INNSPUB

International Journal of Biomolecules and Biomedicine (IJBB)

ISSN: 2221-1063 (Print), 2222-503X (Online)
http://www.innspub.net

RESEARCH PAPER OPEN ACCESS

Prevalence of *Toxoplasma gondii* infection in domestic animals in District Bannu Khyber Pakhtunkhwa (KP), Pakistan

Feroz Khan*[1], Muhammad Rooman[2], Hameed Ur Rehman[3], Abdur Rab[4], Aamir Khan[4], Abid Ur Rehman[4], Abdullah Khan[5], Asad Ullah[5], Maqsood Ali[6], Afzal Ahmad[7]

[1]*Department of Zoology and Biology, Pir Mehr Ali Shah-Arid Agriculture University, Rawalpindi, Pakistan*

[2]*Department of Zoology, Hazara University, Garden Campus, Mansehra, Khyber Pakhtunkhwa, Pakistan*

[3]*Department of Chemistry, Kohat University of Science & Technology, KUST, Khyber Pakhtunkhwa, Pakistan*

[4]*Department of Zoology, Kohat University of Science & Technology, KUST, Khyber Pakhtunkhwa, Pakistan*

[5]*Arrazi Medical Complex Jeddah Street near Tamimi Camp. Al Arifi area, Al-Jubail, Kingdom of Saudia Arabia*

[6]*Department of Biomedical Sciences, CHA University, South Korea*

[7]*Department of Microbiology, Abbotabad University of Science and Technology, Abbottabad, Pakistan*

Key words: *Toxoplasma gondii,* Domestic animals, District Bannu

Article Published: June 28, 2018

Abstract

Toxoplasma gondii is an intracellular zoonotic protozoan parasite, infect both humans and animals population worldwide. It can also cause abortion and inborn disease in humans and livestock population. In the present study total of 313 domestic animals were screened for *Toxoplasma gondii* infection. Of which 45 cows, 55 buffalos, 68 goats, 60 sheep and 85 shaver chicken were tested. Among these 40 (88.88%) cows were negative and 05 (11.12%) were positive. Similarly 55 (92.72%) buffalos were negative and 04 (07.28%) were positive. In goats 68 (98.52%) were negative and 01 (01.48%) was recorded positive. In sheep and shaver chicken the infection were not recorded.

***Corresponding Author:** Feroz Khan ✉ 03449002451h@gmail.com

Introduction

Toxoplasma gondii is an intracellular zoonotic protozoan parasite, infect both humans and animals population worldwide. This infection is transferred by using raw meat and deeply contact with cat fical materials containing oocytes. It can also cause abortion and inborn disease in humans and livestock population (Krick and Remington, 1978; Dubey and Beattie, 1988).

Toxoplasma gondii is approximately 25% of the population is transport this parasite worldwide (Petersen, 2007; Ahmad *et al.*, 2013). It is most common infection, because 6 billion peoples of the world have been suffered from this infection (Furtado *et al.,* 2011). Other survey indicates that one third of the humans' population is recorded to transfer the toxoplasmosis worldwide (Ryan and Ray 2004). It has been also recorded that warm and humid regions have high value of prevalence of toxoplasmosis (Coelho *et al.*, 2003).

Toxoplasma gondii has deeply adverse effects on livestock production (Dubey and Jones, 2008). For example it infect the birds and other domestic animals and produce many serious symptoms like neck twisting and weight loss ett (Dolores and Dubey, 2014). The cysts of *Toxoplasma gondli* has been documented in various infected cattle tissue like ribs muscles, brain, liver, tongue and heart (Dubey and Thullies, 1993; Sanger *et al.*, 1953).

Toxoplasmosis is causes abortion, neonatal deaths and still births in small ruminants. Similarly sub-clinical infection may also causes in adult animals (Buxton, 1990; Hassig *et al.*, 2003). Epidemiological studies of toxoplasmosis have been conducted in different countries owing to its significance in livestock sector (Figliuolo *et al.*, 2004).

In Pakistan, goats and sheep breeding is a vital source of meat and milk production. Besides from commercial husbandry practices, these animals are also kept by the poor farmers at their homes because of their reduce price maintenance and short term return. Studies carried out in southern parts of the country have diagnosed the prevalence of *Toxoplasma gondii* in sheep and goats (Ramzan *et al.*, 2009; Lashari and Tasawar, 2010; Tasawar *et al.*, 2011).

Any other reports of *Toxoplasma gondii* infection has not documented in small ruminants from the southern KPK (district Bannu), which has unique climatic and gerographic conditions as compared to the other regions of the country. Therefore, keeping in view the significance of the infection, a survey was carried out the prevalence of *Toxoplasma gondii* infection in domestic animals in District Bannu Khyber Pakhtunkhwa (KP), Pakistan.

Materials and methods

The present survey was carried out in district Bannu region KP, Pakistan. It is located in between the 31.28° North latitude and 73.25° East longitudes. It occupies total area of 1,227 square kilometers, and total human population is 677350 with annual growth rate is 2.8% respectively. The climatic condition is 48° C in summer and 6° C in winter season. 45% area is irrigated through canal systems and the remaining area is depend upon the rain fall.

The domestic animals were randomly selected and collected 5 ml blood from their jugular vein. The collected blood were immediately transported to the civil veterinary hospital district Bannu. The serum was removed by centrifugation at the speed of 3500 rpm for five minutes. For the detection of *toxoplasma gondii* antibodies IgG and IgM, commercial ELISA Kits were used according to manufacturing protocole.

Results

In the present study total of 313 domestic animals were screened for *Toxoplasma gondii* infection. Of which 45 cows, 55 buffalos, 68 goats, 60 sheep and 85 shaver chicken were tested. Among these 40 (88.88%) cows were negative and 05 (11.12%) were positive. Similarly 55 (92.72%) buffalos were negative and 04 (07.28%) were positive. In goats 68 (98.52%) were negative and 01 (01.48%) was recorded positive. In sheep and shaver chicken the infection were not recorded (Table 1).

Table 1. Prevalence of *Toxoplasma gondii* infection in domestic animals.

S.No	Animals	No. Screened	No. Negative	No. Positive	% Negative	% Positive
1	Cows	45	40	05	88.88	11.12
2	Buffalos	55	51	04	92.72	07.28
3	Goats	68	67	01	98.52	01.48
4	Sheep	60	60	00	100	00.00
5	Shaver Chicken	85	85	00	100	00.00

Discussion

Toxoplasmosis is a zoonotic parasite, caused by the *Toxoplasma gondii*. It is deeply concerned with high morbidity and mortality in all warm-blooded organisms including human beings. In the present study total of 313 domestic animals including 45 cows, 55 buffalos, 68 goats, 60 sheep and 85 shaver chicken were screened for *Toxoplasma gondii* infection. Among these 40 (88.88%) cows were negative and 05 (11.12%) were positive. Similarly 55 (92.72%) buffalos were negative and 04 (07.28%) were positive. In goats 68 (98.52%) were negative and 01 (01.48%) was recorded positive. In sheep and shaver chicken the infection were not recorded.

A study was conducted by Ahmad *et al.,* 2015 in Pothwar Region of Punjab Pakistan, the overall prevalence of *Toxoplasma gondii* antibodies was recorded in sheep and goats with percentile range of 18.16% (75/413) and 14.32% (60/419) respectively. But the IgG antibodies prevalence was 15.49% (64/413) and 11.93% (50/419) in sheep and goats, while IgM antibodies prevalence was 3.39% (14/413) and 2.86% (12/419) in sheep and goats respectively.

Another study was conducted by Mahmood *et al.,* 2014 in district Mardan KP, Pakistan, therefor the prevalence of toxoplasmosis was recorded 5.90% and 20.70% in caged and free range chickens. The caged chickens were less infected with *toxoplasma* rather than free range chickens. Similarly Dubey, 2010; Shah *et al.,* 2013 reported that free range birds and chickens were more susceptible to the *Toxoplasma* infection rather than caged birds. Because free-range birds and chickens were closely come in contact with ground soil. The free-range birds and chickens are the best indicator of environmental contamination by oocysts. Murao *et al.*, 2008; Wu *et al.,* 2011 reported that birds are the most important hosts of *T. gondii* and this infection is transmitted easily to others. Usually the infection is transferred to ground-foraging birds when come in contact with soil containing oocysts. Cats are frequently transferred this infection. Previous results indicate that *T. gondii* infection produce high mortalities in different wild birds.A study was conducted by Akhtar *et al.,* 2014 in rural areas of Faisalabad Punjab, Pakistan, A total of 36.33% prevalence was recorded in chicken. On the basis of age wise, 1.5-2 years have high prevalence (57.14%) of toxoplasmosis. Similarly chickens who's kept near along with cats kept along with pet cats have higher prevalence 95% as compared to those without cats 53.89% respectively. A study was conducted by Wang *et al.*, 2015 in neighboring country like China, total of 200 horses were screened, of which (31.4%) were seropositive for *T. gondii*.

The results showed that horses were more suceptible to the *T. gondii* in Xinjiang, northwestern China, indicating a severe threat to the human health and animals. Another studies were conducted by Ramzan *et al.*, 2009; Lashari and Tasawar, 2010; Tasawar *et al.*, 2011 reported *T. gondii* infection in sheep from southern parts of the country. Similarly in neighboring countries like Iran, India and China (Ghorbani, 1983; Sharma *et al.*, 2008; Zhao *et al.*, 2011 were also reported. Another studies were conducted by Maronpot and Botros, 1972; Hove *et al.*, 2005; Klun *et al.*, 2006; Romanelli *et al.*, 2007; Samra *et al.*, 2007; Sanad and Al-Ghabban, 2007 reported *T. gondii* infection in sheep from Egypt, Zimbabwe, Serbia, Brazil, South Africa and Saudi Arabia. But on the other hand goats were more suceptible to the *T. gondii* infection in Uganda, Thailand, Saudi Arabia, and Egypt Bisson *et al.*, 2000; Jittalpalapong *et al.*, 2005; Sanad and Al-Ghabban, 2007; Barakat *et al.*, 2009.

In short the present findings were less as copmare to the mentioned results because of good farm managements, hygienic and climatic conditions in district Bannu KP Pakistan. Zhao *et al*., 2011 reported that *T. gondii* infection in animals were different in different regions of the world is due to the different farm managements, hygienic and climatic conditions. Vesco *et al*., 2007 also reported that seroprevelance of toxoplasmosis amonge animals is differs because of different serodiagnostic tests used.

Conclusion

Toxoplasma gondii is an intracellular zoonotic protozoan parasite, infect both humans and animals population worldwide. It can also cause abortion and inborn disease in humans and livestock population. The present study was concluded that 45 cows, 55 buffalos, 68 goats, 60 sheep and 85 shaver chicken were tested for *Toxoplasma gondii* infection. Among these 40 (88.88%) cows were negative and 05 (11.12%) were positive. Similarly 55 (92.72%) buffalos were negative and 04 (07.28%) were positive. In goats 68 (98.52%) were negative and 01 (01.48%) was recorded positive. In sheep and shaver chicken the infection were not recorded.

References

Ahmad N, Iqbal Z, Mukhtar M, Mushtaq M, Khan KM, Qayyum M. 2015. Seroprevalence and Associated Risk Factors of Toxoplasmosis in Sheep and Goats in Pothwar Region, Northern Punjab, Pakistan Pak. J. Zool **47(1),** 161-167.

Ahmad ZS, Babar F, Abbas MA, Awan A, Attique MA, Khan N, Rashid A, Wadood M, Shafee, Asadullah S, Jan and Yasir M. 2013. Evaluation of a saponin adjuvanted inactivated *Mycoplasma bovis* (a field isolate from cattle lungs in Balochistan, Pakistan) vaccine. Int. J. Agric. Biol **15,** 1169-1174.

Akhtar M, Ahmed AA, Awais MM, Saleemi MK, Ashraf K, Sawicka EH. 2014. Seroprevalence of *Toxoplasma gondii* in the Backyard Chickens of the Rural Areas of Faisalabad, Punjab, Pakistan. Int. J. Agri & Bio **16(6),** 1105–1111.

Barakat AMA, Abdelaziz MM, Fadaly M. 2009. Comparative diagnosis of Toxoplasmosis in Egyptian small ruminants by indirect hemagglutination assay and ELISA. Glob. Vet **3,** 9-14.

Bisson A, Maley S, Rubaire-Akiiki CM, Wastling JM. 2000. The seroprevalence of antibodies to *Toxoplasma gondii* in domestic goats in Uganda. Acta Trop **76,** 33-38.

Buxton D. 1990. Ovine toxoplasmosis – A review. J. R. Soc. Med **83,** 509-511.

Coelho RA, Kobayashi M, Carvalho B. 2003. Prevalence of IgG antibodies specific to *Toxoplasma gondii* among blood donors in Recife, Northeast Brazil. Revista do Instituto de Medicina Tropical de Sao Paulo **45,** 229- 231.

Dolores EH, Dubey JP. 2014. "Toxoplasmosis." USGS Science for changing world (National Wildlife Health Center), no. **1389,** 56,57.

Dubey JP, Beattie CP. 1988. Boca Raton, FL: CRC Press; Toxoplasmosis of animal and man 1-220.

Dubey JP, Jones JL. 2008. *Toxoplasma gondii* infection in humans and animals in the United States. International Journal of Parasitology **38,** 1257-1278.

Dubey JP, Thullies P. 1993. Persistence of tissue cysts in edible tissues of cattle fed *Toxoplasma gondii* Oocysts. Am. J. Vest. Res **54,** 270.

Figliuolo LPCN, Kasai AMA, Ragozo VSO, Deaula RA, Dias S, Souza LP, Gennari SM. 2004. Prevalence of anti-*Toxoplasma gondii* and anti-*neospora caninum* antibodies in ovine from Sao-Paulo state, Brazil. Vet. Parasitol **123,** 161- 166.

Furtado JM, Smith JR, Belfort R, Gattey D, Winthrop KL. 2011. Toxoplasmosis: a global threat. J Global Infect Dis **3,** 281-284.

Ghorbani M. 1983. Animal toxoplasmosis in Iran. J. Trop. Med. Hyg **86,** 73-80.

Hassig M, Sager H, Reitt K, Ziegler D, Strabel D, Gottstien B. 2003. *Neospora caninum* in sheep: a flock case report. Vet. Parasitol **117,** 213-220.

Hove T, Lind P, Mukaratirwa S. 2005. Seroprevalence of *Toxoplasma gondii* infection in domestic pigs reared under different management systems in Zimbabwe. Onde. J. Vet. Res **72,** 231-237.

Jittapalapong S, Sangvaranond A, Pinyopanuwat N, Chimnoi W, Khachaetam W, Koizumi S, Maruyama S. 2005. Seroprevalence of *Toxoplasma gondii* infection in domestic goats in Satun Province, Thailand. Vet. Parasitol **127,** 17-22.

Klun I, Djurkovic OD, Radivojevic SK, Nikolic A. 2006. Cross sectional survey on *Toxoplasma gondii* infection in cattle, sheep and pigs in Serbia: Seroprevalence and risk factors. Vet. Parasitol **135,** 121-131.

Krick JA, Remington JS. 1978. Toxoplasmosis in the adult: an overview. N Engl J Med; **298,** 550-3.

Lashari MH, Tasawar Z. 2010. Seroprevalence of toxoplasmosis in sheep in Southern Punjab, Pakistan. Pak. Vet. J **30,** 91-94.

Mahmood, Z. U., M. Zahid., A. A. Sthanadar., M. Shah and A. Hussain. 2014. Seroprevalence of *Toxoplasma gondii* Infection in *Gallus domesticus* of District Mardan, Khyber Pakhtunkhwa, Pakistan. Pak. J. Zool., 46(6): 1705-1710.

Maronpot RR, Botros BAM. 1972. *Toxoplasma* serologic survey in man and domestic animals in Egypt. J. Egypt. Publ. Hlth. Assoc **47,** 58-67.

Murao T, Omata Y, Kano R, Murata S, Okada T, Konnai S, Asakawa M, Ohashi K, Onuma M. 2008. Serological survey of *Toxoplasma gondii* in wild waterfowl in Chukotka, Kamchatka, Russia and Hokkaido, Japan. J. Parasitol **94,** 830-833.

Petersen E. 2007. Toxoplasmosis. Semin. Fetal Neonatal Med **12,** 214-223.

Ramazan M, Akhtar M, Hussain I, Muhammad F, Hiszczynska-Sawickaa E, Haq AU, Mahmood MS. 2009. Seroprevalence of *Toxoplasma gondii* in sheep and goats in the area of Rahim Yar Khan (Punjab). Trop. Anim. Hlth. Prod **41,** 1225-1229.

Ramzan M, Akhtar M, Hussain I, Muhammad F, Hiszczynska-Sawickaa E, Haq AU, Mahmood MS. 2009. Seroprevalence of *Toxoplasma gondii* in sheep and goats in the area of Rahim Yar Khan (Punjab). Trop. Anim. Hlth. Prod **41,** 1225-1229.

Romanelli PR, Freire RL, Vidotto O, Marana ERM, Ogawa L, Depaula VSO, Garcia JL, Navarro JL. 2007. Prevalence of *Neospora caninum* and *Toxoplasma gondii* in sheep and dogs from Guarapuava farms, Parana State, Brazil. Res. Vet. Sci **82,** 202-207.

Ryan KJ, Ray CG. 2004. Sherris Medical Microbiology (4th Ed.) Mc Graw Hill. York pp. 723-7.

Samra NA, Mccrinda CM, Penzhorn BL, Cencigoga B. 2007. Seroprevalence of toxoplasmosis in sheep in South Africa. J. S. Afr. Vet. Assoc **78,** 116-120.

Sanad MM, Al-Ghabban AJ. 2007. Serological survey on toxoplasmosis among slaughtered sheep and goats in Tabouk, Saudi Arabia. J. Egypt Soc. Parasitol **37,** 329-340.

Sanger VL, Chamberlain DM, Chamberlain KW. 1953. Toxoplasmosis. V. Isolation of *Toxoplasma* from cattle. J Am. Vet. Med. Assoc **123(917),** 87-88.

Shah M, Zahid M, Asmat P, Sthanadar AA. 2013. Seroprevalence of *Toxoplasma gondii* in goats and sheep of district Mardan, Pakistan. Int. J. Biosci **3,** 90-97.

Sharma S, Sandhu KS, Bal MS, Kumar H, Verma S, Dubey JP. 2008. Serological Survey of antibodies to *Toxoplasma gondii* in sheep, cattle and buffaloes in Punjab, India. J. Parasitol **94,** 1174-1175.

Tasawar Z, Lashari MH, Hanif M, Hayat CS. 2011. Seroprevalence of *Toxoplasma gondii* in domestic goats in Multan, Punjab, Pakistan. Pak. J. life Sci **9,** 24-27.

Vesco G, Buffalano W, Lachiusa S, Manucuso G, Caracappa S, Chianca A, Villari S, Curro V, Liga F, Petersen E. 2007. *Toxoplasma gondii* infections in sheep in Sicily, southern Italy. Vet. Parasitol **146,** 3-8.

Wang JL, Zhou DH, Chen J, Liu G, Pu W, Liu T, Qin S, Yin M, Zhu X. 2015. The prevalence of antibodies to *Toxoplasma gondii* in horses in Changji Hui Autonomous Prefecture, Xinjiang, northwestern China: Braz. J. Vet. Parasitol., Jaboticabal, Doi: http://dx.doi.org/10.1590/S1984-29612015050.

Wu SM, Huang SY, Bq FU, Liu GY, Chen JX, Chen MX, Yuan ZG, Zhou DH, Weng YB, Zhu XQ, Ye DH. 2011. Seroprevalence of *Toxoplasma gondii* infection in pet dogs in Lanzhou, Northwest China. Parasitol. Vect **4,** 64.

Yao L, Chen DK, Zhu XQ. 2011**.** Seroprevalence of *Toxoplasma gondii* infection in dairy goats in Shaanxi Province, Northwestern China. Parasite Vector **4,** 47-51.

Zhang DL, Ma JW, Du CB, Li HP, Niu ZW, Wang YD, Li FX. 2011 Serological detection of *Toxoplasmosa gondii* in goats in Tianzhu county Gansu province. Chin Vet Technol **26,** 31. (In Chinese).