

Prevalence of toxoplasmosis among pregnant women in Najaf city

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Abstract:

Toxoplasma gondii is globally distributed pathogen for human cause significant morbidity and mortality in developing fetus , in pregnant women toxoplasmosis is an important cause of abortions and stillbirth after primary infection . Therefore , the diagnosis of this infection is essential to prevent complications . This study was performed in order to evaluate the prevalence of toxoplasmosis in *pregnant* women and to study some factors that influence toxoplasmosis transmission . Among 260 sera samples tested using enzyme Linked immunosorbent assay(Elisa) . The seroprevalence of IgG which refer to chronic infection of *Toxoplasma* was (30.76 %)(80 out of 260) and IgM which refer to acute infection of *Toxoplasma* was (11.92%) (31 out of 260) . The present study demonstrated, that toxoplasmosis is more common among age group (25- 34) years ,and there is no statistically significant difference between of *Toxoplasma* infection and occupation of pregnant women , and there are significant role for the environmental and personal factors on *Toxoplasma* transmission , the study showed that the cats exposure woman were most affected by *Toxoplasma* (37. 5 %) and the pregnant women who not using disinfectant were more affected (42.51%) and the pregnant women who depending in their feeding on restaurant more frequent to infection with *Toxoplasma* (46.95%).

انتشار طفيلي التوكسوبلازما بين النساء الحوامل في مدينة النجف

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الخلاصة:

يعتبر التوكسوبلازما المنتشر عالمياً طفيل ممرض للإنسان والذي يسبب نسب أمراضية ووفيات عالية في الجنين المتطور. الإصابة بالطفيلي بين النساء الحوامل سبب مهم في الإجهاض وموت الجنين بعد الإصابة الأولية لذا فإن تشخيص الإصابة ضروري لمنع حدوث المضاعفات الدراسة الحالية أجريت لتقييم معدل انتشار طفيلي التوكسوبلازما في النساء الحوامل ودراسة لبعض العوامل المؤثرة في انتقال الإصابة. تم جمع عينات دم من (260) من النساء الحوامل التي تعاني من الإجهاض المتكرر، تم إخضاع العينات إلى اختبار الاليزا (اختبار تقييم الإنزيم المناعي) للكشف عن تواجد الأجسام المضادة للطفيلي من النوعين (م) و(ج) بينت النتائج إن النسبة المئوية لوجود الأجسام المضادة من النوع (ج) والتي تشير إلى الحالة المزمنة للإصابة بالتوكسوبلازما كانت (30,76%) بينما كانت نسبة وجود الأجسام المضادة من النوع (م) والتي تشير إلى الحالة الحادة للإصابة بالتوكسوبلازما (11,92%) وان الإصابة أكثر تواجداً

في الفئة العمرية (25-34) سنة كذلك أظهرت الدراسة عدم وجود علاقة واضحة بين حدوث الإصابة ومهنة المرأة الحامل بينما أظهرت الدراسة دور بعض العوامل البيئية والشخصية التي تم دراستها مع حدوث الإصابة وانتشارها بينت الدراسة أن مجموعة النساء التي تكون معرضة للقسط أكثر إصابة بالتوكسوبلازما (37,5%) وكذلك في مجموعة النساء التي لا تستعمل المعقمات كانت الإصابة أكثر (42.51%) والإصابة تكون أكثر بين مجموعة النساء التي تعتمد على الأكل خارج المنزل (46,95%).

Introduction:

One of the most common human parasites is coccidium *Toxoplasma gondii*, the prevalence of this parasite in most countries varies from 20 -80 %⁽¹⁾. *T.gondii* can infect the central nervous system of warm blooded animals including humans⁽²⁾, the result of infection can range from being a symptomatic in healthy adult to miscarriages with death of fetus⁽³⁾. Congenital toxoplasmosis is the most serious form of this parasite, which results in serious damage to the embryo and development of malformations including hydrocephalus and microcephalus⁽⁴⁾.

The symptoms of congenital toxoplasmosis depending on immune status of the host, virulence of the strain of parasite and the age at the time of primary infection⁽⁵⁾. During pregnancy, the levels of many sex hormone, mostly progesterone and estrogen are vastly increased and consequently their effects on the immune system⁽⁶⁾.

Prevalence of congenital toxoplasmosis in pregnant women, has been based on serological tests for anti-*Toxoplasma* IgG and IgM antibodies, that including complement fixation test, haemagglutination test, latex agglutination test, Elisa, polymerase chain reaction and

indirect fluorescence antibody⁽⁷⁾. Most previous studies have concentrate on prevalence of toxoplasmosis infection among general population^(8,9,10) but limited studies have been conducted to explore the prevalence of *T. gondii* among pregnant women^(11,12,13). The objectives of the current study was to investigate the prevalence of anti-*Toxoplasma* antibodies among pregnant women who had recurrent abortions by using Elisa, accurate serologic test to detect anti-*Toxoplasma* IgG and IgM for clinical identification of Toxoplasmosis and study the relationship between some influences factors associated with infection of *Toxoplasma*.

Materials and methods :

Subjects :

The study included 260 women suffering from recurrent abortions and had been admitted to different hospitals of AL - Najaf city for 6 months time, the age group of these women was (15 - 44) years. Clinical data had been collected regarding history including ; name, age, occupation, exposure to cat, depending in feeding on restaurant and using disinfectant.

Sample and serological test :

Blood sample was drawn from each women which collected in sterile serum tube (5 ml) , the sample was centrifuged 15 min , to separated the serum which stored at (- 20)⁰C till used .Serum samples were tested using Elisa to detect anti -*Toxoplasma* immunoglobulins G and M using bio check *Toxoplasma* IgG and IgM Elisa test kit(USA) . According instructions of kit standard curve for IgG and IgM Elisa was drawn by calibrating known as concentration of positive control , negative control and cut-off calibrator against their corresponding optical density value read by Elisa reader at 450 nm , the cut - off value of the assay was calculated , cut - off value of IgG was 32 IU/ml and cut - off value of IgM was 1 IU/ml , the result which greater than cut - off value indicated positive sample while the result lower then cut - off value indicated a negative sample and the result between values indicated on equivocal result .

Statistics :

The collected data had been analyzed and tested by using chi - square, ($P \leq 0.05$) were considered significant.

Results :

Out of 260 tested samples, 81 (30.76 %) positive IgG , while 30 (11.92 %) were positive IgM . In the sero-positive cases ,*Toxoplasma* IgG and IgM levels in relation with

the women age there are significant differences ($P < 0.05$) , the age groups (25 -34) years was the most affected (55.63 %) in comparison to other age groups as shown in table (1) .

Sero-positive cases of *Toxoplasma* according to the occupation of pregnant women:

Results showed that the infection with *Toxoplasma* were more frequent in housewives (15.76 %) and tend to be lower in official (8.4 %) and student (6.53 %) , but there was no significant difference among sero-positive cases of *Toxoplasma* associated with occupation ($P < 0.05$).

Sero-positive cases of *Toxoplasma* in relation to the influence factors :

There were significant associations between sero-positive cases and other factors considered in this study($P < 0.05$). The results showed that the cats - exposure women were most affected by *Toxoplasma* (37.5%), as compared with non exposure women(18.94 %) . On the other hand, the pregnant women who not using disinfectant were more affected (42.51 %) than other women that used disinfectant (9.67%) . Present study show that the pregnant women that depending in their feeding on restaurant were more frequent to infection with *Toxoplasma* as compared with the other independent woman (46.95% and 3.12% respectively) as it found in table3.

Table 1 : Seropositivity of anti –*Toxoplasma gonohgyfgyfghvdii* IgM and IgG in relation to age of pregnant women:

Age group (years)	Ig M Elisa		Ig G Elisa		Total
	negative	Positive	Negative	Positive	
15-24	97	9 (8.1%)	81	25 (22.52)	106
25-34	63	18 (16.2%)	37	44 (39.63%)	81
35- 44	69	4 (3.6%)	62	11 (9.9%)	73
Total	229	31 (11.92%)	180	80 (30.76%)	260
X ² observed=	12.192*		32.105*		
df=	2		2		
X critical=	5.99		5.99		

*Significant

Table 2 : Seropositivity of anti - *Toxoplasma gondii* IgM and IgG in relation to occupation of pregnant women:

Occupation	IgG Elisa		IgM Elisa		Total
	Negative	Positive	Negative	Positive	
Housewives	66	41(15.76%)	93	14(5.38%)	107
Student	46	17 (6.53%)	57	6(2.3%)	63
Official	68	22 (8.4%)	79	11(4.23%)	90
Total	180	80(30.76%)	229	31(11.92%)	260
X ² observed=	4.952		0.483		
df=	2		2		
X ² critical=	5.99		5.99		

*Significant

Table 3 : Sero – positive cases of *Toxoplasma gondii* of pregnant women in relation to influence factors .

Influence Factors	IgM Elisa			IgG Elisa		
	Positive	Negative	Total	Positive	Negative	Total
Restaurant dep-endent	26*(16.45%)	132	158	77*(46.95%)	87	164
Restaurant independent	5(4.90%)	97	102	3(3.12%)	93	96
Cat exposure	20*(10.64%)	168	188	62*(37.5%)	103	165
Non-exposure	11(15.27%)	61	72	18(18.94%)	77	95
Using disinfectant	4(4.25%)	90	94	9(9.67%)	84	93
Non-using	27*(16.26%)	139	166	71*(42.51%)	96	167

*Significant

Discussion:

The apicomplexan parasite *T.gondii* , is a globally distributed obligate protozoan , the infection when acquired during pregnancy , can lead to fetal infection which may result in the abortion or in lesions which involve the brain and eye⁽¹⁴⁾. The absence of biological test to distinguish infections from oocysts ingestion transmitted by cats , or soil from tissue cysts ingestion from infected meats .Therefore, epidemiology surveys remain the most useful way for different sources

of *T.gondii* infection in human beings. Serological surveys report population infection rate about(50 - 80)% , in some European populations⁽¹⁵⁾ , and in other countries⁽¹⁶⁾.

Pregnant women have significant 2.2 times higher risk of converting of *Toxo -plasma* then non pregnant and there is no vaccine to protect human from this parasite infection , therefore the primary infection for pregnant women should be diagnosed at the early acute stage when treatment is more effective and

to prevent complications^(5,14). In current study the serological test rate of *Toxoplasma* in the 260 pregnant women who with recurrent abortion was (30.76%) of IgG and (11.92) of IgM this rate is nearly similar to result recorded by^(17,12). Obeed (2007) was used Elisa to detected seroprevalence toxoplasmosis among pregnant women and reported the rate of IgG was (60.57%) and IgM was (43.7%), this result is greater when comparing with result of present study⁽¹³⁾.

Higher ratio of infection were reported in neighboring countries like in Jordan was(40%)⁽¹⁸⁾ and in Saudi Arabia was (21.8%)⁽¹⁹⁾. Lower prevalence ratio (0.79) in Korean pregnant women⁽¹⁴⁾ while(20%) in Finland⁽¹⁾ and(24 %)in Prague⁽¹⁶⁾. The variations and similarities in results can be due to the difference in serology tests which used , patients sampling , climate , feeding habits and other factors.

The present study showed a significant relationship between the prevalence of *Toxoplasma* and the age of pregnant women , the positive cases most frequent in (25-34) years,^(12,13) confirmed that , the seroprevalence of anti-*Toxoplasma* antibodies were a gradually increase with age⁽⁵⁾. There has no association between the prevalence of *Toxoplasma* and occupation of women , the highest ratio of infection in housewives and lower ratio in students , education level of pregnant woman and knowledge of these identified risk factors for primary toxoplasmosis may be helpful to prevent the congenital

toxoplasmosis^(20,21), by avoiding risk factors mainly on food and eating habits and hand hygiene in order to give health advice ,by ingestion of adequate washing of fruits and vegetables and eating raw or undercooked meat, in addition the exposure to infected cat and animals identified as a risk factor because, they play important role in life cycle of *T.gondii*⁽²²⁾.

The organisms has complicated life cycle with numerous stages , infected cat are the only species to shed oocyst in feces or suspended in water retained infectivity for up 400. days at (4 – 37)⁰C⁽⁷⁾. Oral route is probably the major source of infection , responsible of(30 – 63) %of all infection , foods that come into contact with contaminated soil act as transmission routes⁽²³⁾. this information about the method of transmission is helpful in guiding appropriate health education message for pregnant women . However , it may suggest that such factors play important role in prevalence of toxoplasmosis among pregnant women in AL-Najaf city , inadvertence personality and commonalty , lack knowledge about mode of transmission in of *Toxoplasma* and adequate conditions of climate are helpful the infection transmission .

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