Prevalence of *Toxoplasma gondii* antibodies among pregnant women in District Bannu, Khyber Pakhtunkhwa (KP), Pakistan

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**Abstract**

Toxoplasmosis is a common zoonotic disease and caused by parasite, *Toxoplasma gondii*. It also causes of high morbidity and mortality in all animals and human beings. The present study was conducted during February to November 2015, for the detection of *Toxoplasma gondii* infection in pregnant women. Total of 150 blood samples were collected from pregnant women randomly. Among these 98.68% (148/150) blood samples were negative and 1.32% (02/150) were positive with IgM and IgG antibodies. Similarly the ages (20-30) and (31-40) years were more susceptible to the toxoplasmosis. Uneducated pregnant women were only susceptible to the *Toxoplasma gondii* infection. The rural area patients were more screened for *Toxoplasma gondii* infection as compared to the urban communities.

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Introduction

Toxoplasma gondii is a common parasitic protozoan, member of phylum Apicomplexa, subclass Coccidiasina and family Sarcocystidae (Hill et al., 2007; Pereira et al., 2010). It is worldwide distributed and 6 billion peoples have been suffered in all over the world (Furtado et al., 2011). High prevalence of T. gondii has been recorded in warm and humid areas (Coelho et al., 2003). In Pakistan approximately 29.5% of human population of different districts like Punjab and Dera Ghazi Khan has serological disease of toxoplasmosis (Tasawar et al., 2011).

Toxoplasma gondii is an obligate intracellular zoonotic protozoan present in humans and animals population globally. The infection is transmitted by using raw meat and deeply contact with cat feces obtaining oocytes. It can also cause inborn disease and abortion in livestock and humans population (Krick and Remington, 1978; Dubey, 1988). Initially the Toxoplasma gondii infection is without any symptoms in pregnant women but produce severe neonatal problems (Linguissi, 2012). In pregnancy the toxoplasmosis has been related with many complications in newborn babies like cerebral calcification and hydrocephalus etc (Flatt and Shetty, 2013). In some developed countries, approximately 0.01% - 0.1% of babies were infected with congenital toxoplasmosis (Montoya and Remington, 2008). When healthy pregnant women are infected with T. gondii parasite, this infection can also causes in fetus through placenta, therefore it is considered congenitally. The prevalence of fetal transmission is various, for example in first trimester the infection is 10%–25%, while in second and third trimesters are 30%–54% and 60%–65% respectively (Montoya and Remington, 2000). A high prevalence of T. gondii has been recorded in many developed countries. For example in France, where the peoples are use improperly cooked meat (Baril et al., 1999), and in tropical areas where cats are present abundantly and environment suitable for oocytes growth (Arias at al., 1996). Human sere prevalence of toxoplasmosis is stopped by washing the hands as well as kitchen instruments like knife and cotton board etc with soap after handling the contaminated meat.

Meat obtaining oocysts can also be killed by boiling in water with range of (67°C) for 4 minutes (Dubey et al., 1990), and also freeze with range of (-13°C) for 3 days (Dubey and Thayer, 1994). For the treatment of toxoplasmosis, different medicines like Sulfadiazine and Pyrimethamine (Daraprim) are prescribed. Someother medicines like atovaquone, clindamycin, diaminodiphenylsulfone and spiramycin are also approved in severe infection (Dolores and Dubey, 2014). Keeping in view the purpose of current study was to investigate the prevalence of Toxoplasma gondii antibodies in pregnant women of district Bannu.

Materials and methods

Study area

District Bannu is situated in between the 31.28° North latitude and 73.25° East longitudes. It is present with adjacent districts Lakki Marwat, Karak and agencies of North South Waziristan. In 1998 census the total population was 677350 and annual growth rate is 2.8% respectively. The total region of district Bannu is 1,227 square kilometers contain total area and 74196 Hectors area is under cultivated. In summer season the temperature range is 48°C, while 6°C in winter season. Total 45% area is irrigated through canal systems, while remaining depend upon rainfall.

Blood samples collection

The present study was arranged during February to November 2015 in district Bannu for the assessment of Toxoplasma gondii in pregnant women. Total of 150 blood samples were collected randomly. The samples contained2mL of venous blood, was taken in a sterile syringe from each patient and brought to the Women & Children Teaching Hospital (WCTH) district Bannu laboratory for Toxoplasma gondii detection.

Toxoplasma gondii detection

The blood sample of each patient was centrifuged for 5 minutes for serum extraction. 2-3 drops of separated serum were kept on rapid diagnostic kit for the detection of IgG and IgM antibodies. The kit obtained different values like ‘C’ (negative value), ‘T1’ and ‘T2’ represented IgM and IgG antibodies respectively. The site ‘S’ is used for serum falling, if the serum was stopped on ‘C’ value it represented
negative sample, if stopped on 'T1' and 'T2' values it represented the positive samples for IgM and IgG antibodies respectively.

**Results**

The present study was conducted during February to November 2015, for the detection of *Toxoplasma gondii* infection in pregnant women. Total of 150 blood samples were collected from pregnant women randomly. Among these 148 blood samples were negative and 02 were positive. Among positive one was infected with IgM, while other was with IgG antibodies. For the prevalence of *Toxoplasma gondii*, the age of pregnant women were divided in to four groups with ten years gape. The age (31-40) years have more patients, while the age (>50) years have least patients. Similarly the ages (20-30) and (31-40) years were infected with *Toxoplasma gondii* (Table 1).

**Table 1.** Age wise prevalence of *Toxoplasma gondii* antibodies in pregnant women during February to November 2015.

<table>
<thead>
<tr>
<th>Age (Years)</th>
<th>Negative IgM Antibodies</th>
<th>IgG Antibodies</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-30</td>
<td>48</td>
<td>01</td>
</tr>
<tr>
<td>31-40</td>
<td>56</td>
<td>00</td>
</tr>
<tr>
<td>41-50</td>
<td>41</td>
<td>00</td>
</tr>
<tr>
<td>&gt;50</td>
<td>03</td>
<td>00</td>
</tr>
<tr>
<td>Total</td>
<td>148</td>
<td>01</td>
</tr>
</tbody>
</table>

The overall percentage wise prevalence of *Toxoplasma gondii* infection in pregnant women was recorded as 1.32% positive and 98.68% was recorded negative (Fig. 1).

Most of the patients were belonged to the rural area, among the infected patients one was belonged to urban area, while the other was rural area patient (Table 2).

**Table 2.** Prevalence of *Toxoplasma gondii* antibodies in pregnant women on the basis of locality.

<table>
<thead>
<tr>
<th>Locality</th>
<th>Negative</th>
<th>Positive</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IgM Antibodies</td>
<td>IgG Antibodies</td>
</tr>
<tr>
<td>Urban</td>
<td>63</td>
<td>01</td>
</tr>
<tr>
<td>Rural</td>
<td>87</td>
<td>00</td>
</tr>
</tbody>
</table>

Uneducated pregnant women were only susceptible to the *Toxoplasma gondii* infection and most of the patients were also screened of this category (Table 3).

**Table 3.** Prevalence of *Toxoplasma gondii* antibodies in educated and uneducated pregnant women.

<table>
<thead>
<tr>
<th>Education</th>
<th>Negative</th>
<th>Positive</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IgM Antibodies</td>
<td>IgG Antibodies</td>
</tr>
<tr>
<td>Literate</td>
<td>69</td>
<td>00</td>
</tr>
<tr>
<td>Illiterate</td>
<td>81</td>
<td>01</td>
</tr>
</tbody>
</table>

**Discussion**

Toxoplasmosis is a common zoonotic disease and caused by parasite *Toxoplasma gondii*. It also causes of high morbidity and mortality in all animals and human beings. The present study was conducted during February to November 2015, for the detection of *Toxoplasma gondii* infection in pregnant women. Total of 150 blood samples were collected from pregnant women randomly. Among these 148 (98.68%) blood samples were negative and 02 (1.32%) were positive. Among positive one was infected with IgM, while other was with IgG antibodies. Similarly the ages (20-30) and (31-40) years were only susceptible to the infection.

A study was conducted by Faisal et al., 2013, total of 805 blood samples were screened from district Swabi Pakistan for *Toxoplasma gondii* infection. Among these 155 (19.25%) were positive and and 650 (80.75%) were negative. The age groups 25-34 years were more susceptible to the infection. Another study was put forwarded by the Khan et al., 2011 in district Kohat Pakistan. Total of 180 blood samples were collected randomly, among these 26 (14.4%) blood samples were positive.
Another study was conducted by Pal et al., 1996 who documented 17% seroprevalence of *Toxoplasma gondii* from Rawalpindi and Islamabad, Pakistan. The above findings were greater as compared to the present work because the females were in great care, they used washed vegetables and properly cooked meat.

A study was arranged in Karaj to winship Iran by Akhlaghi et al., 2014, total of 400 pregnant women were screened. Among these 1% and 29% were positive with IgM and IgG antibodies. The age group >30 years were more susceptible to the infection. A study was conducted by Mwambe et al., 2013 in Tanzania, total of 350 pregnant women were screened and 108 (30.9%) were sero-positive. This infection was recorded higher in urban as compared to rural area (41.5% versus 22.0%).

A study was conducted by Hashemi and Saraei 2010, total of 400 pregnant women were screened for *Toxoplasma gondii* infection in Islamic Republic of Iran. The overall seropositivity was recorded as 34% respectively. In Iran 30%-35% peoples have been contained found *Toxoplasma gondii* infection in most areas (Hashemi and Saraei, 2010). Low level of education was greatly concerned associated with high seroprevalence of toxoplasmosis (Nash et al., 2005). Malarvizhi et al., 2012 reported total of 232 pregnant women were checked for *T. gondii* infection, among these 23 (9.9%) were positive for IgG, while 9 (3.9%) were positive for IgM antibodies. The overall seroprevalence of present findings were smaller as compared to mentioned citations because the pregnant women have high hygeinic conditions and consumption of unpasteurized milk. These females have also no contact with domestic animals because the literature indicates that toxoplasmosis is a zoonotic disease.

**Conclusion**

Toxoplasmosis is a common zoonotic disease and caused by parasite, *Toxoplasma gondii*. It also causes of high morbidity and mortality in all animals and human beings. Overall prevalence was recorded 1.32% (02/150) with IgM and IgG antibodies. Among the age groups (20-30) and (31-40) years were only susceptible to the infection.

Uneducated pregnant women were only susceptible to the *Toxoplasma gondii* infection. The rural area patients were more screened for *Toxoplasma gondii* infection as compared to the urban communities.

**References**


Hashemi HJ, Saraei M. 2010. Seroprevalence of Toxoplasma gondii in unmarried women in Qazvin, Islamic Republic of Iran. EMHJ Vol. 16(1).


