

Trypanosomiasis (Surra) in camels of Pakistan, a mini review

Hamayun Khan¹, Nayab¹, Syed Khalil ud-Din Shah², Abdul Hameed Shakir², Muhammad Adil^{1*}

1. Department of Clinical Medicine and Surgery, University of Agriculture, Faisalabad, 38040, Pakistan.
2. Livestock and Dairy Development Department, Government of Balochistan, Quetta, Pakistan.

*Corresponding Author: madilnawaz143@gmail.com

ABSTRACT

In arid and semi-arid regions of the world, camels are an essential multipurpose animal. The ship of the desert is being used for transportation, meat production, wool, and hides production while milk is also a very valuable product concerning nutritious and economical importance. The single-humped camel (*Camelus dromedarius*) also known as the Arabian camel is the most common camel found in Pakistan. Trypanosomiasis, perhaps the most dangerous protozoan illness affecting camels, is caused by *Trypanosoma evansi*, also known as "Surra", which causes a lot of economic losses as direct or indirect losses. The objective of this mini review of the literature is to identify the comparative prevalence of Trypanosomiasis (Surra) in Punjab, Sindh, Khyber Pakhtunkhwa (KPK), and Balochistan

Introduction

Camels play a crucial role in arid and semi-arid regions worldwide, where their versatile nature makes them indispensable. Often referred to as the "ship of the desert," these remarkable animals serve a multitude of essential purposes. They are the backbone of transportation, providing a reliable means of traversing the challenging terrains of such harsh environments. Camels are also valued for their production of wool and hides. Their fur yields high-quality wool, which can be woven into textiles for clothing and other necessities. The durable hides provide materials for crafting essential items, ensuring that no part of the camel goes to waste. One of the most precious gifts is camel offers their milk, cherished for its nutritional richness and economic significance. Camel milk is a lifeline, especially in areas with limited agricultural resources. It is not only a vital source of nourishment but also serves as a valuable commodity, sustaining livelihoods and economies.

The single-humped camel (*Camelus dromedarius*) also known as the Arabian camel is the most common camel found in Pakistan while the two-humped camel (*Camelus bactrianus*) is very rare in Pakistan and found in some areas of the northern region [1]. According to the FAO (2000), the population of single-humped camels (*Camelus dromedarius*) is about 1200000 in Pakistan [2]. Balochistan has the highest percentage of them (41%), followed by Sindh (30%), Punjab (22%), and Khyber Pakhtunkhwa (7%) [3].

Trypanosomiasis, perhaps the most dangerous protozoan illness affecting camels, is caused by *Trypanosoma evansi*, also known as "Surra," which is widespread throughout the world's regions that raise camels [4]. Evans discovered *T. evansi* in camels from India in 1918. *T. evansi* is an elongated organism with a free flagellum. The organisms are constantly moving. *T. evansi* is almost identical to *T. brucei*, and it is thought that *T. evansi* evolved from *T. brucei* after its introduction into camels and adaptation to direct transmission by *Tabanus* flies [5]. *T. evansi* may have evolved from *T. brucei* when camels arrived in the tsetse fly belt. Later, the disease spread to the Middle East, India, and Far East Asian countries via mechanical transmission by biting flies, specifically *Tabanus*, *Haematopota*, and *Pangonius* species. Trypanosomiasis (Surra) in camels is typically chronic but the disease can be manifested acutely in nature with a 90% mortality rate if not treated [6].

Trypanosomiasis (Surra) in camels is characterized by frequent recurrent episodes of fever and parasitemia. Oedema can also be found in the lower extremities. Urticaria and petechial hemorrhages of the serosal membranes are occasionally observed [7]. When chronic in nature Surra causes wasting disease in camels [8] along with anemia and shakiness in the back limbs [9]. There have also been reports of nervous indications [10].

Sindh

Research conducted by Shah et al. [11] in the province Sindh of Pakistan states that there were 14 positive samples for *T. evansi* out of 102 indicating 13.72% of infection. The study also found that the infection rate is higher in females at 15.68% in comparison to males at 11.76% in addition to that the survey also reveals that there is a higher infection rate in males above 4 years of age at 17.64% than males under 4 years of age at 5.88%.

In another research conducted by Bhutto et al. [12] from six districts in Sindh, where 240 samples (183 male and 57 female) of four breeds were collected in which an infectious rate of an overall 11.25% was found. In that study also females (15.79%) were found to be more infected than males (9.84%). Stress during pregnancy and lactation may contribute to higher infection rates in females by lowering their resistance and making them more vulnerable to infection with *T. evansi* but Pathak and Khanna [13] stated that in any case of breed or age, all 4 camels were equally prone to trypanosome infection.

Punjab

Hasan et al. [14] researched the prevalence of Trypanosomiasis (Surra) in the province of Punjab, where 150 samples were collected from different areas of Punjab and examined using different diagnostic methods such as Giemsa-stained blood smears, microhematocrit centrifugation technique and detection of antigens using Suratex. In that study, 5 camels were positive for parasitological examination indicating 3.3% of infection and 6 camels were positive for serological examination indicating 4% of infection.

In another study, Hussain et al. [15] researched the prevalence of Surra in two different herds in the district Bahawalpur of Punjab, where a total of 217 blood samples were collected with an infection rate of overall 9.67%. Hussain et al. [15] also stated that in comparison to healthy animals, it was found that the mean corpuscular volume was higher while the total erythrocyte counts, packed cell volume, hemoglobin concentration, mean corpuscular hemoglobin concentration, serum total proteins, and albumin were all significantly lower in the infected animals.

Khyber Pakhtunkhwa (KPK)

Research conducted by Khan et al. [16] at the Dera Ismail Khan region of the province KPK, where a total of 600 blood samples, 300 of which were male and 300 of which were female, were screened for parasites. Age-wise, camels were divided into adults (those over 2 years old) and calves (those under 2 years old), and sex-wise, male, and female, with the ratio of animals in each age and sex group remaining 1:1 along with that seasonal prevalence was determined by dividing the data into four seasons: pre-monsoon, monsoon, post-monsoon, and winter.

Out of 600 samples, 40 were positive for Surra indicating an infectious rate of overall 6.67 percent. Adults had a high prevalence of 9.06%, while calves had a low prevalence of 4.30%. Female camels had a higher infestation rate of 7.66%, while male camels had a lower infestation rate of 5.66%. The monsoon wet season has the highest occurrence of the four seasons, at 11.18%, followed by the post-monsoon, pre-monsoon, and winter seasons at 8.45, 7.85, and 0%, respectively.

Balochistan

Balochistan despite being the largest province of Pakistan with the largest population of camels about 41 percent of the total camel population lacks the proper parasitological, serological, and molecular examination concerning Trypanosomiasis (Surra).

A study was conducted by Kakr et al. [17] in two districts of Balochistan, Musa Khail and Jhal Magsi to evaluate the prevalence and economic losses

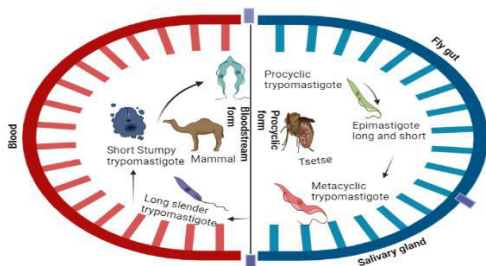


Fig. 1: Life cycle of *Trypanosoma evansi*

Published on: 1 November 2023

<https://biologicaltimes.com/>

To cite this article: Khan H, Nayab, SKD Shah, AH Shakir & M Adil. Trypanosomiasis (Surra) in camels of Pakistan, a mini review. 2(10): 11-12

because of camel Trypanosomiasis (Surra). In that study, a questionnaire was created for a survey of Trypanosomiasis and economic losses due to the parasitic disease.

Farmers' responses, mortality, and the prevalence of the disease in the research area were applied to compute the economic losses brought by Trypanosomiasis while the diagnosis was only constrained to typical signs of Trypanosomiasis in that study.

In that study prevalence of 11.8 percent was estimated in the district of Musa Khail out of 800 camels examined for clinical signs while in the district of Jhal Magsi prevalence of 17.1 percent was estimated out of 800 camels examined for clinical signs.

Conclusion

Trypanosomiasis, perhaps the most dangerous protozoan disease affecting camels, is caused by *T. evansi*, which spreads throughout the country and causes a lot of economic losses as direct or indirect losses.

Trypanosomiasis in camels is typically chronic in nature and the prevalence of the disease merely with clinical signs and parasitological examination is not sufficient for the precise prevalence of Trypanosomiasis in camels.

Serological and molecular tests are recommended to know the precise prevalence of Trypanosomiasis in the country.

References:

- [1] Faraz A, Mustafa MI, Lateef M, Yaqoob M and Younas M, 2013. Production potential of camel and its prospects in Pakistan. Punjab University Journal of Zoology, 28(2): 89-95.
- [2] FAO production yearbook, 2000. Vol. 54, Food and Agricultural Organization. United Nations Rome, Italy.
- [3] GOP (2006) Livestock census, agriculture census organization, Government of Pakistan.
- [4] Higgins AJ, Kock RA and Hoare CA, 1984 The camel in health and disease. British Vet J, 140: 485-506.
- [5] Brown CGE et al., 1990: In Handbook of Animal Diseases in the Tropics. Edition, Sewell, MMH and Brocklesby DW Bailliere Tindall, London, P.217.
- [6] Lukins AG, 1992. Protozoal diseases of camels: Proc. 1st international conference camel Dubai, UAE: 23-27.
- [7] Reid SA, Husein A and Copeman DB, 2001. Evaluation and improvement of parasitological tests for *Trypanosoma evansi* infection. Vet Parasitology, 102: 291-297.
- [8] Ventura RM et al. (2000) Molecular and morphological studies of Brazilian *Trypanosoma evansi* stocks: The total absence of kDNA in trypanosomes from both laboratory stocks and naturally infected domestic and wild mammals. Journal of Parasitology, 86:1289-1298.
- [9] Ferreira MS, Silva SCA and Arosemena H, 1995. An Outbreak of trypanosomosis caused by *Trypanosoma evansi* in equine of Pantanal Matogrossense (Brazil). Vet Parasitology, 60: 167-171.
- [10] Tuntasuvan D, Sarataphan N, Nishikawa H, 1997. Cerebral trypanosomosis in native cattle. Vet Parasitology, 73: 357-363.
- [11] Shah SR, Phulan MS, Memon MA, Rind R and Bhatti WM, 2004. Trypanosomes infection in camels. Pakistan Veterinary Journal, 24(4): 209-210.
- [12] Bhutto B, Gadahi JA, Shah G, Dewani P and Arijio AG, 2010. Field investigation on the prevalence of trypanosomiasis in camels in relation to sex, age, breeds, and herd size. Pakistan Veterinary Journal, 30(3): 175-177.
- [13] Pathak KML and ND Knanna, 1995. Trypanosomiasis in camel (*Camelus dromedarius*) with reference to Indian Sub-continent: a review. International Journal of Animal Sciences, 10: 157-162.
- [14] Hasan MU, Muhammad G, Gutierrez C, Iqbal Z, Shakoor A, Jabbar A. Prevalence of *Trypanosoma evansi* infection in equines and camels in the Punjab region, Pakistan. Ann N Y Acad Sci. 2006 Oct; 1081:322-4. doi:10.1196/annals.1373.043. PMID: 17135532.
- [15] Hussain Riaz, Ahrar Khan, Rao Zahid Abbas, Abdul Ghaffar, Ghulam Abbas, Tauseef ur Rahman and Farah Ali, 2016. Clinico-Hematological and Biochemical Studies on Naturally Infected Camels with Trypanosomiasis. Pakistan Journal of Zoology, vol. 48(2), pp. 311-316, 2016.
- [16] Khan SZ, Umm-e-Aimen, Rizwan M, Ali A, Khan I, Safiullah, Abidullah, Imdad S, Waseemullah and Khan A, 2022. Epidemiological survey of trypanosomiasis in the dromedary camels raised in Dera Ismail Khan, Khyber Pakhtunkhwa, Pakistan Agrobiological Records 7: 10-17.
- [17] Kakr I, Khan S, Khan K and Ahmed S, 2019. Economic losses due to trypanosomiasis of camels in Balochistan. Journal of Innovative Sciences, 5(2): 65-71.