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Sero-Prevalence Study of Camel Trypanosomiasis in Selected Villages of Galkayo, Somalia

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Abstract

A cross-sectional study was carried out aimed to estimate sero-prevalence of camel trypanosomiasis and to investigate the related risk factors of the disease in Four Selected Villages of Galkayo, Mudug region from 14th March 2016 up to 20th April 2016. Blood samples were collected from 69 randomly selected camels of the four study villages, and samples were allowed to clot at room temper to detect the sero-prevalence of trypanosome using Card Agglutination Test for Trypanosomiasis (CATT). The results indicated that the overall sero-prevalence of trypanosomiasis in camels that 15.9% (11) samples were positive for trypanosome evansi (*T. evansi*) was recorded. Higher infection was found in female (19.4) as compared to male (11.1), However, there is no statistically significant difference in sero-prevalence between sex categories ($P > 0.05$). High Test infection of sero-prevalence was noted 20% in young age (<10) followed by 19% in adult age group (>10), and there was statistically significant difference ($P < 0.05$) in susceptibility among age groups. These results seem to indicate that *T. evansi* infection is high in the study area. There is need of further control of camel trypanosomiasis through the uses of curative and prophylactic drugs to avoid the various problems.

Keywords

Sero-Prevalence, Trypanosomiasis, CATT, Camel, Galkayo, Somalia

1. Introduction

The Camel is the most capable animal species which survive and produce under harsh environmental conditions.

The one-humped camel (*Camelus dromedarius*) is the most domestic animals in Somalia, which is mostly found in rid and semi-rid area, and the commonest

uses of camel in Somalia are milk, meat production and viber (such as hide and wool); in addition, mature male camel plays important role for transport water, nomadic household migration and other utensils [1].

Camel is also used in social rituals, while marriage without giving camel to the new father-in-law is unusual in Somalia. However, camels are only animals used to determine to the victim such as blood compensation and homicide [2].

Camel trypanosomiasis is parasitic disease that causes serious economic losses in livestock from anemia, loss of condition, anorexia, weakness, and emaciation that lead to low milk production and meat yield, increase of abortion and death [3].

Trypanosomiasis is a complex disease caused by protozoan parasitic in the family Trypanosomatidae which is found in blood [4].

The disease is caused by flagellate protozoan parasitic called trypanosomes; most trypanosomes are transmitted by tsetse flies [5].

Trypanosoma evansi is transmitted from animal to animal mechanically (non-cyclically) by biting flies, including Tabanus spp., Stomaxys spp. and Musca spare vectors although Vampire bats in South and Central America are hosts, reservoirs and vectors of *T. evansi*; they transmit *T. evansi* mechanically in their saliva, and may develop high parasitaemia which may kill the bat. Recovered bats serve as carriers [6].

2. Materials and Methods

2.1. Study Area

The Federal Republic of Somalia is a country located in the Horn of Africa, it is covered an area of 638,000 square kilometers.

Land-mass is dominated by arid and semiarid rangelands for which pastoralism is the most appropriate form of Land use.

Galkayo is the one of the largest and oldest city in central regions of Somalia; it is capital of mudug region, connecting the northern and southern halves of east Africa country. It was formally established 1901.

The average annual temperature ranges between 33.9˚C - 28.7˚C, the altitude is 47˚N - 26˚N and longitude 6˚E - 45˚E in the time zone of East of Africa, The average humidity is about 50% [7].

The Rainfall is variable and sparse with no one area receiving more than 400 mm of rain annually. Therefore, nomads rely primarily on wells as a water source rather than surface water [8].

The study was conducted from 14th march 2016 up to 20th April 2016 at four villages were Halbookhad, Godad, Talacad and Tawakal, which was located in north Galkaio District.

2.2. Study Animal

A total of 69 indigenous breeds of camels (one hump camel) of different ages and sexes (27 male and 42 female), reared under open system were used to determine the sero-prevalence of Trypanosomiasis.

2.3. Study Design and Sample Size

Across-sectional was conducted to determine the sero-prevalence of camel Trypanosomiasis by selecting site of villages in purposively as suitable. The study camels were selected by using simple random sampling method by taking age, sex and body condition into count [9].

Sample size was calculated using Thrusfield (1995) formula.

$$N = 4PQ/L^2$$

where N is the require sample size, *Pexp* was the expected prevalence and d is the desired about precision and L allowable error.

2.4. Blood Sample Collection

A total of 69 camels Whole blood samples were collected from jugular vein by puncture using plain vacutainers tubes and allowed to clot overnight at room temperature. Serum was separated from clotted blood by transferring to other tube, and transported immediately to the Galkaio Central veterinary laboratory for processing.

2.5. Sample Examination Procedure: Serological Testing

Card Agglutination Test for Trypanosomiasis (CATT) for *T. evansi* is a direct and rapid agglutination test used for detection of *Trypanosome evansi*. Serum samples were diluted up to 1:4 with buffer. Then 25 µl of diluted serum was pipetted on to a plastic coated test card, and added with one drop of CATT reagent, the reaction mixture was spread out gently by using a clean stirring rod and allowed to react on the card with help of manual rotation for 5 minutes. Blue granular agglutinations indicate a positive reaction visible to the naked eye and also we used blood staining.

2.6. Statistical Analysis

Collected data were entered, coded and kept in a Microsoft® Excel spread sheet for Windows® 2007 data base before removed to SPSS sheet. The Statistical Package for Social Sciences (SPSS) for Windows® version 20 was used for all suitable statistical analysis.

3. Results

In this study the total of 69 blood samples collected in villages (Halbookhad, Godad and Tawakal, Talacad) and examined 11 (15.9) samples was sero-positive for *T. evansi*.

The Highest trypanosome infection was recorded in Tawakal followed by Talacad Godad with the lowest sero-prevalence was recorded Halabookhad and Godad villages as showed in Table 1.

Considering the sex of examined camels as indicated in Table 2, 3 (4.3%) of males and 8 (11.6%) of females out of 69 examined camels were sero-positive for Trypanosomiasis.

The Highest rate of trypanosome infection (10.1%) was noted in age of >10 years and followed by (5.8%) in <10 years, there was statistically difference in sero-prevalence between ages as delineated in Table 3.

Depending on body conditions, (76.8%) poor and (23.2%) medium was recorded is showed in Table 4.

4. Discussion

The present study suggests that from 69 samples randomly selected camels in

Table 1. Sero-prevalence of camel Trypanomiasis on the basis of selected villages.

		Results		Total	Sero-Prevalence (%)
		Negative	Positive		
Origin of animal	Halabookhad	6	2	8	11.6
	Godad	13	4	17	24.6
	Tawakal	20	3	23	33.3
	Talacad	19	2	21	30.4
Total		58	11	69	100.0

Table 2. Sex as determinant of *Trypanosoma evansi* infection in camels.

		Results		Total	Sero-Prevalence (%).
		Negative	Positive		
Sex	Female	34	8	42	60.9
	Male	24	3	27	39.1
Total		58	11	69	100.0

Pearson Chi-Square = 0.379; Since Chi-Square $X^2 = 0.379 > 0.05$ there is no significant difference between the sex and the sero-prevalence.

Tables 3. Sero-prevalence of camel Trypanomiasis on the basis of age.

		Results		Total	Sero-Prevalence (%).
		Negative	Positive		
Age	<10	27	4	31	44.9
	>10	31	7	38	55.1
Total		58	11	69	100.0

Pearson Chi-Square = 0.533; Since Chi-Square $X^2 = 0.533 < 0.05$ there is statistically significant difference in sero-prevalence between age and the sero-prevalence.

Table 4. Sero-prevalence of camel Trypanomiasis on the body condition.

		Results		Total	Sero-Prevalence (%).
		Negative	Positive		
Body conditions	Poor	43	10	53	76.8
	Medium	15	1	16	23.2
Total		58	11	69	100.0

study area, 11 (15.9) of camels were positive of which 2 (11.6%) in Halbookhad, 4 (24.6%) in Godad and 3 (33.3%) in Tawakal, 2 (30.4%) in Talacad were recorded.

Generally the highest sero-prevalence of disease was found in Tawakal and the reason could be that the camels in Tawakal have moved from eastern region of Somali Ethiopian. That area is high rate of infection of the trypanosomiasis and its vectors, 33.3% followed by Talacad 30.4% as delineated in **Table 1**. This result of sero-prevalence (15.9) is in disagreement with the previous study obtained by Abdullahi (2014) who reported 3.2% and Abdiweli (2013) who reported 2.6%.

Also the sero-prevalence of the study is higher compared with investigation that was conducted by Ministry of Livestock, Agriculture & Environment (September 2009) in Galkayo recorded prevalence of 9.4%.

The possible justification for higher sero-prevalence detected in this study related to season of the study period.

In abroad countries various prevalence was reported by Pacholek *et al.* [10] (29%) in Niger, Enwsezor and Sackey [11] (28%) in Kenya, Al-Rawshed *et al.* [12] (33%) in Jordan and Rami *et al.* [13] (35.4% and 43.3%) in Morocco which shows higher prevalence compared to the present study result.

Possible explanation for the lower sero-prevalence rate detected in these studies could be associated with the study period and density of parasite vector in study area.

More reason might be the different sensitivity of different diagnostic techniques used.

The present study reveals higher sero-prevalence infection rate that is noted in females than males as indicated in **Table 2**. However, the results of this study disagree with the results found by Pathak and Khanna [14] (1993) which reported that all camels were equally susceptible to trypanosome infection regardless of breed and age. Regarding the present study that agrees with other studies in Asia has reported sex related differences in sero-prevalence in camels where females (15.68%) were observed to be more susceptible to the disease than males (11.76%) counterparts. The reason could be due to the stress during pregnancy and lactation, which could decrease resistance in female camels and render them more susceptible to *T. evansi* infection [15]. The age of examined camels determined by interviewing the owners was categorized into two groups according to ages as (>10) adults and young (<10). This study reveals that the higher trypanosome infection sero-prevalence was found to be (10.1%) in adult age group (>10) followed by (5.8%) in the young age group (<10) as indicated in **Table 3**. However, there is statistically significant difference in sero-prevalence between age groups where a higher infection rate was recorded in adults camels. The present study agrees with previous result of the Atarhouch *et al.* [16] who recorded that higher infection rate was in old camels. The higher sero-prevalence infection in adult camels at this period might be due to heavy stress through their use for transportation of goods from one place to another.

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