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Bovine Trypanosomosis in Selected Paseant Assocation of Guraferda District, Southrn Ethiopia

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Abstract
A cross-sectional study conducted between November 2011 and March 2012 in Guraferda district of Bench Maji, Zone, south Western Ethiopia to determine the prevalence of bovine traypanosomasis, to identity the species of trypanosomes and associated risk factors of the disease blood samples were collected from 250 randomly selected cattle from four peasant associations and the collected sample (blood) were examined using parasitological techniques. In this study forty seven animals (18.8%) were infected with different species of trypanosome. The most predominant infection were due to T. Congolese (53.2%) followed by T. vivax (31.9%), T. Bruce; (6.4%) and mixed infection of T. Congolese and T. vivax (8.5%). However, there was no statistical significance between sex, age, coat color of the skin and site (P>0.05). But significant differences were observed in body condition ((P<0.05). mean PCV value of the infected (21.4%) and non-infected (24.5%) group of animals had significant variation (P<0.05). in conclusion, bovine trypanosomosis is economically important disease that affects the health as well as productivity of cattle in Guraferda district. Therefore, further study on the occurrence of tsetse and trypanosomosis of different season of the year, at different altitude and different species of animals should be conducted. And also appropriate disease prevention and control methods should be undertaken so as to improve livestock production and agricultural development area.
Keywords:-Prevalence, Pack cell volume

INTRODUCTION

Trypanosomiasis is evident in roughly 10 million km^2 in 37 countries and is a major constraint to the development of livestock production and mixed faming (Jahnke et al., 2002). Ethiopia, as part of the African continent shares as substantial loss from trypanosomosis (Sinshaw et al., *2006*). Bovine typanosomosis, an important protozoan disease caused by the genus trypanosome is transmitted trough bites by different species of glossing and mechanically by a number of biting flies such as Tabnus and Stomoxys species (Oluwfemi et al*.,* 2007).

The most important trypanosome species affecting live stock in Ethiopia are T. congolence, T. vivax and T. brucei in cattle, sheep and goats, T. evansi in camels and T. equiperdum in horse (Chake et al, 2003). It is characterized by intermittent fever, parsasitamia, anemia, lymph adenopathy, jaundice, progressive emaciation, weakness, and reduced productivity (PAITEC, 2002). It has direct impacts on livestock productivity, Management and human settlement. Through these direct impacts the disease has indirect impacts on crop agriculture and human well fare (Radiostitis et al*.,* 2000). The benefits of tsetse and trypanosomosis eradication will include improved human and livestock health, diversified agricultural systems, increased food production and security and improved livelihood of the community and more responsible utilization of available natural resources. Therefore there is the need for an integrated approach and the use of appropriate combinations of available technologies in the tsetse eradication effort (PATTEC, 2001).

The aim of this study is to determine the prevalence of bovine trypanosomes in the study area.

MATERIALS AND METHODS

Study area

The study will be conducted in Guraferda woreda of Bench maji zone, south western Ethiopia. The town of Bench Maji zone is Mizan Teferi it for Addis Ababa 561 km and also from Mizan to Guraferda 64 kms far. There is large and small rivers that flow permanently year long this cooped to being fertile, possessing virgin terrain and undisrupted vegetation coverage make this area suitable for agricultural production and currently as a result of settlement program people are being introduced so that they can secure their food sufficiency. Guraferda is located at 6^0 49'-7^0 21' latitude and 34^0 88'-35^0 43 longitude with total area of 2,505.80 km^2. The altitude is ranging from 600-2,500 m above sea level with mean annual temperature from 15.1-27.5 ^{0}C and means annual rain fall from 1601-2000mm. the total human population was 18.366 and animal population of the zone is estimated as 635,345 cattle, 135,411 sheep, and 89,990 goats, 14,065 equines and one million poultry. The main crops which are cultivable are rice, coffee, banana, papaya, sorghum, maize and ground nut.

Study animals

The study was carries out in the bovine. The number of animals sampled based on the animal population of the study areas. Color coat, reproduction (lactating, pregnant and dry), Agro- ecology and PCV from selected animals were recorded.

Studies Design.

The study was cross- sectional type where by the blood sample were collected from animals to determine the prevalence of trypanosome infection as high challenge of its vectors.

Sample size and sampling methods

The sampling methods employed were simple random sampling. The total numbers of animals required for the study was calculated based on the formula given by Thrufield, (1995) using the following formula.

$$N = \frac{1.96^2 \times Pexp (1-Pexp)}{d2}$$

Where, n= no of animals to be sampled

Pexp= expected prevalence

d= desired absolute precision.

By referring the expected prevalence of 15% (Fasil, 2004) and considering a 5% absolute presidium and at 95% confidence level give us 196 sample sizes. To increase the probability I used 20% expected prevalence.

Study methodology

Parasitological examination will be conducted with blood a sample was taken from ear vein after blooding using piercing lancent from each experimental animal. Then the Haematocrit capillary tube put symmetrically with the sealed part outside and centrifuge at 1200 rpm for 5 minutes using microhaematocrit reader. After PCV was measured, the capillary tube was broken 1mm below the buffy coat and 1cm about buffy coat, sup. The samples move then examined for trypanosomes based on the type of movement in the microscopic field. Confirmation of trypanosome species by morphological characteristics was done after staining the blood smear with giemsa and examination with oil immersion with 100x power magnification (Muray *et al*, 1983).

Data analysis

Parasitological (prevalence rate) data and hematological data (PCV- anemia indicator) collected, organized and entered in to Microsoft excel spread sheet for data summarization. Statistical soft were called STATA (inter cooled STAT 6) will be used for different way of analyses. Measures of association between the different characteristics will be checked by relative risk or odds ration and their significance tested by X^2 – test or using confidence intervals.

RESULT

Parasitological findings

Form total of 250 sampled animals, were diagnosed positive for trypanosome infection using buffy coat microscopy with an overall prevalence of 18.8%. T. Congolese (53.2%) was the most prevalent trypanosome species followed by *T .vivax* (31.9%) and *T. brucei*, (6.4%). *T. vivax* has been found causing mixed infection with T.congolense (Table 1)

Table 1:- The different trypanosome species and their prevalence at the study site

District	PA	No of animals Examined	Trypanosome species				+ve (%)
			T. congolese	*T. brucie*	*T. vivax*	*T. congolese and T. vivax*	
Guraferda	Komata	54	8	0	1	1	10(22.4)
	Gabika	58	5	1	5	2	13(15.2)
	Semetra	59	7	0	2	0	9(15.9)
	Kuki	79	5	2	7	1	15(18.5)
	Total	250	25	3	15	4	48(18.8)

Site

A total of 250 animals were examined in the four peasant association (Pas). The prevalence of trypanosomosis at Kometa, Gabika, semerta and Kuki was 18.5%, 22.4%, 15.2% and 18.9% respectively. The difference of prevalence between the sites was non significant ($p>0.05$) (Table2).

Table2:- parasitological prevalence of try pan soma infection in cattle of the 4PAS

PAS	Number Of Cattle Examined positive		Prevalence (%)	95% CI
	Examined	Positive		
Kometa	54	10	18.5	(8-29%)
Gabika	58	13	22.4	(11.5-33.2)
Semerata	59	9	15.2	(5.9-24.5%)
Kuki	79	15	18.9	10.2-27.7%)
Total	250	47	18.8	(13.9-23.6%)

Sex

31 (19.3%) from a total of 161 male animal and 16 (17.7%) from a total of 89 females were positive for bovine trypanosomosis. The statistical analysis showed that there was no significant difference of trypanosome infection between the two sexes (P>0.05)(Table3).

Table 3:- the prevalence of trypanosomosis on age basis.

sex	Sample size	+ve	Prevalence (%)	95% CI	P-value
Male	161	31	19.3	13.2-25.5%	P=0.756
Female	89	16	17.7	9.7-25.7%	
Total	250	47	18.8		

Age

The prevalence of trypanosomosis on age basis was determined considering two groups as calf, young and adults ,there was no statically significant difference (P>0.05) among the age group in trypanosomosis infection(Table 4).

Table 4:- prevalence of bovine trypanosomosis on age basis.

Age	Sample size	+ve	Prevalence	95% CI	P-Value
Calf	35	4	11.4%	(6.8-22.1%)	
Young	66	13	19%	(9.9-29.4%)	P=0.296
Adult	149	30	20%	(13.6-26.6%	
Total	250	47	18.8%		

Body condition

The body condition of the animals were recorded by classifying animals in to three groups as good, medium and poor based on the appearance of ribs and dorsal spines.

The majority of sampled animals were in poor body condition of from 250 animals sampled, 5.3%, 11.4% and 31.7% prevalence of bovine trypanosomosis was recorded as Good, medium and poor group of animals, respectively. The statistical analysis result showed that there was a statistically significant difference (P<0.05). Between poor animals and animals and animals with medium to good body condition (Table5).

Table 5: distribution of trypanosome infection on body condition basis

Body condition	Examined animals	Positive animals	Prevalence	95%.CI	P-value
Good	56	3	5.3	(6.2-11.3%)	P 0.001
Medium	87	10	11.4	(4.7-18.2%)	
Poor	107	34	31.7	(22.8-40%)	
Total	250	47	18.8		

Coat color

The body coats of the animal were recorded by classifying animals as black, brown, red and with coat color. The majority of sampled animals were red coat color. From 250 animals sampled, 19.1%, 11.7%, 21.7% and 13.8% prevalence of bovine trypanosomosis was recorded as black, brown, red and white coat color of animals, respectively. The statically analysis result showed that there was no statistically significant difference (P>0.05) among the coat color of trypanosomosis infection (Table 6).

Table 6:-the prevalence of trypanosome infection on coat color basis.

Coat color	Examined Animals	Position animal	Prevalence (%)	95% C.I	P. Values
Black	47	9	19.1	(7.7-30.5%)	P=0.482
Brown	34	4	11.7	(0.7-22.8)	
Red	133	29	21.8	14.7-28.8%)	
Whit	36	5	13.8	(2.3-25.4%)	
Total	250	47	18.8		

Hematological findings

Table7:- Mean packed cell volume of infected and non-infected cattle in selected areas of Guraferda district.

Animals	Sampled animals	Mean P<V (%)	Std. error	95% CI	P-value
Infected	47	21.36	0.72	19.93-23.94 22.78-25.1	P =0.00
Non-infected	203	24.52	0.29		

DISCUTION

The overall prevalence of bovine trypanosomosis in the study area was 18.8% (95%CI 13.9-23.6%) which is virtually similar with the result of Aferwork (1998) at pawe, Northwest Ethiopia (17.2%) and Abebe and Jobre (1996) for tsetse infested areas of Ethiopia (17.63%) this is much higher than Akalu(2008) reported that a prevalence of 12.6% in and around Gedeo Zone . due to this the area was uncultivated; new settlemenent covered with bush land and have different rivers. Therefore; it creates favorable condition for breeding of flies (vectors). This produce high prevalence of trypanosomosis .Daud and Molalegne (2011) reported that higher prevalence (24.7%) in Mao-komo special district of Benshangul Gumz regional states. This might be attributed to the difference in agroecology which favors tsetse flies.

The present result revealed that *T. congolese* was predominant species (53.2%) over *T.vivax* (31.9%) and *T.brucei* (6.4%). closer results were reported by Abeba and Jober (1996) in southwest Ethiopia where they reported T. Congolese infection in cattle may be due to the high number of serodems of T. Congolese as compared to *T.Vivax* and development of better immune response to T.Vivax by the infected animal (Leak et al., 1999). and also according to Getachew (2005). *T. congolese* and *T.vivax* are the most prevalent trypanosomes that infect cattle in tsetse infested and tsetse free areas of the Ethiopia respectively. The epidemiology of trypanosomosis is determined mainly by the ecology of the tsetse fly, nevertheless the disease due to *T.vivax* is also based on the distribution of the mechanical vectors like Tabanus and stomoxys.

Prevalence comparison of trypanosome infection between different (PAS) was 18.5%; 22.4%, 15.2% and 18.9% for kometa, Gabika, Semerta and Kuki respectively. The result showed that there was no statically different between different site (P>0.05). This is in agreement with Abebayehu et al., (2011) also reported that there were no significant difference between two sites. In contrast to this Biniam (2010) reported that there was a significant difference between different sites. Since the presence of suitable habitat for vectors which results in high fly density which induces variation in the prevalence of trypanosomosis.

Prevalence comparison were conducted between the different sex groups and it was higher in males (19.3%) than the female (17.7%) during the time of the study. the result showed that there was no statically significant difference of tryponosomosis infection between males and females (P>0.05) Yibrah, (2008) also reported that similar results which states that there was no significant difference in trypanosome infection between males and females. This is due to the fact that cattle are driven to pasture and watering regardless of sex and allowed in the same ecology having comparable degree to acquire infection.

Prevalence comparison conducted between the different age group indicated the higher in adult and young group (20.1%) and (19.6%) ; respectively then calf groups (11.4%) . the result showed that there was no statically significant difference of trypanosome infection between age groups (P>0.05) .although similar higher infection rate in older animals (44%)than in young animals (33%) was reported by Unnamed author , (2008) . in contrast to the current a significant degree of variation among the age groups categorized the highest prevalence was recorded in adult cattle (19.03%) followed by young cattle (10.53%). This variation has likely occurred as the husbandry system reflect young animals on less exposed since they are either tethered or kept close to the home –stead where tsetse habitat has been destroyed (ISCTRO,1999).

Prevalence comparison were conducted between animals of different body condition where the prevalence was conducted between animals of different body condition where the prevalence was 31.7%,11.4% and 5.3% for animals in poor ,medium and good body condition . the prevalence difference in the prevalence of trypanosome infection among the different body condition were significant (P>0.05). Biniam (2010) also reported that similar results which state that there was a significant different among the different body condition

where animal with poor body condition are more associated with the disease as compared to animals with good body condition .

This is in agreement with Daud and Molalegn (2011), obviously; the disease itself results in progressive emaciation of the infected animals nevertheless; non – infected animals under good body condition have well developed immune status that can respond to any foreign protein better than those non- infected cattle with poor body condition which can be immune compromised due to other disease (malnutrition); since malnutrition an concurrent infection depress the immune responsiveness in some cases (Collins, 1994).

The prevalence comparison conducted between animal of different coat color where the prevalence was 19.1%, 11.7%, 21.8% and 13.8% for animals with black, brown and red white coat color respectively. The result showed that there were no statistically significant different of trypanosome infection among coat color of animals. This is similar with Mekuria, et.al. *(*2011) reported that there was no statistically different among coat color of the animal.

The recorded PCV of animals' analysis to compare the PCV values of parasitemic and aparasitemic animals has mean PCV of 21.36 and 24.52 respectively. The mean PCV of parasitemic animals were statically different from aparasitemic animals (P>0.05). This result was in agreement with Sinshaw (2004) reported that the mean PCV of trypanosome positive cattle was 21.6% and statistically significant difference (P>0.005) between affected and non-affected animals were observed. The development of anemia is the most reliable indicator of the progress of trypanosome infection in cattle ILRAD, (1988) and also to be assumed that numerous concurrent disease Mathewos et.al. (2001) and nutritional factors interfere with anemia development (Radostitis et.al. 2006).

CONCLUSION AND RECOMMENDATION

From this study it is possible to conclude that bovine trypanosomes is economically important disease that affects the health as well as productivity of cattle in fertile areas of Guraferda district of Bench Maji zone , the major species of trypanosomes in the study area T. *congolese* followed by *T.vivax*. The infection of bovine trypanosomes negatively afftcts PCV and body condition. This indicates that trypanosoma infection of cattle in the study areas causes loses of body weight and production. Therefore; based on the above conclusion the following recommendations are forwarded:-

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