

Research

Chlamydia trachomatis infection in an infertile population: a cross sectional study

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Abstract

Introduction: *Chlamydia trachomatis* is sexually transmitted and causes infection of the genital tract that leads to many long term complications. Invasive procedures in infected infertile females increase the risk of ascending infection and long term consequences. Though infertile individuals are considered a high risk population prevalence data for our population is not available. Furthermore, the use of risk factor identification in diagnosis is not well established. This study was planned to determine the prevalence of *Chlamydia* infection and to describe the socio-economic clinical characteristics that are associated with the presence of infection among a patient population who sought treatment for infertility at a tertiary care facility.

Method: A cross sectional study was carried out among patients who sought infertility treatment at the infertility clinic of Colombo North Teaching Hospital, Ragama. Two hundred married couples were included in the study.

The socio-economic data and any symptoms suggestive of genital infections were collected and *Chlamydia trachomatis* infection was diagnosed with a rapid antigen test using a commercial test kit. Intracervical swabs of the female and first void urine samples of the male were used. Data analysis was done to describe the prevalence of *Chlamydia* infection in each partner as well as to identify the number of couples where either partner was affected. Associations with recognized risk factors were identified.

Results: Presence of symptoms was low in the males while one third of female subjects had

one or more symptoms. The *Chlamydia* test revealed 12(6%) female and 6(3%) male study participants to be positive for current disease. These study participants were from 15 couples giving a prevalence rate of either partner being positive in 7.5% of couples.

Of the risk factors identified the duration of marriage or infertility, education level, household income, alcohol use and smoking by the male, and presence of symptoms did not demonstrate a significant association with the presence of the disease. Partners staying away from each other were significantly associated with a positive result.

Conclusion: There is 7.5% disease prevalence among infertile couples seeking treatment. Risk assessment and clinical symptoms have a limited value in identification of affected couples. Couples living separately have a high risk of *Chlamydia* infection. The high disease prevalence warrants either screening or empirical treatment of all infertile female patients undergoing invasive procedures.

Introduction

Chlamydia trachomatis serotypes D-K cause sexually transmitted infection of the genital tract. It may give rise to short term symptoms during the acute phase of the infection as well as long term complications. The long term consequences in the female include damage to the epithelium of the fallopian tubes and formation of pelvic adhesions. These together can cause dysfunction of the fallopian tubes resulting in impaired ovum pickup and transport of embryos¹. In the male, infection may damage the germinal epithelium of the seminiferous tubules causing impaired spermatogenesis².

The prevalence of *Chlamydia trachomatis* infection is found to vary in different populations and is estimated to be between 1-38%³. Multiple sexual partners and non-adherence to practices of safe sex are known risk factors for the infection. Certain social attributes such as low socio-economic status, alcohol usage and either partner staying away from home have also been shown to be associated with an increased risk of infection^{4,5}.

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The diagnosis of Chlamydia infection could be made by one of three methods. Firstly, the culture method which was considered the gold standard in the past is not currently used in clinical practice except in medico-legal cases. While it has a specificity near 100%, the sensitivity is low around 70-80%⁶. Secondly, the non-culture, non nucleic acid amplification techniques involve detection of antigens or products of an immunological reaction. Antigen detection technique is the more commonly used method of these and has the advantage of having a very high specificity (98-99%) with a high sensitivity (80-90%). Low cost as well as the ease of carrying out the test has made it very attractive in many low-resource settings. However, the third method, the nucleic acid detection methods which include nucleic acid amplification tests (NAAT) such as polymerase chain reaction (PCR), ligase chain reaction (LCR), transcription mediated amplification (TMA) and DNA strand displacement amplification (SDA) are the mainstay of screening and diagnosis in the developed countries at present⁷. They have very high levels of specificity and sensitivity and are currently considered the gold standard.

Chlamydia trachomatis infection among infertile patients is important in two aspects. Firstly, the infection may be a contributory cause of infertility. While this may be due to tubal disease in the female, in the male it may either be due to defective spermatogenesis or obstruction to sperm transport⁹. Secondly, the presence of Chlamydia infection in the lower genital tract at the time of invasive procedures, such as hysterosalpingography (HSG) and intrauterine insemination (IUI), may result in ascending infection and more serious long term complications.

The prevalence of Chlamydia infection among the infertile population of Sri Lanka is not established. This study was aimed at determining the prevalence of Chlamydia infection among a patient population who seek infertility treatment at a tertiary care treatment facility and to describe the socio-economic and clinical characteristics that are associated with the presence of infection.

Method

The study was carried out as a cross sectional study at the infertility clinic of the Faculty of Medicine, University of Kelaniya conducted at the Colombo North Teaching Hospital, Ragama. Two hundred married couples were included in the study that was carried out from January 2007 to December 2008.

The socio-economic data and any symptoms suggestive of genital infections were collected from all subjects by an in-depth clinical interview. The age

of each partner, duration of marriage and infertility, educational level, use of tobacco and alcohol by the male partner and monthly household income were recorded. The couples were asked if either partner is staying away from home due to occupational needs. Presence of symptoms such as a urethral discharge, meatal pain and dysuria in the male and vaginal discharge, itching or dyspareunia in the female were recorded.

Chlamydia trachomatis infection was diagnosed with a rapid antigen test using a commercial test kit (On-call Chlamydia rapid test kit, ACON Laboratories Inc., San Diego, USA) on intracervical swabs of the female and first void urine samples of the male. The sensitivity and specificity of the test is 88.5% and 93.7% for endocervical swab specimens and 90.9% and 96.5% for urine specimens of males respectively, when compared to polymerase chain reaction (PCR) method.

If the test was positive in either partner, both partners were treated with doxycycline after appropriate counselling. Data analysis was done to describe the prevalence of Chlamydia infection in each partner as well as to identify the number of couples where either partner was affected. Any association with recognized risk factors was identified to determine the presence of these in a local population. Ethical approval was obtained from the Ethics Review Committee of the Faculty of Medicine, University of Kelaniya.

Results

The mean (SD) age of the female partners was 30.6 (5.5) years and 33.2 (5.79) years for the males. The mean (SD) duration of marriage was 4.7 (3.37) years and duration (SD) of infertility was 3.3 (2.6) years.

The history revealed sexually transmitted infection in one each of the female and male subjects and pelvic inflammatory disease in four female subjects. Two of the study subjects have had an ectopic pregnancy in the past. The symptoms that are associated with Chlamydia infection were common among the female study subjects on direct questioning. Vaginal discharge was admitted by 20 (10%) subjects, dysuria in 31 (15.5%), lower abdominal pain in 16 (8%) and dyspareunia in 34 (17%). Altogether 66 (33%) subjects had either one or more symptoms. Dysuria was the most common symptom among the male partners with 5 (2.5%) experiencing the symptom while the other symptoms included penile discharge in 1 (0.5%) and meatal pain in 2 (1%). Only five subjects (2.5%) had either one or more of these symptoms.

The alcohol consumption among male partners was seen in 68 (34%) study participants while recreational drug usage was seen in 2 (1%) subjects.

The Chlamydia test revealed 12 (6%) female and 6 (3%) male study participants to be positive for current disease. These study participants were from 15 couples giving a prevalence rate of either partner being positive in 7.5% of couples.

The mean±SD age of the female partner was not significantly different between the couples with a positive Chlamydia test and those who were negative (31.33±7.2 vs. 30.51±5.4 years, p=0.58). Also no difference was observed in the duration of marriage (4.47±2.7 vs. 4.71±3.4 years, p=0.78) or the duration of infertility (3.33±1.5 vs. 3.25±2.75, p=0.913). Education level of either partner, up to GCE ordinary level or beyond, was also not associated with a positive result for infection in either partner of the couple. The mean±SD monthly household income was not significantly different between the couples with a positive test and those who did not (Rs 19666±2516 vs. 24439±4376, p=0.483). Neither the use of alcohol by the male (OR 1.33, 95%CI 0.47-3.76) nor smoking (OR 1.75, 95% CI 0.63-4.89) was associated with a positive result.

Symptoms elicited at history taking was not significantly associated with a positive result in the

female (OR 1.02, 95% CI 0.35-3.02) as well as in the male partner (OR 3.52, 95% CI 0.36-29.18). The couple staying separated from each other due to requirements in occupation was significantly associated with a positive result with an odds ratio of 3.86 (95% CI 1.14-13.06). The above findings are summarized in Table 1.

Discussion

Since it is a sexually transmitted infection, the prevalence of Chlamydia infection is related to the sexual behavior of the society. High prevalence rates have been reported in societies with more sexual liberty in comparison to more conservative societies such as Sri Lanka. However, the infertile patients are a high risk group for this disease since the disease itself can contribute towards infertility.

This study demonstrated that 7.5% of the couples were affected by the disease. While this is low compared to many other countries that have been studied, it is comparable with other high risk groups of the country. The prevalence rate warrants active interventions prior to invasive procedures in order to minimize the risk of ascending infection.

Table 1. Association between risk factors and disease prevalence; n=200 couples

	<i>Positive vs. negative couples</i>
Age of the female (mean±SD)	31.33±7.2 vs. 30.51±5.4, p=0.58
Duration of marriage (mean±SD)	4.47±2.7 vs. 4.71±3.4, p=0.78
Duration of infertility (mean±SD)	3.33±1.5 vs. 3.25±2.75, p=0.91
Monthly household income (mean±SD)	19666±2516 vs. 24439±4376, p=0.483
Male educated up to O/L or less (OR, 95% CI)	0.65 (0.20-2.09)
Female educated up to A/L or less (OR, 95% CI)	1.34 (0.38-4.77)
Use of alcohol by male (OR, 95% CI)	1.33 (0.47-3.76)
Smoking by the male (OR, 95% CI)	1.75 (0.63-4.89)
Presence of symptoms in the male (OR, 95% CI)	3.52 (0.36-29.18)
Presence of symptoms in the female (OR, 95% CI)	1.02 (0.35-3.02)
Couple staying separately (OR, 95% CI)	3.86 (1.14-13.06)

However, the silent nature of the acute illness makes it difficult to diagnose. Identification of couples at a high risk by identification of risk factors in the history is being employed in some clinical settings. However, as our results demonstrate, risk factor identification has limited value since they do not correlate with the couples who are positive for the disease. Of the risk factors that were studied, only couples staying separately was significantly associated with disease prevalence in this population. Therefore a more practical approach would be to either investigate all patients prior to any invasive procedures or to treat empirically⁶.

The study demonstrated a discrepancy in disease prevalence between the male and female subjects (3% vs. 6%). While this could be a true difference many other causes may also contribute to this difference. Since presence of symptoms is commonly associated with presence of the disease in the male, they would have a higher tendency of seeking treatment than the females. They may also have a higher tendency of obtaining non prescription medication.

Living separately from each other, mainly for occupational purposes, is a significant risk factor for disease prevalence. Clinicians should be aware of this risk and should consider it in screening for sexually transmitted infections.

Many laboratory investigations are available for diagnosis of Chlamydia infection. Though nucleic acid amplification techniques such as PCR is considered the most effective method of testing in present day practice, the high cost limits their use in clinical practice in resource poor settings such as Sri Lanka. Antigen detection tests, such as that used in this study, are also acceptable methods of testing since they demonstrate acceptable sensitivity and specificity for the disease. However, it should be noted that the true disease prevalence may be higher than what is demonstrated in this study as the test has a limited sensitivity. The culture techniques which have a near 100% specificity has limited use because of its low sensitivity (70-80%) and cost implications.

A cardinal question in management of patients with infertility is whether to offer universal screening to all patients or to offer empirical treatment without any testing prior to invasive procedures¹⁰. Larger studies with cost analysis would be required to compare between the two approaches in the local setting¹¹.

Conclusion

Chlamydia trachomatis infection was found among 7.5% of infertile couples. Living separately from

each other was associated with the presence of the disease while other socio-economic factors and presence of symptoms did not show a correlation. We recommend that all infertile patients undergoing invasive procedures be offered either screening or empirical treatment for Chlamydia infection without relying on clinical identification.

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