



## Prevalence of *Chlamydia trachomatis* infection in a tertiary care hospital in New Delhi (India) in pregnant women

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### ABSTRACT

*Chlamydia trachomatis* is known to cause several complications in pregnant women and in their newborn. This study was conducted to find out the prevalence of *C. trachomatis* infection in pregnant women. Sera of 400 pregnant women reporting to a tertiary care hospital in New Delhi and 100 non pregnant controls was screened by ELISA method to look for the presence of antibodies IgG, IgM and IgA against *C. trachomatis*. 84(21%) pregnant women were seropositive for *C. trachomatis* infection as compared to 17(17%) non-pregnant women ( $\chi^2$  0.794,  $P$  0.373). This study highlights high prevalence of *C. trachomatis* infection amongst pregnant and non-pregnant women in our country.

**Key words:** *Chlamydia trachomatis*, Pregnancy, ELISA

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### INTRODUCTION

*Chlamydia trachomatis* is known to cause several complications in pregnant women and in their newborn like premature rupture of membrane, preterm labor, low birth weight, still birth, postpartum/postabortal infections, neonatal conjunctivitis and infant pneumonia.[1] Hence, efforts must be made to detect and treat this infection which could adversely affect the outcome of pregnancy. Screening for *C. trachomatis* infection does not form a part of routine screening of pregnant women during antenatal check-up in India. This study was undertaken to find out whether *C. trachomatis* infection is a serious problem in Indian settings as compared to some of the affluent nations and does it require Government intervention in the form of National Health Programme. Since around seventy five percent of the infection caused by Chlamydia in women is asymptomatic in nature,[2] it becomes imperative to screen all pregnant women for this infection irrespective of the presence of symptoms. Various diagnostic modalities like specific IgM serology, [3], ELISA method for IgM, IgG and IgA antibodies, [4] chlamydial culture from endocervical swabs,[5, 6] chlamydiazyme test,[7] antigen assay,[8] direct immunofluorescence test, DNA amplification[9] and ligase chain reaction[10] have been employed by various investigators. Amongst the diagnostic techniques, blood testing for presence of antibodies by ELISA method was used as it is a cost effective, sensitive procedure and can easily be performed in antenatal clinics. The objective why this study was taken up was with the aim to improve the antenatal services.

### MATERIAL AND METHODS

A total of 500 women, between the ages 18-35 yrs were included in the study which included 400 pregnant women seen during the antenatal period or during labor and 100 non pregnant age matched controls. Since almost three-fourth of chlamydial infection in women is asymptomatic in nature, women were selected at random for the study. Pregnant patients with diabetes, hypertension, anemia or any other medical complication of pregnancy were excluded from the study. Serological tests for IgG, IgM and IgA antibodies were tested for *Chlamydia trachomatis* with the help of kits supplied by Vircell, S. I. Granada, Spain by ELISA method. The test showed sensitivity for IgG, IgM and IgA to be 96%, 90%, and 95% respectively while specificity for IgM and IgG was 100% and IgA was 98%. In the assay is used COMP (Complexes of Outer Membrane Proteins) of *C. trachomatis*, free of lipopolysaccharides. The study was cleared by Hospital Ethics Committee.

Data was analyzed by using Student T Test and Chi Square test.

## RESULTS

The mean age of women in control group was 24.56 yrs (S.D 3.52) and of study group was 24.43 yrs (S.D 3.866). The difference in mean age between the cases and controls was found to be statistically insignificant (P 0.76). The prevalence of *C. trachomatis* in cases and control is as shown in Table 1.

## DISCUSSION

The *C. trachomatis* has a prevalence in India in both pregnant as well as in non pregnant women as reported by various investigators is as shown in Table 2. Similarly the prevalence of *C. trachomatis* in other countries is as shown in Table 3.

In our study we found a seropositivity of 21% in pregnant women, which though higher as compared to the non pregnant controls (17%), was found to be statistically insignificant ( $\chi^2$  0.794, P 0.373). Both the Indian studies[4, 6] recorded a significantly higher prevalence of chlamydial infection in pregnant women as compared to non pregnant women, which possibly is due to the impaired cell mediated immunity during pregnancy and the ability of the organism to penetrate the cervical mucus plug by producing protease and mucinase. The International studies give conflicting results, with a higher prevalence seen in pregnant women in United States[22, 23] and New Zealand[31], and a lower prevalence recorded in Australia,[34, 35] Italy[36, 37] and Brazil.[38, 39] The countries with good antenatal care are likely to have lower prevalence of *C. trachomatis* in pregnant women as compared to non pregnant women.

We found a seropositivity of 17% in non pregnant controls as compared to 10% by Sawhney and Batra[4] and 4% by Rastogi et al[6] and 23.3% by Singh et al.[11] The difference in rates may be due to selection of control groups. Sawhney and Batra[4] had healthy non pregnant women as controls, whereas we took our controls from the non pregnant women with or without symptoms suggestive of *C. trachomatis* infection in a random manner. However, some of the controls taken by Rastogi et al[6] were symptomatic. Singh et al[11] does not mention regarding the presence or absence of symptoms in women screened for the presence of infection. In the International studies, the prevalence of infection in non pregnant women was found to be in less than 10%[23, 31, 35, 37, 39, 44-48] in most of the developed countries. Some of the countries from Africa like Papua New Guinea,[41] Jamaica[42] and Pennsylvania[43] had high prevalence rate of more than 10% as was seen in our study. No data is available from Fiji, El Salvador, Martinique and Nairobi in non pregnant women where high prevalence of *C. trachomatis* infection, comparable to some of the Indian studies was found in pregnant women.[12-15]

**Table 1.** Results of ELISA test for *C. trachomatis* in pregnant and non-pregnant controls

Group	Number (%)	ELISA Positive (%)	IgM Positive (%)	IgG Positive (%)	IgA Positive (%)
Control	100 (100%)	17 (17%)	12 (12%)	4 (4%)	6 (6%)
Study	400 (100%)	84 (21.0%)	60 (15%)	17 (4.25%)	26 (6.5%)

**Table 2.** Prevalence of *C. trachomatis* infection in India in pregnant and non-pregnant women

Author	Pregnant women	Non-pregnant women
Yasodhara et al <sup>[3]</sup>	29.3%	-
Sawhney and Batra <sup>[4]</sup>	25%	10%
Mookherjee et al <sup>[5]</sup>	24.5%	-
Rastogi et al <sup>[6]</sup>	21.3%	4%
Paul et al <sup>[7]</sup>	18.6%	-
Alexander et al <sup>[8]</sup>	3.3%	-
Singh et al <sup>[11]</sup>	-	23.3%

A seropositivity of 21% found in pregnant women in our study was comparable to most other Indian studies[3-7] which recorded the prevalence of infection in the range of 17%-29.3%, barring one study conducted by Alexander et al[8] which recorded a prevalence of only 3.3%. This was in contrast to the 29 International studies which recorded the prevalence in the range of 1.9%-13% in pregnant women[9, 10, 16-22, 24-34, 36, 38, 40] except for studies in Fiji[12], El Salvador,[13] Martinique[14] and Nairobi[15] which recorded a higher prevalence of infection in the range of 22%-50%.

Hence, we conclude that *C. trachomatis* infection has a very high prevalence in both pregnant as well as in non pregnant women in India as compared to most of the developed countries, possibly because of the

poor socioeconomic conditions, low levels of education, poor nutritional status and various myths and beliefs regarding vaginal discharge. We therefore recommend screening for presence of *C. trachomatis* infection should be done routinely during antenatal period in pregnancy.

**Table 3.** Prevalence of *C. trachomatis* infection in the other countries in pregnant and non pregnant women

Country	Pregnant women	Non pregnant women
Fiji	50% [12]	-
El Salvador	44% [13]	-
Martinique	26.7% [14]	-
Nairobi	22% [15]	-
Cape Verde	13% [16]	-
Seattle	13% [17]	-
South Africa	12.4% [18]	-
Gabon	10% [19]	-
Denver	9.0% [20]	-
Bangkok	8.6% [21]	-
United States	8.1% [22]	4.7% [23]
Brooklyn	8.0% [24]	-
Iceland	8.0% [25]	-
Denmark	6.7% [9]	-
United Kingdom	6.2% [10]	-
Central African Republic	6.2% [26]	-
Tanzania	8.0% [27]	-
Thailand	5.7% [28]	-
Hungary	5.4% [29]	-
San Francisco	5.0% [30]	-
New Zealand	4.8% [31]	2.3% [31]
Japan	4.2% [32]	-
France	3.9% [33]	-
Australia	3.0% [34]	5.7% [35]
Italy	2.7% [36]	3.5% [37]
Brazil	2.1% [38]	8.1% [39]
Quebec City	1.9% [40]	-
Papua New Guinea	-	26% [41]
Jamaica	-	12.2% [42]
Pennsylvania	-	11.2% [43]
Jordan	-	4.6% [44]
Greece	-	3.2% [45]
Sweden	-	2.7% [46]
UAE	-	2.6% [47]

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