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## Seroepidemiologic Evaluation of Anti-toxoplasma Antibodies among Women in North of Iran

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**Abstract:** This study is a cross sectional and descriptive study. Sample population was the women referred for marriage consultation to Gorgan Marriage Consultation Center in 2004. The prevalence of toxoplasma antibodies (IgG, IgM) was determined by ELISA method. Blood samples were collected randomly from 300 women referred to the center for consultation. They were transferred to the laboratory for antibodies determination. Gorgan located in north of Iran and south east of Caspian sea. The results showed that the general prevalence to the positive cases based on high titer of IgG was 48.3% and of IgM was 11.7%. There was not any relation between positive cases and age, education, place of residence, job, keeping domestic animals (except cat) vegetable consumption and wash-up, but there was a relation between the positive cases of IgM and keeping cat at home (PV<0.025). More over 51.7% of pregnant women in Gorgan were seronegative and the were prone to acute toxoplasmosis during their pregnancy. The results of this study confirm that the determination of the diagnostic toxoplasmosis is an necessary test during pregnancy.

**Key words:** Toxoplasmosis, pregnancy, IgG, IgM, Iran

### INTRODUCTION

*Toxoplasma gondii* (TG) as an obligate internal cell protozoon is responsible for sever infection in human and domestic animals. Toxoplasmosis is a clinical problem that caused by *Toxoplasma gondii* (TG). It is transfer to human by several agents, same as uncooked meat (Ertug *et al.*, 2005), cat feces, blood transfusion, organ transplantation and rarely by randomly accidental in laboratories filtration and also in congenital period from placenta (Mandell *et al.*, 1995; Ertug *et al.*, 2005; Spalding *et al.*, 2005; Avelino *et al.*, 2004; Nowakowska *et al.*, 2006; Alvarado-Esquivel *et al.*, 2006; Bobic *et al.*, 2003).

Toxoplasmosis is considerable in pregnant women for it's congenital damages. Toxoplasmosis to be cased a broad spectrum complications in congenital period, same as fever, hydrocephalia, microcephalia, splenomegalia, jaundice, convulsion, mental retardation, chorioretinitis (usually bilateral), cerebral calcification and CNS damage (Ertug *et al.*, 2005; Alvarado-Esquivel *et al.*, 2006; Bobic *et al.*, 2003; Spalding *et al.*, 2005).

Congenital infectious from T.G. almost cases complication in labor time or next its (Ertug *et al.*, 2005; Alvarado-Esquivel, 2006; Bobic *et al.*, 2003; Spalding *et al.*, 2005; Jones *et al.*, 2003; Mandell *et al.*,

1995; Cunningham *et al.*, 1997; McCabe and Oster, 1989). Serological method is a general method for determine of prevalence rate of toxoplasmosis in human and animals, that fallows by Immuno Flyrescence Assay (IFA) and Enzyme-Linked Immunosorbent Assay (ELISA). In the last years, polymerase chain reaction (PCR) method carry out for detection of congenital infection before birth in France (Garcia and Bruckner, 1997; Alvarado-Esquivel *et al.*, 2006; Rorman *et al.*, 2006).

American college of feminity and midwifery and other investigations recommended a serological screening before pregnancy in 1993 (Roider *et al.*, 1996; Rorman *et al.*, 2006; Bobic *et al.*, 2003; Logar *et al.*, 2002).

Prevalence rate of human contamination with TG is deferent on base of age geographical area, temperature, moisture, food habits (Mandell *et al.*, 1995) and keeping cat at home (Mandell *et al.*, 1995; Cunningham *et al.*, 1997; Avelino *et al.*, 2004; Nowakowska *et al.*, 2006; Alvarado-Esquivel, 2006; Ertug *et al.*, 2005; Bobic *et al.*, 2003). Morbidity rate from toxoplasmosis can be increase with older age, eating raw meat, keeping cat at home, living is lowlands, warm and moisture area. Scattering studies in Iran show high and some variety of Toxoplasmosis in different region (Ertug *et al.*, 2005; Spalding *et al.*, 2005; Avelino *et al.*, 2004; Alvarado-Esquivel, 2006; Ertug *et al.*, 2005; Bobic *et al.*, 2003;

Shuhaiber, 2003; Kravetz and Federman, 2005a). Because of 90% or more of patients are asymptomatic, therefore toxoplasmosis undefined in this woman (Kravetz and Federman, 2005b; Cunningham *et al.*, 1997). Determination of prevalence rate and assessment of anti-toxoplasmosis antibody before pregnancy is a useful action for controlling of positive IgM and IgG antibody in Iran. With this regard, we studied quality relation between some variable for example age, keeping cat at home, eating raw or semi-cooked meat, literacy and residence with mention criteria.

**MATERIALS AND METHODS**

This study carried out in Gorgan district in 2004. Gorgan is a capital city that located in north of Iran and south east of Caspian sea.

There is a cross sectional-descriptive study that be established for assessment of level of IgM and IgG (Anti-toxoplasma Antibody) among women at marriage consulting time. Other objective are determine correlation between positive antibody with living local (rural or urban), literacy, keeping cat at home or contact with it, keeping other domestic animal (cow, sheep, goat and dog) at home and consumption raw vegetables or uncooked meat. With regard to prevalence (55% in north of Iran) and 5% currency sample volume computed 275 cases. These cases were chosen- among client people to Gorgan Health Center for marriage consulting by random sampling.

We drive 5 mL blood from any cases. After, blood serum analyzed by IgM and IgG kit (type of biotech) with ELISA method and antibodies detect with this way. On base of kit information, results to be classified in 3 groups (positive, negative and suspect). Biochemical and questionnaire data saved in computer and analyzed by SPSS soft ware.

**RESULTS**

The mean of age was 21.14 with minimum 10 and maximum 47 years old. 125 (41.7%) and 175 (58.3%) people were living in urban and rural, respectively. Seventeen cases (5.7%) were keeping cat and 117 cases (93.9%) were keeping other domestic animal in their home. 273 cases (91%) consumed raw or semi-cooked meat and 295 cases (98.3%) be used to raw vegetable. On the whole, 145(48.3%) cases that client for marriage consulting have been IgG positive antibody and other were be negative mention factor. Beside 35(11.7%) persons were IgM positive antibody, 14 (4.7%) persons were in suspect IgM positive and 251(83.6) persons didn't have IgM antibody.

Table 1: Distribution of IgG and IgM antibody among client women to Gorgan married consulting center

Status	Positive		Suspect		Negative	
	No.	%	No.	%	No.	%
IgG	145	48.3	-	-	155	51.7
IgM	35	11.7	14	4.7	251	83.6

Table 2: Relation between antibody reaction and some variable among client women to Gorgan married consulting center

Antibody	Variable	Consume raw milk			Keeping cat at home		
		Yes	No	PV	Yes	No	PV
IgG	+	5	140	0.05	10	135	0.395
	-	1	151		148	7	
IgM	+	2	33	0.11	29	5	0.025
	-	4	248		240	12	

$\chi^2$  test is significant among raw milk consumer about IgG,  $\chi^2$  test is significant among cat keeper at home about IgM, +: Positive, -: Negative

The suspect cases no computed for detection of correlation between IgG and IgM reaction. On this way 29(9.6%) cases were both IgM and IgG positive and 135(45%) cases were negative two above antibody (Table 1). Positive IgG antibody observed among 55(44.7%) urban women and 90(51.7%) rural women. In other side 17(13.9%) cases and 18(10.9%) cases were positive IgM that living in urban and rural respectively. There is no statistical significant differentiation between place of study and positive IgG and IgM ( $PV \geq 0.355$ ). Also, 5(83.3%) cases were positive IgG antibody that consumed fresh milk.  $\chi^2$  test between two factors had statistical significant differentiation ( $PV \leq 0.05$ ) (Table 2). We didn't observe a positive correlation between consumption of raw vegetable ( $PV \geq 0.507$ ), uncooked meat ( $PV \geq 0.427$ ) and keeping domestic animals at home.

In besides, 5(29.4%) of women that keeping cat at home was IgM positive and 12(70.6%) were IgM negative. Between keeping cat at home and IgM positive exists a statistical significant relation ( $PV \leq 0.025$ ) (Table 2).

**DISCUSSION**

Toxoplasmosis is one of the widespread parasitological diseases commonly between human and animal that spread in Iran and other countries (Ertug *et al.*, 2005; Spalding *et al.*, 2005; Avelino *et al.*, 2004; Nowakowska *et al.*, 2006; Alvarado-Esquivel, 2006). Results of present study showed that 48.3% of females, candidates to marriage in Gorgan, are anti-toxoplasma IgG positive. Infant, these women had been toxoplasma infectious and there is no necessary reassessment or following in pregnancy period. 11.7% of women were positive IgM antibody and they are in acute phase of disease. Twenty nine cases are positive with combination of IgG and IgM. Eleven cases with IgM positive antibody

are IgG negative antibody that is a indicator of coughing of infection within last weeks. In other wise if pregnancy is occurred in this time, it will be followed up and should be treatment. In other study, 50% of pregnant women that to be treatment in last time, will be caused congenital infection and have related complication (Ghorbani *et al.*, 1981; Hoghoogi Rad *et al.*, 1993).

On base of similar studies (Ghorbani *et al.*, 1981), infectious rate was reported 9.3% on the high land region in Khozestan province, 29.3% in Azarbayjan and 55.7% in around Caspian sea. The prevalence rate of toxoplasmosis among pregnant women in world wild is deferent. One study in Benin, acknowledged that 53.9% of pregnant women were IgG positive antibody (Roider *et al.*, 1995). Other studies showed that 83% in Paris, 31.7% in USA, 49% in Algeria, 12% in Norway and 22% in London 74.5% in south of Brazil, 80.1% in Turkey, 69% in Serbia, 88% in Aukland, 42% in Armenia, 86.3% in Spain, 43.4% in Wolclawek were TgG positive (Cunningham *et al.*, 1997; Jeannel *et al.*, 1989; Ertug *et al.*, 2005; Spalding *et al.*, 2005; Shuhaiber *et al.*, 2003; Ruiz-Fons *et al.*, 2006).

The prevalence of toxoplasmosis in human is different on base of age and it is high in older women (Spalding *et al.*, 2005; Avelino *et al.*, 2004; Nowakowska *et al.*, 2006; Bobic *et al.*, 2003; Dubey, 1990). Lack of correlation between age and positive antibody in this study was happen for low age of cases. Semi cooked meat consumption is the most way for transferring of toxoplasma Gondei to human. American and Swedish people and others that consume above form meat, the common of T.G is high (Frenkel and Ruiz, 1981; Spalding *et al.*, 2005; Bobic *et al.*, 1998; Cook *et al.*, 2000; Shuhaiber *et al.*, 2003; Kravetz and Federman, 2005a; Lopez-Castillo *et al.*, 2005).

There is no significant differentiation between make of cooks and TG infection. That is probably flowed for complete cooking the meat. Cat is known as a major source of infectious (Frenkel, 1971; Bobic *et al.*, 1998; Cook *et al.*, 2000; Shuhaiber *et al.*, 2003; Kravetz and Federman, 2005b; Lopez-Castillo, 2005). Present study were be verified this idea. We observed anti-toxoplasma antibody (IgM) among 29.4% of women that contact with cat in last time. A positive correlation established between above tow factors ( $PV \leq 0.025$ ). In general, 51.7% of marital female client to married consulting center had been negative anti-toxoplasma serum. They are potentially at risk for accrued acute toxoplasmosis in congenital period for their fetus. Therefore, we recommend that all of female candidates for marriage should be check for anti-toxoplasma antibody and should be established a program check up in Health System Care (HSR). With this way, besides follow up of pregnant women that have

negative test, educational planning is necessary for preventing of toxoplasmosis infectious. Tow mentions way are important for decreasing of prevalence rate of toxoplasmosis in human.

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