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Research Article

Prevalence of Toxoplasmosis in Different Animals Species in Distract Rawalpindi, Punjab

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Abstract

Toxoplasma gondii causes toxoplasmosis, a zoonotic disease. Animal toxoplasmosis is a global public health and economic concern. From January to March 2021, the current study looked at disease in cattle, sheep, and goats in Rawalpindi. The Latex Agglutination Test was used to screen 250 serum samples for antibodies to *T. gondii*. A total of 19.2% of the population was affected by the disaster. Between the two fields of study (Taxila and Chakri) Goats were found to have a substantially higher prevalence rate (34.82%) than sheep (20.83%) than cattle (10.91%). Gender and age groups had a major impact on the prevalence rate. In this study, breed variation had no effect on toxoplasmosis sero-prevalence. Goats had more antibody titration than sheep and cattle, females had higher antibody titration than males, and older animals had higher antibody titration than younger animals, all without statistically significant differences ($P > 0.05$). In this study, *T. gondii* infection was found in 10.84% of newly born animals (ages 1-6 months), 39.6% (ages 7-15 months), 29.2%, (ages 2-5 years), and 14.3% (age 6-12 years). This is the first report on animal toxoplasmosis sero-prevalence in Rawalpindi that we are aware of. The state's public health will benefit from extension and instruction on how to properly cook meat and milk.

Keywords: Toxoplasmosis; Prevalence; LAT; Rawalpindi

Introduction

Toxoplasmosis is a ptotozoal infection produced by *Toxoplasma gondii* in animals that causes infectious abortion in livestock all over the world [1]. The parasite has infected humans and animals all over the world [2,3]. The majority of human infections were caused by consuming raw or undercooked meat, as well

as other edible parts of meat-producing animals [4]. The global prevalence of *Toxoplasma gondii* in cattle was 9% on average [5]. Anti-Toxoplasma gondii antibodies were not found in cow serum diluted 1:8 and 1:64 using LAT and IHAT, respectively, in Iran [1]. However [6], discovered 9 and 15.9% prevalence of cattle toxoplasmosis, respectively, using ELISA and IFAT. The parasite was studied in cattle in central Punjab using several serological methods [6]. Several investigations on the prevalence of toxoplasmosis in sheep have been conducted around the world, with results ranging from 0% to 100% [7]. Sheep and goats were found to be prevalent in 31% of the world's population [7]. Ewes and their foetuses of diverse breeds, sexes, and ages are affected by toxoplasmosis [7]. In Egypt, serological studies found that the average incidence of infection in sheep and goats was 9.4% and 6.9%, respectively [8]. The goal of this study was to investigate the prevalence of animal toxoplasmosis in Rawalpindi using a Latex agglutination test. District Rawalpindi was the location of the study. The average temperature in the summer is 45°C, while in the winter it is 8°C. Two of the areas investigated were Taxila and Chakri. To begin, all sera were qualitatively assessed according to the recommendations of the LAT maker [9]. Visible aggregates indicate positive agglutination. To establish the antibody titration level, the positive samples were submitted to a semi-quantitative test using serial double dilutions ranging from 1:4 to 1:256. The research population consisted of 250 animals of different sexes and ages, with 110 cattle, 64 sheep, and 76 goats. Blood samples were obtained from the jugular veins of 250 animals between January and March 2021. The serum was collected from each clotted blood sample and stored at -200C until it was examined.

Statistical analysis

SPSS version 20 statistical tool for social sciences was used to examine the data. It was determined that P<0.05 was statistically significant.

Results

Rawalpindi has a high prevalence of toxoplasmosis infection.

In the animals investigated, the overall prevalence rate was 16.8% (Table 1). The incidence rate in the Taxila area was higher than in Chakri.

The prevalence rates between the three animal species differed (Table 2).

Area	No of Animals (%)	Positive (%)	Positive reactivity to toxoplasmosis antibody titers (%)				
			1:4	1:8	1:16	1:32	1:128
Taxila	170 (68)	32 (18.82)	7 (21.88)	7 (21.88)	8 (25)	6 (18.75)	4 (12.5)
Chakri	80 (32)	16 (20)	2 (12.5)	4 (25)	5 (31.25)	3 (18.75)	2 (12.5)
Total	250	48 (19.2)	9 (18.75)	11 (22.92)	13 (27.08)	9 (18.75)	6 (12.5)

Table 1: Prevalence of toxoplasmosis in different areas.

Species	No of Animals (%)	Positive (%)	Positive reactivity to toxoplasmosis antibody titers (%)				
			1:4	1:8	1:16	1:32	1:128
Cattle	110 (44)	12 (10.91)	2 (16.67)	4 (33.33)	6 (50)	0 (0)	0 (0)
Sheep	64 (25.6)	10 (20.83)	5 (50)	2 (20)	3 (30)	4 (40)	2 (20)
Goats	76 (30.4)	26 (34.21)	4 (15.38)	4 (15.38)	7 (26.92)	6 (23.08)	5 (19.23)
Total	250	48 (19.2)	11 (22.92)	10 (20.83)	16 (33.33)	10 (20.83)	7 (14.58)

Table 2: Prevalence of toxoplasmosis in different animal's species.

However, there was no significant difference in the occurrence rate between local and foreign breeds (Table 3).

Differences in prevalence of toxoplasmosis infection were identified between the sexes and age groups, as indicated in tables 4 and 5.

Breed	No of Animals (%)	Positive (%)	Positive reactivity to toxoplasmosis antibody titers (%)				
			1:4	1:8	1:16	1:32	1:128
Local	154 (61.6)	34 (22.08)	5 (14.71)	8 (23.53)	6 (17.65)	10 (29.41)	5 (14.71)
Foreign	96 (38.4)	14 (14.58)	3 (21.43)	2 (14.29)	3 (21.43)	3 (21.43)	3 (21.43)
Total	250	48 (19.2)	8 (16.67)	10 (20.83)	9 (18.75)	13 (27.08)	8 (16.67)

Table 3: Prevalence of toxoplasmosis in different breeds of animals.

Sex	No of Animals (%)	Positive (%)	Positive reactivity to toxoplasmosis antibody titers (%)				
			1:4	1:8	1:16	1:32	1:128
Male	87 (35)	10 (11.49)	2 (20)	2 (20)	1 (10)	4 (40)	1 (10)
Female	163 (65)	38 (23.31)	9 (23.68)	8 (21.05)	7 (18.4)	8 (21.05)	6 (15.79)
Total	250	48 (19.2)	11 (22.91)	10 (20.83)	8 (16.7)	12 (25)	7 (14.6)

Table 4: Prevalence of toxoplasmosis in different sexes of animals.

Titration of antibodies against toxoplasmosis in positive reactions

The distribution of specific antibody titers to *T. gondii* positive reactions was unaffected by different locations, animal species, breeds, sexes, or age groups (P > 0.05) (Table 1, 2, 3, 4, 5). Positive serum from goats and sheep had the highest antibody titration, while positive serum from cattle had the highest titration (Table 2). Table 4 shows that female animals titrated more than male animals, and that titration increased with age (Table 5).

Age	No of Animals (%)	Positive (%)	Positive reactivity to toxoplasmosis antibody titers (%)				
			1:4	1:8	1:16	1:32	1:128
1-6 month	83 (33)	9 (10.8)	1 (11.11)	3 (33.33)	4 (44)	1 (11.11)	0 (0)
7-15 month	53 (21)	19 (39.6)	4 (8.33)	5 (10)	6 (13)	2 (4.2)	2 (4.2)
2-5 yrs	72 (29)	14 (29.2)	2 (14.29)	4 (29)	4 (29)	3 (21)	1 (7.1)
6-12 yrs	42 (17)	6 (14.3)	1 (16.67)	2 (33)	2 (33)	1 (17)	0 (0)
Total	250	48 (19.2)	8 (16.67)	14 (29)	16 (33.33)	7 (15)	3 (6.3)

Table 5: Prevalence of toxoplasmosis in animals of various ages.

Discussion and Conclusion

The prevalence of *T. gondii* infection in goats 34.21%, sheep 20.83%, and cattle 10.91% was greater than the global average, according to the current study [10]. These findings were lower than those in Central and Western Sudan [8], but higher than those in Egypt (Hassan., *et al*. 2000), South Africa (Abusamra., *et al*. 2007), and Iran (Zein Eldin., *et al*. 2014). Cattle have a lower infection rate than goats and sheep, which could be due to *T. gondii* susceptibility and dietary patterns. Goats and sheep were more susceptible to *T. gondii* infection than cattle, according to various investigators (Innes, 2011), since their prevalence and antibody titration were higher. In serum from 2000 cows, it was observed no positive reactivity to *T. gondii*. The researched factors, such as location, animal species, sex, and age, were found to have a significant effect (P > 0.05) on *T. gondii* infection prevalence in Rawalpindi in the current study. In this experiment, newborn animals account for 14% of the

seropositive instances (1-6 month). This could increase the chances of congenital transmission in the animals being studied [11]. Pakistanis prefer sheep meat, but the majority consume beef, making cattle a more common cause of toxoplasmosis infection. Raw meat from sheep, goats, and cattle is consumed in Pakistan [12]. This is the first occurrence of animal toxoplasmosis in Rawalpindi, as far as we know. Extension and education in the community about the proper eating of cooked meat and milk are promoted.

Conflict of Interest

The authors declared there is no conflict of interest of this article.

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Volume 3 Issue 11 November 2021