

## SERO-PREVALENCE OF TOXOPLASMOSIS IN PREGNANT MOTHERS AND NEW BORN INFANTS IN EASTERN PROVINCE, SAUDI ARABIA

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**المقدمة:** يعيش طفيلي التوكسوبلازما داخل الخلايا، وهو ذو انتشار واسع في جميع أنحاء العالم، ولا تسبب إصابة الشخص الطبيعي الذي يتمتع بمناعة كاملة، بطفيلي التوكسو بلازما أية أعراض، ولكن قد تسبب الإصابة بهذا الطفيلي في وقت الحمل مخاطر على الجنين.  
**هدف الدراسة:** تحديد معدل انتشار الإصابة بالتوكسو بلازما لدى النساء الحوامل.  
**طريقة الدراسة:** أجريت هذه الدراسة في مستشفى الملك فهد الجامعي بالخبر، تم جمع مائة وخمسة وسبعين عينة من النساء الحوامل، هذه العينات تم فحصها لوجود الأجسام المضادة للتوكسوبلازما من نوع (I.G.G) و (I.G.M).  
**نتائج البحث والاستنتاجات:** تبين أن عدد النساء الحوامل اللاتي أصبن بطفيلي التوكسوبلازما كانت قليلة جداً (1 من 175) وأن عدد النساء الحوامل اللاتي أصبن في الماضي كان (69) من أصل (175) امرأة (39.4%)، وكانت كل حالات الولادة طبيعية بالرغم من وجود طفل مصاب بالتوكسوبلازما (1 من 175).

**الكلمات المرجعية:** طفيل التوكسوبلازما، النساء، الحوامل.

**Background:** *Toxoplasma gondii* is an obligate intracellular protozoa of worldwide distribution. In immunocompetent adults, it is usually the cause of asymptomatic infection. However, infection during pregnancy poses a special risk because of the teratogenic effect of toxoplasma.

**Objective:** Determine the sero-prevalence of toxoplasmosis in pregnant women and newborn infants in King Fahd Hospital of the University, Al-Khobar, Eastern Province.

**Methods:** In this hospital-based study, sera from 175 pregnant females were screened for toxoplasma IgG and IgM.

**Results and Conclusion:** A very low number ( $N=1/175$ , 0.57%) of pregnant mothers seroconverted during pregnancy, although many ( $N=69/175$ , 39.4%) were recorded with inactive toxoplasmosis during pregnancy. Delivery was normal in all cases except for a small number ( $N=1/175$ , 0.57%) of newborns (as recorded from cord blood) who were positive for toxoplasmosis.

**Key Words:** *Toxoplasma*, pregnant women

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## INTRODUCTION

Toxoplasma infection is universal in all countries of the world.<sup>1</sup> The definitive host is the domestic cat, its feces being the main source of infection. Human infection is acquired mainly through contact with an infected cat, ingestion of tissue cyst, undercooked or raw livestock meat.<sup>2</sup> Studies conducted on the prevalence of toxoplasmosis in Saudi Arabia are mainly hospital-based. No community-based studies on the seroprevalence of toxoplasmosis in humans in Saudi Arabia have so far been conducted. The current study was motivated by the fact that though some work on toxoplasmosis in pregnant mothers in Saudi Arabia has been conducted,<sup>3-7</sup> the new technique of micro-particle enzymes immunoassay (MEIA) was not used in any of these except two.<sup>8,9</sup> However, the latter were not community-based.

The study aimed at determining the seroprevalence of toxoplasmosis in pregnant mothers (seroconversion during pregnancy) and infants born to these mothers. It is a part of a larger study of seroprevalence of toxoplasmosis in males and females of all ages in the Eastern Province.

## MATERIAL AND METHODS

This was a hospital-based study conducted at King Fahd Hospital of the University (KFHU). The study population comprised pregnant mothers and later their infants attending the antenatal clinic at KFHU. Sera from pregnant mothers in their second and third trimesters (a sample of 175) and later from the cord blood of the infants of these mothers were collected to determine IgM. Blood specimens were collected by venapuncture by trained medical personnel under the supervision of members of the research team. The specimens were taken to the nearest primary health care center; serum was prepared and stored at 20°C for further analysis by the MEIA for IgG and IgM.<sup>10</sup>

In this test, IMX Toxo IgG assay results of less than 2.94 IU/mL were considered negative for IgG antibody to *T. gondii*. IMX Toxo IgG assay results of greater than or equal to 2.94 IU/mL were considered positive for IgG antibody to *T. gondii* and may indicate past inactive infection. Sera from subjects who were positive for IgG were tested for IgM using the same technique: IMX Toxo IgM (MEIA) for IgM. IMX Toxo IgM assay indexes of less than 0.500 are negative for IgM antibody to *T. gondii*. IMX Toxo IgM antibody to *T. gondii* indicates acute active infection. Maternal blood was collected from a peripheral vein by venapuncture and cord blood was collected from a large vein on the fetal side of the placenta immediately after delivery.

Data were analyzed by computer, using SPSS version 6. Analysis of variance, Chi-square and T-tests were used as appropriate, taking significant values of  $p$  to be  $< 0.05$ .

## RESULTS

### *Seroprevalence of toxoplasmosis in pregnant mothers and their infants*

Table 1 shows toxoplasma antibodies (IgG) in pregnant mothers during pregnancy. The ages of the pregnant women ranged from 25-35 (25±8) years. Of the 175 pregnant women included in the samples, 69 (39.4%) were found to be seropositive with values ranging from 0.6 to 300 IU/ml. Of these, only one mother was found to have active infection (0.57%).

Table 2 shows the perinatal outcome and IgM levels in the cord blood of infants born to the mothers in the sample. One infant was found to have active toxoplasmosis (value of 0.5% for IgM). However, he had no abnormalities. The IgM values of the other cord samples were negative. The deliveries of the pregnant mothers were normal in all 175 cases: fetal weight ranged from 2.5-3.9 kg (mean=2.8 ± 1.2). There were no abortions, stillbirths or premature deliveries.

**Table 1: Toxoplasma antibodies IgG in pregnant mothers during pregnancy\***

No. of pregnant mothers	Age (years) (Mean ±)	No (%) Positive in second trimester	Distribution of IgG values	No (%) of seroconversion
175	25 – 35 (25 ± 8)	69 (39.4)	5.6 – 300	1 (0.56)

\*Positive at 2.94 IU.mL or higher

**Table 2: Perinatal results of pregnant mothers and IgM levels in cord blood**

No. of cord blood samples examined	State of delivery		Fetal Weight (Kg)		Seroprevalence IgM		Distribution of IgM in cord blood	Distribution of IgM values
	No*	(%)	Mean Range	± SD	No	(%)		
175	Normal = 175	100	2.8 (2.5-3.9)	1.2	1/175	0.57	0.10-0.50	5.6-300

\*Stillbirth, premature, and abortion = 0

## DISCUSSION

The diagnostic technique (MEIA) used in the present study is a relatively new technique, but has been well documented by other researchers. The technique was evaluated at 15 clinical locations in Europe and the USA. A high sensitivity of 97%, as well as a high specificity of 99.8%, was recorded.<sup>10-12</sup>

It has already been shown that for the general population in the Eastern Province, the inactive toxoplasmosis (IgG levels) was about 25%, which is rather high.<sup>5</sup> That for the pregnant mothers was even higher (39.4%).

It is, however, comparable to that recorded for the Dammam area (42.1%) and higher than that for the Hofuf area (22.7%).<sup>5,13</sup> Other investigators have recorded similar values in other areas of the Kingdom.<sup>4,7,14</sup> This seroprevalence in pregnant mothers of the present study is in accordance with epidemiological surveys in the Eastern Region.<sup>13</sup> However, there was a very low level (1 of 175) of seroconversion (active toxoplasmosis), and congenital transmission occurred in this study similar to that level recorded in the Dammam area

(1/152) and that recorded over all of Saudi Arabia (9/1863).<sup>5</sup>

The perinatal outcome of the pregnancy in this study is remarkably favorable. There were no abortions, stillbirths or premature deliveries, or congenital anomalies. This has a significant bearing on screening and management. According to our findings only those at high risk need be screened, since it may not be cost effective to routinely screen all pregnant mothers.

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