

# Prevalence of Serum Antibodies to TORCH Infection in and Around Varanasi, Northern India

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## ABSTRACT

**Background:** The acute infections which are caused by *Toxoplasma gondii*, Rubella virus, Cytomegalovirus (CMV) and the Herpes Simplex Virus (HSV-2) during pregnancy are often associated with adverse foetal outcomes and reproductive failures. In the Indian context, the exact seroprevalence of these infections is not known due to unavailability of baseline data.

**Aims:** The present study was undertaken to determine the serological evidence of the acute TORCH infections in women who were in the first trimesters of their pregnancies in and around Varanasi, north India.

**Settings and Design:** This study was carried out in the Sir Sunderlal Hospital, Varanasi and in the Department of Microbiology, Institute of Medical Sciences, BHU, Varanasi, UP, India. The study population involved pregnant women with bad obstetric histories, who were in the first trimester of their pregnancy.

**Methods and Materials:** Sera were collected from the women with Bon and they were tested for the presence of specific IgM antibodies against the TORCH infections by ELISA.

**Statistical Analysis:** A 95% confidence interval was calculated for the positive cases in each of the TORCH components.

**Results:** The specific IgM antibodies were found to be positive in 74(19.4%) cases for toxoplasmosis, in 126 (30.4%) cases for the Rubella virus, in 130 (34.7%) cases for CMV and in 151 samples (33.5%) for the HSV-2 infections.

**Conclusions:** The study showed a high prevalence of the infections which were caused by the TORCH complex amongst pregnant women with bad obstetric histories. Therefore, all the antenatal cases should be routinely screened for the TORCH infections, for carrying out early interventions to prevent foetal loss.

**Key Words:** TORCH, Serological, Specific IgM, Antibodies, Pregnant

## INTRODUCTION

The maternal infections that are transmissible in utero at several stages of the pregnancy, can be caused by many organisms, of which the members of the TORCH complex, namely *Toxoplasma gondii*, Rubella virus, Cytomegalovirus (CMV), the Herpes Simplex Virus (HSV) occupy prominent positions. These infections are associated with inadvertent outcomes like multiple abortions, sterility, intrauterine foetal deaths, still births, congenital malformations and other reproductive failures, especially when they are acquired during the first trimester of the pregnancy. Since these maternal infections are initially asymptomatic and as the clinical diagnoses are unreliable, the diagnoses of these infections depend on serological evidences. The detection of the IgM antibody against TORCH is the best approach for the identification of these infections [1]. Due to the lack of a national screening programme, there is no baseline serological data regarding the presence of an antibody in the TORCH infection during pregnancy.

This study was undertaken to detect the serological evidence of the acute TORCH infections in pregnant women, by establishing the presence of the specific IgM antibodies.

## MATERIALS AND METHODS

A total of 380 sera samples were collected for the detection of the *Toxoplasma* IgM, 414 cases were collected for Rubella IgM, 374 cases were collected for CMV IgM and 450 cases were collected for HSV-2 IgM, over a period of two years. The study population included pregnant women who were in the first trimester of their

pregnancy. who attended the Obstetrics and Gynaecology Out Patients Department (OPD) and the Prasuti Tantra OPD of the Sir Sunderlal Hospital, Varanasi, with past histories of spontaneous abortions, still births or congenitally malformed neonates. The approval of the institute's ethical committee was taken prior to the sample collection and an informed consent was obtained from all the patients. All the samples were tested for the TORCH infections by using sandwich and capture ELISA based commercial kits (Biotech Lab. Ltd, UK and Omega Diagnostics, UK) in the Serology Section of the Department of Microbiology. All the sera were assayed according to the manufacturer's instructions and the results were calculated on the basis of the cut off Activity Index (AI). The values which were 10% above the AI were considered as positive, whereas those which were 10% below the AI were taken as negative. The values which were in between these values were considered as equivocal. A 95% confidence interval was calculated for the positive cases in each of the TORCH components.

## RESULTS

In our study, a total of 74 cases (19.4%) were found to be seropositive for *Toxoplasma*, 126 samples (30.4%) were positive for Rubella, 130 samples (34.7%) were positive for CMV and 151 samples (33.5%) were positive for the HSV-2 infections. The average age of the study population was 23.4 years. The seropositivity rates have been shown in [Table/Fig-1]. The seropositivities for each component of the TORCH infections were seen in a majority of the cases which were in the 19-25 years age group. Mixed infections

Serological test	Total No. of cases tested	No. of positive cases (%)	95% Confidence interval	No. of equivocal cases (%)	No. of negative cases (%)
Toxoplasma IgM	380	74 (19.4)	15.48-23.32	95 (25)	211 (55.5)
Rubella IgM	414	126 (30.4)	28.1-34.8	40 (9.6)	248 (59.9)
CMV IgM	374	130 (34.7)	29.88-39.52	43 (11.4)	201 (53.7)
HSV-2 IgM	450	151 (33.5)	29.2-37.9	26 (5.7)	273 (60.6)

**[Table/Fig-1]:** Serological evidence of specific IgM antibodies against TORCH infections in pregnant women

Serological test	No. of positive cases (%)
Rubella IgM	18 (64.28)
CMV IgM	4 (14.28)
HSV IgM	3 (10.71)
Rubella IgM and CMV IgM	3 (10.71)

**[Table/Fig-2]:** Prevalence of mixed infections in Toxoplasma seropositive pregnant women (n=28)

were seen in 28 out of the 74 (37.83%) positive cases for the Toxoplasma IgM antibodies, as has been shown in [Table/Fig-2].

## DISCUSSION

This study shows the seropositivity of the TORCH infections in the pregnant women, in and around Varanasi. Epidemiological studies have suggested that toxoplasmosis affects a wide variety of race groups [1]. In India, the exact seroprevalence of toxoplasmosis is not known. However, a prevalence which is as low as 5% and which is as high as 80% in adults, has been reported [2,3]. In the present study, the *Toxoplasma* specific IgM antibodies were found in 19.4% of the pregnant women during the first half of their pregnancies, whereas an earlier study had reported such antibodies in 12% of the women in a similar population [4]. Though a history of petbreeders and their association with toxoplasmosis could not be elicited in this study, avoiding raw or undercooked meat and unpasteurized milk and keeping away from pets, mainly cats, should be advised in these patients. The women who show seroconversion during their pregnancies should be closely followed clinically during their pregnancies.

The presence of the Rubella IgM antibodies were found in 30.4% of the pregnant women, which was in concordance with the findings of a comparable study (26%) from Mumbai [5]. Seroepidemiological studies have shown that 10-20% of the women who were in the childbearing ages in India, were susceptible to Rubella infection [6,7]. The risk of the congenital Rubella infection following a maternal infection ranged from 5% to 50% in various studies, with an increasing severity when it was acquired in the first trimester of the pregnancy [8]. But Rubella is such a mild disease, that not more than 1 in 10 cases are recorded. The paradox lies in the fact that a large proportion of the cases are subclinical and that the clinical diagnosis is unreliable. Moreover, there is a considerable variation in the prevalence of the Rubella specific IgG antibodies among the women of the child bearing ages, with studies suggesting a prevalence of a 71.3% Rubella immunity, thus leaving about 1/3rd of the women susceptible to the Rubella infection [9]. As the screening for the Rubella immunity was not done in this study, the serological diagnoses of the recent infections were made on the basis of the presence of the specific IgM antibodies. The history of the vaccination against Rubella could not be gathered from the study population, but on the basis of the socioeconomic status and the educational background, it could be presumed that most of them had not been previously vaccinated. Such cases need proper

monitoring, counselling and management and a consideration for a prior routine vaccination.

CMV is a member of the herpes viruses family and it is found universally throughout all the geographical locations and in the areas of low socioeconomic conditions. A majority of these infections are asymptomatic as others and they are difficult to diagnose clinically. However, the rate of the primary infection is significantly higher in pregnant women from the low socioeconomic groups. A seropositive rate of 8.4% for the CMV IgM in women with Bad Obstetric Histories (BOH) has been reported [5]. Though more women who are in the child bearing ages are already seropositive, reinfection with a new strain of CMV can cause infections even in the presence of detectable IgG levels [10]. This study showed a seropositive rate of 34.7% for the CMV specific IgM, thus indicating a higher prevalence in and around Varanasi. Therefore, it is necessary that behavioural and educational interventions for prevention are given and that an antenatal screening is routinely done.

Neonatal Herpes which can be acquired in utero from maternal infections, is quite severe and it is associated with a high morbidity and mortality [11]. In this study, the prevalence rate of the anti HSV IgM antibodies against HSV-2, which is the most common component of TORCH, was detected to be 33.5%. An antenatal screening for HSV among the pregnant women is definitely required for carrying out effective interventions on the lifestyle practices.

In this study, the seroprevalence rates of the specific IgM antibodies for all the TORCH components showed a narrow range of a 95% confidence interval, thus denoting precision in the detected results.

This study showed that the seroprevalence of the anti TORCH complex IgM was notable amongst the pregnant women who resided in and around Varanasi, India. It has already been emphasized that knowing the epidemiology of the TORCH infections is an important aspect in the development of strategies for the prevention of congenital infections [1]. Hence, it should be recommended that all the antenatal cases with BOH should be routinely screened for the TORCH complex to avoid adverse foetal outcomes. Moreover, similar studies as this one, which document the seroprevalence of the TORCH infections, should be done to create a baseline data in the country. In such a context, the development of a vaccine strategy against these infections, especially in the developing countries, should be considered.

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