

## Seroprevalence of Igm antibodies against the agents of torch infections among the patients visiting National Public Health Laboratory, Teku, Kathmandu.

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### Abstract

<b>Introduction</b>	TORCH, as an acronym, stands for Toxoplasma gondii, Rubella virus, Cytomegalovirus (CMV) and Herpes Simplex Virus (HSV). This acronym has become one of the most recognized in the field of neonatal/perinatal medicine <sup>1</sup> . TORCH infections also pose a threat to immunosuppressed patients including HIV/AIDS patients, cancer patients undergoing chemotherapy, transplant recipients etc.
<b>Objective</b>	To determine the distribution of TORCH infections among the suspected patients of different age groups and gender and to correlate this data with different disease conditions.
<b>Methods</b>	The present study was conducted in the Immunology section of National Public Health Laboratory (NPHL), Teku from May to September 2006. Serum samples collected from 276 suspected patients were tested for TORCH infections by IgM Enzyme Linked Immunosorbent Assay (IgM-ELISA).
<b>Results</b>	Among 276 patients tested for TORCH infections by IgM-ELISA, 23.2 percent (64/276) patients showed presence of IgM antibodies against one or more TORCH agents. Higher seroprevalence of TORCH (IgM) was found in females (26.3%) than in males (16.3%). Seroprevalence percentages of IgM antibodies were <i>T. gondii</i> (4.9% in male and 15.7% in female), Rubella virus (9.4% in male and 3.7% in female), CMV (14.7% in male and 11.0% in female) and HSV (9.5% in male and 11.9% in female).
<b>Conclusion</b>	In the present study on the seroprevalence of antibodies (IgM) against the agents causing TORCH infections, an overall prevalence of <i>T. gondii</i> (13.7%), Rubella virus (4.7%), CMV (11.7%) and HSV (11.2%) was found.
<b>Key words</b>	TORCH infection, Serum, IgM, ELISA

### Introduction

*Toxoplasma gondii*, a protozoan causing toxoplasmosis is most frequently acquired orally by eating raw meat or exposure to infected cat feces<sup>2</sup>. Primary infection in pregnant women may result in congenital toxoplasmosis while infection in immunocompromised subjects like AIDS patients may cause potentially fatal *Toxoplasma* encephalitis<sup>3</sup>. Rubella or German measles is an infectious disease caused by the rubella virus which is usually transmitted by droplets from the nose or throat that others breathe in. It can also pass through a pregnant woman's bloodstream to infect her unborn child causing Congenital Rubella syndrome<sup>4</sup>.

Cytomegalovirus (CMV) is the most frequent cause of congenital infection in humans<sup>5</sup>. About 10 to 20 percent of infected infants may suffer sensorineural hearing loss, ocular damage or impairment of cognitive and motor function<sup>6</sup>. HSV is ubiquitous virus, infecting the majority of the world's population early in life<sup>7</sup>. HSV type 1 (HSV-1) is usually associated with primary infections of the orofacial area and latent infection of the trigeminal ganglion, while HSV-2 is usually associated with genital infections and latent infection in sacral ganglia. Although both primary and recurrent infections are usually self-limited, HSV can cause serious diseases such as neonatal

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disseminated herpes, viral encephalitis and blinding keratitis<sup>8</sup>.

TORCH infections are unique in their pathogenesis and have potentially devastating clinical manifestations<sup>9</sup>. Most of the TORCH infections cause mild maternal morbidity but have serious fetal consequences and treatment of maternal infection frequently has no impact on fetal outcome. Therefore, recognition of maternal disease and fetal monitoring once disease is recognized are important<sup>10</sup>. These infections, acquired in utero, can be severe enough to cause fetal loss or can result in intrauterine growth restriction, prematurity, or chronic postnatal infection. The degree of severity is dependent on the gestational age of the fetus when infected, the virulence of the organism, the damage to the placenta, and the severity of maternal disease<sup>11</sup>.

Congenital toxoplasmosis remains an important cause of blindness, although avoiding exposure to cats and uncooked meat can prevent it. The incidence of rubella infection and subsequent congenital rubella syndrome can be lowered by vaccination. While cytomegalovirus remains the most common cause of congenital infection even in the developed countries, the possibility of effective treatment with Ganciclovir has emerged from recent studies. In neonatal herpes, selective use of cesarean delivery and antiviral therapy can decrease incidence and improve outcomes<sup>9</sup>.

All women of childbearing age, especially, pregnant women and women with bad obstetric history (BOH) should be screened for TORCH titers (IgG and IgM). Prenatal and newborn screening should be employed

to identify and treat congenital infections. Immunosuppressed patients including HIV/AIDS patients, cancer patients undergoing chemotherapy, transplant recipients etc. should be routinely tested for TORCH infection agents and treated timely in order to avoid serious complications.

## Materials and Methods

During May to September 2006, a total of 276 blood samples from patients suspected of TORCH infections were collected and processed according to the standard laboratory protocols. ELISA techniques for the detection of IgM antibodies to TORCH agents (*Toxoplasma*, Rubella, Cytomegalovirus and Herpes simplex virus) were performed. Steps involved in ELISA were common to all TORCH agents and were performed as per the instruction of the manufacturer (Human, Germany) and result was interpreted as positive or negative. Data were statistically analysed using Chi-square test.

## Results

Among 276 patients visiting for TORCH tests, the highest number of patients (157) belonged to the age group 21-30 years out of which 125 (65.8%) were female patients and 32 (37.2%) were male patients. This was followed by 57 patients in the age group 31-40 years out of which 32 (16.8%) were female patients and 25 (29.1%) were male patients.

Of the total 276 blood samples, 16.3 percent (14/86) of male patients and 26.3 percent (50/190) of female patients were positive to one or more TORCH agents.

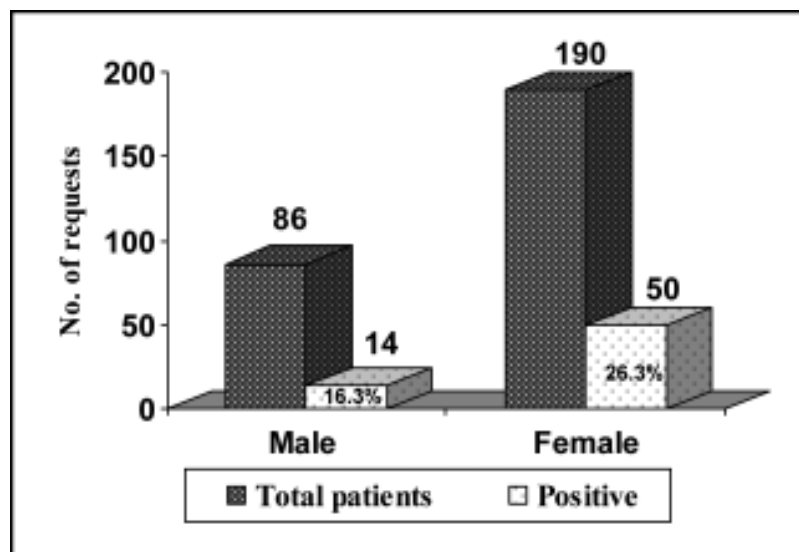


Figure 1: Gender wise distribution of total TORCH tested cases and test result

Likewise, out of 276 patients, 46 (17%) were found to be infected with single TORCH agent, 18 (7%) with

multiple TORCH agents and 212 (76%) were found to be negative.

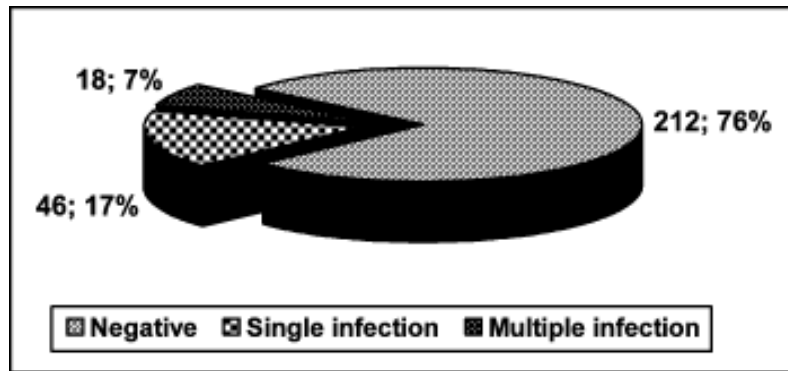


Figure 2: Pattern of torch test results

Distribution of TORCH (IgM) test results in male and female patients was as given in table 1.

Table 1: Gender wise distribution of TORCH (IgM) test results

S. N.	Test performed	Total no. of suspected cases	Gender	No. of cases	No. of positive cases	Seropositivity percentage	Overall Seropositivity percentage	p value
1.	ELISA test for Toxoplasma (IgM)	219	Male	41	2	4.9%	13.7%	(p>0.05)
			Female	178	28	15.7%		
2.	ELISA test for Rubella (IgM)	193	Male	32	3	9.4%	4.7%	(p>0.05)
			Female	161	6	3.7%		
3.	ELISA test for Cytomegalovirus (IgM)	197	Male	34	5	14.7%	11.7%	(p>0.05)
			Female	163	18	11.0%		
4.	ELISA test for Herpes simplex virus (IgM)	242	Male	74	7	9.5%	11.2%	(p>0.05)
			Female	168	20	11.9%		

Seropositivity pattern of TORCH agents in patients with different disease conditions was as shown in table 2.

Table 2: Seropositivity percentage of TORCH agents in patients with different disease conditions

S. N.	Patients with different disease conditions	Seropositivity Percentage of Toxoplasma (IgM)	Rubella virus (IgM)	Cytomegalovirus (IgM)	Herpes simplex virus (IgM)
1.	Female with bad obstetric history (BOH)	15.43 (25/162)	4 (6/150)	9.33 (14/150)	11.33 (17/150)
2.	Male (Husbands of female patients with BOH)	0(0/8)	0(0/8)	0(0/8)	0(0/8)
3.	Infants suspected of congenital infections or those born to female with BOH	0(0/20)	0(0/20)	27.78(5/18)	5.55(1/18)
4.	Patients suffering from ocular infection	30(3/10)	14.28(1/7)	14.28(1/7)	14.28(1/7)
5.	Patients suffering from HIV/AIDS	33.33(2/6)	16.67(1/6)	33.33(2/6)	16.67(1/6)
6.	Patients suffering from genital infections	-	-	-	12.76(6/47)
7.	Patients with other symptoms such as fever, joint pain, fainting attacks, paralysis etc	0(0/13)	25(1/4)	12.5(1/8)	12.5(1/8)

## Discussion

In the present study on the seroprevalence of antibodies (IgM) against the agents causing TORCH infections, an overall prevalence of *T. gondii* (13.7%), Rubella virus (4.7%), CMV (11.7%) and HSV (11.2%) was found as given in table 1. *Toxoplasma* (IgM) was found to have the highest seroprevalence among the four TORCH agents probably because in addition to congenital transmission, *Toxoplasma* is also transmitted orally by eating raw meat or exposure to infected cat faeces. And the lowest seroprevalence rate of Rubella (IgM) as compared to other TORCH agents may be due to Rubella vaccination during the childhood.

The highest number of female patients (125) were found in the age group 21-30 followed by 32 in the age group 31-40 years. This is probably because of the fact that females of these age groups are of childbearing age and are screened for antibodies against TORCH infection agents at their prenatal visits. Though statistically insignificant, females showed higher positive rate of 26.3 percent (50/190) as compared to 16.3 percent (14/86) in males as shown in figure 1. Out of total 276 TORCH infections suspected serum samples, 212 (76.8%) samples showed negative result and 64 (23.2%) samples showed positive result. Out of 64 positive patients, 46 were found to be infected with single and 18 with multiple TORCH agents as evident from figure 2.

Seroprevalence percentages of IgM antibodies were *T. gondii* (4.9% in male and 15.7% in female patients), Rubella virus (9.4% in male and 3.7% in female patients), CMV (14.7% in male and 11.0% in female patients) and HSV (9.5% in male and 11.9% in female patients) as given in table 1. Associations of the presence of *T. gondii*, Rubella virus, CMV and HSV in male and female patients were found to be statistically insignificant ( $P > 0.05$ ).

As evident from table 2, seroprevalence percentages of IgM antibodies were *T. gondii* (15.4%), Rubella (4.0%), CMV (9.3%) and HSV (11.5%) in the female patients with bad obstetric history. Similar *Toxoplasma* IgM positive rate was found in a study done by Rai et al<sup>12</sup>. In a similar study carried out in 380 pregnant women with BOH by Turbadkar et al<sup>13</sup> seroprevalence percentages of IgM antibodies were *Toxoplasma* (10.5%), Rubella (26.8%), CMV (8.4%) and HSV-II (3.6%). A higher seroprevalence to TORCH infection was also accounted in a study conducted by Thaplival et al<sup>14</sup>. However, lower seroprevalence of IgM were found in a study

conducted by Kafle et al<sup>15</sup> in TORCH suspected Nepalese women of childbearing age.

Likewise, seroprevalence of IgM antibodies were *Toxoplasma* (0.0%), Rubella (0.0%), CMV (27.8%) and HSV (5.6%) in the infants. Among the four TORCH agents under study, CMV was found to have the highest seroprevalence rate in the infants. This may be because of the fact that in addition to the placental route, CMV can be transmitted at delivery via the maternal genital tract, during the post partum period in breast milk and transfused blood products. In a similar study carried out by Bos et al<sup>16</sup> in Southern Africa, CMV (IgM) positive rate of 19.2 percent was found in female patients with BOH and that of 24.2 percent was found in the infants.

Similarly, seroprevalence of IgM antibody in the patients suffering from ocular infection were found to be 30 percent for *Toxoplasma* and 14.3 percent for each of Rubella, CMV and HSV. Thus, in our study, patients suffering from ocular infections were found to have the highest seropositivity of *Toxoplasma* which correlates with the study done by Jain et al<sup>17</sup> in India.

Likewise, seroprevalence of IgM antibodies were found to be *Toxoplasma* (33.3%), Rubella (16.7%), CMV (33.3%) and HSV (16.7%) in the HIV/AIDS patients. Thus, from our study, *Toxoplasma* and CMV were found to be more prevalent opportunistic infectious agents than Rubella and HSV in the HIV/AIDS patients. This higher *Toxoplasma* (IgM) positive rates in HIV/AIDS patients is in accordance with the results [32% (130/411)] obtained in a similar study done by Grant et al<sup>18</sup>. However, the seroprevalence of *Toxoplasma* (IgG/IgM) in HIV infected hosts was found to be higher (67.8%) in a similar study carried out in Bombay by Meisheri et al<sup>19</sup>. Similarly, seroprevalence of HSV IgM antibodies in the patients suffering from genital infections were found to be 12.8 percent (6/47) in our study.

## Conclusion

The study was carried out to determine the seroprevalence of TORCH (IgM) among suspected patients visiting NPHL, Teku. Out of total 276 TORCH suspected serum samples, 23.2 percent (64/276) samples showed positive result. An overall prevalence of *T. gondii* (13.7%), Rubella virus (4.7%), CMV (11.7%) and HSV (11.2%) was found in the study.

Seroprevalence percentages of IgM antibodies were *T. gondii* (15.4%), Rubella (4.0%), CMV (9.3%) and

HSV (11.5%) in the female patients with bad obstetric history; *Toxoplasma* (0.0%), Rubella (0.0%), CMV (27.8%) and HSV (5.6%) in the infants; *Toxoplasma* (30.0%), Rubella (14.3%), CMV (14.3%) and HSV (14.3%) in the patients suffering from ocular infection and *Toxoplasma* (33.3%), Rubella (16.7%), CMV (33.3%) and HSV (16.7%) in the HIV/AIDS patients; *Toxoplasma* (0.0%), Rubella (2.0%), CMV (12.5%) and HSV (12.5%) in the patients with other symptoms (fever, joint pain, fainting attacks etc). Similarly, seroprevalence of HSV IgM antibodies in the patients suffering from genital infections were found to be 12.8 percent (6/47) in our study. Among the patients with different disease conditions, the highest seroprevalence of *Toxoplasma*, CMV and HSV were found to be in HIV/AIDS patients whereas the highest seroprevalence of Rubella was found in the patients with other symptoms.

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