Original Article

THE ASSOCIATION BETWEEN SPERM QUALITY AND ASYMPTOMATIC CHLAMYDIAL INFECTION IN INFERTILE MEN AT A PRIVATE FERTILITY CLINIC IN NIGERIA

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ABSTRACT

BACKGROUND: Association between chlamydia trachomatis infection and male infertility is debated in literature. There is little or no information from Nigeria. The study aimed to determine the prevalence of chlamydial infection and its association with sperm quality parameters among asymptomatic men that present for infertility treatment in a Nigeria facility.

METHODS: A cross-sectional study conducted at a private assisted conception clinic in Lagos, Nigeria among 138 men seeking infertility care. Seminal fluid analysis and IgG Chlamydial serology were performed for each participant. Data obtained were analysed using SPSS; *p* was significant at <0.05.

RESULTS: Of the 138 men screened, 13.9% were Chlamydia-positive. Twenty-one per cent of clients who tested positive to Chlamydia had predominantly immotile sperm, compared with 10.2% without the infection; 26.3% with non-progressive motility had Chlamydia, compared with 2.8% men who were not infected. These differences were statistically significant (p = 0.001). More of those (57.9%) with Chlamydia (compared to 33.1% without) had significant leukocyte counts (p = 0.037). There were no statistically significant differences in sperm count and percent motility between serologically positive and negative men.

CONCLUSION: Positive Chlamydia serology is associated with non-progressive motility and leukocytospermia in infertile Nigerian men.

KEY WORDS: Chlamydia, semen analysis, infertility

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INTRODUCTION

Sexually transmitted infection (STI) is the commonest aetiological factor for infertility in developing countries. Its impact is made worse on account of poor diagnostic capability, indiscriminate antibiotic use, higher levels of risky sexual behaviour and poor health-seeking behaviour of afflicted individuals.[1,2] Chlamydia is the commonest bacterial cause of STI worldwide[1] and paradoxically, individuals infected are often unaware because of its asymptomatic progression in most cases.[1,2] Studies have shown that most infected men and women are asymptomatic.[3,4] Chlamydia trachomatis (CT) is commonly associated with both upper and lower reproductive tract infections with evidence of progression to tubal infertility in women when it is poorly treated.[2] Regarding the choice of appropriate screening methods, there has been a systematic improvement in the quality and accuracy of techniques used over the years especially in the industrialized countries. There are a number of laboratory tests to detect CT to different degrees of certainty. They include: antigen detection in the form of enzyme immunoassay, direct immunofluorescence assay and nucleic acid amplification tests; secondly, the molecular tests detect either DNA or RNA using PCR; and lastly the serological tests use immunoglobulin markers of CT such as IgA and or IgG.[2,5,6]

Male infertility investigation has witnessed conflicting recommendations for routine

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screening of CT infection during the evaluation phase of infertility management because of the controversial evidence from literature. Some studies conclude that positive CT infection markers are not associated with abnormal sperm parameters[7,8], whereas others have suggested that there is high correlation with abnormal sperm motility, lower density, and reduced viability and morphology [9,10]. Another argument for male screening is that men are believed to be the reservoir of CT infection for females [11]. The debate has made a universal call for CT screening among men seeking infertility a bit challenging and presently, the screening is often context-based .

In Nigeria, the commonest cause of infertility among couples seeking treatment is still infection-related and local studies mostly focus attention at unravelling the causation among women rather than their male partners . Chlamydial infection screening studies among infertile couple have been largely restricted to women, using different study designs and outcomes . Usually, these studies use their results as proxies in either describing or estimating the burden of Chlamydial infection among males.[15] The usual pattern has been indirect treatment of men suspected to have CT through partner notification methods.

Men in Nigeria are often not forthcoming in seeking infertility treatment due to the socio-cultural stereotype that feminizes infertility. However, the reality is that male factor contributes a sizeable proportion of the aetiology. This gap has made objective assessment of CT infection burden herculean, and made its consequential impact on sperm quality among men seeking infertility treatment unknown. It is against this backdrop that we aimed to study the prevalence of CT infection and its association with sperm quality parameters among men without clinical symptoms that present for infertility treatment.

Materials and Methods

This was a cross-sectional study conducted among men seeking infertility treatment with their female partners at Nordica Fertility Centre, Lagos, Nigeria. The study area is a privately-owned assisted conception centre which offers a wide range of assisted reproductive services to Nigerians and other nationals from the West African sub-region. Couples desiring fertility treatment are referred, while others present on their own after failed attempts at conventional care for infertility. All patients that present for fertility treatment at the study centre undergo an initial counselling session to familiarize them with the treatment protocols and thereafter, pre-treatment evaluation is offered to the couple. This includes serological screening for CT infection and seminal fluid analysis.

The study subjects were men at this clinic who were counselled for and consented to the use of their seminal fluid analysis and Chlamydia screening results for this study. These men were being evaluated as part of the routine care offered by the clinic and gave written consent to participate in the study and for their laboratory results to be analysed. They were assured that refusal to participate would not affect their care in any way.

Those with clinical evidence of STI or who had had antibiotic treatment in the preceding two weeks were excluded. The null hypothesis was that there is no association between Chlamydial infection in infertile men and abnormal sperm parameters. Minimum sample size was determined to be 73 with a formula for cross-sectional studies[16], using a prevalence of 5%.[17] A convenience sampling method of consecutive consenting patients was employed.

Blood samples were collected for the serological examination. Semen samples were collected by masturbation. Seminal fluid analysis was performed in the laboratory within an hour of the collection. The men were counselled to avoid sexual activity 3 to 5 days prior to the collection of semen. The semen was prepared, and the analysis reported according to standard criteria.[18]A total of 138 consenting men were reported in this study.

Chlamydia serology: Five millilitres of venous blood was collected into a universal bottle and the serum separated by centrifuging the clotted sample. The serological assay for Chlamydia antibody (IgG) testing was performed using an automated kit for multi-serovar for CT species, Immunocomb® Chlamydia Bivalent IgG kit (Orgenics Ltd., Yavne, Israel), which employs an indirect solid phase enzyme immunoassay

technique. Prior to each test, the reagent was allowed to stand till it was at room temperature. Pipette samples of the sera were assayed with the reagent's control samples for CT antibodies. This process passed through different stages as specified by the manufacturer with strict timing schedule. Thereafter, the result was read with the aid of colorimeter calibration and this was compared with the control sample. A CT serological result was deemed positive when the titre was at least 1 in 16 or more.

Data analysis was performed with SPSS. Descriptive analysis of pattern of sperm parameters and Chlamydia serology were performed and thereafter, cross tabulations between seminal fluid analysis results and CT serological outcomes were also performed using chi-square test. The level of statistical significance was set at $p < 0.05$.

Ethics

All procedures followed were according to the Declaration of Helsinki. Approval was given by the study Centre's review committee.

RESULTS

Of the 138 men that presented with infertility, 19 (13.9%) were positive for Chlamydial antibody.

The sperm quality of the 138 men studied is shown in Table 1. In terms of sperm count, 64 (46.3%) subjects had varying degrees of reduced or absent counts. Thirty-five (15.1%) had less than 30% motility while only thirty-six men (28.6%) had at least 50% motility.

Table 1: Profile of Sperm Quality

Sperm quality parameters	Chlamydia serology outcome			
	Positive n (%)	Negative n (%)	$\chi 2$ **	p-value
Sperm Count				
Azoospermia	1(5.3)	11(9.3)	6.44	0.092
Severe oligozoospermia	5(26.8)	9(7.6)		
Oligozoospermia	5(26.3)	33(28.0)		
Normozoospermia	8(42.1)	65(55.1)		
Mean Motility*				
Immotile	3(21.1)	11(10.2)	17.62	0.001
Non-progressive motility	5(26.3)	3(2.8)		
Progressive motility	10(52.6)	94(87.0)		
Percent motility*				
<30%	4 (22.2)	15 (14.2)	0.99	0.609
>30% and <50%	10 (55.6)	59 (55.7)		
≥ 50%	4 (22.2)	32 (30.2)		
WBC				
<1 x 10^6/ml	8 (42.1)	79 (66.9)	4.36	0.037
=1 x 10^6/ml	11 (57.9)	39 (33.1)		

**Totals do not include the azoospermic samples*

** Fisher's exact correction used with cells <5

For sperm count, 5 men (26.3%) positive to Chlamydia had severe oligozoospermia compared to 9 (7.6%) that were Chlamydia negative. Similarly, a higher proportion of men (55.1%) without Chlamydia had normal sperm count compared with those who were infected (42.1%). However, the differences in these proportions were not statistically significant ($p = 0.092$).

Among those with above 50% motility, thirty-two (30.2%) were Chlamydia negative while four (22.2%) were positive. Similar proportions of Chlamydia positive and negative men had percent motility between 30% and <50%. There was no statistically significant difference between the percent motility of those with and without Chlamydia infection ($p = 0.145$).

A significantly higher proportion of men without Chlamydia (66.9%) compared to 42.1% with Chlamydia had normal leukocyte counts while more of those with the infection (57.9%) had significant leukocyte counts ($p = 0.037$).

DISCUSSION

In the index study, it was observed that 13.9% of men seeking infertility treatment were positive for Chlamydial infection even though they did not demonstrate any clinical features. Reported prevalence in literature (diagnosed from antibody) varies from 5% to 21.7%. [17,19] Over half of the study participants had good sperm quality. There was a significant difference in sperm quality results between those with positive and negative Chlamydial serology. There was a higher proportion of non-progressive motility and leukocytospermia among Chlamydia-positive men compared to those who were negative. These findings corroborated previous reports that positive Chlamydial serology may be associated with abnormal sperm quality. [19,20] The association of leukocytospermia with poor sperm function, and therefore, infertility has been demonstrated. [21,22]

The association between Chlamydial serologic test and sperm quality appears controversial due to mixed results, and this has made other methods preferable, such as antigen and DNA testing. [23] Serology does not indicate the difference between recent or previous infection; and its value for male

infertility workup may be limited.[28] Despite these flaws, serological test for CT is highly sensitive, and a positive result is an indication for a clinician to pay attention to the sexual history of the patient. This could provide a clue to the aetiology, and the method of infertility treatment that best suits the situation. Furthermore, the challenge prevalent in the management of men by proxy in developing countries (that is, from their partner's CT infection report) can easily be resolved with this simple test.

This study therefore highlights a critical aspect of male infertility evaluation that is often neglected in the developing countries, and adds to the sparse body of data on male infertility in Nigeria. The use of serology may be limited, yet it is by far better than opting for 'therapeutic guessing' in offering treatment to men, which may not have any scientific rationale. At the same time, efforts should be made to make a more specific test such as antigen and/or DNA test available and accessible in our setting.

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