

SEROPREVALENCE OF TOXOPLASMA ANTIBODIES AMONG PREGNANT WOMEN IN KERMANSHAH

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ABSTRACT

Sera from 495 pregnant women were examined for toxoplasma antibodies by indirect fluorescent antibody testing (IFAT). Antibodies were positive in 32.7%. Seropositivity was not increased significantly with age but showed a statistically significant rise in accordance with frequency of parity, abortion and contact with cats.

The high rate of seronegativity (67.3%) observed in pregnant women represents a high risk group for acquiring toxoplasma infection and also congenital toxoplasmosis.

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INTRODUCTION

Infection with *Toxoplasma gondii*, an obligate and intracellular protozoan, occurs throughout the world and is seen particularly in warm and moist climates.¹ Congenital toxoplasmosis, which is the result of an acute infection acquired by the mother during gestation, poses the greatest threat to the fetus in utero.²

Despite numerous reports on toxoplasma antibody determinations in the general population of Iran,^{3,4} few sero-epidemiological studies have been performed in pregnant women.

toxoplasma antibodies in this group in the Kermanshahan province, western Iran.

MATERIALS AND METHODS

The study was done during 1991-1992 in the city of Kermanshah, the capital of Kermanshahan province and the largest city in the west part of Iran. This area has an annual rainfall of 300-400mm, mean daily temperature of 13.3°C and mean relative humidity of 47%.

Blood samples were collected from 495 pregnant women aged between 15 and 45 years, who attended a private clinic and two health centers for antenatal care and gynecological complaints. Information on age, parity, history of abortion and contact with cats was obtained from all participants by questionnaires. After collection, the samples were immediately transported to the laboratory of the Sina University Hospital where the sera were separated and stored at -20°C until examined.

Table I. Prevalence of toxoplasma antibodies in 495 pregnant women

| IFAT titres | Number | Prevalence(%) |
|----------------------------|--------|---------------|
| 0 | 333 | 67.3 |
| 1:50 | 34 | 6.8 |
| 1:100 | 64 | 12.9 |
| 1:200 | 38 | 7.7 |
| 1:400 | 19 | 3.8 |
| 1:800 | 4 | 0.8 |
| 1:1600 | 1 | 0.2 |
| 1:3200 | 2 | 0.4 |
| Total positive \geq 1:50 | 162 | 32.7 |

Toxoplasma Antibodies in Pregnancy

All sera were examined by the IFAT, a method proven in the past to possess sensitivity and specificity in detecting toxoplasma antibodies.⁵

Toxoplasma gondii antigen, control serum and polyvalent human conjugated serum were provided by the Pasteur Institute of Iran (Tehran) and tests were performed according to the manufacturer's instructions. Sera reacting positively at dilutions greater than or equal to 1:50 were considered indicative of previous toxoplasmal infection. Significance of differences was determined by Chi-squared and Pearson contingency coefficient testing.

RESULTS

A total of 162 sera were positive by IFAT at $\geq 1:50$, indicating a 32.7% prevalence of seropositivity (Table I). The age distribution of examined and seropositive women is shown in Table II.

(37.7%) was observed in the 31-35 age group, there was no statistically significant correlation between age and infection. 120 (24.2%) women were in their first pregnancy and gave no history of abortions. Seropositivity in this group was 22.5%, but toxoplasma antibodies were present in 135 (36%) multiparous women ($P < 0.05$).

One or more abortions were mentioned by 209 (42.2%) pregnant women and 87 (41.6%) of them were seropositive (Table III). Results of our study showed a significant correlation between abortion and prevalence of toxoplasma antibodies ($P < 0.05$). Among the study population, 147 (29.6%) gave histories of continuous contact with cats and 348 (70.4%) had no contact (Table IV). Seropositivities in these two groups were 48.2% and 26.1% respectively, showing a statistically significant difference ($P < 0.05$).

Of all of the pregnant women who participated in this survey, only two had previously undergone IFA testing for the detection of toxoplasma antibodies.

DISCUSSION

Recent investigations performed throughout the world show a wide spectrum of seropositivity for toxoplasma antibodies among pregnant women, ranging from 17.9% to 78%.^{6,7} Seroprevalence in our present study (32.7%) is similar to Hady in 1991 who found a prevalence of 31.6% in Saudi Arabia⁸ and with Jaqueti et al⁹ who reported toxoplasma antibodies in 38.9% of Spanish pregnant women. The reported rates of seropositivities are 20.3% in Finland,¹⁰ 47.4% in Libya¹¹ and 78% in Nigeria.⁷ In Iran Medghalchi¹² examined sera from 550 pregnant women in Tehran by IFAT and found a high prevalence (82.2%) of toxoplasma antibodies. Apart from geographical differences, a possible explanation of this would be that in the present study,

Table II. Age distribution in examined and seropositive pregnant women

| Age group | <21 | 21-25 | 26-30 | 31-35 | ≥ 36 |
|-----------------|-----|-------|-------|-------|-----------|
| Number examined | 130 | 158 | 109 | 61 | 37 |
| Seropositive | 34 | 56 | 38 | 23 | 11 |
| Prevalence (%) | 26 | 35.4 | 34.8 | 37.7 | 29.7 |

Table III. Seropositivity in relation to frequencies of abortions in 495 pregnant women

| Number of abortions | 0 | 1 | 2 | 3 | 4 | 5 |
|---------------------|------|------|------|------|---|------|
| Examined number | 286 | 124 | 59 | 22 | 1 | 3 |
| Seropositive | 75 | 53 | 24 | 9 | - | 1 |
| Prevalence (%) | 26.2 | 42.7 | 40.6 | 40.9 | - | 33.3 |

Table IV. Contact with cats in relation to toxoplasma seropositivity in pregnant women

| | with contact | without contact |
|----------------|--------------|-----------------|
| Total | 147 | 348 |
| Seropositive | 71 | 91 |
| Prevalence (%) | 48.2 | 26.1 |

dilutions of sera greater than or equal to 1:50 were accepted as positive reactions, but in the last study the criteria for positive reactions were amounts greater than or equal to 1:20. Age was not significantly associated with the presence of toxoplasma antibodies in our study. This finding was contrary to the survey performed on the general population¹ but was consistent with the results of Jaqueti et al in 1991.⁹

Another feature of our results was the determination of a high percentage (42.2%) of previous abortions among pregnant women and its association with the presence of toxoplasma antibodies. According to this finding and with regard to the low prevalence of protective antibodies against toxoplasma among pregnant women, the etiological study of abortions is recommended.

Our study did not evaluate meat consumption as a major route of toxoplasma transmission because of controversial responses to the questionnaire.⁵ But contact with cats in 48.2% of seropositive women showed a statistically significant difference as compared with seronegative individuals. Onadeko et al in 1992 also described such a condition.⁷

The fact that only two pregnant women had undergone toxoplasma serologic tests before their gestations showed that screening tests are performed very rarely in Iran and this matter appears to be a significant risk factor for fetuses, particularly in areas where the prevalence of toxoplasma

seropositivities are low. Therefore, serological examinations before the onset of pregnancy and repeated at 10-12 and 20-22 weeks of gestation are recommended for the control and management of congenital toxoplasmosis.¹³

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REFERENCES

1. McCabe RE, Remington JS: Toxoplasmosis; in Warren KS, Mahmoud AF: Tropical and Geographical Medicine, 2nd edition, McGraw-Hill, 309-320, 1990.
2. Wilson CB, Remington JS: What can be done to prevent congenital toxoplasmosis? Am J Obstet Gynecol 138: 337-363, 1983.
3. Ghorbani M, Edrissian GH, Afshar A: Serological survey of toxoplasmosis in mountainous regions of the north-west and south-west parts of Iran. Trans R Soc Trop Med Hyg 75(1), 38-9, 1981.
4. Ghorbani M, Edrissian GH, Assad N: Serological survey of toxoplasmosis in the northern part of Iran using IFAT. Trans R Soc Trop Med Hyg 72(4), 369-71, 1978.
5. Brook RG, McCabe RE: Role of serology in the diagnosis of toxoplasmic lymphadenopathy. Rev Infect Dis 9(5): 1055-1062, 1987.
6. Forsgren M, Gille E, Ljungstrom I, Nokes DJ: *Toxoplasma gondii* antibodies in pregnant women in Stockholm in 1969, 1979 and 1987. Lancet 337: 1413-14, 1991.
7. Onadeko MO, Joynson DHM, Payne RA: The prevalence of toxoplasma infection among pregnant women in Ibadan, Nigeria. J Trop Med Hyg 91: 143-145, 1992.
8. Hady EL HM: Toxoplasmosis among pregnant women in Abha, Saudi Arabia. J Egypt Soc Parasitol 21(3): 811-5, 1991.
9. Jaqueti J, Hernandez GR, Nicols D, Martinez HD: Serology against *Toxoplasma gondii* in pregnant women, Development of prevalence rates in the course of 4 years. Rev Clin Esp 188(6): 278-80, 1991.
10. Lappalainen M, Koskela P, Hedman K, Teramo K, Ammala P, Hiilesmaa V, Koskiniemi M: Incidence of primary toxoplasma infection during pregnancy in southern Finland: A prospective cohort study. Scand J Infect Dis 24(1): 97-104, 1992.
11. Kassem NH, Morsy TA: The prevalence of anti-toxoplasma antibodies among pregnant women in Benghazi, (S.P.L.A.J.) Libya. J Egypt Soc Parasitol 21(1): 69-74, 1991.
12. Medghalchi M: The prevalence and incidence of toxoplasmosis in pregnant women. Thesis for M.S. degree. Iran university of Medical Sciences, 1991 (unpublished).
13. Daffos F, Forestier F: Prenatal management of 746 pregnancies at risk of congenital toxoplasmosis. N Eng J Med 318: 271-75, 1988.