Status of Bovine Trypanosomiasis in Debre Elias Woreda, North West Ethiopia

Ayenew Lealem, Mebrahtu Gebreyohannes, Gebreselema Gebreyohannes and Mebrahtu Gebreselassie

Department of Veterinary Pharmacy and Biomedical Science, Faculty of Veterinary Medicine, The University of Gondar, P.O. Box 196, Gondar, Ethiopia
Department of Biological and Chemical Engineering, Mekelle Institute of Technology, Mekelle University, P.O. Box 1632, Mekelle, Ethiopia

Abstract: A cross sectional study was conducted from September 2011 to January 2012 in Debre Elias Woreda with the objective of estimating the prevalence of bovine trypanosomiasis. Wet and buffy coat blood films were used to screen a total of 164 animals. Furthermore, thin blood smear was prepared from positive animals for species identification and revealed a point prevalence of 7.92%. Of which, 5.5%, 1.2% and 1.2% were T. vivax, T. congolense and T. brucei, respectively. The prevalence of trypanosomiasis based on the study region were 6.2% in Dejem, 9.87% in genet and 5.88% in Alenge. Statistical analysis of the result showed no significant difference in prevalence between study regions (P>0.05). The statistical analysis of various factors with risk of trypanosomiasis indicated no significant difference in particular among sex, age and body condition scores (P>0.05). However, PCV values showed a significant difference (P<0.05) between anemic and non-anemic animals.

Key words: Bovine · Prevalence · Trypanosomiasis · Blood Films

INTRODUCTION

African bovine trypanosomiasis, caused by the extracellular flagellate protozoan of trypanosome parasite is endemic throughout the humid and semi-humid zones of sub-Saharan Africa. Bovine trypanosomiasis is a chronic debilitating disease causing severe cachexia and anaemia with associated intermittent fever, oedema and loss of condition [1]. The disease is frequently fatal and is a major constraint on livestock and agricultural production in Africa [2]. Accordingly, trypanosomiasis is ranked among the top 10 global cattle diseases impacting on the poor [3]. It is a wasting disease in which there is a slow progressive general loss of body condition, anaemia and the first sign appear about one to two weeks after infection and animals become more anemic and lose body condition, collapse and death [4]. The disease is coincident with the distribution of the tsetse fly (Glossina species), which are a vectors for the parasite and infest an area of around 10 million km² encompassing 36 countries [5]. Trypanosoma brucei, Trypanosoma congolense and Trypanosome vivax are the main cause of bovine trypanosomosis. Human African trypanosomiasis (HAT) also known as sleeping sickness, is endemic to sub-Saharan Africa where it is a major threat to public health in 36 countries [6]. It is caused by Trypanosoma brucei, a single-celled eukaryotic parasite and member of the Kinetoplastida order [7] Two subspecies are able to infect humans: Trypanosoma brucei gambiense causes a chronic form of HAT in West and Central Africa, while Trypanosoma brucei rhodesiense is the pathogenic agent for the more acute form of the disease and is endemic to Eastern Africa [8]. The parasite is transmitted by the bite of an infected tsetse fly (genus Glossina) and cases of HAT are only found in areas of tsetse fly infestation, which are limited to sub-Saharan Africa. In Ethiopia, different researchers have reported about the status of the disease in various regions of the country and showed that it is one of the major diseases, which contribute to the direct and indirect economic losses on livestock production. In this study, we aimed at knowing the status of the disease in the selected area.

Corresponding Author: Mebrahtu Gebreyohannes, Department of Veterinary Pharmacy and Biomedical Science, Faculty of Veterinary Medicine, The University of Gondar, P.O. BOX: 196, Gondar, Ethiopia.
MATERIALS AND METHODS

Study Area: The study was carried out in Deber Elias woreda. It is found at Amhara Regional State, East Gojam Zone, 342 km far from Addis Ababa capital.

Study Design: A Cross sectional study was conducted to determine the prevalence of bovine Trypanosomiasis in the area.

Study Population: The study animals included was bovines, local breeds of both sex (male and female) and age groups (young and adult) individuals.

Blood Sample Collection: Blood samples were taken from the ear vein of animal using sterilized heparinated haematocrite capillary tube. Three fourth (3/4) of the heparinated haematocrite capillary tube was filled with blood. Sealed tubes were then centrifuged in microhaematocrite centrifuge adjusted at 12, 000 revolution per minute for 5 minutes. The content of the capillary tube (including about 1mm above and below the Buffy coat) was expelled by cutting with a diamond tipped pen. For the presence of the parasites, we took part of the Buffy coat in the PCV and examined under 100x Objective of light microscopy and for further species identification, thin blood film was prepared and examined under 100x Objective [9].

Sample Size Determination: With 12.8% of expected prevalence and 3900 total cattle population in the area, the sample size was calculated according to Thrusfield. 2005 [10].

$$n = \frac{1.96^2 \times p_{exp} \times (1-p_{exp})}{d^2}$$

$n$ = required sample
$p_{exp}$ = is expected prevalence of the disease
$d$ = desired absolute precision

$$n = \frac{1.96^2 \times p_{exp} \times (1-p_{exp})}{d^2}$$

$n = \frac{[1.96^2 \times 12.8\% \times (1-12.8\%)]}{(0.05)^2}$
$n = 171$

For a population of cattle, 3900 "n" is adjusted using

$$n_{adj} = \frac{(N \times n)}{(N + n)}$$

Data Analysis: Prevalence of the disease was calculated by dividing the number of positive animals to the total animals examined. $P<0.05$ was taken as significant. All data collected during the study was analyzed using SPSS Version 16.

RESULT

Haematological Findings: The average PCV reading of animals positive for trypanosomiasis from the collected blood sample (26.53%) haemoconcentration were between 14-24%. Whereas, (73.47%) of the packed cell volume reader indicated greater than 24%. Moreover, from 26.53% of low packed cell volume samples, 36% of the samples were shown positive for trypanosomiasis and the remaining 64% of anemic animal have no trypanosoma parasite.

Parasitological Findings: In the study area, an overall prevalence of 7.92% was recorded. The prevalence of $T. \text{vivax}$, $T. \text{brucei}$ and $T. \text{congolense}$ was 5.49%, 1.21% and 1.21% respectively. Although the prevalence of $T. \text{vivax}$ was higher than the rest species identified, no statistical difference was observed ($P>0.05$).

Out of a total of 164 animals examined for trypanosomiasis, 49(6.12%), 81(9.87%) and 34 (5.88%) of the prevalence was occurred in Dejen, Genet and Alegn Kebeles, respectively. Even though the prevalence was relatively higher in Genet and relatively lower in Alegn kebele, no statistically significance difference was recorded among these three kebeles($P>0.05$).

Prevalence of trypanosomiasis in male and female animals was 8.53% and 7.31%, respectively. There was no significant difference ($P>0.05$) between both groups. But the prevalence was relatively higher in male than female individuals.

Highest prevalence of trypanosomiasis was observed in cattle with age group of 2-3 years (14%) and low prevalence was observed in less than 2 years (3.12%). A prevalence of 8 % was recorded in adult age groups. A significant difference ($P>0.05$) was not observed among age groups in the study area.
Fig. 1: Prevalence of trypanosomosis on species basis

Fig. 2: Prevalence of trypanosomosis on site basis

Fig. 3: Prevalence of trypanosomosis on sex basis:

Fig. 4: Prevalence of trypanosomosis on age basis:

Fig. 5: Prevalence of trypanosomiasis based on body condition scoring

In the study, based on the analysis of the body condition score, the highest prevalence was recorded in poor (8.19%) followed by medium (8%) and good (7.5%) body conditions. This result revealed that the existence of no statistically significant difference (P>0.05) in the occurrence of trypanosomiasis among the three body condition categories.

DISCUSSION

This study was conducted to assess the status of the bovine trypanosomiasis (T. vivax, T. brucei and T. congolense). The result of the questionnaire survey indicated that trypanosomiasis has been occurring in the area frequently caused loss of animals. A similar report by regional laboratory and office of agriculture and rural development was indicated as trypanosome is a highly prevalent disease in the area and causing mortality, morbidity, decrease plough power of the animal and decrease wealth of livestock owners. Organization for food and agriculture has also indicated the magnitude of the problems which also affect crop production as a direct loss [11]. As a result, the farmers in the area do not use the land for agriculture production. This study indicated that the prevalence rate of trypanosomiasis was 7.92% which is lower than the result which is presented previously [12] in the same study area which is 12.19%. this variation might be related to the sample size and duration of study period. Similar works were also reported in different parts of the regions showing similar findings [13]. The highest prevalence was observed in young age group (2-3 years). The prevalence rate was also not affected by sex. All sex groups (males and females) has similar prevalence rate. The similarity may be due to the reason that all animals are kept under the same management systems. This result is in agreement with
previous reports [13]. The prevalence of the present study varies among the three kebeles but did not show a significant difference due to the similarity in agro ecology. This result was in agreement with previous reports [12]. The study has also showed T. vivax was the predominant species in the studied animals (5.5%). The high prevalence of T. vivax may be due to its ability to adopt and established itself in the absence of tsetse flies and it is transmitted by other biting flies. Decreasing in the number of T. brucei and T. congolense in the studied animals were attributed to the fact that this species established themselves in acyclic transmission in tsetse infested area. This result was similar with previous reports [13]. The packed cell volume was measured by haematocrit centrifugation method and from the collected blood sample and 26.53% haemoconcentration were between 14-24% and 73.47% of the packed cell volume reading. However, from 26.53% of low packed cell volume samples, 36% of the samples showed positive for trypanosomiasis. Whereas, 64% of anemic animal have no trypanosomal parasite. T. vivax, constituted the majority of infections in the study area. This is in accordance with the results obtained from a survey conducted in the same area [14]. In haematocrit centrifugation examination method the packed cell volume value of studied animals was significantly (P<0.05) varying between anemic and normal animals. The highest prevalence of trypanosomiasis in anemic animals is due to the parasite damage on the red blood cells leading to anemia.

CONCLUSION

The present study showed the presence of three trypanosoma parasites in the area namely, T. vivax, T. brucei and T. congolense and this finding can be used as a base line information for further studies and control measures in the region.

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REFERENCES


