

SEROPREVALENCE OF *TOXOPLASMA GONDII* IN SHEEP AND GOATS

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ABSTRACT: A study was carried out to determine the seroprevalence of *Toxoplasma gondii* in sheep and goats by using Latex agglutination test. Blood samples were taken from sheep (50) and goats (50) from slaughter house of Lahore and local sheep & goat farms. The serum was separated and analyzed for anti *Toxoplasma* antibodies. The animals were divided in three groups, Group I included animals below one year, Group II consisted of 1-4 years of age and Group III 4 years and above. The 8 and 6 percent overall seroprevalence were recorded in sheep and goats respectively. Age titer relationship in sheep showed that Group III had (12.5percent), Group II (7.6 percent) and Group I had no positive case. In goats Group III had (10 percent), Group II (5.7 percent) and no seropositive case in Group I could be recorded. The infection was higher in older animals than young ones. Breed wise seroprevalence indicated that disease was recorded in 14.28 percent Kcchhi, 8.33 percent Desi (none descript) and 0.00 percent in Lohi and Thali breeds respectively. In goats 11.11 percent, 5.55 percent and 0.00 percent sero positivity cases were recorded in Teddy, Desi (none descript) and Beetal goats respectively.

Key words: Seroprevalence, *Toxoplasma gondii*, Sheep and Goats

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INTRODUCTION

Toxoplasmosis is an infectious disease caused by *Toxoplasma gondii* that is an intestinal coccidium having a variety of intermediate hosts. Sheep, Goats, Pigs, Cattle and Human were more prone to infection. The parasite was discovered first time in a rodent by Nicolle and Manceaux in 1908 (Altinoz *et al.*, 2007), the *gondii* (*Ctenodactylus gondii*) (Omar and Khoo, 1999). Agnaga *et al.* (1981) have reported the presence of antibodies in food producing animals. Cat is the only host in which the organism undergoes sexual reproduction within the intestine. Intermediate hosts often become infected by taking contaminated meat from sheep that also contacted through placental route or congenitally (Pepin *et al.* 1997). After ingestion by any host, the coccidium escape from its cyst and penetrate the intestinal wall and emerge there as sporozoites. In an immunocompetent individual, the organism will encyst itself in the brain, muscle and eye as a bradyzoite (Burney, 1996). However, if the host becomes immunosuppressed the parasite may reactivate.

Toxoplasmosis in sheep and goats cause abortion, weak kids, still birth, birth defects and mummification of fetuses in pregnant does and ewes. Milk and meat from goats infected by *T. gondii* are an important source of contamination to human beings. This factor must be considered seriously as the disease control is linked to public health and increased consumption of goat milk in Pakistan. The infection of milk by *T. gondii* had been

reported by Chiari and Neves (1984) in goats. Another study reported that in humans there was a close association between intake of goat milk and positive serology for *T. gondii* (Chiari *et al.* 1987). As toxoplasmosis had been established a high risk of public health disease through ingestion of contaminated milk and meat Therefore present study was designed to understand the relation of disease with breed, age and sex of sheep and goats.

MATERIALS AND METHODS

Sample Collection: A total of 100 serum samples were collected (50 sheep and 50 goats) and analyzed for the presence of anti-*Toxoplasma* antibodies in sheep and goats. Age and breed history of sheep and goats were noted in prescribed Form. The experimental animals were divided into three age groups, under one year (Group I), 1 year to 4 years (Group II) and 4 year and above (Group III). The samples were collected from slaughter house of Lahore and local goat farms. The goats were divided into three groups; Group I, comprised of goats below 1 year; Group II from 1 year to 4 years and Group III consisted of goats from 4 years and above.

6-8 ml of blood under aseptic measures was withdrawn slowly by disposable syringes and then transferred to a screw capped clean test tubes slowly to avoid haemolysis (Benjamin, 1985). All the test tubes were labeled with number and date of collection.

1. **Separation of serum:** The samples were allowed to clot for one hour then separated with a fine loop and were centrifuged for 5 minutes at 3500 rpm. The supernatant was transferred to clean conical test tubes and stored for further process and analysis. (Samaha *et al.*, 1993)

2. **Serum samples analysis:** The collected samples were analyzed using Latex Agglutination, (LA) test for specific Ig G Toxoplasma antibodies.

3. **Interpretation of results:**

4. The interpretation was as under

a) 1:16 sera noimmunity i.e; **Negative**

b) 1:16 sera non-specific or residual immunity. **Positive**

c) 1:32 to 1:128 evolving or acquired immunity. **Positive titer**

d) 1:256 indicated recent contact. **Positive titer**

Statistical analysis: Statistical analyses were done with the SPSS for Windows (Version 12.0).

RESULTS AND DISCUSSION

Toxoplasmosis in Sheep: The prevalence of anti-*Toxoplasma* antibodies overall in sheep was recorded as 8 percent. Near similar results were recorded by Pandey *et al.* (1992) in Zimbabwe, Seinenke (1996), Mainar and Vazquez (1998) in Madrid region, Spain recorded the same findings as in the present study. However, higher seroprevalence of toxoplasmosis were recorded by Hashemi (1996) in Iran and Gondim *et al.* (1999) in Brazil. These variations in the seroprevalence may be due to different managemental and environmental conditions in various geographical areas.

The age Group III had the highest seropositive percentage of 12.5 percent, followed by Group II which was 7.6percent, and there was no positive case in Group I. (Table. I) As far as antibody titer is concerned, 3 sheep showed antibody titer at screening dilution of 1:16, one sheep gave antibody titer of 1:128 and no one were positive at screening dilution of 1:256.

Table-1 Anti *toxoplasma* antibodies in sheep in relation to their age

Age group (years)	No. tested	Anti body titer reciprocal			Seropositive	percent seropositive
		16	128	256		
Group I	3	0	0	0	0	0
Group II	39	2	1	0	3	7.6
Group III	8	1	0	0	1	12.5
Total	50	3	1	0	4	8

Breed titer relationship was compared among 4 samples from Lohi, 7 samples from Kachhi, 3 from Thali and 36 from none descript or desi breeds of sheep. Amongst the breeds Kachhi had the highest seropositive percentage as 14.28, followed by Desi breed having 8.33percent seropositive where as Lohi and Thali had no positive sample. The seropositive percentage was 8percent overall in sheep in and around Lahore.

Toxoplasmosis in Goats: In the goats, prevalence of anti-*Toxoplasma* antibodies overall was recorded as 6percent. Mainardi *et al.* (2003) in Barazil, Gondim *et al.* (1999) in Barazil, Amin and Morsy (1997) in Saudi Arabia, Hashmi (1996) in Iran and Samad *et al.* (1993) in Bangladesh recorded high seroprevalence than the present study. This may be due to different managemental and geographical conditions. The other factor for this low seroprevalence may be the small sample size which is 50 in the present study, so it is difficult to estimate the correct seroprevalence in this size of sample. Contamination of feed by faeces of cat, flies and cockroaches carry oocysts and intimate association of goats with pets are the additional epidemiological factors in positive serology.

The Group III (4 years and above) had the highest seropositive percentage (10percent), followed by the Group II (1-4 years) having 5.7percent seropositive percentage. While the goats of Group I had no positive case (Table 2). According to antibody titer, 2 goats showed antibody titer at screening dilution of 1:16, one goat showed antibody titer at 1:128 and no one showed antibody titer at screening dilution of 1:256. For the breed titer relationship, 5 samples from Beetal, 9 from Teddy and 36 from Desi or local breeds were collected and screened for anti *Toxoplasma* antibodies at different screening dilutions. Amongst the breeds Teddy goats showed the highest seropositive percentage of 11.11 percent, followed by Desi having 5.55 percent seropositive while Beetal had no positive case. The seropositive percentage overall in goats for anti *Toxoplasma* antibodies in goats was 6percent.

Age titer relationship was compared in the sheep as: over 4 years had more seropositive percentage (12.5percent) than animals between 2-4 years (7.6percent) and below one year (0 percent). The present study correlate with the observations of Panday *et al.* (1992) and Aktaset *et al.* (2000) in Malatya, which shows that the infection is more prevalent in adults than the young ones. Among 50 sheep examined, 3 gave anti body titer of 1: 16 which indicated residual or non specific immunity; one showed antibody titer of 1:128 which was due to acquired or evolving immunity, whereas, no sheep was positive at antibody titer of 1:256 which suggest no recent contact with parasite.

The seroprevalence of *T. gondii* in goats varied with different age groups. The highest percentage of

seropositivity (10percent) was found in Group III, followed by Group II (5.71percent) and no seropositive case recorded in Group I. The study revealed that the prevalence of antibodies increased with age. These findings are in concomitant with the results of Opel *et al.* (1991) who recorded 7percent seroprevalence in kids and 23percent in yearlings and 37 percent in adults. Nieto and Melendez 1998 in Venezuela recorded no seropositive case in 1 year age group however, 26 out of 386 in four years old goats were positive.

Among 50 goats examined, 2 gave an antibody titer of 1: 16 which indicated residual or nonspecific immunity; one showed antibody titer of 1:128 which is due to acquired or evolving immunity, whereas no goat was positive at antibody titer of 1:256 which suggests absence of recent contact with parasite.

Table-2. Anti-toxoplasma antibodies in goats in relation to their age

Age group (years)	No. tested	Anti-body titer reciprocal			Seropositive	percent seropositive
		16	128	256		
Group I	5	0	0	0	0	0
Group II	35	1	1	0	2	5.71
Group III	10	1	0	0	1	10
Total	50	2	1	0	3	6

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