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PREVALENCE AND RISK FACTORS FOR CHLAMYDIA INFECTION AMONG INFERTILE WOMEN IN A NIGERIAN TERTIARY HEALTH CENTRE

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ABSTRACT

Background: *Chlamydia trachomatis* is the commonest bacterial sexually transmitted infection in the world. This can cause salpingitis and pelvic inflammatory disease which may lead to infertility due to tubal obstruction. **Aim**: The aim of this study was to determine the prevalence and risk factors of Chlamydia infection among infertile women in a tertiary health centre in North western Nigeria. **Materials and method:** This was a cross-sectional study among infertile women presenting at the Gynaecology clinic of Usmanu Danfodiyo University Teaching Hospital Sokoto, Sokoto State. An interviewer administered questionnaire was used to obtain relevant information. Blood sample was obtained and subjected to the ELISA procedure using IgG kit. Data was entered and analyzed using SPSS version 22 (Armonk, NY: IBM Corp.) Chi square was used to determine association between categorical variables. A *P*-value of less than 0.05 was considered statistically significant. **Results:** The prevalence of chlamydia trachomatis infection obtained from this study was 45%. The prevalence by age showed highest prevalence among the participants aged 35 and above. However, there was no significant association between age and chlamydia infection (Fischer exact test = 8.81, *p* value = 0.317). The chlamydia infection was more among the participants in polygamous family setting but the difference was not statistically significant ($\chi^2 = 0.879$, $p = 0.762$). There was no significant relationship between the number of sexual partners and type of contraceptive use with positive *Chlamydia trachomatis* test among the participants. **Conclusion:** The prevalence of Chlamydia infection among those with infertility was high. It is more among those 35 years and above and those in polygamous setting.

KEYWORDS: *Chlamydia trachomatis*, risk factors, infertility.

INTRODUCTION

Chlamydia trachomatis infection is one of the common sexually transmitted infection in the world.[1,2] About 5-10% of women of child bearing age are infected in the United Kingdom.[3,4] Approximately four million cases of chlamydial infections are reported per year in the United States.[3] In Ethiopia, the prevalence of serological *Chlamydia trachomatis* IgG and IgM antibodies among 184 women attending a specialized hospital gynaecology clinic was 45.6% and 5.6% respectively.[5] Opoku *et al* found a prevalence of 4.8% among 1070 women at risk of genital Chlamydia and Gonococcal infections in Kumasi, Ghana using Rapid Immunoassay kit(Quickvue).[6] In most parts of Nigeria, there is paucity of information about prevalence of the organism.[7] A prevalence of 35.7% among pregnant and non-pregnant women and their spouses attending Pre and Post Natal Clinic in the College of Medicine of the University of Lagos has been reported.[8] A case controlled study from a hospital in North-central, Nigeria

found the prevalence of serum *Chlamydia trachomatis* among women with tubal infertility and the fertile pregnant women was 75.0% and 23.5% respectively.[9] In Benin, Nigeria a prevalence of 13.3% was reported among antenatal clinic attendees using an endocervical specimen for chlamydia antigen while it was negative among the controlled subjects.[10] A low prevalence of 9.6% was reported from Kano, among one hundred and twenty five participants attending infertility and sexually transmitted disease clinics using a Rapid immunoassay test for the detection of genital chlamydial antigen in urogenital samples.[11]

Chlamydia trachomatis, serovars D-K cause sexually transmitted diseases and may also produce infection of the eye (inclusion conjunctivitis). In sexually active men, it causes non-gonococcal urethritis and occasionally epididymitis. In women, *Chlamydia trachomatis* causes cervicitis, urethritis and pelvic inflammatory disease, which can predispose to ectopic pregnancy or lead to infertility.[12] Furthermore, any of these anatomic sites of infection may give rise to symptoms and signs, or may remain asymptomatic but communicable to sex partners. Up to 50% of non-gonococcal urethritis in men or urethral syndrome in women is attributed to Chlamydia.[12] It causes one of the most common sexually transmitted infections and in most cases; it gives rise to slow and insidious infection causing detrimental effects on the female genital tract.[4]

Genital *Chlamydia trachomatis* infection is a sexually transmitted disease that is spread by contact with infected sex partners. As in all sexually transmitted diseases, the presence of multiple aetiologic agents must be considered.[12] The ultimate control of all sexually transmitted disease depends on safe sex practices and on early diagnosis and treatment of infected persons.

Adverse sequel of chlamydia results from upper genital tract involvement. Salpingitis and pelvic inflammatory disease may lead to infertility due to tubal obstruction. Occasionally patients with chlamydia infection develop perihepatitis (Fitz-Hugh Curtis syndrome), an inflammation of the liver capsule and adjacent peritoneal surfaces. Hence the need to identify the risk factors in our environment so as to prevent these consequences. Several risk factors that predispose to *chlamydia trachomatis* infection have been reported which includes; number of sexual partners, previous history of sexually transmitted infections, age at coitarche, inconsistent use of condom, recent change of partner and socioeconomic factors.[13] The use of serological diagnosis of *Chlamydia trachomatis* infection which may suggests previous or ongoing infection has been incorporated into routine pretreatment evaluation of women with infertility.[14] The aim of this study was to determine the risk factors of Chlamydia infection among infertile women in a tertiary health centre in North western Nigeria.

MATERIALS AND METHODS

This was a cross-sectional study among infertile women presenting at the Gynaecology clinic of Usmanu Danfodiyo University Teaching Hospital Sokoto, Sokoto State. All infertile women within the reproductive age group who gave informed consent were included in the study until the sample size was reached. They were recruited consecutively after obtaining their informed consent.

Sample size was calculated using the following formula,

$$n = \frac{z^2\ 1\text{-}\alpha/2\ P(1-P)}{d^2}$$

This formula was use to estimate sample size for cross-sectional studies involving one group of study population.[15]

Where prevalence of *Chlamydia trachomatis* infection of 3.5%[11] from previous study was used.
n = minimum sample size.
$Z_{1-\alpha/2}$= Z statistic for level of confidence of 95%= 1.96.
p = Proportion of the population possessing the desired characteristics (0.035, deducted from prevalence of 3.5% from previous study).
d = desired precision.

$$n = \frac{3.8416 * 0.035 * 0.965}{(0.05)^2}$$

n= 51.9

50% attrition rate was added, making a sample size of 78. Therefore 80 patients were recruited. An interviewer administered questionnaire was used to obtain biodata, demographic details, sexual behaviour, infertility and history of sexually transmitted of the participants. History of possible risk factors was also obtained.

Venous blood was collected from the dorsal veins of the arm or antecubital fossa and put into a plain blood sample container. It was transported to the laboratory and immediately centrifuged at 3000 revolution per minute. The serum was then separated into a labelled plain bottle and preserved at -20^0c. The samples were then subjected to the ELISA procedure using IgG kit obtained from Inqaba biotechnical industries, South Africa. The manufacturer's instructions were followed strickly. The results were read with spectrophotometer at 450nm (measuring filter) against 620nm (reference filter). The antibody index was determined, the interpretation was as follows; a value of less than 9 was negative, 9 to 11 was equivocal and greater than 11 was positive result.

Data was entered and analyzed using SPSS version 22 (Armonk, NY: IBM Corp.) Descriptive statistics was done and presented in number & percentages/ mean & standard deviation. Chi square was used to ascertain the association betweeen categorical variables. A *P*-value of less than 0.05 was considered statistically significant. Ethical approval for the study was obtained from UDUTH health research and ethics committee. Written

and informed consent was obtained from each participant before data collection.

RESULTS

The mean age of the participants was 30 ± 6 years. Majority of the participants were Hausa and had at least secondary level of education. Majority were of low social class. Most of the participants were in a monogamous relationship (52.5%) and the mean duration of infertility was 5.36 ± 3.37 years.

The most common cause of infertility among the participants was unexplained followed by tubal factor. This is shown in figure 1.

The prevalence of chlamydia trachomatis infection obtained from this study was 45%. Among the participants, 45% had a negative result and 10% were equivocal. The prevalence by age showed highest prevalence among the participants aged 35 and above. However, there was no significant association between age and chlamydia infection (Fischer exact test = 8.81, *P* value = 0.317). This is shown in Table 1.

Table 1: Prevalence of chlamydia infection in relation to the age.

Age group(years)	Positive test n (%)	Negative test n (%)	Equivocal n (%)	Fischer exact test	*P* value
15-19	1(2.9)	1(2.8)	0(0)	8.81	0.317
20-24	7(17.1)	7(19.4)	0(0)		
25-29	9(25.7)	9(25.0)	6(75)		
30-34	9(25.7)	13(36.1)	1(12.5)		
35 and above	10(28.6)	6(16.7)	1(12.5)		
Total	36(100)	36(100)	8(100)		

The chlamydia infection was more among the participants in polygamous family setting but the difference was not statistically significant (χ^2 = 0.879, *p* = 0.762). There was no significant relationship between the number of sexual partners and type of contraceptive use with positive *Chlamydia trachomatis* test among the participants. This is shown in Table 2. Majority of the participants were asymptomatic and the commonest symptom was vaginal discharge. This is shown in figure 2.

Table 2: Risk factors for chlamydia infection.

Risk factors	Positive test n (%)	Negative test n (%)	Equivocal	Chi square	*P* value
Polygamous setting	19(52.8)	16(44.4)	3(37.5)	0.879	0.762
Monogamous	17(47.2)	20(55.6)	5(62.5)		
Multiple sexual partners	1(2.8)	0(0.0)	0(0.0)	1.846	1.000
Single sexual partner	35(97.2)	36(100.0)	8(100.0)		
Previous STD	1(2.8)	4(11.1)	0(0.0)	1.99	0.207
No previous STD	35(97.2)	32(88.9)	8(100.0)		
Contraceptive method				7.54	0.930
None	25(69.4)	24(66.7)	6(75.0)		
Implants	4(11.1)	2(5.6)	0(0.0)		
Injectables	4(11.1)	3(8.3)	2(25.0)		
Pills	2(5.6)	3(8.3)	0(0.0)		
Condom	1(2.8)	2(5.6)	0(0.0)		
IUD	0(0.0)	1(2.8)	0(0.0)		
Others	0(0.0)	1(2.8)	0(0.0)		

DISCUSSION

The prevalence of *Chlamydia trachomatis* infection found in this study is much higher than what was reported from a previous study conducted at the same centre.[16] This may be due to difference in study population and the test kit used. The previous study was conducted among general Gynaecological cases and cervical swab was taken and subjected to rapid test. The prevalence found in this study was similar to that found in a study conducted in Ethiopia which used similar serological chlamydia IgG test kits.[5] The high infection rate among participants aged 35 years and beyond contradicts the finding from previous studies were prevalence was higher among the younger age group.[11,13,17] This may be due to differences in the age of the participants in this study. However, there was no significant association between the age and *Chlamydia trachomatis* infection.

Majority of those that tested positive for *Chlamydia trachomatis* infection in this study were in a polygamous marriage but it was not statistically significant. This may be due to the fact that polygamous setting could indirectly imply having multiple sexual partners and this increases the risk of transmission of the infection. Other risk factors for chlamydia trachomatis infection like

previous history of sexually transmitted infections, number of sexual partners and contraceptive usage were all not significantly associated. Even though 69.4% of those that tested positive for *Chlamydia trachomatis* infection were not using any form of family planning method. This was contrary to what was found by Bello et al in Sokoto,[16] Ige *et al* in Zaria,[17] and Ugboma *et al* in Port Harcourt[18] where higher infection was associated with age of sexual debut, multiple sexual partners and inconsistent use of condom.

Many studies have attributed pelvic inflammatory disease (PID) as complication of *Chlamydia trachomatis* infection and an important complications of PID are ectopic pregnancy and infertility.[14,19]

In this study 25% of those that were positive for *Chlamydia trachomatis* infection had tubal factor infertility and majority (50%) were nulliparae and it was statistically significant. Most of the participants with positive chlamydia infection were asymptomatic and this was similar to what was obtained from previous studies.[19,20]

CONCLUSION

The prevalence of Chlamydia infection among those with infertility was as high as 45%. It is more among infertile women of 35 years and above and those in polygamous setting.

Recommendation: There is need to screen all women with infertility for *Chlamydia trachomatis* infection. It is recommended that those with risk factors are treated appropriately to prevent further complication. A large multicenter study is recommended in order to make the findings generalizable.

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