

Prevalence of Toxoplasmosis in Pregnant Women

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ABSTRACT

Background: Toxoplasmosis is a universal zoonotic disease approximately 30-50% of the individuals throughout the world have antibodies to *Toxoplasma gondii*. This study aimed to determine the prevalence of *Toxoplasma gondii* infection among pregnant women of Peshawar.

Materials and Methods: The present cross-sectional study was conducted from September 2017 to December 2017. A total of 94 pregnant women attending antenatal care clinics were enrolled and screened for IgG and IgM antibodies against *Toxoplasma gondii* using the ICT technique.

Results: Of the 94 pregnant women, 20 (21.3%) have either IgG or IgM antibodies detected against *Toxoplasma gondii*. Overall, positivity rate of IgG antibodies against *Toxoplasma gondii* was 14.9% while positivity rate of IgM antibodies was 6.3% in pregnant females. Highest sero-positivity was observed in elder age pregnant females with 8.51% in age group 43-53 years.

Conclusion: It is concluded that about one-fifth of the pregnant women in the present study were infected with *Toxoplasma gondii* parasites so the preventive method should be considered.

Keywords: Toxoplasmosis, prevalence, pregnant women.

INTRODUCTION

Humans and various other animal species can contract toxoplasmosis, an infection brought on by the parasite *Toxoplasma gondii*. Consequences of congenital toxoplasmosis include chorioretinitis, severe neonatal infection, brain lesions that appear months after becoming dormant, and protracted evolution¹. The main way to become infected with *Toxoplasma gondii* is to consume infected meat cysts or oocysts, which can contaminate food, water, and soil. Water has been identified as a primary source of infection in both people and animals in recent studies². Humans can get the disease congenitally by transmission from mother to fetus in utero, through water or food contaminated with cat feces, or by consuming undercooked meat from infected animals. Oocysts may spread on fomites and can endure exposure to cold for up to 18 months, particularly if they are covered and protected from the sun³. Recent epidemiological studies have also identified the following risk factors: having cats, eating unwashed or raw fruits or vegetables, consuming raw vegetables outside the home, traveling to areas where the disease is prevalent, and consuming raw meat, poultry, or seafood⁴. Human hosts often experience no symptoms unless immune suppression has a place and the bacterium can reactivate⁵.

Pregnant women are most frequently infected by eating raw or undercooked meat, drinking contaminated water, or coming into contact with dirt when gardening or farming without gloves. Only a tiny percentage of women with *Toxoplasma gondii* infection will exhibit clinical symptoms; studies have indicated that over 90% of them remain asymptomatic and may spontaneously recover. When compared to pregnant women, the clinical presentation in non-pregnant women is more severe, and it most frequently manifests as an influenza-like illness (malaise, low-grade fever, cervical lymphadenopathy), with an incubation period of 5 to 18 days⁶. It has been shown that the main maternal infections acquired after one or perhaps before two conceptions are when *Toxoplasma gondii* is passed from mother to fetus⁷. Some chronically infected women who had a reactivation of their infection due to a non-immune condition (such as AIDS or corticosteroid therapy for their underlying sickness) have experienced transmission to the fetus⁸. Reactivation of latent *Toxoplasma gondii* infection led to the congenital transmission of the parasite to the fetus in severely non-immune, chronically infected pregnant women (e.g., patients with AIDS and those receiving high dose immunosuppressive therapy,

including organ transplant recipients, patients with connective tissue disorder, and malignancies)⁹.

A serological test for *Toxoplasma gondii* antibodies has been used to prevent congenital toxoplasmosis in pregnant women. The detection of antibodies against *Toxoplasma gondii* has been done using a variety of serological techniques, such as the ELISA, latex agglutination test, indirect fluorescent antibody test (IFA), and haemagglutination test¹⁰. Congenital toxoplasmosis can be avoided through education of pregnant women on how to avoid primary infection, through routine serological detection of recent *Toxoplasma* infection in pregnant women (secondary prevention), allowing for accurate prenatal diagnosis and prompt treatment, or through serological screening and treatment of infected newborns. *Toxoplasma* infection screening has been used for 20 years in nations with a high risk of toxoplasmosis¹¹.

IgG anti-T. *gondii* prevalence in the state of Parana, Southern Brazil, varied from 40 to 66 percent in 1983 and 1996, respectively, while 1.8 percent IgM anti-T. *gondii* sero-incidence in pregnant women has been noted in the state's northern areas^{12, 13}. In Albania, the seroprevalence of toxoplasmosis in pregnant women was assessed. Of the 496 pregnant women, 241 (48.6% [range 44-53]) tested positive for IgG, and three of them (1.3%) also tested positive for IgM¹⁴. The aims of the present study were to determine the prevalence of toxoplasmosis in pregnant women of Peshawar.

MATERIAL AND METHOD

The Pak Medical Laboratory in Dabgari Garden, Peshawar, conducted this cross-sectional study. The KPK capital, Peshawar, is located in a wide valley close to the historic Khyber Pass' eastern terminus and extends toward the mountains, allowing residents to live at an altitude of about 347 meters. 21 degrees Celsius is Peshawar's average daily temperature. Peshawar is the largest city in KPK and the sixth-largest city in Pakistan, with a population of 1,970,042 as of the 2017 census.

Serological testing for toxoplasmosis was done on pregnant women who visited an antenatal clinic in Peshawar from September 2017 to December 2017. In Peshawar, prenatal clinics were visited by 94 pregnant women who provided blood samples for this study. Those who rejected to participate in the study or refused to provide their consent were not included in the study. The ladies were between the ages of 21 and 53, with a median age of 32.

Demographic information was gathered using a structured questionnaire interview, including name, age, place of residence, educational level, gestational age, marital status, occupation, consumption of raw/undercooked meat, consumption of raw vegetables, and sources of drinking water and exposure to soil.

Between September 2017 and December 2017, samples were taken. Each research participant gave 5ml of blood, which was collected aseptically into plain vacutainer tubes. The patient's laboratory number was then properly labeled on the tubes. Centrifugation at 3000 rpm for 5 minutes was used to extract the serum from these blood samples. Once separated, the serum was stored at 20°C until use in clean Pasteur pipettes.

If a pregnant woman has been infected, it may be determined whether she contracted the illness recently or a long time ago by looking for antibodies to *Toxoplasma gondii* in her serum. If the findings of a serological test point to a recent illness, an attempt is undertaken to ascertain whether the infection was probably picked up during pregnancy or just before conception. Immunochromatographic technology (ICT) kits were used to screen blood samples for IgG and IgM to identify *Toxoplasma gondii* serologically (LDBIO Diagnostics, France). According to the manufacturer's instructions, serologic tests were conducted at the Khalid Medical Laboratory in Dabgari Garden, Peshawar. IgG and IgM titers in women were regarded to indicate a potential recent infection. Women were regarded as latently infected if they had positive IgG titers but negative IgM titers.

RESULTS

The goal of the current study was to determine the prevalence of toxoplasmosis among Peshawar's pregnant women. 94 pregnant women in all were enrolled during the research period. Their ages ranged from 21 to 53, with a mean of 32. 20 (21.27%) of the 94 women tested positive for *Toxoplasma gondii* antibodies (Table:1).

Table 1: Overall prevalence of *Toxoplasma* antibodies.

Toxoplasma antibodies	Number of infected pregnant women	Total number of pregnant women
IgM+IgG	20 (21.27%)	94

IgG and IgM antibodies were found to be positive (seropositive) in 20 (21.27%) of the 94 pregnant women. Of the pregnant women whose anti-*Toxoplasma* antibody findings were examined, 14 (14.89 percent) were found to have IgG antibodies that were positive (seropositive). IgG antibody was not present in 80 (85.1%) of the women. In 88 (93.61 percent) of 94 pregnant women, the IgM antibody was found to be negative, and in 6 (6.38 percent) of pregnant women, the IgM antibody was found to be positive.

Table 2: Prevalence of IgM and IgG antibodies.

	IgM	IgG
Positive	6 (6.38%)	14(14.89%)
Negative	88 (93.61%)	80(85.10%)
Total	94	94

Twenty of the 94 serum samples that were evaluated for *T. gondii* were positive, making the overall prevalence 21.27 percent. Seropositivity rose with age, rising from 6.38 percent in the age group of those aged 21 to 31 to 8.51 percent in the age group of people aged 32 to 53. The age groups with the highest frequency, 43-53 years old (8.51%), and the lowest prevalence, 21-31 and 32-42 years old (6.38%) (Table.3).

Table.3: Age-wise prevalence of toxoplasmosis

Age(group)	IgM-IgG positive cases	Seroprevalence %
21-31	6/94	6.38%
32-42	6/94	6.38%
43-53	8/94	8.51%

DISCUSSION

A common parasite illness, toxoplasmosis primarily poses a concern to unborn children and people with compromised immune systems. It has been investigated how common toxoplasmosis is in various nations. The current study found that among 94 pregnant women, the frequency was 21.27 percent. There hasn't been any research done in Peshawar on the epidemiology of *Toxoplasma gondii* infections in general or in pregnant women in particular. Numerous findings from throughout the world attest to toxoplasmosis's widespread prevalence in people. The current frequency was greater than the 17.4% recorded for persons with anti-*Toxoplasma* antibodies from Islamabad¹⁵.

The prevalence in our study is much greater than the prevalence seen in pregnant women in other nations, including Zambia (5.87%)¹⁶, the United Kingdom (9%)¹⁷, and Korea (3.7%)¹⁸. The current prevalence was lower than the corresponding figures for Saudi Arabia (25%)¹⁹, Brazil (77.5 percent)²⁰, Colombia (63.5 percent)²¹, Jordan (66.9%)²², and the Kuwait (53.1%)²³.

The findings of all of this research suggested that the incidence of *T. gondii* may be particularly high among populations that regularly consume raw or undercooked meat, unwashed produce, interact with cats, dogs, or other animals, or come into contact with contaminated soil.

CONCLUSION

Pregnant women in Peshawar have a high incidence of antibodies that specifically target *Toxoplasma gondii*. The prevalence of *T. gondii* infections was independently linked with older women's age. According to the findings of this study, pregnant women have a significant chance of contracting toxoplasmosis because of their low levels of education, interaction with the cat that causes the disease, and inadequate sanitation. Therefore, women of reproductive age must be informed of the disease's transmission and prevention. Limiting the spread of illness should be made easier by controlling household cats. To stop the infection, the sanitation system needs to be made clean.

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