

# SEROPREVALENCE OF HUMAN TOXOPLASMOSIS IN KALLARWALI VILLAGE OF DISTRICT MUZAFFAR GARH, PAKISTAN

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## ABSTRACT

**Background:** Toxoplasmosis is a zoonosis of human and warm-blooded animals caused by the parasitic protozoan *Toxoplasma gondii*. This parasite is distributed worldwide. It causes severe congenital abnormalities including hydrocephalus and mental retardation in infants. The present study was designed to know the prevalence of human toxoplasmosis and its relationship to gender and age of humans in Kallarwali, District Muzaffar Garh.

**Material & Methods:** The present investigation was carried out in Kallarwali, Muzaffar Garh, Punjab, Pakistan. A total of 150 sera were examined. The Orient Toxo Latex Kit was used for the analysis of sera. It is highly specific and sensitive test to detect antibodies to *Toxoplasma gondii*. The samples were tested by latex agglutination test. The data was collected on the pre-designed proforma.

**Results:** Out of 150 sera examined 63 were positive giving the overall prevalence of *T. gondii* as 42%. It was more common in males 33(44%) as compared to females 30(40%). The parasite was also found in all age groups (range 1 to 70 years). The prevalence was 60% in age group of 1-10 years, 19.35% in age group 11-20 years, 39.28% in age group of 21-30 years, 50% in age group 31-40 years, 68.75% in age group 41-50 years, 33.33% in age group 51-60 years and 50% in age group 61-70 years. The highest (68.75%) prevalence was observed in age group 41-50 years and the lowest (19.35%) in age group 11-20 years.

**Conclusion:** The infection rate of toxoplasmosis is high in village Kallarwali, District Muzaffar Garh. It increases with age. Men have higher risk of infection than women.

**KEY WORDS:** *Toxoplasma gondii*; Seroprevalence; Toxoplasmosis; *Toxoplasma*.

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## INTRODUCTION

Toxoplasmosis is a diverse zoonosis caused by the parasitic protozoan *Toxoplasma gondii*.<sup>1</sup> The parasite infects most warm blooded animals including humans but the primary host is the felid (cat) family. Animals are infected by eating meat, by contact with cat feces or by transmission from mother to fetus. The most significant ways for transmission to humans are by ingestion of food or water contaminated with oocysts shed by cats, by eating undercooked or raw meat containing infective tissue cysts and via placenta when the mother becomes infected for the first time during pregnancy.<sup>2-5</sup>

The infection is worldwide, particularly in warm and moist climates.<sup>6</sup> One-third of the human world

population is infected with this parasite.<sup>7</sup> During the first few weeks, the infection typically causes no symptoms in healthy adults. However, people with weakened immune system, such as those infected with HIV may become seriously ill and can occasionally be fatal. The prevalence of *T. gondii* has been reported to increase with age (>40 years) and in women consuming raw meat, vegetables and fruits.<sup>8</sup>

In immune competent individuals, *T. gondii* specially infects tissues of central nervous systems, which might be an adding factor of certain psychiatric disorders. This parasite can cause life threatening infections and spontaneous abortions.<sup>9,10</sup> The parasite can cause encephalitis, dementia, anxiety and personality disorder.<sup>11</sup> Toxoplasmosis is a major public health problem with a high socioeconomic impact in terms of human suffering including the cost of caring for sick, mentally retarded and blind children.<sup>12</sup>

Various studies have been carried out on the prevalence of *T. gondii* in different parts of the

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world<sup>13-15</sup> and in Pakistan<sup>16,17</sup> but there is no published report on the prevalence of human toxoplasmosis from Kallarwali District Muzaffar Garh.

The present study was conducted to see the prevalence of human toxoplasmosis and its relationship to gender and age in Kallarwali village of District Muzaffar Garh.

## MATERIAL AND METHODS

During this study a total of 150 blood samples were collected randomly from males and females of the rural area Kallarwali, District Muzaffar Garh, Pakistan for human toxoplasmosis. The host age and sex was also recorded. Blood was taken (3-4 ml) from each person under aseptic conditions and serum was extracted. The extracted serum was stored in eppendorf tubes at -20°C until proceeds for further analysis. The samples were processed for the analysis of specific immunoglobulin (IgG) and (IgM). The commercial "Latex Agglutination Kit" (Antec Diagnostic Product, UK) was used for this purpose. It is highly specific and sensitive test to detect antibodies

*Toxoplasma gondii*. The test is based on a plate latex agglutination method. The serum and latex reagent were mixed with plastic stirrer. Slide was rocked gently and slowly for five minutes. A positive result was expressed by agglutination visible to naked eye. A negative result was expressed by a homogenous mixture with no visible agglutination.

## RESULTS

Out of 150 sera examined 63 were positive giving the overall prevalence of *T. gondii* as 42%. It was more common in males 33(44%) as compared to females 30(40%). The parasite was also found in all age groups (range 1 to 70 years). The prevalence was 60% in age group of 1-10 years, 19.35% in age group 11-20 years, 39.28% in age group of 21-30 years, 50% in age group 31-40 years, 68.75% in age group 41-50 years, 33.33% in age group 51-60 years and 50% in age group 61-70 years. The highest (68.75%) prevalence was observed in age group 41-50 years and the lowest (19.35%) in age group 11-20 years.

**Table 1: Relationship between gender and human toxoplasmosis.**

Gender	Number examined	Number infected	Prevalence (%)
Males	75	33	44
Females	75	30	40

**Table 2: Relationship between age and human toxoplasmosis.**

Age groups (years)	1-10	11-20	21-30	31-40	41-50	51-60	61-70
Number examined	5	31	56	32	16	06	04
Number infected	3	6	22	16	11	2	2
Prevalence (%)	60	19.35	39.28	50	68.75	33.33	50

## DISCUSSION

Toxoplasmosis is a widespread parasitic disease and mostly a risk to unborn infants and to persons with weakened immune systems. The prevalence of toxoplasmosis in many countries has been explored. Similar results (30%) were reported in the eastern region of Saudi Arabia.<sup>6</sup> While higher values 47.4%, 59.6% and 90% were calculated in Brazil, Egypt and Ethiopia, respectively.<sup>18-20</sup> However, lower prevalence (4.19%, 11.3%, 22%, 26.3%) was recorded in Vietnam, Mexico, Pakistan and India respectively.<sup>21-24</sup> Studies on the prevalence of toxoplasmosis have shown that prevalence of parasite depends on many factors like nutritional habits, socio-economic status, immunity<sup>25</sup> hygienic conditions and consumption of raw or under cooked meat and contaminated soil.<sup>26</sup> The prevalence of toxoplasmosis in this survey was seen in the population living in

rural area and the reason for high prevalence may be lack of education and environmental conditions. In addition, lengthy summer and dry weather of the area may be favorable for the sporulation of oocytes.<sup>27</sup>

Gender of the hosts plays a significant role in the occurrence of toxoplasmosis. The prevalence of Toxoplasmosis during present survey was found to be 44% in males and 40% in females. Relatively higher prevalence of *T. gondii* in male host could be due to low resistance of male hosts as compared to female hosts.<sup>28</sup> Levels of immunoglobulin, including IgG, IgM, and IgA are greater in females than in males.<sup>29</sup> The literature generally shows that the females are more resistance to parasitic infections than males because of the gender associated differences in exposure and testosterone immunosuppressive properties.<sup>30</sup>

During the present survey the higher preva-

lence 68.75% was recorded in age group of 41-50 years and lower prevalence 19.35% in age group 11-20 years. It shows that the prevalence of *T. gondii* increases with increase in age due to decrease of host immunity, similar results have been reported by others as well.<sup>17,31,32</sup> The *T. gondii* infection increases as the age of host increases. Age is an important factor in the prevalence of human toxoplasmosis.

## CONCLUSION

The infection rate of toxoplasmosis is high in village Kallarwali, District Muzaffar Garh. It increases with age. Men have higher risk of infection than women. There is a need to create public awareness.

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**CONFLICT OF INTEREST**

Authors declare no conflict of interest.

**GRANT SUPPORT AND FINANCIAL DISCLOSURE**

None declared.