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RESEARCH ARTICLE

Seroepidemological Study on infected Women by *Toxoplasma gondii* in Al- Ramadi City

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Abstract

During a period from 1/June - 10/August 2011, 165 blood samples were collected from aborted women who were referred to the Maternity and Child Hospital in Ramada city. Their ages ranged from 20- 45 years.

All women were screened for *Toxoplasma* IgG antibodies by latex agglutination test to study the positive rate of toxoplasmosis in the community. Most of the positive women showed the highest titers (320 IU/ml), especially, in age groups (30- 40) years. The majority of aborted women showed the highest rate 88(65.18%) in age groups (20- 30) years, while, the lowest rate 1(0.74%) in age groups >40 years. The blood parameters showed the rates of Hb(12.696),PCV(40.590) and ESR(21.850) increased in progressive age groups in pregnant infected women, while of WBCs count(5.557) decreased in pregnant infected women in progressive age, and the rates of Hb(12.351), PCV(38.919) and ESR(18.500) in pregnant infected women in rural areas were more than pregnant infected women in urban areas. While the WBCs count was in urban areas (7.115) more than rural areas (6.851). Hb, WBCs, PCV and ESR increase in non-educated pregnant infected women, while in educated pregnant infected women decrease.

The level of education, residency, age, malnutrition and contact with animals are effected and help to diffused the disease, whereas present of antibodies of toxoplasmosis in pregnant women in rural areas was more than pregnant women in urban. The study showed the most infections were among the age groups 20- 30 years. The psychological factor is affected on some blood parameters which effect in pregnant women

Introduction

Toxoplasmosis is a parasitic infection caused by *Toxoplasma gondii*. When acquired during pregnancy, toxoplasmosis often goes unrecognized in the mother, but it can produce sever congenital infection with ocular and neurological damage to the infant. Up to 38% of women in the United States have immunity against *T. gondii* from a prior infection. This leaves about 62% of women at risk to acquire toxoplasmosis during pregnancy (**Sever, et al. 1988**).

Toxoplasmosis is azoonotic disease caused by an obligate intracellular protozoan parasite called *Toxoplasma gondii* which belongs to phylum Apicomplexa, class coccidea (**Robert and Janovy, 2000**). Toxoplasmosis can manifest with a wide range of clinical symptoms that are often related to the immunologic of the status of the patient. The organism *T. gondii*, is found worldwide, and serologic studies indicate that rate of in infection often varies from country to country. In the United state more than 20% of the population show serologic evidence of infection, but in parts of Europe the figures may be a high as 80% (**Smith, 2007**). Typically transmission occurs from the ingestion of cysts excreted in the feces of infected cats or from eating undercooked beef or lamb. Immunocompromised patients are particularly at risk (**Davidson, 1984**).

The clinical toxoplasmosis takes serious toll on human health in the form of abortion, congenital defects, Blindness, and both chronic and acute diseases (**William and Demure, 2000**). *T.gondii* can be carried by many warm-blooded

animals (birds or mammals, including humans) (**Dubey et al, 2007**). Toxoplasmosis is usually minor and self-limiting but can have serious or even fetal effect on fetus whose mother first contracts the disease during pregnancy or on an immunocompromisid human or cat .(**Ira et al , 2009**). In Arab world including Iraq, Toxoplasmosis has high prevalence rate of infection (**Jasim, 1979; Tawffiq, 1983; Jawad, 1985**).

Aims of our study conduct to the prevalence environmental risk factors, and effects in some blood parameters and educations, area residency and age groups.

Material and Methods

Blood samples: 135 blood samples were collected from aborted women at AL-Ramada Maternity and Child Hospital during the period from, First/June/ to Tenth/ August/2011. The age ranged between20-›40 years. In addition 30 blood samples were collected from aborted women non- affected by toxoplasmosis. Blood samples were collected as follow: Blood was collected by vein puncture, allowed to clot at room temperature and sera were separated by centrifugation at 3000 rpm for 5 minutes then stored at 20 °c.

Infection rate: Direct agglutination test on the slide for the determination of anti-Toxoplasma (Antibody titer). The Toxoplasmosis latex test is a rapid agglutination procedure for the qualitative and semi-quantitative determination Toxoplasma antibodies in serum. The determination was made by specific agglutination of a latex suspension coated with ***T. gondii*** antigen with Toxoplasma antibodies present in the sample. The reagents and serum samples were brought to be prepared as in Individual circles of the control, as follow (Table 1):

Table 1.

Tubes	**1**	**2**	**3**	**4**	**5**	**6**
Saline sol.	**---**	**50µl**	**50µl**	**50µl**	**50µl**	**50µl**
Sample	**100 µl**	**Serial dilution of 5oµl**				
Dilution	**1:1**	**1:2**	**1:4**	**1:8**	**1:16**	**1:32**
Iu/ml	**10**	**20**	**40**	**80**	**160**	**320**

1. 50 µl of each sample dilution were placed into the individual circles of the control.
2. One drop of the toxoplasma latex reagent was added to each circle near the sample to be tested, helped with the little stirrer components were mixed covering all the surface of the circle.
3. Slide was rotated slowly either by hand or by mean of a mechanical rotator (80 rpm) for a period of 5 minutes.

Blood parameters: Hemoglobin (Hb), Erythrocyte Sedimentation Rate (ESR), Leukocyte counting (WBCs), packed cell value (Pcv) were determined as described by (**Henry and Davidson, 1974).**

4. Agglutination was noticed by naked eye, and if positive, serial dilution was prepared as in the above table.

Result and Discussion

Specific antibodies to *T. gondii* were investigated by latex agglutination test in 165 blood samples out of the total number 135(81.8%) were found to be positive, while 30 (18.2%) patients were found to be negative (Table 2).

Table 2. Results of latex agglutination test in all patients.

Group	**Blood samples**	**Positive**	**%**	**Negative**	**%**
Total	**165**	**135**	**81.8**	**30**	**18.2**

Table 3 shows that the infected women with toxoplasmosis were higher in rural area 86(63.4%) more than infected women in urban area 49(36.6%), the non-educated women in rural 47(54.6%) higher percentage from educated infected women 39(45.4%). In urban areas the non-educated infected women 25(51.0%) recorded highest rate

compared to educated infected women 24(49.0%). This is due to presence of cats in rural area has important role for transmission which is considered the last animal reservoir for this disease (**Advincula et al., 2010**). The epidemiology of toxoplasmosis in different population groups was affected partially by ingestion of undercooked meat, food and water contaminated with cat's feces (**Abbas, 2002**).

Table 3. Number of abortions according to residency and level of education

Residency	Educated	Non-educated	Total
Rural	39(45.34%)	47(54.66%)	86(63.71%)
Urban	24(48.97%)	25(51.03%)	49(36.29%)

Our result don't agree with a study by **Hussain (2010)** for toxoplasmosis in Fallujah city, which explained that the pregnant – infected women with toxoplasmosis in urban areas was higher than pregnant – infected women in rural areas, but the result in agreement with Behloehani and Al- Karmi (1980) showed the mean number of obortion in pregnant – infected women in rural and urban areas highest in age group > 40 years, the lowest rate in age groups 20-30 years so younger women more healthy to get tested early (Table 4).

Table 4. Number of abortions according to age groups

Age groups	20-30	30-40	>40
Mean	3	4	6

Table 5, 6, 7 and 8 showed the blood parameters of Hb, PCV, WBCs and ESR increased in progressive age groups in pregnant infected women, while of WBCs count decreased in pregnant infected women in this age. The study found the rates of Hb, PCV and ESR in pregnant infected women in rural areas were more than pregnant infected women in urban areas. While the WBCs count was in urban areas more than rural areas. The blood parameters (Hb, PCV, WBCs and ESR) increased in non-educated pregnant infected women, while in pregnant infected women decreased.

Table 5. ANOVA table analysis for Hb (g/dl)

Age group	Environment	Education	
		Non-educated	Educated
20- 30	Urban	11.540 f g	11.363 g
	Rural	11.614 f g	11.717 e f
30- 40	Urban	12.o16 d e	12.035 d e
	Rural	13.138 a	12.170 d e
›40	Urban	12.841 a b	12.578 b c
	Rural	13.027a	12.339cd
LSD 0.05 = 0.388			

Table 6. ANOVA table analysis for PCV level %

Age group	Environment	Education	
		Non-educated	Educated
20- 30	Urban	37.152 g f	36.367 g
	Rural	37.095 g f	36.824 g
30- 40	Urban	38.300 e f	38.701 e d
	Rural	38.734 e d	38.940 e d c
›40	Urban	40.592 b a	39.846 b d c
	Rural	41.686 a	40.238 b a c
LSD 0.05 = 1.462			

Table 7. ANOVA table analysis for WBCs count (cell/mm^3)

Age group	Environment	Education	
		Non-educated	Educated

20- 30	Urban	8.350 a	8.620 a
	Rural	8.300 b a	8.100 a
30- 40	Urban	7.570 b c	7.260 d c
	Rural	6.910 d e	6.460 e
›40	Urban	5.250 f	5.640 f
	Rural	5.590 f	5.750 f
LSD 0.05 = 0.586			

Table 8. ANOVA table analysis for ESR rate mm/hr

Age group	Environment	Education	
		Non-educated	Educated
20- 30	Urban	13.000 fe	12.200 f
	Rural	12900 fe	15.000 d e
30- 40	Urban	16.500 dc	15.700 d
	Rural	19.100 bc	19.100 b c
›40	Urban	21.300 ba	21.200 b a
	Rural	23.400 a	21.500 b a
LSD 0.05 = 2.699			

The causes of increased or decreased in the rate of Hb are the differential of physiological and immunity state in pregnant infected women with toxoplasmosis, the blood parameters (PCV and ESR) some time remains stable and not changeable during period of infection (**Lappin, 1996**).

Cause of WBCs count decrease progressive age because these cells had been affected by toxoplasmosis. Which it considered as one of the important factors which control the natural and acquired immunity response in the body of pregnant infected women (**Ajiok et al., 2002**).

The present study agrees with **AL-Rawi (2010**) Physiological and immunological changes in pregnant women in Ramada city, which pointed to the increase of the rate of some blood parameters (PCV and ESR), While the WBCs count was lower rate.

The relationship between of HB level and WBCs count against (Negative) and high degree whereas a connective index was (R= - 0.733***). While HB level was Positive and high degree among PCV level and ESR level whereas connective and index was as follow (0.676***, 0.675***) (Table 9).

Table 9. Correlation Coefficients among properties study

X	ESR	PCV	WBCs	HB
HB	0.6751***	0.676***	-0.733***	1.00000
WBCs	-0.796***	-0.757***	1.00000	-0.733***
PCV	0.640***	1.00000	-0.757***	0.676***
ESR	1.00000	0.640***	-0.796***	0.675***

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