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Original Article

Prevalence of asymptomatic genital chlamydia trachomatis infection among infertile women in Maiduguri, Northern Nigeria.

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Abstract

Background: Chlamydia trachomatis is a well-recognized sexually transmitted pathogen which usually remains asymptomatic and therefore largely untreated with its attendant sequelae of infertility. Chlamydia trachomatis infection usually remains asymptomatic and untreated.
Studies that demonstrate the presence of chlamydia antibodies with female infertility are few in our environment, despite the well documented fact that tubal factor infertility is common and genital tract infections largely implicated.
Aim: To determine the prevalence of chlamydia trachomatis infection among infertile women attending the gynaecological clinics and also to identify associated risk factors. Study Design: This was a cross-sectional study.
Study Area: Department of Obstetrics and Gynaecology of the University of Maiduguri Teaching Hospital (UMTH), Maiduguri.
Methodology: One hundred and forty consecutive, consenting infertile patients, who satisfied the inclusion criteria of having tubal infertility as seen on Hysterosalpingography (HSG) and confirmed by laparoscopy, were recruited for the study. Women who do not have tubal infertility and non-consenting women were excluded. Socio-demographic variables such as age, marital status, educational status and parity were recorded. Sexual and reproductive risk factors including age at sexual debut, number of sexual partners, use of condoms, history suggestive of previous pelvic infections and where they sought treatment were also evaluated.
Additionally, 5mls of blood were collected from the respondents for serological assay of Chlamydia antibody titre.
Results: The prevalence of C .trachomatis antibodies amongst the infertile women was 42.9% with mean age of 28.56±5.81. All the participants were married. Most of the infertile women were childless with 88(62.9%) of them being nulliparous. Symptoms that were significantly associated with being chlamydial seropositive include abnormal vaginal discharge, dysmenorrhoea, lower abdominal pain and dyspareunia. The study showed that younger ages at sexual debut, type of family setting and having more than three lifetime sexual partners were risk factors for being seropositive for chlamydia trachomatis infection.
Conclusion: The prevalence of IgG antibody to chlamydia trachomatis was significantly high in infertile women in this study. Risk factors that showed association with infertility were also identified. This suggests that Chlamydia trachomatis infection is a potential contributor to female infertility in Maiduguri.

Keywords: Chlamydia trachomatis infection, infertility, Chlamydia antibody testing, Maiduguri.

Introduction

Genital *Chlamydia trachomatis* infection is a sexually transmitted infection (STI) of public Health importance with major burden on the female reproductive tract[1,2, 3].

Infection with the intracellular bacterium *Chlamydia trachomatis* can cause a variety of diseases in men and women including urethritis, pharyngitis, proctitis, epididymitis, and mucopurulent cervicitis with its sequelae of pelvic inflammatory disease (PID), ectopic pregnancy and tubal factor infertility. In addition, Chlamydial infection during pregnancy may cause complications such as spontaneous abortions, premature rupture of membranes, preterm delivery, low birth weight and neonatal infections including conjunctivitis and pneumonia[4, 5].

One of the most important and unappreciated reproductive health problems in developing countries is the high rate of

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infertility[6]. It is a global problem with about 60-80 million couples experiencing infertility worldwide[6,7]. Though a worldwide problem, the highest prevalence is in low resource countries, particularly in sub-Saharan Africa where infection-related tubal damage is the commonest cause [6,7,8,9]. It forms a major indication for gynaecological consultations in Nigeria. Idrisa and Ojiyi found that infertility accounted for 38.8% of all out-patients gynaecological consultations in Maiduguri [9].

Although, studies have shown that genital tract infections are largely responsible for bulk of the cases of infertility seen in Nigeria, data on the specific contribution of chlamydia trachomatis infection, the most prevalent bacterial STI are sparse[10.]This study was designed to determine the prevalence of Chlamydia trachomatis antibody titres amongst infertile patients in UMTH, since pelvic infection is common in our environment with its sequelae of tubal infertility. It is expected that the findings from this study will provide an overview of association of Chlamydia trachomatis infection and infertility in Maiduguri, Nigeria.

Material and Methods

This was a cross sectional study among infertile women the gynaecological clinics of the hospital during the period of the study.

The study was conducted in the Department of Obstetrics and Gynaecology of the University of Maiduguri Teaching Hospital (UMTH), Maiduguri, Nigeria. The UMTH, Maiduguri is a Major hospital in Maiduguri and a tertiary health institution which is a referral centre for neighbouring states in the North-Eastern geopolitical zone of Nigeria. It also serves neighbouring countries of Cameroon, Niger, Central African Republic and Chad being a border State. It is a 520 - bedded hospital.

The subjects were recruited from the population of infertile patients with proven tubal factor infertility as seen on hysterosalpingography and confirmed by Laparoscopy attending the gynaecological clinic of the hospital. Tubal factor infertility was taken as unilateral or bilateral obstruction to dye and/or hydrosalpinx. Each consecutive infertile woman that attended the gynaecological clinics and satisfied the inclusion criteria which is tubal factor infertility confirmed by hysterosalpingography were recruited until the sample size was obtained.

Upon recruitment, a data sheet containing socio-demographic variables, sexual and reproductive histories was opened. Specifically the following information was obtained: Age, marital status, educational status and parity. Other information that was obtained includes age at sexual debut, number of sexual partners, use of condoms and history suggestive of previous pelvic infection. Also the sources from which she sought treatment for any previous pelvic infection was elicited.

The subject's arms were cleansed with 70% methylated spirit and 5mls of venous blood was collected. This was done using sterile disposal hypodermic syringe and needles. The samples were taken to the microbiology laboratory immediately. All specimens were analysed in microbiology laboratory by two medical laboratory scientists and a pathologist who worked in collaboration with me. The blood specimens were allowed to retract and subsequently centrifuged over five minutes to obtain the sera which were used for the assay. Specimens that were not analysed immediately were stored in the deep freezer at 2-8^{o}C and were allowed to thaw before subsequent analysis.

The serological assay was done using the Immunocomb *Chlamydia trachomatis* 1gG kit (Immunocomb Chlamydia trachomatis Ig G, orgenics code: 50410002 Version: 410/E8 format 3 x 12 tests) [11]which is a test intended for the quantitative determination of the 1gG antibodies to *Chlamydia trachomatis* in human serum or plasma. The test is an indirect solid phase enzyme immuno assay (EIA).The solid phase is a comb with 12 projections (teeth); each tooth is sensitive at two positions-an upper and a lower spot.

The reagent test kit was brought to room temperature and then 10 micro litre of the pipetted serum was assayed with the reagent control samples for *Chlamydia trachomatis* 1gG antibodies. The procedure was allowed to run via a number of timed steps as outlined by the manufacturer[11].The results were documented as positive or negative. Titre values of 1:32 and above were regarded as positive. Those with positive results and their consorts were treated with Doxycycline for 7 days or Azithromycin 1g as a single dose.

Approval for the study was obtained from the research and ethical committee of the hospital. The study was carefully explained to the subjects and their informed consent obtained before being recruited into the study.The sample size was calculated based on known *Chlamydia trachomatis* infection prevalence rate of 9% reported by Amin JD et al [12]using the formula by DW Taylor[13].

Results

A total of 140 women were recruited into the study. The analyses of the data are presented in tables 1-4.

The mean age for the study group was 28.56 ± 5.81 years amongst the infertile women. The age range for the study population was 18-42 years.

All the Participants in the study population were married. Majority of the infertile women had less than tertiary education with 50(35.7%) and 43(30.7%) attaining primary and secondary level of education respectively.

A total of 88(62.9%) of the infertile women were nulliparous, while 48(34.3%) and 4(2.9%) were multiparous and grand multiparous respectively. The mean duration of infertility was 5.2 years and the maximum duration of infertility seen in the study was 15 years. In 18(12.6%) of the cases, the duration of infertility was 10 years or more. Among the infertile women, 62.1% had secondary infertility.

The mean age at sexual debut for the infertile women was 15.83 ± 3.14 years.

Table 1: Socio demographic Characteristics of the Study Population (N=140)

Characteristics	Frequency N	Percentages(%)
Age (Years)		
15-19	**5**	**3.6**
20-24	**36**	**25.7**
25-29	**42**	**30.0**
30-34	**35**	**25.0**
35-39	**16**	**11.4**
≥40	**6**	**4.3**
Education		
Primary	**50**	**35.7**
Secondary	**43**	**30.7**
Tertiary	**36**	**25.7**
No formal education	**11**	**7.9**
Parity		
Nulliparous	**88**	**62.9**
1-4	**48**	**34.3**
≥ 5	**4**	**2.9**
Marital Status		
Single	**0**	**0**
Married	**140**	**100**

Among the infertile women, 60(42.9%) reported having had three or more lifetime sexual partners which was statistically significant (χ^2=45.31, P=0.000). Amongst the infertile women, 118(84.3%) had never used condoms before. This was statistically significant (χ^2=45.78, P=0.000). Furthermore, 80(57.1%) of the infertile cases were currently in a polygamous marriage setting compared to 50(35.7%) of infertile women in Monogamous setting. This difference was statistically significant (χ^2=12.92; p=0.000). These results of sexual characteristics are depicted in table 2.

Table 2: Sexual behavioural characteristics of study population (n=140)

Characteristics	Frequency (n)	Percentage (%)	P-value
Age at sexual debut (years)			
≤ 15	**90**	**64.3**	**0.000**
16-20	**30**	**21.4**	**0.000**
21-25	**11**	**7.9**	**0.217**
26-30	**9**	**6.4**	**0.077**
MEAN AGE:	**15.83±3.14**		
No of lifetime sexual partners			
1 or 2	**80**	**57.1**	**0.000**
≥ 3	**60**	**42.9**	**0.000**
Condom use			
Never used	**118**	**84.3**	**0.000**
Used (occasionally or always)	**22**	**15.7**	**0.000**
Family setting			
Monogamous	**60**	**42.9**	**0.000**
Polygamous	**80**	**57.1**	**0.000**

Table 3: Symptoms and treatment sources (n=140)

Characteristics	Frequency N	Percentages (%)	P-value
Symptoms			
Vaginal discharge	**69**	**49.3**	**0.000**
Lower abdominal pain	**49**	**35.0**	**0.000**
Dysmenorrhea	**41**	**29.3**	**0.000**
Dysuria	**32**	**22.9**	**0.560**
Intermenstrual bleeding	**7**	**5.0**	**0.198**
Dyspareunia,	**9**	**6.4**	**0.077**

Treatment sought			
Hospital Based	**29**	**20.7**	**0.260**
Non hospital Based	**40**	**28.6**	**0.000**

Among the infertile women, dysuria was reported in 32(22.9%), vaginal discharge in 69(49.3%), lower abdominal pain in 49 (35.0%), dyspareunia in 9 (6.4%), dysmenorrhoea in 41(29.3%) and inter-menstrual bleeding in 7(5.0%) of the cases.

Infertile women were significantly less likely to report that they sought treatment in formal sector of health care (private or public Hospital) than the fertile controls. Only 29(20.7%) of the infertile cases had hospital based

Among the infertile group, 60 of the women had positive titres for serum chlamydia antibodies giving a prevalence of 42.9 %.

Table 4: Prevalence of chlamydia antibodies in study population(n=140)

Result	Cases	
	Frequency (n)	**Percentage (%)**
Positive	**60**	**42.9**
Negative	**80**	**57.1**

Discussion

The study demonstrated that a considerable number of patients with infertility showed evidence of past Chlamydial infection. Within the study period, a total of 60 out of the 140 infertile cases had positive titres for chlamydial antibodies giving a prevalence of 42.9%. This is similar to earlier reports which showed chlamydial antibodies to be commoner in infertile women compared with controls[14-18].

Most of the infertile cases had lower level of education (primary, secondary), with tertiary level of education offering significant risk reduction. Women with lower level of education are more likely to acquire genital tract infection that could lead to infertility because they are less likely to have access to sexual and reproductive health information that could reduce the risk of acquiring chlamydia trachomatis infection. Furthermore, those with lower level of education are more likely to seek inappropriate care (due to lack of knowledge and financial power) which could predispose them to infertility. Thus, as infertility caused by sexual transmission is preventable, increasing women's access to sexual and reproductive health information and services especially to those with lowerlevel of education is important to prevent long term sequelae.

Early age at sexual debut, being in a polygamous setting, non-use of condoms and having more than one sexual partner were more likely to be associated withbeing seropositive for chlamydia trachomatis. These factors increase the risk of infection and its sequelae of tubal damage andthese proxies of sexually transmitted infection have been strongly associated with infertility in other reports.[16,17,18]. Reports have shown that having multiple sexual partners in the recent past remain a significant risk factor for chlamydia trachomatis infection even after controlling for other factors such as age using multivariate analysis[19].

The present study also found an association of sexual history with Chlamydial seropositivity. Early age at sexual debut, being in a polygamous setting, non-use of condoms and having more than one sexual partner were more likely to be associated with infertile women. These factors increase the risk of infection and its sequelae of tubal damage andthese proxies of sexually transmitted infection have been strongly associated with infertility in other reports.[15,16,17,20]. Reports have shown that having multiple sexual partners in the recent past remain a significant risk factor for chlamydia trachomatis infection even after controlling for other factors such as age using multivariate analysis[19].

Clinical features from this study that showed statistical significant potential for identifying women at high risk for chlamydial infection include vaginal discharge, lower abdominal pain, Intermenstrual bleeding and dysmenorrhoea. These features compare with reports from other studies and they are usually evidence of pelvic inflammatory disease, of which tubal blockage is a sequelae [5, 8].The number of lifetime sexual partners showed the strongest association in the multivariate analysis.

The results showed that infertile women were more likely to seek ineffective and inappropriate treatment for gynaecological symptoms because they sought treatment from quacks (chemist/patent medicine dealers, hawkers and traditional medicine practitioners) rather than obtaining effective treatment from the formal health

sector (private or public hospital). They were also more likely to be chlamydial positive compared to those who sought treatment from hospital based care. This poses great consequences becausedelay in receiving appropriate and effective treatment in the face of genital tract infections may increase the risk of progression to irreversible tubal damage.

In conclusion, this study has shown a high prevalence of chlamydial seropositivity amongst infertile women .A strong association between risk factors and chlamydial trachomatis antibodies was also demonstrated and therefore highlyimplicates chlamydia trachomatis infection as a potential contributor to female infertility. Furthermore, risk factors that could form a basis for community health education and screening were also identified.

From the foregoing, it is recommended that Health education amongst adolescents should be increased, so as to increase the awareness about chlamydia trachomatis infection and its attendant reproductive sequelae. Other measures such as the use of barrier methods and limiting the number of sexual partners may also help in reducing the prevalence of this infection.

There is a need for routine screening tests for chlamydia trachomatis infection of young sexually active women in order to reduce the prevalence of chlamydia trachomatis infection, the most prevalent bacterial sexually transmitted infection. This is justified by the high prevalence of this organism seen in this study.

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