Seroprevalence of Toxoplasmosis in Pregnant Women in Matta, Upper Swat, Khyber Pakhtunkhwa, Pakistan

Umar Aleem¹, Sana Ullah², Muhammad Qasim³, Muhammad Suliman⁴

ABSTRACT

Background: Toxoplasmosis caused by Toxoplasma gondii is a zoonotic disease. It is essential to detect anti-Toxoplasma immunoglobulin (IgM) and IgG in pregnant women for diagnosis of T. gondii infection. Acquired Toxoplasmosis can lead to fetal infection, which may ultimately result in loss of fetus or lesion in brain and eyes.

Objectives: In the present study seroprevalence of Toxoplasmosis in pregnant women of Matta, District Swat was assessed.

Materials & Methods: Serum samples of 360 pregnant women attending the local hospital were screened for anti-Toxoplasma antibodies using latex agglutination test. Data regarding risk factors was collected through questionnaire.

Results: The overall seroprevalence of anti-Toxoplasma antibodies was 47.2% (170 positive sera out of 360). Prevalence of T. gondii infection was high at 1st Trimester (61.7%) than in 2nd Trimester (58.4%) and 3rd Trimester (27.7%). Seroprevalence (54.7%) in age group (18-25) was high as compared to (38.8%) in age group (26-33). High prevalence was found in uneducated (66.01%) as compared to educated (22.07%).

Conclusion: The results of current study revealed that pregnant women are more vulnerable to Toxoplasma gondii infection. This indicates a need to provide health education to pregnant women and control measure should be made in the District Swat.

Keywords: Toxoplasma gondii, Toxoplasmosis, Pregnant women, Swat, Pakistan.

INTRODUCTION

Toxoplasmosis is a worldwide zoonotic disease caused by an obligate, intracellular parasite protozoan Toxoplasma gondii which use felines as definitive host. About 20%-90% of the adult human populations in different regions of the world have been reported to have contact with T. gondii⁷⁻². Serological surveys conducted in many parts of the world stated that more than one third of human population has antibodies against Toxoplasmosis⁴. The worldwide Toxoplasmosis figures in descending order was recorded as; Taiwan (84%), Brazil (72%), Iran (55%), Somalia (53%), Egypt (44%), Jordon (37%), Saudi Arabia (31%) and India 18 %⁵, ⁶. In Pakistan the infection ratio of toxoplasmosis shows the Punjab on the top with 63% followed by Azad Kashmir with 48 %, Khyber Pakhtunkhwa with 38% and Rawalpindi/Islamabad with lowest ratio of 17%. Toxoplasma infection is acquired from contact with cat feces, ingesting tissue cysts in raw or undercooked meat and using unpasteurized milk from infected animal⁷, ⁸. T. gondii infection cause serious implications in people with weakened immune system and pregnant women⁹, ¹⁰. In pregnant women, the infection may be associated with abortion, miscarriage, chorioretinitis, and hydrocephalus in newborn, if congenital transmission occurs¹¹.

T.gondii infection is indicated by IgA, IgM and IgG antibodies. Specific IgM anti-Toxoplasma antibodies usually indicate acute infection as they appear first and disappear faster than IgG antibodies. Anti-Toxoplasma IgA, IgM antibodies disappear after few months of infection and specific IgG antibodies remains detectable for whole life indicating the chronic stage of infection¹². Across-sectional study was carried out on the seroprevalence of toxoplasmosis in the female population of Malakand Agency, KP, Pakistan¹³. They reported overall 65.71% prevalence rate, which is quiet alarming. The present study was designed to determine the seroprevalence of Toxoplasma gondii infection by measuring antibodies against T. gondii using Latex Agglutination Test in pregnant women of District Swat, KP, Pakistan and to identify major risk factors associated with the infection. The aim of the study was to provide data for the prevention and control measures of toxoplasmosis in District Swat.

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MATERIALS AND METHODS

A quantitative cross-sectional design was used to guide this study as well as to examine a phenomenon of interest in a fixed point of time. This helped to highlight the overall existence of the disease in pregnant women of the area.

This study was conducted in Tehsil Headquarter Hospital, Matta, Upper Swat. Matta is a Tehsil of District Swat of Khyber Pakhtunkhwa province of Pakistan.

Target population of this study included all pregnant women residing in Tehsil Matta of district Swat. The samples were collected from pregnant women of the area attending gynecology department for antenatal care. All pregnant women regardless of age were included in this study who agreed to participate. All those were excluded who were suffering from any major illnesses.

For estimation of calculated sample size the Epi-Info software version used with prevalence of 50% at confidence level of 95% and with worst acceptable result of 10%. The estimated sample size derived through software was 360 participants and the approach was consecutive sampling and the willingness of pregnant women to participate in the study, until the desired sample size obtained regardless of time frame. Consecutive sampling involves recruiting all the people satisfying eligibility criteria for a specified time or a specified sample size. The data collection was started from June 12, 2017 and required sample size completed by August 10, 2017.

A total of 360 blood samples were collected from pregnant women of Tehsil Matta, upper Swat, attending their local hospitals for antenatal checkups. The blood samples were then transferred to gel and clot activator tubes for serological analysis. At the time of blood collection information about maternal age, gestation period and educational level were also collected on a standard questionnaire. Educational level was categorized as educated and uneducated. Educated were those who could read and write and uneducated were those who could not. After clotting, the samples were centrifuged at 3000 rpm for 10 minutes the serum were decanted and stored in Eppendorf tubes at -4°C in refrigerator until analysis.

Demographic data were entered into statistical software SPSS version 18 for cleaning and analysis. Frequencies and percentages were calculated for all demographic data.

The serum samples were analyzed for specific antibodies against toxoplasmosis gondii by using Atlas Toxo Latex Kit manufactured by Atlas Medical UK. The samples were diluted in AMP buffer briefly. The samples were tested in only two screening dilutions, 1:16 and 1:32. The test was performed according to manufacturer’s instructions by adding a drop of latex reagent on test slide with a diluted serum (30 µl). The agglutination was observed and antibody titers of 1:32 were considered as positive.

A written approval has been taken from the head of the hospital, where study was to be conducted. After this, a formal permission was obtained from Ethical Review Committee (ERC) of Saidu Medical College, Swat. This study involved human population as study participant, however, no apparent harm predicted during the whole research process. Written and informed consent was signed from each participant before data and sample collection. Participation in the study was on voluntarily basis and they could withdraw themselves from the study at any point without any threat. All the blood samples were labelled with unique codes to ensure confidentiality and anonymity of the participants.

RESULTS

A total of 360 blood samples were collected from pregnant women of Tehsil Matta, upper Swat, attending their local hospitals for antenatal checkups. The blood samples were then transferred to gel and clot activator tubes for serological analysis. At the time of blood collection information about maternal age, gestation period and educational level were also collected on a standard questionnaire. Educational level was categorized as educated and uneducated. Educated were those who could read and write and uneducated were those who could not. After clotting, the samples were centrifuged at 3000 rpm for 10 minutes the serum were decanted and stored in Eppendorf tubes at -4°C in refrigerator until analysis.

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The overall seroprevalence of T. gondii antibodies in the study population was 47.2%. The highest seropositivity of (54.7%) was observed among individual of the age group 26-33 years as compared to (38.8%) amongst the age group 18-25 years. A significant difference was observed in the seroprevalence between educated (22.07%) and uneducated (66.01%) females. The seroprevalence was high in 1st trimester (61.7%) and 2nd (58.4%) as compared to 3rd trimester (27.7%). (Table 1).

Table 1: The seroprevalence of anti-Toxoplasma antibodies among pregnant women (N = 360) 170

<table>
<thead>
<tr>
<th>Variables</th>
<th>Categories</th>
<th>No. Examined</th>
<th>No. Positive (%)</th>
<th>No. Negative (%)</th>
</tr>
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<td>Age groups</td>
<td>18-25</td>
<td>190</td>
<td>104 (54.7)</td>
<td>86 (45.3)</td>
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<tr>
<td></td>
<td>26-33</td>
<td>170</td>
<td>66 (38.8)</td>
<td>104 (61.2)</td>
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<td>Gestational age</td>
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<td>115</td>
<td>71 (61.7)</td>
<td>44 (38.3)</td>
</tr>
<tr>
<td></td>
<td>2nd Trimester</td>
<td>101</td>
<td>58 (58.4)</td>
<td>42 (41.6)</td>
</tr>
<tr>
<td></td>
<td>3rd Trimester</td>
<td>144</td>
<td>40 (27.7)</td>
<td>104 (72.3)</td>
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<tr>
<td>Educational background</td>
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<td>154</td>
<td>34 (22.07)</td>
<td>120 (77.93)</td>
</tr>
<tr>
<td></td>
<td>Uneducated</td>
<td>206</td>
<td>136 (66.0)</td>
<td>70 (34)</td>
</tr>
</tbody>
</table>
DISCUSSION
The present study is one of the few studies in Pakistan to explore the seroprevalence of Toxoplasmosis in pregnant women. The current study was aimed to determine the prevalence of *T. gondii* infection among pregnant women of District Swat. *T. gondii* infection during pregnancy could lead to serious fetal damage in the fetus and neonate. It is also one of the major risk factors causing morbidity and mortality in people with weak immune system. Seroprevalence of toxoplasmosis varies from 7% to 52.3% in pregnant women worldwide and in women with abortion or pregnancy complications the prevalence varies from 17.5% to 53.3%. A study reported that 40.8% of pregnant women were seropositive for Toxoplasma antibodies in Nigeria. In 2011 Ferguson and colleagues reported that 75% women were susceptible to toxoplasmosis. A Pakistani study reported overall 65.71% prevalence rate in the female population of Malakand Agency, KP, Pakistan. The seroprevalence of toxoplasmosis obtained in this study among pregnant women in the Matta, District Swat was 47.2%, which is comparable to the results of previously reported studies. Regional variations among the seroprevalence of anti-Toxoplasma antibodies may be due to the differences in climatic conditions, cultural habits, feeding, and hygienic conditions. In the present study, the prevalence of *T. gondii* infection was high at first Trimester (61.7%) and second Trimester (58.4%) as compared to the third Trimester (27.7%). However, the difference was not significant and the results are consistent with the previous study. In the current investigation, a high prevalence (54.7%) was detected in age group (18-25) as compared to (38.8%) in age group (26-33), which is in accordance with previous research studies. The present study the prevalence rate was significantly higher in uneducated women (66.01%), as compared to educated ones (22.07%). This is highly risky and need to educate the women about the prevention of Toxoplasma gondii infection. This may be due to low socioeconomic status, unawareness and may be related to greater soil exposure. The current results are also comparable with the results of previous Pakistani researches. As cat feaces is a major risk factor in the prevalence of toxoplasmosis. However, in the study area, no one keep cats as a pet, but is still present in the area. Considering the presence of cats, use of raw vegetables and under cooked meat, suitable climate conditions in District Swat for sporulation of Toxoplasma gondii oocysts, it seems that exposure to cat feaces is the prime source of *T. gondii* infection.

CONCLUSION
It is concluded from the present study that women of Matta, District Swat are highly susceptible to *T. gondii* infection. Therefore, the present study emphasizes to monitor pregnant women during pregnancy to minimize the prenatal infections. Proper health education, awareness about the risk factors, prevention and control measures should be adopted in the area.

REFERENCES


