Prevalence of *Chlamydia trachomatis* infection among patients attending infertility and sexually transmitted diseases clinic (STD) in Kano, North Western Nigeria.

Nwankwo E. O[1], Magaji N Sadiq[2]

1. Department of microbiology, Kogi State University, Anyigba.

2. Department of Medical Microbiology, and Parasitology, Aminu Kano Teaching Hospital (AKTH), Kano

Abstract

Background: *Chlamydia trachomatis* is the most common bacterial sexually transmitted disease in the world with severe complications. The aim of this study was to determine the prevalence and possible risk factors of *C. trachomatis* in Kano. There is dearth of information on this subject in this locality.

Method: Urine samples, Endocervical swabs and Urethral swab were collected from consecutive patients attending the Infertility and STD clinics in Aminu Kano Teaching Hospital (AKTH) between June and December 2012, after administering a questionnaire by the attending physician and also obtaining an informed consent.Samples were analyzed using Diaspot Chlamydia kit, a rapid immunoassay test for the detection of genital chlamydial antigen in urinogenital samples.

Results: A total of 125 consecutive samples were collected, comprising 69 females and 56 males aged between 14 – 55 years. Twelve samples tested positive for *C. trachomatis* antigen giving a prevalence rate of 9.6%. The age group prevalence were as follows 25 – 29 yrs (17.1%), 20 – 24 (16.7%), 15 – 19 (12.5%), 30 – 34 (11.1%) and > 49 years (9.0%). Married patients were associated with higher infection rate than single (8.3%), and divorced patients (33.3%). A higher percentage of the patients (95.2%) were not aware of the existence of *C. trachomatis* infection and its complications. Previous STD exposure was associated with increased risk of Chlamydia infection.

Conclusion: *C. trachomatis* infection if unchecked will continue to pose a threat to reproductive life with its established complications. Since asymptomatic cases are common in the population regular screening should be encouraged for every adult especially before commencement of marital life.

Key words: *Chlamydia trachomatis*, Prevalence, risk factors, Infertility, STD, Kano.

DOI:http://dx.doi.org/10.4314/ahs.v14i3.24

Introduction

Chlamydia trachomatis is a non-motile, small Gram-negative bacterium that is an obligate intracellular parasite[1].

Genital infection caused by *C. trachomatis* is generally asymptomatic. Approximately 50% of infected males and 80% of infected females show no symptoms, but infection may cause a mucopurulent cervicitis in females and urethritis in males[2]. Commonly unrecognized and often poorly or inadequately treated, *Chlamydia* infections can ascend the reproductive tract resulting in pelvic inflammatory disease (PID) and, consequently, lead to chronic pelvic pain, ectopic pregnancy, and infertility[3].

Owing to varied characteristics of the study population and different methods used for *Chlamydia* detection, there is a wide variation in prevalence rates of *Chlamydia* infection[4]. Approximately 4 million cases of *Chlamydia* infection are reported per year in the US, with an overall prevalence of 5%[5]. In Ethiopia[6], the prevalence rate for *Chlamydia* infection of the cervix was 5.9%. Among unsuspecting women attending antenatal clinic in Benin City, Nigeria[7], a prevalence rate of 13.3% was noted, while Nwanguma *et al.*[8] reported a prevalence of 33% in asymptomatic volunteers in another Nigerian population.

In many developed countries, screening programmes for Chlamydia have been set up to reduce transmission and reproductive tract morbidity[9]. The United States Centers for Disease Control and

Corresponding author.
Nwankwo.E. O
Department of microbiology,
Kogi State University, Anyigba.
emmaonwubiko@yahoo.com

Prevention recommend annual screening of all sexually active women aged 25 or less[10], as is screening of older women with risk factors (for example, those who have a new sex partner or multiple sex partners).

Materials and methods

Participants included patients attending Infertility and STD clinics in AKTH. Informed consent was obtained from the patients after which the attending physician administered a questionnaire that had been validated by other researchers. Demographic details as well as questions on sexual behavior, such as previous exposure to STD, awareness of *C. trachomatis* infection and its complications including diagnosis at the time of attending the clinic were obtained.

A total of 125 consecutive samples comprising 69 endocervical swabs from the Infertility clinic, 53 urine and 3 urethral swabs from the STD clinic, AKTH were collected from patients between June – December 2012 and processed according to the manufacturers (Interchemical Shenzhen Ltd. China) instruction in the Microbiology laboratory Department of AKTH

Specimen collection:

The quality of specimen obtained is of extreme importance as the detection of Chlamydia requires thorough collection technique that provides cellular materials rather than just body fluid.

Sample analysis

The Chlamydia Rapid Test Device (Swab/Urine) is a qualitative, lateral flow immunoassay for the detection of Chlamydia antigen from female cervical swab, male urethral swab and male urine specimens. In this test, antibodies specific to Chlamydia antigen is coated on the test line region of the test. During testing, the extracted antigen solution reacts with an antibody to Chlamydia that is coated onto particles. The mixture migrates up to react with the antibody to Chlamydia on the membrane and generates a colored line in the test line region. The presence of this colored line in the test line region indicates a positive result, while its absence indicates a negative result. To serve as a procedural control, a colored line will always appear in the control line region, indicating that proper volume of specimen has been added and membrane wicking has occurred.

Samples were collected and processed according to the detailed instruction in the manufacturers leaflet[11].

Statistical analysis

Epi info version 6 was used for Fisher exact and chi squared analysis. Statistical significance was accepted at $P<0.05$ (95% confidence limits).

Simple percentages were used to compare rates.

Results

A total of 125 samples in all were tested for *C. trachomatis* antigen out of which 12 tested positive giving a prevalence rate of 9.6% in the study. However, a prevalence rate of 8.7% was observed from the

Infertility clinic while 10.7% was observed in the STD clinics.

The age and sex distribution of both screened and infected patients were presented in Table 1. The highest age group prevalence rate occurred in 24 – 29 (17.1%) followed by 20 – 24 (16.7%), 15 – 19 (12.5%) and > 49 years (9.0%).

Table 1: Age and Sex distribution of screened and infected patients for *Chlamydia trachomatis.*

Age (yrs)	No. Screened (%)		Total No. screened (%)	No. Positive (%)		Total No. positive (%)	Prevalence (%)
	M	F		M	F		
< 15	0 (0)	1 (1.4)	1 (0.8)	0 (0.0)	0 (0.0)	0 (0.0)	0
15 – 19	2 (3.6)	6 (8.7)	8 (6.4)	1 (16.7)	0 (0.0)	1 (8.3)	12.5
20 – 24	2 (3.6)	4 (5.8)	6 (4.8)	0 (0.0)	1 (16.7)	1 (8.3)	16.9
25 – 29	15 (26.8)	20 (29.0)	35 (28.0)	3 (50.0)	3 (50.0)	6 (50.0)	17.1
30 – 34	12 (21.4)	15 (21.7)	27 (21.6)	2 (33.3)	1 (16.7)	3 (25.0)	11.1
35 – 39	5 (8.9)	8 (11.6)	13 (10.4)	0 (0.0)	0 (0.0)	0 (0.0)	0
40 – 44	13 (23.2)	6 (8.7)	19 (15.2)	0 (0.0)	0 (0.0)	0 (0.0)	0
45 – 49	2 (3.6)	3 (4.3)	5 (4.0)	0 (0.0)	0 (0.0)	0 (0.0)	0
> 49	5 (8.9)	6 (8.7)	11 (8.8)	0 (0.0)	1 (16.7)	1 (8.3)	100
Total	56	69	125	6	6	12	

Table 2 shows the infection rate in different specimens/clinic. While a prevalence rate of 8.7% was observed in infertility clinic where endocervical swabs were used, 10.7% was seen in STD clinic where urine and Urethral samples were collected. However, there was no statistical significance. **$X^2 = 2.01$, df2 P = 0.37**

Table 2: Prevalence of *Chlamydia trachomatis* **in relation to clinical samples**

Types of Samples	No. of samples screened (%)	No. positive (%)
ECS	69 (55.2)	6 (50)
US	3 (2.4)	1(8.3)
UR	53 (42.4)	5 (41.7)
Total	125	12

$X^2 = 2.01$, df2 P = 0.37

ESC: Endocervical Swab

US: Urethral Swab

UR: Urine

Table 3 shows the prevalence of *Chlamydia trchomatis* in relation to marital status. The highest prevalence of 58.3% occurred in married women followed by divorced patients 33.3%. ($X^2 = 11.0$ df2 P <0.002)

Table 3: Prevalence of *Chlamydia trachomatis* in relation to marital status.

Marital status	No. screened (%)	No. positive (%)
Single	2 (1.6)	1 (8.3)
Married	110 (88)	7 (58.3)
Divorced	13 (10.4)	4 (33.3)
Total	125	12

$X^2 = 11.0$, df2 P< 0.002

Table 4 shows the prevalence of *C trachomatis* in relation to awareness. Majority of the patients 119 (95.2%) were not aware of the existence of *Chlamydia trachomatis* while 6 (4.8%) were aware. All 11 (91.7%) out of 12 infected persons were unaware of this infection. (Fisher exact P>0.05)

Table 4: Prevalence of *Chlamydia trachomatis* in relation to awareness.

Awareness	No. screened (%)	No. positive (%)
Aware	6 (4.8)	1 (8.3)
Not aware	119 (95.2)	11 (91.7)
Total	125	12

Fisher exact P> 0.05

Table 5 shows the prevalence of *Chlamydia trachomatis* in relation to previous STD exposure. The highest infection rate (75%) was observed in persons with previous STD exposure. ($X^2 = 5.18$ df2 P>0.07)

Table 5: Prevalence of *Chlamydia trachomatis* in relation to previous STD exposure.

Previous STD exposure	No. screened (%)	No. positive (%)
Yes	55 (44)	9 (75.0)
No	48 (38.4)	2 (16.7)
No response	22 (17.6)	1 (8.3)
Total	125	12

$X^2 = 5.18$, df2, P = 0.007

Table 6 shows the prevalence of *Chlamydia trachomatis* in relation to provisional diagnosis or health factor. The highest infection occurred in patients from the STD clinic 50%, closely followed by those for Infertility evaluation 41.7%. (X^2 = 20.6, df2 P<0.003)

Table 6: Prevalence of *Chlamydia trachomatis* in relation to clinical diagnosis.

Diagnosis	No. screened (%)	No. positive (%)
Infertility	10 (8)	5 (42.7)
STD	90 (72)	6 (50)
PID	25 (2)	1 (8.3)
Total	125	12

X^2 = 20.6, df2, P< 0.003

Discussion

Even among the educated people, knowledge of Chlamydia infection and its associated complications is very low.

The actual incidence of Chlamydia infection in developing countries is difficult to establish due to many factors. There is a socio cultural inhibition that prevents women from reporting sexual symptoms, non availability of facility to detect the organism in many health clinics and the asymptomatic nature of the disease [12, 13]. In spite of these limitations, it is still reported that there is a high prevalence of the chlamydia infection in most parts of Africa [] [14]

Laboratory methods of testing for Chlamydia include cell culture, polymerase chain reaction and enzyme immunoassay. There is a wide variation in the cost, sensitivities and specificities of these methods [3]. As a result of the different characteristics of the study population and different methods used for Chlamydia detection, there is a wide variation in prevalence rates of Chlamydia infection [4].

In the present study, the risk factors observed include age, marital status, previous history of STD, lack of awareness and provisional diagnosis on reporting to the clinic. However, significant association was found with marital status and provisional diagnosis on reporting to clinic such as infertility, STD, and pelvic inflammation disease.

These observations were consistent with the findings of other researchers in their centres . [15, 16]

The prevalence of Chlamydia infection in this finding was 9.6%. This is in agreement with the report from Ibadan 10% [17] but at variance with the findings in other part of Nigeria which showed higher figures. Two reports from Lagos had a wide margin in their observations 51% [18] and 18.2% [16] prevalence. Other reports from Jos, South Eastern parts of Nigeria, Zaria and Benin city showed prevalence rates of 51.6% [15], 40.7% [19], 38.3% [20] and 13.3%[21] respectively.

This is however in contrast to the observation from some countries such as United States of America where approximately 4 million cases of Chlamydia infection are reported annually with an overall prevalence of 5% [5] and in Ethiopia 5.9% [6].

These observed differences in prevalence rates could be due to study population and laboratory methods of identification.

In analysis of age group prevalence 24-29 yrs had the highest with 17.1% followed by 20-24 yrs in this study. These are age groups of high sexual activity and this may be responsible for high prevalence observed. Also married patients were observed to be more affected than the singles and divorced. The numbers of sexual partners may have played a role in the observed increased incidence in married ones because the study population was predominantly polygamous with some

having remarried about twice. It was however difficult to obtain information in this regard because of socio cultural inhibitions.

The observation made in the study of age group prevalence and marital status is in agreement with the findings of other researchers [15, 16]

A significant association which was seen between health factor or some disease states such as secondary infertility and sexually transmitted disease were reported by other researchers [15, 16].

A very high percentage of the patients in this study, 95.2% were completely ignorant of the existence of Chlamydia infection and consequently do not know of it associated complication.

Some researchers have observed that men constitute a large reservoir of Chlamydia infection and could repeatedly reinfect their partners without knowing it [22]. A major problem in this situation is the lack of diagnostic facilities in most laboratories to confirm genital Chlamydia infection such as ectopic pregnancy, infertility. It is suggested that a screening program should be organized by the appropriate authorities on a regular basis to check the ever presence of Chlamydia infection in the population. Secondly, all intending couples must be tested before they can start a marital life. All those found positive should be treated and counseled as a means of control of the infection.

We advocate an awareness campaign through mass education of the populace about Chlamydia infection especially, mode of transmission, complications including prevention and control. This could be done through hand bills and electronic media including regular seminars for both literate and illiterate population in the society.

Reference

1. McAdam AJ and Sharpe AH. Infectious Diseases. In: Kuma V, Abbas AK, and Fausto N. Robbins and Cotran pathologic basis of disease. 7th edition, Elsevier Sanders philadelphia, Pennsylvania 2005: 343 – 414.
2. Ingalis RR, Rice PA, Qureshi N, Takayama K, Lin JS, Golenback DT. The inflammatory cytokine response to *Chlamydia trachomatis* infection is endotoxin mediated. Infect Immun 1995;63:3125-30.
3. Ikeme A. C., Ezegwui H. U., Ikeako L. C., Agbata I., Agbata E (2001) Seroprevalence of Chlamydia trachomatis in Enugu Nigeria. Nig J clin pract, Vol 14(2):176 – 180.
4. Verkoyeen RP, Peeter MF, Van Rijsoort-Vos JH, van der Meijden WI, Marton JW. Sensitivity and specificity of three new commercially available *Chlamydia trachomatis* tests. Int J STD AIDS 2002;2:23-5.
5. Centres for Disease Control and Prevention. *Chlamydia* screening among sexually active young female enrollees of health plans-United States 2000-2007. MMWR Morb Mortal Wkly Rep 2009;58:362-5.
6. Buve A, Weiss HA, Laga M, Van Dyck E, Musonda R, Zekeng L, *et al.* The epidemiology of gonorrhea, *Chlamydia* infection and syphilis in four African countries. AID 2001;15:579-88.
7. Isibor JO, Ugbomoiko D, Nwobu GO, Ekundayo AO, Eweani IB, Okogun GR. Detection of *Chlamydial* Antigen in cervical specimens from antenatal clinic attendee in Benin City, Nigeria. Af J Clin Exp Microbiol 2005;6:208-11.
8. Nwanguma BC, Kalu I, Ezeanyika LU. Seroprevalence of anti-*Chlamydia trachomatis* IgA antibody in a Nigeria Population: Diagnostic significance and implications for the heterosexual transmission of HIV. Int J Infect Dis 2009;7:2.
9. European Centre for Disease prevention and control. Chlamydia control in Europe. ECDC, 2009.
10. CDC. Sexually Transmitted Diseases Treatment Guidelines.MMWR 2006; 55: 56 – 7.
11. Chlamydia Antigen Rapid test (Interchemical Shenzhen ltd) available on http://interchemicallab.en.ecplaza.net/9.asp
12. Okonuua F.E, Ako-Nai K.A, Dishotoghi M.D. Lower genital tract infection in infertile Nigerian women compared with controls. Genitourinary Medicine. 1995; 71:163-8.
13. Harry T.C, SaravanamuttuK.M, Rasid S, Shrestha T.L Audit evaluating the value of routine screening of Chlamydia trachomatis urethra infection in men. Int J. STD AIDS 1994; 5:374-375.
14. Okonufua FE. Infertility in sub-Saharan Africa . in: okonufue F, Odunsi K. (eds). Contemporary

Obstetrics and Gyneaocology for Developing Countries. Ed 1, Women Health and Action Research Center. Benin City, Edo State, Nigeria.2003; pp 129-156.

15. Mawak JD, Dashe N, Agabi YA, Panshak BW (2011). Prevalence of genital Chlamydia trachomatis infection among Gynaecologic clinic attendees in Jos, Nigeria. Shirez E Medical Journal, 12(2) 100-106.

16. Oloyede OAO. Fakoya TA, Oloyede AA, AlayomAM (2009). Prevalence and awareness about chamydial infection in women undergoing infertility evaluation in Lagos, Nigeria. Int j Health Res, 2(2); 157

17. Darouglar S, Forsey T, Osoba A O, Dines R J, Adelusi B, Coker G O. chlamydial genital infection in Ibadan, Nigeria. A seroepidemiological survey. Br J Vener Dis. 1982; 5; 366-369.

18. Okoror, LE, Omilabu, SA., Fadojutimi, J. and Nsongkhai, V. (2000): Seroepidemiological survey of Chlamydia in patients attending pre and post natal cilinic at the College of Medicine of the University of Lagos , Nigeria. In: Book of Absract of the 24th annual conference of the Nigerian Society of Mcrobiology.

19. Okoror LE, Agbonlahor DE, Esumeh FI, and Umolu PI. Prevalence of Chlamydia in patients attending gynaecological clinics in south eastern Nigeria. Afr Health Sci. 2007; 7 (1): 18-24.

20. Tukur J, Shittu SO, Abdul AM. A case control study of active genital Chlamydia trachomatis infection among patients with tubal infertility in northern Nigeria. Trop Doct. 2006; 36(1): 14-6.

21. Isibor JO, Ugbomoiko D, Nwobu GO, Ekundayo AO, Enweani IB, Okogun GRA. Detection of Chlamydia antigen in cervical specimens from antenatal clinics attendees in Benin City, Nigeria. African Journal of Clinical and Experimental Microbiology. 2005; 6 (3): 208-211.

22. Sule Odu AO, Fakoya TA, Odusoga OL, Olatunji AO Olusanya AO. Endocervical infection of infertile women in Sagamu, Nigeria. The Niger Med. Practitioner, 1997; 34 ($^{3}/_{4}$) : 51-53