**Common Risk Factors related Toxoplasmosis Infection during pregnancy**

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**Abstract:**

**Back ground:** Toxoplasmosis a foremost cause of death recognized to foodborne illness. More than 40 million men, women, and children in the U.S. women newly infected with *Toxoplasma* during or shortly before pregnancy should be alert that toxoplasmosis may have severe consequences.**Objectives:** to assess risk factors of toxoplasmosis among the pregnant women. **Methodology**: A descriptive analytic study was conducted on (100) of pregnant women. Who attending at primary health care centers in AL - Hilla city they have previous or positive test for toxoplasmosis. Data collected for the period of (13thFebruary - 30th July 2019) and; including: characteristics (socio, reproductive); and Risk factors. **Results:** showed that high significant association between demographical variables(age with dietary and hygiene) and significant association between education with dietary and between residence and hygiene) high significant association between reproductive variables(gravid, para with dietary and hygiene) and high significant association between abortion, stillbirth ,visiting health centers with dietary factors .

**Conclusion**: Pregnant women must be changes some dietary behaviors and also following personal hygiene when contact with meat and vegetables.

**Keywords:** Risk factors, infection, Pregnancy, intracellular , parasite , Toxoplasma

**Introduction**

The Toxoplasmosis disease due to intracellular protozoan parasite Toxoplasma gondii, it can caused different syndrome in pregnancy, during prenatal period, acquired infection may result in abnormalities as hydrocephalus, microcephalus, jaundice and hepatosplenomegaly (1).

Nicolle and Manceaux study they discovered Toxo- plasma gondii in 1908 in Tunisia and Splendore and Brazil, in 1939–1940 toxoplasmosis was documented as a human disease.in1960s defined the lifecycle of the parasite (2).  Epidemiology of *T. gondii* infection in pregnant women was ranged from 9% to 67% in Europe and 92.5% in Ghana. Worldwide, over 6 billion people were infected with *T. gondii*. and there are 20,000 cases of retinal infection and 750 deaths, that mean it is the second common cause of deaths related to food-borne diseases .In Iraq 2016 a study stated that in Al- Najaf and Misan governorates the highest rates of toxoplasmosis prevalence were (20%) (3).

In congenital toxoplasmosis the parasite transmission to the fetus through the placenta when the mother has active infection during pregnancy .The risk depends on the time of infection during pregnancy. Transmission to the fetus is less than 5% when maternal infection occurs before the 12th week of pregnancy (4) .When acquired during pregnancy, it can cause a severe congenital infection with ocular and neurologic impairment to the infant. Up to 38% of women in the United States have immunity against *T. gondii* from a prior infection. This means 62% of women at risk to acquire toxoplasmosis during pregnancy. [5]

**Methodology:** A descriptive analytic study was conducted on (100) Non probability (purposive sampling) of pregnant women. Who attending at primary health care centers in AL - Hilla city they have previous or positive test for toxoplasmosis . The study carried out from (13thFebruary - 30th July 2019). Data collected through a questionnaire format constructed for the purpose of this study, consists of four part include;(5)items related to socio demographic, (6) related items to reproductive characteristics; and Risk factors for toxoplasmosis, (6) related items to food , and (9) related items to hygiene risk factors. These items are rated according to three level Likert scale (Always, Sometimes, and Never)and scored (3,2,1) **,cut of point of score=2,** Descriptive statistical and Inferential analyses are used to analyze the data.Data were analyzed using the Statistical Package for Social Sciences (SPSS version 20).

**RESULTS:**

**Table (1): Distribution of the Sample According to Their Socio Demographic**

**Characteristics (N=100)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Items** | **Groups** | **Frequency** | **Percent (%)** |
| **Age/years** | 18-22 | 11 | 11 |
| 23-27 | 27 | 27 |
| 28-32 | 36 | 36 |
| 33-37 | 17 | 17 |
| 38-42 | 9 | 9 |
| **Total** | **100** | **100** |
| **Educational level** | illiterate | 9 | 9 |
| Primary | 14 | 14 |
| Secondary school | 38 | 38 |
| College and above | 36 | 36 |
| **Total** | **100** | **100** |
| **Occupation** | Employed | 40 | 40 |
| Not employed | 60 | 60 |
| **Total** | **100** | **100** |
| **Residency** | Urban | 68 | 68 |
|  | Rural | 32 | 32 |
|  | Total | 100 | 100 |
| **Economic level** | Enough | 61 | 61 |
|  | Just enough | 28 | 28 |
|  | Not enough | 11 | 11 |
|  | **Total** | **100** | **100** |

**Table (1)** shows that the highest percentage (36%) of the study sample were aged (28-32) years, (38%) of them were secondary educational level, (60%) of them were not employed (68%) of them living in urban and (61%) of them have enough economic status

**Table (2)Distribution of study sample according reproductive variables. (n=100)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Items** | **Group** | **Frequency** | **Percent (%)** |
| **Number of (Gravida)** | 1-2 | 69 | 69 |
| 3-4 | 24 | 24 |
| 5&More | 7 | 7 |
| Total | 100 | 100 |
| **Number of (Para)** | 0-1 | 15 | 15 |
| 1-2 | 60 | 60 |
| 3-4 | 20 | 20 |
| 5&More | 5 | 5 |
| Total | 100 | 100 |
| **Number of abortion** | 1-2 | 94 | 94 |
| 3-4 | 4 | 4 |
| 5&More | 2 | 2 |
| Total | 100 | 100 |
| **Stillbirth** | 1-2 | 91 | 91 |
| 2-3 | 9 | 9 |
| 5 &More | nill | 0 |
| No dead baby | nill | 0 |
| Total | 100 | 100 |
| **Visit the health center** | Regular | 71 | 71 |
| Irregular | 29 | 29 |
| Total | 100 | 100 |
| **Toxoplasmosis test** | IgG | 75 | 75 |
| IgM | 25 | 25 |
|  | **Total** | **100** | **100** |

Table (2) shows that the highest percentage of the sample were gravid (69%) ranged (1-2), (60%) of them the number of Para were having (1-2).Little of them (9%) of them having (1-2) time abortion and the highest percentage ,( 91%) of them were having still birth (1-2) and they were (71%)of them were visiting health centers regularly and (75%) of the participants were IgGToxoplasmosis test result.

**Table3: Distribution of the study sample according risk factors related to foods.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Items** | **Group** | **Frequency** | **Percent (%)** | **Mean of score** |
| **Eating a freezing meat** | **Always** | 32 | 32 | **1.9** |
| **Sometimes** | 26 | 26 |
| **Never** | 42 | 42 |
| **Total** | 100 | 100 |  |
| **Eating uncooked meat** | **Always** | 7 | 7 | **1.25** |
| **Some times** | 11 | 11 |
| **Never** | 82 | 82 |
| **Total** | 100 | 100 |  |
| **Drink un pasteurized milk** | **Always** | 23 | 23 | **1.83** |
| **Some times** | 37 | 37 |
| **Never** | 40 | 40 |
| **Total** | 100 | 100 |  |
| **Drink un cleaned water** | **Always** | 5 | 5 | **1.14** |
| **Some times** | 4 | 4 |
| **Never** | 91 | 91 |
| **Total** | 100 | 100 |  |
| **Eating cheese made by hand** | **Always** | 55 | 55 | **2.33** |
| **Some times** | 23 | 23 |
| **Never** | 22 | 22 |
| **Total** | 100 | 100 |  |
| **Eating un cleaned fruit & vegetables** | **Always** | 2 | 2 | **1.2** |
| **Some times** | 16 | 16 |
| **Never** | 82 | 82 |
| **Total** | 100 | 100 |  |
| **Total mean of score** |  |  |  | **1.6** |

Table (3) shows that the lowest mean of score were (1.2) for eating un cleaned fruit & vegetables and the rest and the highest mean of score (2.33) for the item eating cheese made by hand. The total mean of score are (1.6)

**Table4: Distribution of the studied responding of risk factors related to hygiene**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Items** | **Group** | **Frequency** | **Percent (%)** | **Mean of score** |
| Contact with soil in the garden without using gloves | **Always** | 44 | 44 | 2.17 |
| **Some times** | 29 | 29 |  |
| **Never** | 27 | 27 |  |
| **Total** | 100 | 100 |  |
| Dealing with sand piles without using gloves | **Always** | 45 | 45 | 2.18 |
| **Some times** | 28 | 28 |  |
| **Never** | 27 | 27 |  |
| **Total** | 100 | 100 |  |
| Breeding cat at home | **Always** | 21 | 21 | 1.59 |
| **Some times** | 17 | 17 |  |
| **Never** | 62 | 62 |  |
| **Total** | 100 | 100 |  |
| Cats touch with dishes in the kitchen | **Always** | 0 | 0 | **1.1** |
| **Some times** | 10 | 10 |  |
| **Never** | 90 | 90 |  |
| **Total** | 100 | 100 |  |
| Raise poultry at home | **Always** | 30 | 30 | 1.89 |
| **Some times** | 29 | 29 |  |
| **Never** | 41 | 41 |  |
| **Total** | 100 | 100 |  |
| Deals with waste without gloves | **Always** | 46 | 46 | 2.14 |
| **Some times** | 22 | 22 |  |
| **Never** | 32 | 32 |  |
| **Total** | 100 | 100 |  |
| Have good sewage at home | **good** | 81 | 81 | 2.62 |
| **Just good** | 0 | 0 |  |
| **bad** | 19 | 19 |  |
| **Total** | 100 | 100 |  |
| Wash hands after touching meat | **Always** | 80 | 80 |  |
| **Some times** | 12 | 12 | **2.72** |
| **Never** | 8 | 8 |  |
| **Total** | 100 | 100 |  |
| Wash hands after dealing with vegetables | **Always** | 19 | 19 |  |
| **Some times** | 10 | 10 | 1.48 |
| **Never** | 71 | 71 |  |
| **Total** | 100 | 100 |  |
| **total mean of score** |  |  |  | **1.99\*** |

**\*Cut of point=2**

Table (4) shows that the low mean of score are (1.1) Cats touch with dishes in the kitchen, (2.72) the highest mean of score for wash hands after touching meat. Also, the total mean of score (1.99).

**Table 5:** **Association of Socio-Demographical Characteristics variables with the Risk Factors. (n=100)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Relationships for Dietary&** **Hygiene Factors**  **with Demographical variables** | **Dietary** | | | **Hygiene** | | |
| **C.C.** | **Sig.** | **C.S.** | **C.C.** | **Sig.** | **C.S.** |
| **Age Groups** | **0.863** | **0.000** | **HS** | **0.844** | **0.001** | **HS\*** |
| **Educational level** | **0.506** | **0.033** | **S** | **0.585** | **0.803** | **NS** |
| **Occupation** | **0.239** | **0.535** | **NS** | **0.333** | **0.190** | **NS** |
| **Residency** | **0.304** | **0.178** | **NS** | **0.395** | **0.030** | **S** |
| **Economic Status** | **0.349** | **0.457** | **NS** | **0.416** | **0.281** | **NS** |

**(\*) HS: Highly Sig. at P≤0.01; S: Sig. at P≤0.05; NS: Non Sig. at P>0.05**

**Table (5)** shows that high significant association between age with risk factors and significant association between education with dietary and residence with hygiene.

**Table 6: Association of reproductive variables with the Risk Factors. (n= 100)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Relationships for Dietary& Hygiene Factors with Reproductive variables** | **Dietary** | | | **Hygiene** | | |
| **C.C.** | **Sig.** | **C.S.** | **C.C.** | **Sig.** | **C.S.** |
| **Number of (Gravida)** | **0.519** | **0.001** | **HS** | **0.655** | **0.000** | **HS** |
| **Number of (Para)** | **0.407** | **0.006** | **HS** | **0.462** | **0.001** | **HS** |
| **Number of abortion** | **0.639** | **0.000** | **HS** | **0.431** | **0.260** | **NS** |
| **Stillbirth** | **0.687** | **0.000** | **HS** | **0.488** | **0.261** | **NS** |
| **Visit the health center** | **0.405** | **0.141** | **NS** | **0.340** | **0.786** | **NS** |
| **Toxoplasmosis test** | **0.393** | **0.008** | **HS** | **0.420** | **0.011** | **S** |

**(\*) HS: Highly Sig. at P≤0.01; S: Sig. at P≤0.05; NS: Non Sig. at P>0.05**

**Table (6)** shows that high significant association between reproductive variables (gravida, para with risk factors . and high significant association between abortion, .stillbirth ,visiting health centers with dietary factors and high significant association between toxoplasmosistest and dietary but only significant association with hygiene .

**Discussion:**

The study showed that the highest percentage (36%) of the study sample were aged (28-32) years, (38%) of them have secondary educational level, (60%) of them were not employed (68%) of them living in urban and (61%) of them have enough economic status.

Joseph L., et al stated that the mean age of pregnant women were 37.5 ± 15.5 years. 73% of women were of reproductive age, that result agreed with this study.[6]

The current study shows the highest percentage of the sample were gravid (69%) ranged (1-2), (60%) of them the number of Para were (1-2). (94%) of them having (1-2) time abortion,(9%) of them have still birth.(71%) they visit the health centers regularly and all pregnant women doing Toxoplasmosis test which was (positive).

The present study showed that the relationship between Toxoplasmosis and rate of abortion. accounts of 173 aborted women between age of ≤20 and 50 years old. *Gondii*antibodies presented in 54(31.2 %) of aborted women. Also 77 (44.5%) of of them were at age group 21-30 years old ,and the anti-toxoplasmosis IgM &IgG found in 66(38.2%)of them. [7]

The study shows that the lowest mean of score were (1.2) for eating un cleaned fruit & vegetables and the rest and the highest mean of score(2.75) for the item eating uncooked meat. The total mean of score are (1.85)

A study stated that freezing meat was more active than the biosecurity intervention. In spite of high freezing costs.[8]

Astudy mentioned that infection caused by the Toxoplasma gondii parasite is usually acquired by eating dairy products, eating infected meat or contacted with the feces of an infected cat.[9] Iraqi women cooked food for enough long time and they sometimes used freezing meat. Finaly, the low mean of score are (1.1) Cats touch with dishes in the kitchen, (2.72) the highest mean of score for wash hands after touching meat. And the total mean of score (1.99).

The ways of obtaining the infection are digestion of tissue cyst in undercooked meat, or raw or interaction with polluted sand or soil with oocyst infected cat feces, or congenitally from the pregnant to the fetus when the first pregnancy .also, significant association of T. gondii seropositivity with eating undercooked meat, poor hygienic practice and drinking untreated water. [10]

**Recommendation**: the study recommended for Screening for anti-Toxoplasma specific IgG and IgM antibodies in the first trimester of all antenatal women for a preventive measure and early detection and treatment. And mass media education about the preventive measure.

**Conclusion**

The present study concludes that the prevalence of toxoplasmosis due to rsik factors linked to foods as eating un cleaned fruits and vegetables and the risk factors linked to hygiene as contact with soil , sand and waist in the garden without using gloves .

Author’s Contributions:

All the authors are equally contributed to complete this research.

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Ethical Clearance: Informed consent was obtained and oral permission for agreement from the pregnant women in the interviewing face to face included in this study.

**References:**

[1] Medical Dictionary for the Health Professions and Nursing © Farlex 2012

[2] Luc Paris, in Hunter's Tropical Medicine and Emerging Infectious Disease (Ninth Edition), 2013

[3] [Entsar J.Saheb](https://www.sciencedirect.com/science/article/pii/S2405609X17303007#!):The prevalence of parasitic protozoan diseases in Iraq, 2016: [Karbala International Journal of Modern Science](https://www.sciencedirect.com/science/journal/2405609X); [Volume 4, Issue 1](https://www.sciencedirect.com/science/journal/2405609X/4/1), March 2018, Pages 21-25

<https://doi.org/10.1016/j.kijoms.2017.10.002>[Get rights and content](https://s100.copyright.com/AppDispatchServlet?publisherName=ELS&contentID=S2405609X17303007&orderBeanReset=true)

[4] Doudou Y., Renaud P., Coralie L., Jacqueline F., Hypolite S., Hypolite M.,et al ,:Toxoplasmosis among pregnant women: High seroprevalence and risk factors in Kinshasa, Democratic Republic of Congo; [Asian Pac J Trop Biomed](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3819499/). 2014 Jan; 4(1): 69–74.

PMCID: PMC3819499 , PMID: [24144134](https://www.ncbi.nlm.nih.gov/pubmed/24144134)

[5]

Toxoplasmosis Luc Paris, in Hunter's Tropical Medicine and Emerging Infectious Disease (Ninth Edition), 2013

[6][Joseph L](javascript:;), [Kanix W](javascript:;), [Kelsey W](javascript:;), [Fatima C](javascript:;), [Ashtyn D](javascript:;), [Kamal El B](javascript:;), [Ying Z](javascript:;), [Christopher L](javascript:;), [Andrey R](javascript:;), [Rima M](javascript:;): Understanding Toxoplasmosis in the United States Through “Large Data” Analyses : *Clinical Infectious Diseases*, Volume 63, Issue 4, 15 August 2016, Pages 468–475, <https://doi.org/10.1093/cid/ciw356>; Published:26 June 2016

[7] A. ANWAR, Sheelan; AL-BAYATI, Nuha S.. Prevalence of Toxoplasma gondii and Cytomegalovirus in Sera of Aborted Women in Samaraa city. Tikrit Journal of Pure Science, [S.l.], v. 22, n. 6, p. 34-38, oct. 2018. ISSN 2415-1726. Available at: <<http://tjps.tu.edu.iq/index.php/j/article/view/608>>. Date accessed: 15 nov. 2019.

[8] Suijkerbuijk AWM, Opsteegh M, Deng H, Gils PFv, Bonačić Marinović AA, et al. (2019) A social cost-benefit analysis of two One Health interventions to prevent toxoplasmosis. PLoS ONE 14(5): e0216615. https://doi.org/ 10.1371/journal.pone.0216615 Editor: Juan J Loor, University of Illinois, UNITED STATES Received: January 7, 2019 Accepted: April 24, 2019 Published: May 10, 2019

[9]Chris M. Matsk O,: [How to Kill Toxoplasma Gondii](https://www.wikihow.com/Kill-Toxoplasma-Gondii): Updated: May 4, 2019

[10] Chemoh, W., Nur Farhana, M.N., Noor Azmi, M.A., Si Lay, K., Sawangjaroen, N., Tan, T.C.2, Chandramathi, S.R. and Nissapatorn, V., Prevalence and risk factors of Toxoplasma infection – an update in Malaysian pregnant women: Tropical Biomedicine 36(3): 694–702 (2019)