



Original Research Article

## Prevalence of Seropositive Toxoplasmosis in Pregnant Women in Hail Region

Sarah Y.A.<sup>1,2</sup>, Uzma AK<sup>1</sup>, Asmaa IE<sup>1</sup>

<sup>1</sup>Department of Clinical Laboratory Sciences, College of Applied Medical Sciences, University of Hail, P.O. Box: 2440, Hail, 81451, Saudi Arabia

<sup>2</sup>Department of Bacteriology, Mycology and Immunology, Faculty of Veterinary Medicine, Zagazig University, Egypt, P.O. Box 44511, Zagazig, Egypt.

Corresponding Author: Sarah Y.A

Received: 26/08/2014

Revised: 17/09/2014

Accepted: 21/09/2014

### ABSTRACT

**Objective:** To evaluate prevalence of toxoplasmosis which is caused by *Toxoplasma gondii* in pregnant women in Hail region, Kingdom of Saudi Arabia and to evaluate environmental and behavioral factors that may influence the infection rate of *Toxoplasma gondii*.

**Methodology:** Data was collected by interviewing a total number of 100 pregnant women by using a standard questionnaire that was translated into the local language.

**Results:** Among expectant females aged above 40 years the seropositive test was found positive in 8.57% while among young females it was negative.

**Conclusion:** There is a need to launch an awareness program for the pregnant women and additional studies of this type should be encouraged to add the knowledge of the community about the risks of exposure to *Toxoplasma gondii* by pregnant women in Hail region.

**Keywords:** Toxoplasmosis, Seropositive, Frequencies, pregnant women, complications

### INTRODUCTION

Toxoplasmosis is an infectious disease that can be transmitted through parasite *Toxoplasma gondii*, to the pregnant women during her pregnancy. [1] Oocyte or cyst of this parasite if ingested by women via contaminated food or water, or some other source, she will be at high risk of infection which can be transmit across the placenta to the unborn child. [2] *Toxoplasma gondii* was discovered a little over 100 years ago, but knowledge of its biological life cycle and its medical importance has grown in the last 40 years. This obligate intracellular parasite was identified early as

a pathogen responsible for congenital infection, but its clinical expression and the importance of reactivations of infections in immuno-compromised patients were recognized later, in the era of organ transplantation and HIV infection. Recent knowledge of host cell-parasite interactions and of parasite virulence has brought new insights into the comprehension of the pathophysiology of infection. [3]

In rare cases if a women lack adequate immune response, she has high chances of infection caused from parasite *gondii* resulting congenital transmission. It is very much unlikely that symptoms of this

infection can be noticed in pregnant women with acute acquired infection even by biomedical technique ELISA, [1,4] meant to assay antigen – antibody. Because IgG antibodies cannot be detected at early stages of this infection, sometimes it takes years for the visibility of infection. [5]

## **MATERIALS AND METHODS**

Centers involved in the study, Hospitals of Hail region of Saudi Arabia operate screening for toxoplasmosis. Approximate hundred pregnant women were selected for the screening. Pregnant women were considered as case and control after they screened at prenatal stage. Women diagnosed with IgG and IgM and showed positive results for seroconversion were considered as cases and those who showed negative towards these tests were considered as control, all the tests were performed in the same laboratory. Standard questionnaire was prepared containing all the possible questions related to the disease. The prepared questionnaire was used to interview the patients to collect the data. Study group survey was conducted in the Maternity homes and the hospitals in the Hail region of Saudi Arabia. 100 pregnant women were selected for the study. The age of the study groups ranged from 18-45 years. Survey on the influential risk factors. Different subjects were grouped and were considered in the study include: maternal age, educational level, owning cats, family status finally the nature of cooking and eating habits such as: eating raw or undercooked meat, tasting raw food while cooking and dining in restaurants. The level of knowledge regarding toxoplasmosis and sources of *Toxoplasma* infection was also evaluated. A questionnaire sheet was designed to assess some of the main risk factors which may influence the prevalence of *Toxoplasma* infection among the expecting women volunteers. These data

were intended to be completed by interviewing each participant during her hospital visit. Statistical analysis a descriptive statistical analysis of the epidemiological variables, used in the study, was done. Chi-square test and t-test were used and appropriate P values of <0.05 were considered significant

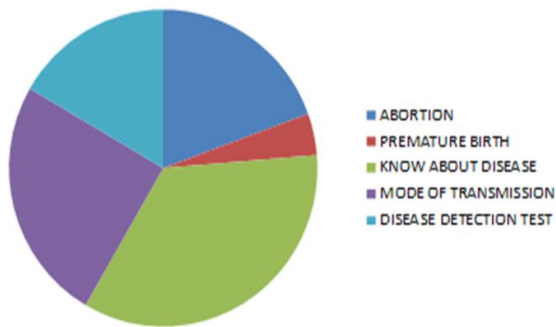
**Study group:** Survey was conducted in the Maternity homes and the hospitals in the Hail region of Saudi Arabia. A total number of 100 pregnant women were selected for the study. The age of the study groups ranged from 18-45 years. The approval of the ethics committee of the institute was obtained prior to the sample collection, informed written consent was obtained from all the participants. Detailed clinical history and conventional laboratory investigations were conducted.

**Survey on the influential risk factors:** Different subjects were grouped and were considered in the study include: maternal age, educational level, owning cats, family status finally the nature of cooking and eating habits such as: eating raw or undercooked meat, tasting raw food while cooking and dining in restaurants. The level of knowledge regarding toxoplasmosis and sources of *Toxoplasma* infection was also evaluated. A questionnaire sheet was designed to assess some of the main risk factors which may influence the prevalence of *Toxoplasma* infection among the expecting women volunteers. These data were intended to be completed by interviewing each participant during her hospital visit.

**Statistical analysis:** A descriptive statistical analysis of the epidemiological variables, used in the study, was done. Chi-square test and t-test were used and appropriate P values of <0.05 were considered significant.

## **RESULTS**

Data reveals that 62.8% of women were less than 30 years 20% between 30-40 and 17.2 percent above 40 years of age. Among expectant females aged above 40 years the seropositive test was found positive in 8.57% while in the young females the test was negative. It was depicted from the results that 71.4% of the women were not aware about the disease. Those who were aware only 51.5% of them had the knowledge about the transmission of the disease were in addition all women were unable to identify any of the risk factors associated. Among all the participants 65.8% were unaware of being serologically tested or not for toxoplasmosis.

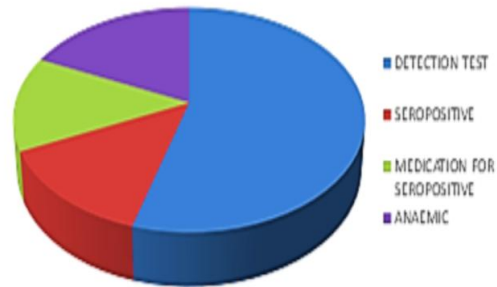


Abortion - 18.6% Premature birth - 8.3% Know about disease - 37.8% Mode of transmission - 18.6% Disease detection test - 16.7%  
Figure 1: Data representing awareness for Toxoplasmosis among the selected cases.

Seroprevalence in relation to educational background: Results showed that IgG seroprevalence tends to be lower in educated participants (from primary school education up to university graduates) (27.8%) compared to the uneducated (not exposed to formal or informal education) group (42.8%).

Seroprevalence in relation to other influence factors: There were no significant associations between seroprevalence of anti-*Toxoplasma* IgG and IgM antibodies and other risk factors considered in the study. These influential factors include: cat exposure, consumption of undercooked

meat, tasting food while cooking, dining out doors in restaurants and having domestic helper.



Detection test-38.2% Seropositive -20.6% Medication- 20.6% Anaemic- 20.6%  
Figure 2: Data related to the seropositive testing Consequences of seropositive; All the seropositive women were reported to be found anemic.

## DISCUSSION

In our study we evaluated the prevalence of toxoplasmosis in pregnant women in Hail region, Kingdom of Saudi Arabia. If a woman gets infected with *Toxoplasma gondii* for the first time of her life during pregnancy, she becomes anemic and may pass infection to the foetus; a situation that ultimately could lead to a very serious fetal damage. The risk of toxoplasmosis causing birth defects in foetus. Toxoplasmosis has the tendency to reoccurs [6] if one was diagnosed with this infection earlier in his life. Severe damage can be caused to the vital organs of the body under severe conditions. People who are born to weak defensive mechanism are more likely to be infected as compare to the people with immune system. Though it can also be found in the people with good immune system. Infected fetus in the womb do not show any symptoms of at birth but later in their life they can be found with some with some disabilities due to re appearance of the toxoplasmosis. However, only small percentage has been found in the infants having damage in their brain or eye since birth. [7] Most previous studies in

Saudi Arabia have concentrated on the prevalence of *Toxoplasma* infection among general population. Current study is also one of the leading studies that evaluate some environmental and behavioral factors that may influence the infection rate of *Toxoplasma gondii* in the kingdom. The *Toxoplasma* seroprevalence obtained in this study among pregnant women in the Hail region was 8.57% which comparable to results previously reported in Abha 31.6%,<sup>[8]</sup> and in Makkah 35.6%.<sup>[9]</sup> A comparable seroprevalence healthy blood donor from two rural areas in the Eastern Region 25% to 26.36%.<sup>[10,11]</sup> A higher *Toxoplasma gondii* among blood donors in Asir.<sup>[12]</sup> The 29.4% seroprevalence rate obtained lies within the range of the average prevalence rate of *Toxoplasma gondii* most parts of the world which is 20- 30%.<sup>[13]</sup> Low prevalence rates of 10% were reported in the United Kingdom<sup>[13]</sup> high as around 55% were reported in France<sup>[14]</sup> and Greece.<sup>[15]</sup> Higher prevalence rates were also reported in some neighboring Kuwait (58.2%)<sup>[16]</sup> and Jordan (37%).<sup>[17]</sup> In Kenya, a hemagglutination test found antibodies in 54% of blood donors and a dye test of blood donors.<sup>[18]</sup> In Saudi Arabia,<sup>[19]</sup> seropositivity determined by an indirect hemagglutination test was 37.5% in blood donors, an EIA method found a prevalence of 79.9% in men and of 63.4% in women.<sup>[20]</sup> Regional variations in the incidence of *Toxoplasma* infection rates from country to another or even within the same country, has been well documented. These changes can be credited to environment, traditional differences regarding hygienic and feeding habits.<sup>[15,21,22]</sup> The significant relation showed in the current study between the mother's age confirms the fact that seroprevalence of *Toxoplasma* is well known to increase with age; the greater the prevalence, the earlier the rise.<sup>[23]</sup> This association does not mean that older age is a risk factor predisposing to

infection but might be explained by the older the longer time being exposed to the causing agent and may retain a steady level of anti-*Toxoplasma* IgG in serum for years.<sup>[24]</sup> A contradictory result was reported in the Eastern Region where seropositivity declined with age.<sup>[25]</sup> The present data showed the highest level of seroconversion was age group (12% IgM seropositivity); a result that does disagree with the common finding which supports most frequent seroconversion in age groups.<sup>[26]</sup>

## CONCLUSION

The current results suggested that the educational level of pregnant women, reduce risk exposure and to adopt appropriate hygienic measures. This study may also be informative and useful to the public health community. It revealed that around of participants were aware of toxoplasmosis and its association with congenital disease. Furthermore, all pregnant women were not aware of being previously tested for *Toxoplasma* nor were able to identify any risk factor by their gynecologist. Different strategies should be adopted to promote healthy life style among the people to make a move towards optima health. Disease management programme should be promoted by the various government and Non-government agencies especially for the pregnant women for the protection of their babies as well as for their own life.

## ACKNOWLEDGEMENTS

The authors would like to thank the University of Hail for supporting this research. The authors also express gratitude to Dr. Ibrahim El Shangeti, Dean of applied medical science college for his encouragement. Many thanks to Saja amash, Hesa Nasl, Sarah Nasal, Abeer Eid and Amjad Saud, For their help in data collection.

## REFERENCES

1. Remington JS, McLeod R, Thuilliez P, Desmonts G. Toxoplasmosis. In: Remington JS, Klein JO, Wilson CB, Baker C, eds. 2006. Infectious diseases of the fetus and newborn infant. 6th ed. Philadelphia: Elsevier Saunders. 90:947–1091.
2. Dubey, J.P. Hill, D. E. Jones, J. L. ; Hightower, A. W. ; Kirkland, E. , Roberts, J. M. et al.,2005. Prevalence of viable *Toxoplasma gondii* in beef, chicken, and pork from retail meat stores in the United States: risk assessment to consumers. *J Parasitol.* 91:1082–93.
3. Florence Robert-Gangneux and Marie-Laure Dardé (2012): Epidemiology of and Diagnostic Strategies for Toxoplasmosis. *Clin. Microbiol. Rev.* vol. 25 no. (2): 264-296.
4. Boyer KM, Holfels E, Roizen N, Swisher C, Mack D, Remington J, Withers S, Meier P, McLeod R. 2005. Risk factors for *Toxoplasma gondii* infection in mothers of infants with congenital toxoplasmosis: implications for prenatal management and screening. *Am J Obstet Gynecol.* 192:564–71.
5. Thulliez P, Remington JS, Santoro F, Ovlaque G, Sharma S, Desmonts G. 1986. A new agglutination reaction for the diagnosis of the developmental stage of acquired toxoplasmosis]. *Pathol Biol (Paris).* 34;(3.);173-7.
6. Tudor Rares Olariu, Jack S. Remington, Rima McLeod, Ambereen Alam, Jose G. Montoya. 2011. Severe Congenital Toxoplasmosis in the United States. *The Pediatric Infectious Disease Journal,* 30: 1056–106.
7. Nicholas M. Fisk, Mario Cortina-Borja, HooiKuan Tan, Martine Wallon, Malgorzata Paul, Andrea Prusa, et al.,2010. Prenatal Treatment for Serious Neurological Sequelae of Congenital Toxoplasmosis: An Observational Prospective Cohort Study. *PLoS Medicine.* 7 (10): e1000351.
8. Hady el HM. 1991. Toxoplasmosis among pregnant women in Abha, Saudi Arabia. *J Egypt Soc Parasitol.* 21(3): 811.
9. Ghazi HO, Telmesani AM & Mahomed MF. 2002. TORCH agents in pregnant Saudi women. *Med Princ Pract.* 11 (4): 180.
10. Al-Qurashi AR, Ghandour AM, Obeid OE, Al-Mulhim A & Makki SM. 2001. Seroepidemiological study of *Toxoplasma gondii* infection in the human population in the Eastern Region. *Saudi Med J.* 22(1):8-13.
11. Al-Qurashi AR. 2004. Seroepidemiological study of toxoplasmosis in rural areas in the eastern region of Saudi Arabia. *J Egypt Soc Parasitol.* 34(1): 23.
12. Al-Amari OM. 1994. Prevalence of antibodies to *Toxoplasma gondii* among blood donors in Abha, Asir Region, south-western Saudi Arabia. *J Egypt Public Health Assoc.* 69(1-2): 77.
13. Wilson M & McAuley JB. 1991. Laboratory diagnosis of toxoplasmosis. *Clinics Lab Med.* 11(4):923.
14. Allain JP, Palmer CR & Pearson G. 1998. Epidemiological study of latent and recent infection by *Toxoplasma gondii* in pregnant women from a regional population in the UK. *J Infect.* 1998, 36:189.
15. Jenum PA, Kapperud G, Stray Pedersen B, Melby KK, Eskild A & Eng J. 1998;70(1): 80-83.
16. Jenum P A, Kapperud G, Stray-Pedersen B, Melby K K, Eskild A and Eng J. 1998. Prevalence of *Toxoplasma gondii* specific immunoglobulin G antibodies among pregnant women in Norway. *Epidemiology and Infection.* 120(1):87-92.
17. Ancelle T, Goulet V, Tirard-Fleury V, Baril L, du Mazaubrun C & Thulliez P. 1996. La Toxoplasmose chez la femme enceinte en France en 1995. Resultats d'une enquete nationale perinatale. *Bulletin Epidemiologique Hebdomadaire.* 51: 227.
18. Decavalas G, Papapetropoulou M, Giannoulaki E, Tzigounis V & Kondakis XG. 1990. Prevalence of *Toxoplasma*

- gondii antibodies in gravidas and recently aborted women and study of risk factors. *Eur J Epidemiol.* 6:223.
19. Al-Nakib W, Ibrahim ME, Hathout H, Moussa MA, Deverajan LV, Thorburn H & Yousof AM. 1983. Seroepidemiology of viral and toxoplasma infections during pregnancy among Arab women of child-bearing age in Kuwait. *Int J Epidemiol.* 12(2):220.
  20. Morsey TA & Michael SA. 1980. Toxoplasmosis in Jordan. *J Egyptian Soc Parasit.* 10 :457.
  21. Griffin L, Williams KA. 1983. Serological and parasitological survey of blood donors in Kenya for toxoplasmosis. *Trans R Soc Trop Med Hyg.* 77(6):763–6.
  22. Yaneza A, Kumari P. 1994. Prevalence of Toxoplasma antibodies in blood donors in Al-Hass. *Ann Saudi Med.* 14:230–2.
  23. Coelho RA, Kobayashi M, Carvalho Jr LB. 2003. Prevalence of IgG antibodies specific to Toxoplasma gondii among blood donors in Recife, Northeast Brazil. *Rev Inst Med Trop Sao Paulo.* 45 (4):229–31.
  24. Remington JS, McLeod R, Thulliez P & Desmonts G. 2001. Toxoplasmosis, Infectious diseases of the fetus and newborn infant; in Remington JS, Klein J (5<sup>th</sup> ed.). W. B. Saunders, Philadelphia, Pa. 10: 205-346.
  25. Dupouy-Camet J, Gavinet MF, Paugam A & Tourte-Schaeffer C. 1993. Transmission, incidence and prevalence of toxoplasmosis. *Med Mal Infect.* 23: 139.
  26. Jackson MH & Hutchison WM. 1989. The prevalence and source of Toxoplasma infection in the environment. *Adv Parasitol.* 28: 55.

How to cite this article: Sarah Y.A., Uzma AK, Asmaa IE. Prevalence of seropositive toxoplasmosis in pregnant women in Hail region. *Int J Health Sci Res.* 2014;4(10):66-71.

\*\*\*\*\*

**International Journal of Health Sciences & Research (IJHSR)**

**Publish your work in this journal**

The International Journal of Health Sciences & Research is a multidisciplinary indexed open access double-blind peer-reviewed international journal that publishes original research articles from all areas of health sciences and allied branches. This monthly journal is characterised by rapid publication of reviews, original research and case reports across all the fields of health sciences. The details of journal are available on its official website ([www.ijhsr.org](http://www.ijhsr.org)).

Submit your manuscript by email: [editor.ijhsr@gmail.com](mailto:editor.ijhsr@gmail.com) OR [editor.ijhsr@yahoo.com](mailto:editor.ijhsr@yahoo.com)