to carry out the study was obtained from the NHA Research and Ethics Committee. A minimum sample size of 420 was calculated using the statistical formula of Fisher; n = Z2 [P (1- p)] / d2 after making allowance for 10% attrition. All willing eligible women who attended the gynaecological clinics at the NHA were interviewed to participate in the study. Demographic information was obtained using a designed proforma/data extraction form. Endocervical swabs taken from the sample population was processed using "Onsite Chlamydia antigen Rapid test (San Diego, CA 92121USA)" which is a lateral flow immunoassay for qualitative detection of Chlamydia trachomatis antigen in human endocervical and endourethral swab specimen. Data generated was then analyzed using SPSS version 21.0. Student's t-test or Chi-square test was employed as appropriate. P-value <0.05 at 95% confidence interval was regarded as being statistically significant.

Results

Genital Chlamydia trachomatis was found in 48 subjects (11.4%). And this was distributed across all reproductive age groups from 20 years and above. No subject in the age range of 15 – 19 years was infected with Chlamydia trachomatis. The lowest rate of 8.3% was found among women between the ages of 25 -29 years, while the highest rate of 12.9% was seen among women in the age range of 35 – 39 years. Table 1.

One hundred and forty-eight subjects (35%) had the history of infertility out of which eighteen women (12.2%) were positive for genital Chlamydia trachomatis. Only 21 (10%) subjects with no history of infertility had the infection. Some non-responders on the history of infertility (61 women) were also found to have an infection rate of 14.8% (Table 1). Other sociodemographic distributions of the Chlamydia trachomatis were as shown in Table 1.

The majority of the patients were literate, up to the tertiary level of education (78.3%), whereas, only 0.7 % had primary education, and 3.1% had no formal education at all. Most (45.7%) of the subjects were nulliparous, while 14.3% were primiparous. Only 4.8% of the respondents were para- five and above.

More than seventy-five per cent of respondents were married. Thirty-nine patients (12.1%) were positive among the married women and 9.5% among the single unmarried ones. There was no positive result among the three divorcees. Table 1.

About 70% of subjects had used condom occasionally or always, while, only 30% had ever used oral contraceptive pills. Higher rates of genital Chlamydia infection (13.3%) were found among women with three or more lifetime sex partners and those who did not respond on the number of lifetime sex partners, whereas, five out of the seventy respondents with two-lifetime sex partners were positive for Chlamydia with the lowest rate of 7.1%. Table 1.

The average age at first sexual intercourse was 21.8 years with a range of 9 to 40years. Twenty-five per cent of women who had their first sexual debut at less than fifteen years of age were positive and this declined with increase in the age of first coitus up to the age of 20 - 24 years (8.5%). Nine women whose ages were between 25 and 29 years tested positive (14.3%). Table 1.

Figure 1 is the Pie chart of the ethnic distribution of the subjects. The minority ethnic groups of Ebira, Igala, Idoma, Edo and Ishan constituted the major subjects in this study. This was followed by the Igbo ethnicity (34.5%) and Yoruba (13.8%) and Hausa (11.9%). The native Gbagi ethnic group accounted for only 1.0%. Six patients (1.4%) did not disclose their ethnicity.

Further analyses showed that age groups (P =0.224), infertility history (P= 0.199), marital status (P= 0.199), number of sexual partners (P= 0.213) and the onset of sexual activity (P =0.220) were not significantly related to genital Chlamydia infection. Also, cross-tabulation of infertility history against the outcome of the Chlamydia test result did not show any significant relationship (P =0.549) between Chlamydia infection and infertility history (P=0.5490).Tables 2 & 3

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Table 1: Prevalence of Chlamydia trachomatis infections in relation to some socio-demographic variables

Variables	No Examined N=420	No Positive N=48	% Positivity
Age Groups			
15 – 19	0	0	0
20 – 24	16	2	12.5
25 – 29	72	6	8.3
30 – 34	119	15	12.6
35 – 39	101	13	12.9
40 – 44	112	12	10.7
Infertility History			
No response	61	9	14.8
Absent	211	21	10.0
Present	148	18	12.2
Marital status			
Single	95	9	9.5
Married	322	39	12.1
Divorced	3	0	0
No of sexual partner(s)			
One	147	16	10.9
Two	70	5	7.1
Three and above	188	25	13.3
No response	15	2	13.3
Age of onset of sexual activity in years			
Below 15	8	2	25.0
15 – 19	86	13	15.1
20 – 24	189	16	8.5
25 – 29	63	9	14.3
30 and above	23	3	13.0

Table 2: Factors associated with Chlamydia infection.

Variables	Chlamydia Test results: Negative N=372	Positive N=48		
Variables	**df**	**χ^2**	**LR**	**P-value**
Age Group	25	30.000	21.501	0.224
Infertility History	4	6.000	6.592	0.199
Marital status	4	6.000	6.592	0.199
No of sexual partner	9	12.000	11.090	0.213
Age of onset of sexual activity	16	20.000	16.094	0.220

N= Number, LR= Likelihood ratio.

Table 3: Cross tabulation of prevalence of Chlamydia test result with history of infertility.

Variables	Chlamydia Test results: Negative N=372	Positive N=48	df	χ^2	LR	P-value
No response	52	9				
History of infertility absent	190	21				
History of infertility present	130	18	2	1.199	1.167	0.549

N= Number, LR= Likelihood ratio.

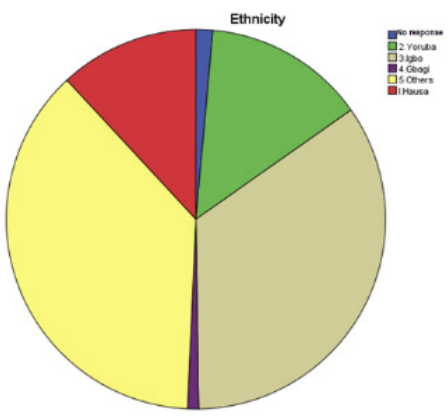

Figure 1. Pie chart showing the ethnic distribution of the subjects

Discussion

The prevalence of genital Chlamydia trachomatis infection in this study was 11.4%. This is far lower than the respective 56.1% and 38.3% reported by Mawak et al [5] in Jos and Ikeme et al [13] in Enugu. The lower burden in this study compared to those of Mawak et al and Ikeme at al was probably due to the cosmopolitan nature of our setting and the better health-seeking behaviour and judicious antibiotic usage by our clientele. Our patients were also of higher literacy level compared to those in Jos and Enugu. Higher educational level impacts on the health- seeking behaviour including getting diagnosed and having been treated for Chlamydia infection.

Contrariwise, the prevalence of 11.4% in this study was higher than the 6.7% by Ewuru and Umeh in Owerri, Southeast Nigeria and the 2.6% by Ghazal – Aswad et al in United Arab Emirate (UAE) [2, 14]. While male subjects were included in Owerri study, the larger sample size in UAE study could explain the differences in this study and those of others [2, 14]. The better health-seeking behaviour among the patients in the Middle East could also contribute to the observed lower Chlamydia trachomatis infection.

However, the prevalence of 11.4% of Chlamydia trachomatis infection in this study compares closely with 9.8% in Abeokuta [15] and the 11.4% in Quebec, Canada [16].

The highest prevalence of Chlamydia trachomatis within the age group of 30 -39 years in this study compares with Abeokuta study [15] but was higher than the 25-29 year age group reported by Mawak et al in Jos [5] and Nwankwo and Sadiq in Kano [11].

The higher prevalence of the Chlamydial trachomatis infection in the age group of 30-39 years also contrasts with the findings in Owerri [2] and in Nnsuka [17] where a higher infection was found in the age groups of 20-29 years and 15-24 years respectively. We suggest that the different gynaecological symptoms and the different modalities for recruitment into the different studies to be responsible for these differences.

The Igbo ethnic group constituted the largest single ethnicity and also has the highest prevalence rate of infection in this study. While Igbo also formed the major ethnic group in a similar study in Port Harcourt; a higher Chlamydia trachomatis infection rate was however reported among the native Ibibio [18].

The higher burden of Chlamydia trachomatis among married women as compared to spinsters in this study is similar to the findings in the studies by Mawak et al [5] and Nwankwo and Sadiq [11]. However, it contrasts with the findings in Jos whereby a higher infection burden was found among the divorcees [5]. The higher possibilities of polygamous relationships and multiple sexual partners may have accounted for the higher burden among the divorcees in the Jos study.

The finding of a high (13.3%) rate of Chlamydial infection among three or more sexual partners in this study is similar to other studies [7, 12, 16-19]. Many other earlier researchers have also reported a high prevalence of Chlamydia infection among women of multiple sexual partners including those of Inyang-Etoh et al [7], Ikeme et al [12], Levallois et al [16], Dibua et al [17] Ugbonna et al [18] and Boisvert et al [19].

However, we also found a lower (7.1%) rate of infection in women of

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2 sex partners as compared to 10.9% among those with one sexual partner. We call for further studies to elucidate this finding.

Furthermore, the highest rate of infection among one in every four subjects who have had their first sexual intercourse at the age of 15 years or less also compares with the finding in Port Harcourt [18], which showed a high prevalence among 14 years or less.
In this study, Chlamydia infection was also higher among infertile (12.2%) compared to fertile (10.0%) subjects, but, this was not statistically significant.

Similar higher rates of Chlamydia infection was also reported among infertile patients compared to fertile patients in the studies by Malik et al (28.1% vs 3.3%) [6], Inyang – Etoh et al (22.0% vs 2.0%) [7], and Tukur et al (38.3% vs 13.3%) [13]. The differences in the studied population subsets, the study designs and methods of Chlamydial infection detection could account for these subtleties.

Conclusion

In conclusion, the prevalence of genital Chlamydia in National Hospital Abuja is 11.4% and the highest rate was found among females of 30 – 39 years of age. While higher infection rates are seen among subjects with the history of infertility, multiple sex partners, early coitarche and married marital status, these findings were not statistically significant.

A multi-centre or community-based study with DNA study done for molecular typing is recommended in the Federal Capital Territory. Community health education and development of routine screening and treatment of genital Chlamydia infection is important to reduce the enormous burden of this disease and is hereby recommended.

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