

Indexed, Abstracted and Cited: ISRA Journal Impact Factor, International Impact Factor Services (IIFS), Directory of Research Journals Indexing (DRJI), International Institute of Organized Research and Scientific Indexing Services, Cosmos Science Foundation (South-East Asia), Einstein Institute for Scientific Information {EISI}, Directory of Open Access Scholarly Resources,

citefactor.org [journalsindexing](http://journalsindexing.com)

Directory Indexing of International Research Journals

World Journal of Biology and Medical Sciences

Published by Society for Advancement of Science®

ISSN 2349-0063 (Online/Electronic)

Volume 2, Issue-4, 42-56, October-December, 2015



WJBMS 2/03/16/2015

All rights reserved

A Double Blind Peer Reviewed Journal / Refereed Journal

www.sasjournals.com

wjbmedsc@gmail.com/wjbms.lko@gmail.com

REVIEW ARTICLE

Received: 22/04/2015

Revised: 21/07/2015

Accepted: 25/07/2015

Prevalence of Bovine Trypanosomosis and Farmers Perception in the Management of Disease in Bure and Womberma Districts of West Gojjam Zone, North West Ethiopia

Erkihun Tadesse and Gashaw Getaneh

Addis Ababa University, College of Veterinary Medicine and Agriculture, Addis Ababa, Ethiopia

ABSTRACT

*A cross-sectional survey of bovine trypanosomosis was carried out in Bure and Womberma districts of west Gojjam zone, North West Ethiopia from November 2013 to April 2014 from four selected peasant associations in the district. A total of 384 cattle were randomly selected and examined for trypanosomosis and the overall prevalence of the disease as determined by Giemsa stained direct thin smear was 2.86%. Among the total of 11 cases of trypanosomosis 9 (81.8%) were due to *T.vivax* and the rest 2(18.2 %) were due to *T. congolense*. No statistically significant associations ($P>0.05$) were observed between the disease and potential risk factors like age, sex, body condition. Questionnaire survey was undertaken to assess farmers' perception on the presence, and management of bovine trypanosomosis in the selected districts. The result of this study showed that 91% of the respondents considered bovine trypanosomosis as an economically important cattle disease. Chemotherapy was reported the major method to combating the problem, mean frequency of treatment being 3 times per animal per year.*

The study revealed that livestock keepers are familiar with bovine trypanosomosis as well as its impacts. In conclusion, trypanosomosis was found to be important disease in the study area, and *T. vivax* was the more prevalent species. Although the present study revealed a low prevalence in the study area; nevertheless, a vigorous disease mitigation strategies is warranted owing to the economic implication of the disease.

Key words: Bovine trypanosomosis, Bure and Womberma districts, farmer's perception, prevalence.

INTRODUCTION

Animal trypanosomosis is an important livestock disease in Africa which is considered as a threat to the ongoing effort on poverty alleviation in the continent (Wint *et al.*, 2010). It is a serious disease in domestic livestock that causes a significant negative impact in food production and economic growth in many parts of the world particularly in sub-Saharan Africa (Cecchi *et al.*, 2008). Bovine trypanosomosis is one of the most prevalent and important disease in Ethiopia limiting livestock productivity and agricultural development (Abebe, 2005). Once it is estimated that about 38% of the national cattle herd affected or at risk of trypanosomosis infection (Dagnachew, 1982). More than 20,000 heads die per annum, and annual loss attributed to the diseases is estimated to be over US\$236 million, whereas loss due to reduce meat, milk and draft power is not applicable to this figure (OAU, 2002). The disease is very economical because of its highest prevalence in the most arable and fertile land with high potential for agricultural development in the South West and North West part of the country along the great river basins of Abay, Omo, Ghibe and Baro which are infested with vector tsetse fly. In Ethiopia, tsetse flies are confined to southwestern and northwestern regions between longitude 33° and 38°E and latitude 5° and 12°N an area covers 220,000 km² (NTTICC, 2004). There are also studies which show the disease to be equally important in non-tsetse infested

highland part of the country (Cherinet *et al.*, 2006).

The presence of animal trypanosomosis is a major constraint to the introduction of highly productive exotic dairy animals and draught oxen to lowland settlement and resettlement areas for the utilization of large land resources (Getachew, 2005 and Cherinet *et al.*, 2006). Since more than 90% of crop production in Ethiopia is dependent on animal draught power mainly on ploughing oxen, many large fields lie fallow due to a lack of these animals in trypanosomosis infested area, which worsens the food supply and living conditions in affected areas (MARD, 2007). The host range of trypanosomosis includes domestic and wild animals as well as human beings. The vector includes several species of tsetse flies and biting flies. Tsetse flies are grouped in the three categories: *Glossina morsitans* group (savanna areas), *Glossina fusca* group (forest areas) and *Glossina palpalis* group (river and lake areas). There are five species of *Glossina* in Ethiopia: *G. pallidipes*, *G. morsitans submorsitans*, *G. fuscipes*, *G. tachinoides* and *G. logipennis* (Shimelis, 2004). The most important *Trypanosoma* species affecting cattle in Ethiopia are *T. congolense*, *T. vivax* and *T. brucei* in cattle, sheep and goats. Camels are affected by *T. evansi* which is common species in camel rearing areas of the country while equines mainly horses are affected by *T. equiperdum* in some highland parts of the country. Apart from cyclical transmission of trypanosomosis by *Glossina* species, mechanical transmission

is a potential threat to livestock productivity in some parts of Ethiopia (Abebe, 2005). *T. vivax* infection can be transmitted mechanically by several tabanide and large number of biting flies (Chernet *et al.*, 2006). Biting flies have been reported as the major cause of *T. vivax* infection in three highland districts bordering Lake Tana (Sinshaw *et al.*, 2006). Control can be exercised at several levels, including eradication of tsetse flies and use of prophylactic drugs. Tsetse flies can be partially controlled by frequent spraying and dipping of animals, aerial and ground spraying of insecticides on fly-breeding areas, use of insecticide-impregnated screens and targets, bush clearing, and other methods. The Sterile Insect Technique has been used with success in Zanzibar and is expected to be used in other area-wide control operations after suppression of tsetse populations by insecticides. There is renewed international interest in large-scale tsetse eradication through the Pan African Tsetse and Trypanosomosis Eradication Campaign supported by the African Union. Animals can be given drugs prophylactically in areas with a high population of trypanosome-infected tsetse. Drug resistance must be carefully monitored by frequent blood examinations for Trypanosomes in treated animals (Holms, 2004). The Amhara Bureau of Agriculture and Rural Development has already prepared a control strategy. Applying control program of tsetse and trypanosomosis regionally, evaluating the effectiveness of the control program and identifying the challenges of the control strategy were the main objectives of the control program. Previous studies revealed the prevalence of the disease in many districts of Amhara region with obvious economical consequences (Shimels *et al.*, 2005; Sinshaw *et al.*, 2006; Mekuria and

Gadissa, 2011; Bitew *et al.*, 2011) were reported. The problem was seen to be prominent in districts bordering the Abay river basin where both cyclically and mechanically transmitted trypanosomosis were reported. Bure and Wemberma districts of West Gojjam zone are such districts where there was serious complaint of the disease.

Therefore, the objectives of this study were:

- To determine the current prevalence of bovine trypanosomosis and to identify the major bovine affecting species of trypanosoma and,
- To assess community perception about the disease and control measures taken in the study districts of West Gojjam bordering the Blue Nile River.

MATERIALS AND METHODS

Study area

The study was conducted in Bure and Wemberma districts of West Gojjam zone of Amhara regional state, North West Ethiopia. Bure is found 415 km North West of Addis Ababa and 150 km South West of Bahir Dar with longitude and latitude of 10°42'N 37°4'E. According to available data the mean annual rainfall ranges from 1386 to 1757 mm. The western and northern parts of woreda receive relatively higher annual rainfall compared to other parts of the woreda. It has mono-modal rainfall distribution which extends from May to September. The altitude of the woreda ranges from 713 to 2604 meters above sea level. The altitude decreases from 2604 to 713 meters above sea level as one travels from north to south part (Nile gorge) of woreda, while the opposite holds true for temperature. Long term annual mean temperature of Bure ranges from 14 °C to 24 °C (BWOARD, 2013). Wemberma district is bordered on the south by river Abay which separates it from Oromiya

regional state, on the west by Bure district, on the north and north east by Ankesha district and on the east by Guanga district. The district is the land of diverse topography with altitude ranging from 800 to 2212 meter above sea level with 10° 5.7'N latitude and 37° 2.6'E longitude. Based on altitude it is divided in to two agro-ecological zones as midland ('woynadega') 47% and lowland ('Kola') 53% respectively. The area has a rainy season (June to September) and a longer dry season (October to May) with mean annual rain fall of 1115mm. The land is covered by different vegetation types namely savanna grass lands, forest and bush lands. The annual mean temperature for most parts of the district is 14°C to 26°C (OWWARD, 2013). The farming system in the areas is a crop-livestock mixed farming and the cattle involved in the study are maintained under traditional management system (OWWARD, 2013).

Study population

The study was carried out on 384 indigenous zebu cattle of all age groups of both sexes in four selected Peasant Associations, which are managed under traditional mixed farming system in study areas.

The age of the animals was grouped as young (below 3 years) and adults (>= 3 years) according to the classification used by Bitew (2011). Body condition for each cattle was estimated based on Nicholson and Butterworth scores (1986) with scale ranging from 1 (emaciated) to 5 (obese).

Study design and sample size determination

The study design was based on cross sectional study including parasitological and questionnaire survey that were conducted from November 2013 to April 2014. A total of 384 animals were randomly selected from four selected Peasant Associations (Gomere dond, Asses woynma, Lijamor tabo and Kuch

sentom) during study period to determine the current prevalence of bovine trypanosomosis in the study areas. Questionnaire survey was undertaken to assess farmers' perception on the presence, impact and management of bovine trypanosomosis in the selected districts. During sampling age, sex, address and body conditions of the animals were recorded. The sample size was determined following the formula given by Thrusfield (2007), with a 95% confidence interval and an expected prevalence of 50% and at 5% absolute precision.

$$n = 1.96^2 \text{ pexp} (1 - \text{pexp}) / d^2$$

Where, n= sample size, pexp= expected prevalence, d= desired absolute precision.

Methodology

Parasitological examination

Blood samples were obtained by puncturing the marginal ear vein with a lancet and collected directly into a pair of heparinised capillary tubes. A small drop of blood from a micro-hematocrit capillary tube was applied to a clean slide and spread by using another clean slide at an angle of 45° for thin smear preparation. A total of 384 smears were prepared from 384 cattle that is one smear from individual animal. The smear was air dried and was fixed for 2 minutes in methyl alcohol. The thin smear was flooded with Geimsa stain (1:10 solution) for 30 minutes. Excess stain was drained and washed by using distilled water. Then it was allowed to dry by standing up right on the rack and examined under the microscope (x100) oil immersion objective lens (OIE, 2008).

Questionnaire survey

Animal health or production extension workers and, village community leaders and elders were involved in the identification of key informants and households that keep livestock within the area. Consequently questionnaire was

administered to a total of 100 randomly selected farmers (59 from Bure and 41 from Womberma) in order to assess their knowledge on constraints of cattle production mainly on bovine trypanosomosis.

Before the interview, the objective of the research was explained to each participant and consent of the interviewee was obtained. Identities of the livestock keepers interviewed were kept confidential to facilitate open and accurate responses. The questionnaire focused mainly on farmers perception on the occurrence of trypanosomosis, major livestock production constraints and diseases, commonly affected animal species and major clinical signs observed, status of disease, control methods of trypanosomosis, sources of drugs and commonly used drugs, personnel's involved in the treatment of disease, and effectiveness of treatment and frequency of treatment within a year (annex).

Data analysis

Data on individual animal and parasitological examination result was entered into MS-Excel spread sheets program. The trypanosomosis infection

rates with different variables like age, sex and body condition score are compared by using chi- square test. SPSS version 20 was used to conduct the statistical analysis. Throughout the analysis, *p*-value < 0.05 was considered to have statistically significant difference.

RESULTS

Prevalence of trypanosomosis

Trypanosome infections were found in both districts. Out of a total of 384 cattle examined, 11 were positive for trypanosomosis hence the overall prevalence rate of the study area was 2.86 %. All of the infection in this study was found to be due to *T. vivax* (81.8%) and *T.congolense* (18.2%). The prevalence rate in this study was considered to be low when compared with earlier reports from the neighboring areas and other parts of Ethiopia. The associations of the disease with age, sex and body condition were assessed. No significance association was observed with respect to age, sex, body condition and districts since *p* value was > 0.05.

Table 1. Prevalence of bovine trypanosomosis based on host related risk factors.

Host related factors	Total sampled	No. Positive (%)	Prevalence (%)	(P-value)
Sex				
Male	285	9 (74.2)	3.16	(0.559)
Female	99	2 (25.8)	2.02	
Age				
Young	81	1 (21.1)	1.23	(0.332)
Adult	303	10 (78.9)	3.30	
Body Condition				
Poor	261	10 (68.0)	3.83	(0.246)
Medium	101	1 (26.3)	0.99	
Good	22	0 (5.7)	0.0	
District				
Bure	194	5 (45.4)	2.58	(0.56)
Womberma	190	6 (55.6)	3.16	

Accordingly, there was no significant difference in the prevalence of trypanosomosis in female animals compared to male animals ($p=0.559$). Similarly when the prevalence of trypanosomosis was computed for the two age categories in this study, the infection rate in adult cattle was not significantly different from young ones ($p=0.332$) but it was slightly higher in adult animals than young ones. The prevalence of trypanosomosis under different body condition groups was indicated in (Table 1). The infection rate in animals with poor body condition was slightly higher than in animals with medium body condition, but good body

condition cattle were not parasitaemic for bovine trypanosomosis. Prevalence rates were slightly higher in Womberma district (3.16%) than Bure district (2.58%) and was not significantly difference by districts ($p=0.56$).

Farmers perception of the problem of bovine trypanosomosis

Livestock production constraints

The farmers in questionnaire survey indicated that the constraints of their livestock production were mainly disease followed by lack of grazing land, drought and feed shortage in that order as indicated in (Table2).

Table 2. Major Livestock production constraints reported in the study districts.

Constraints	Bure	Womberma	Total
	Frequency (%)	Frequency (%)	Frequency (%)
Disease	34 (57.6)	33 (80.5)	67 (67.0)
Grazing land	15 (25.4)	5 (12.2)	20 (20.0)
Drought	7 (11.9)	3 (7.3)	10 (10.0)
Feed shortage	3 (5.1)	0 (0)	3 (3.0)

Diseases resulting in high morbidity and mortality were perceived by 67% of livestock owners or respondents as the important constraints associated with cattle production and trypanosomosis were among the major top diseases in the

districts. As indicated in (Table 3), Trypanosomosis (91%), Fasciolosis (41%), pneumonia (36%), septicemia (29%), leeches (27%), diarrhea (26%) and LSD (25%) were most frequently reported diseases by the respondents in that order.

Table 3. Major livestock diseases mentioned by respondents in the study districts.

Major livestock disease	Bure	Womberma	Total
	Frequency (%)	Frequency (%)	Frequency (%)
Trypanosomosis	51 (86.4)	40 (97.6)	91 (91.0)
Fasciolosis	30 (50.8)	11 (26.8)	41 (41.0)
Pneumonia	20 (33.9)	16 (36)	36 (36.0)
Septicemia	21 (35.6)	8 (19.5)	29 (29.0)
Leeches	22 (37.3)	5 (12.2)	27 (27.0)
Diarrhea	11 (18.6)	15 (36.6)	26 (26.0)
LSD	15 (25.4)	10 (24.4)	25 (25.0)
Others	7 (11.9)	18 (43.9)	25 (25.0)

Farmers perception on the presence of trypanosomosis

Most respondents 91% (97.6% in Womberma and 86.4% in Bure) reported that they are familiar with trypanosomosis with in the areas and locally called (Gendi or wezwuz). About 95.6% of respondents have stated that cattle's are most commonly affected species among domestic animal species by trypanosomosis.

Respondents description of sign of bovine trypanosomosis

Livestock owners noticed that different clinical signs of trypanosomosis that could be easily identified through visual observation. Though, the level of precision depends on the experience of livestock keepers, among the observed signs of trypanosomosis: ruffled hair, emaciation, reduced feed intake, coughing and lacrimation were the most

frequently reported clinical signs of trypanosomosis by the respondents in that order (Table4). In addition to this, respondents emphasized that in cattle suspected of trypanosomosis, noticeable reductions could be observed on milk production, body condition, working ability of oxen, growth rate, and price of the animal in addition to increased mortality in untreated cases.

Respondents perception on the management practice of bovine trypanosomosis

All of the respondents that are 100% stated that there is control of trypanosomosis in the study areas. Treatment of affected animals were the only method of control the disease by using modern trypanocidal drugs including diminazine aceturate(Berenil) and isometamedium.(Trypamidium).

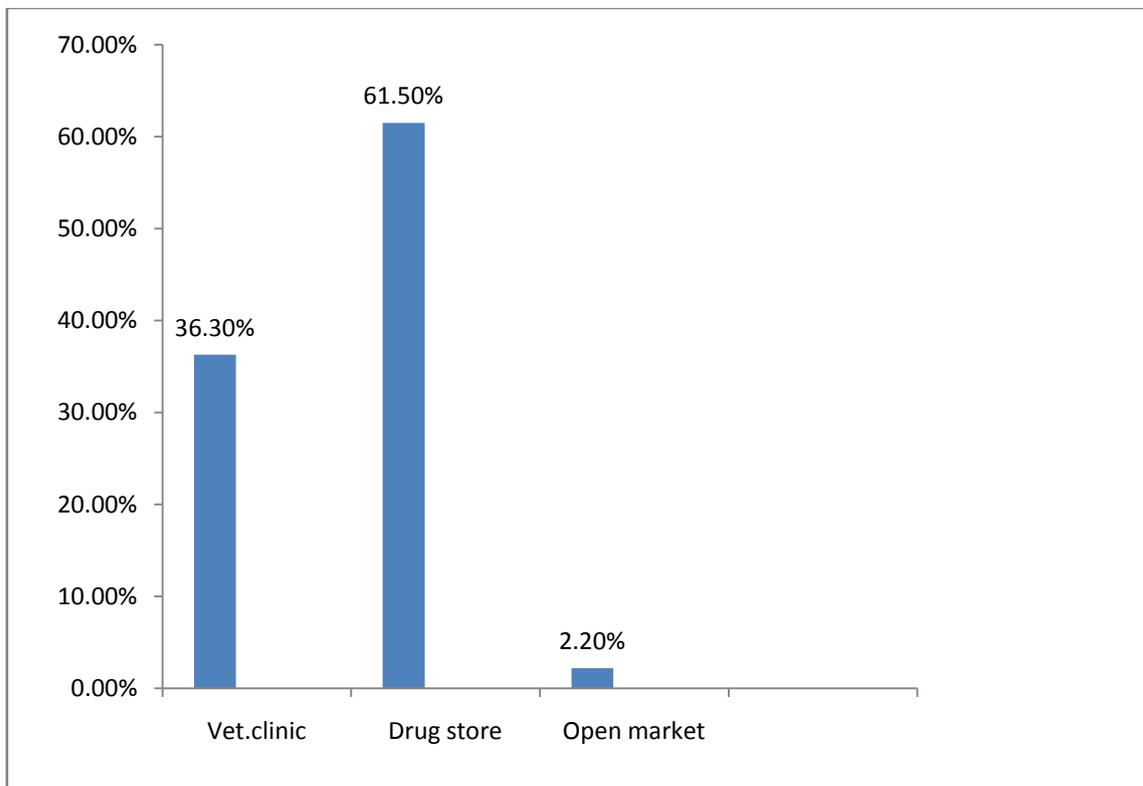


Figure 1. Common sources of trypanocidal drugs for trypanosomosis treatment.

Table 4. Major clinical signs frequently observed in animals affected by trypanosomosis in the districts.

Signs	Bure	Womberma	Total
	Frequency (%)	Frequency (%)	Frequency (%)
Ruffled hair	50 (84.7)	40 (97.6)	90 (90.0)
Emaciation	45 (76.3)	39 (95.1)	84 (84.0)
Reduced feed intake	36 (61.0)	23 (56.1)	59 (59.0)
Coughing	9 (15.3)	4 (9.8)	13 (13.0)
lacrimation	5 (8.5)	4 (9.8)	9 (9.0)

Most of the owners that is 95.6% of the respondents in districts used diminazine aceturate and only 4.4% of the respondents used isomethamidium for the treatment of disease. These drugs have been mainly sourced from drug stores, veterinary clinics and open markets (figure1). In this aspect, drugs stores are the main drug source in Womberma district for 72.5% and in Bure district for 52.94% respondents that was 61.5% of respondents from both districts; which was significantly different between districts ($p < 0.05$) that was 0.18.

In addition, according to respondents report, trypanocidal drugs are commonly administered by animal owners or other family members and animal health personnel (animal health assistance and community animal health workers). About

65.9 % of the respondents reported that these drugs are administered by themselves or other family members and only 34.1% of the respondents reported that drugs are administered by animal health personnel.

The respondents also added about the effectiveness of treatment by trypanocidal drugs and they responded as effective or not effective. About 93.4% of the respondents stated that the treatment program was effective and 6.6% of them responded as ineffective. Respondents stated that trypanocidal drugs treatment frequency ranges from two to four times per year per animal .About 82.4% of the respondents reported that frequency of treatment in affected animals was three times per year indicated in (Figure 2).

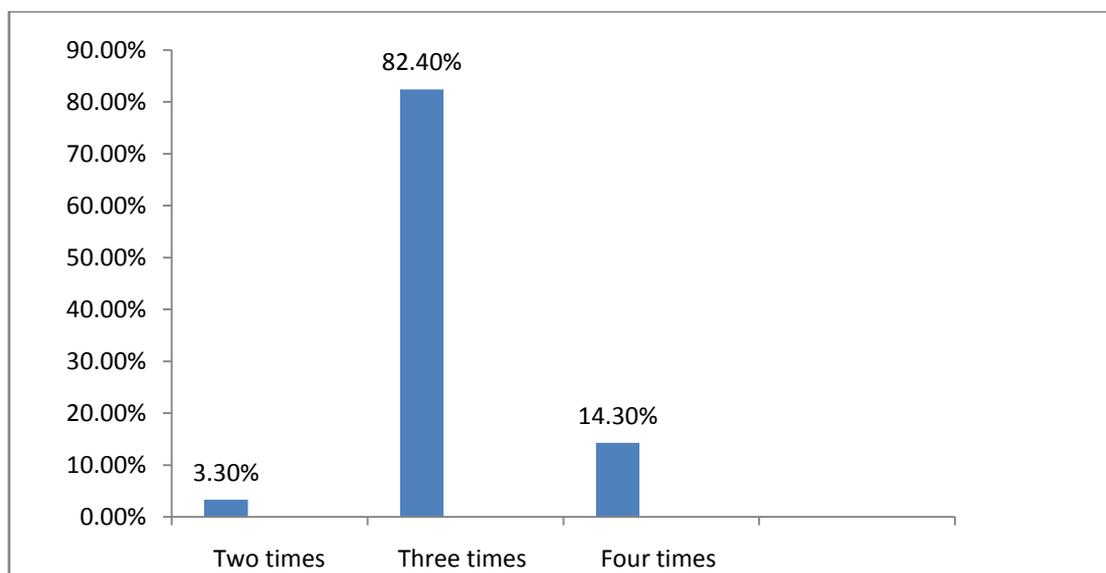


Figure 2. Frequency of Trypanosomosis treatment per year by trypanocidal drugs.

According to respondents, the status of disease was explained as getting better, getting worse and no change. Most owners in districts (63.7%) have stated

that the status of disease was getting better and only 7.7% of the respondents stated the status is getting worse (figure 3).

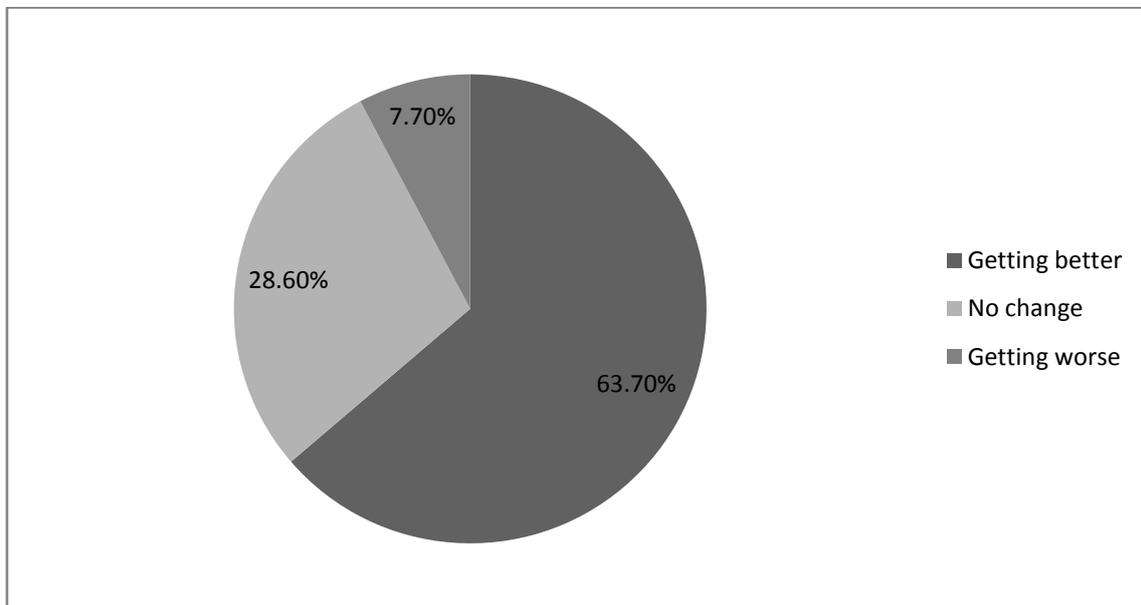


Figure 3. Status of trypanosomosis recently in the study districts.

DISCUSSION

Prevalence of bovine trypanosomosis

The results of the present study disclose that trypanosomosis is a major disease of cattle in areas bordering the Blue Nile River of West Gojjam zone with an overall infection rate of 2.86%. The prevalence rate in this study was considered to be low when compared with earlier reports from the neighboring and other parts of Ethiopia. This result was in close agreement with the findings of Ayana *et al.* (2012) who reported a prevalence of 2.10% from West Gojjam zone, North West Ethiopia and Ababayehu *et al.* (2011) who reported a prevalence of 2.66% trypanosomosis from Western Tigray, Northern Ethiopia. However, these results were lower with results of a previous study in Womberma district of West Gojjam 7.8% by Bishaw *et al.* (2012), in selected districts of East and West Gojjam 12.8% by Kebede (2012) and East

Gojjam during early dry season 12.4% by Mihret and Mamo (2007). The ongoing application of trypanosomosis control program (effective treatment of affected animals and prophylactic treatment of all animals) in the study areas could have contributed for the lower prevalence. Furthermore, density fly population is another determinant factor for the occurrence of trypanosomosis, where fly population increases after the short and long rainy seasons, this lies from April to June and September to November. However, this study was conducted from November to April that is in the dry periods, hence lower fly population and consequently lower prevalence of trypanosomosis. In support of this, Sinshaw *et al.* (2006) revealed that reproduction and development of biting flies is best suited to the climatic conditions prevalent during the heavy rainy seasons.

T. vivax and *T. congolense* were the species detected from infected animals. The higher proportion of *T. vivax* infection in the study districts was in agreement with trypanosome species prevalence data in West Gojjam by Bitew *et al.* (2011) and Ayana *et al.* (2012). Similarly in a survey of 384 cattle examined at Womberma district of West Gojjam zone, 7.8% were positive for trypanosomosis of which 6 (20%) were due to *T. congolense* while the remaining 24 (80%) of the infection were due to *T. vivax* (Bishaw *et al.*, 2012). This could probably as the distance from the edges of the tsetse belt increases, the species of trypanosome most encountered is *T. vivax* because of its ability to adapt and establish itself in the absence of tsetse flies.

In the present study, the associations of the disease with potential risk factors were assessed. No significance association was observed with respect to age, sex and body condition since p value is > 0.05 (Table1). Accordingly, there was no significant difference in the prevalence of trypanosomosis in female animals compared to male animals ($p=0.559$). This result was in close agreement with what was reported previously by (Adane and Gezahegne 2007; Ababayehu *et al.* (2011) Ayana *et al.* (2012) and Bishaw *et al.* (2012). And this might be due to the fact that both sexes have virtually similar exposure to biting flies in grazing areas. Similarly when the prevalence of trypanosomosis was computed for the two age categories in this study, there was no significance difference of trypanosomosis in adult animals compared to young animals since p. value is 0.332. This finding was in contrary with previous report of Ayana *et al.* (2012) and Tesfaheywet and Abraham (2012). And it was inline with previous report by Bishaw *et al.* (2012) in the districts. This could probably both adult and young animals

are field grazers and they have equal exposure to biting flies in grazing lands and probably due to relatively low prevalence of the tsetse transmitted trypanosome (*T. congolense*). The infection rate in animals with poor body condition was slightly higher than in animals with medium body condition, but good body condition cattle were not parasitaemic for bovine trypanosomosis. This finding was in contrary with previous reports from the bordering areas by Bishaw *et al.* (2012) and in line with the previous study by Ayana *et al.* (2012). The absence of trypanosome infection in the good body condition animals might be related to that well-nourished animals have good level of immunity and are in a better position to resist infection, moreover there is a very rare possibility of re-establishment of infection in animals with good body condition.

Farmers' perception and management practices on bovine trypanosomosis

In order to improve the welfare and security of rural communities in Africa, particularly Ethiopia, rapid method for assessing risk and diagnosing urgent problems are needed for the control of both animal and human diseases. Therefore, this survey was conducted with the objective of seeking information about constraints of cattle production, diseases of cattle particularly the impacts of bovine trypanosomes and its management in selected districts of West Gojjam, North West Ethiopia. The results of the survey indicated that diseases resulting high mortality and morbidity were highly prevalent in both districts and perceived as the most important constraints associated to cattle production.

Diseases were the primary constraints of livestock production in the study areas and trypanosomosis was the major. This was in agreement with Desalegn *et al.*

(2005) in tselemt woreda of Tigray, where 95.7% of the interviewed respondents responded that trypanosomosis was the most devastating disease of cattle and Seyoum (2012) in Guraferda and Gimbo districts in the Baro Akobo and Gojeb River basins, where 95.2% of the interviewed respondents responded that trypanosomosis was the major disease of cattle.

Though, the level of precision depends on the experience of livestock keepers, most farmers could determine clinical signs suggestive of bovine trypanosomosis that are commonly described for the disease (Holms *et al.*, 2004). Similarly, studies conducted in tsetse infested areas of Ethiopia Tesfaye *et al.* (2011) and Seyoum (2012) have revealed that most of the interviewed livestock farmers were able to mention the common symptoms that are used as diagnostic tool for trypanosomosis suspected cases.

According to the result from the questionnaire survey chemotherapy was the major against trypanosomosis using the modern drug including diminazine aceturate and isomethamedium and about 93.4% of the respondents themselves or other family members administered these drugs but the share of veterinary system was inadequate. The results were in accord with survey reports from other tsetse infested regions of Ethiopia (Berhan, 1999, Dessalegn *et al.*, 2005; Seyoum, 2012) and Kebede (2012) who reported from neighboring districts of West and East Gojjam zones, North West Ethiopia. These suggest that the veterinary service was still inaccessible by many livestock owners and it is also suggestive evidence of risk of drug mishandling, usage and the possible emergence of resistant trypanosome strains in the areas.

The control measures in the areas did appear effective. This finding was in

agreement with previous report by Kebede (2012) in selected districts of East and West Gojjam, North West Ethiopia. However, the high frequency of trypanocidal application coupled with the report of self preparation and injection of the drugs by significant number of farmers indicates that there is high risk of development of drug resistance in the areas. This finding was in agreement to previous study by Seyoum (2012) from South West Ethiopia. The frequency of treatment per animal per year reported in the present study was higher than earlier reports from other parts of Ethiopia (Tewelde *et al.*, 2004). But it was lower than earlier report by Seyoum (2012) in Guraferda and Gimbo districts in the Baro Akobo and Gojeb River basins who reported a mean frequency of 6 times per animal per year. Therefore, this observation deserves further study on the efficacy of the common trypanocidal drugs that are being used.

In general, the number of treatments over a year reflects the magnitude of trypanosome and drug resistance presence in the area. Taking into account the result of questionnaire survey as it was first major obstacle of their animals and the uncontrolled use of trypanocidal drugs, the recorded high prevalence of bovine trypanosomosis in neighbor districts the real prevalence of infection is probably substantially higher. This should validate the need for application integrated disease surveillance in this district during dry as well as in rain season.

CONCLUSIONS AND RECOMMENDATIONS

Trypanosomosis continues to be the most neglected disease of modern times and described as a poor man's disease. From this study it is possible to conclude that trypanosomosis was an important disease and a potential threat affecting the health

and productivity of cattle in the study areas. The major species of trypanosomosis in the study area were *T. vivax* followed by *T. congolense*. No statistically significant associations ($P>0.05$) were observed between the disease and potential risk factors like age, sex, body condition. Farmers in the study area are aware of the presence and management of the disease. Chemotherapy was reported the major method to combating the problem, mean frequency of treatment being 3 times per animal per year. Moreover, there is unsupervised use of trypanocidal drugs often from illegal sources and administered commonly by the farmers themselves. The great potential of livestock to rural farmers, in North West and South West of Ethiopia, especially to those areas which are near to the greater river basin of Abay, Omo, Ghibe and Baro which have higher potential for agricultural development can only be exploited if trypanosomosis and its socioeconomic impact are reduced.

Therefore in view of the above conclusion, the following major points are recommended for further consideration by all concerned bodies:

Legislative reinforcement by way of elaborating a national drug use policy is required to address the indiscriminate drug usage around the study districts.

Training the livestock owners on the situation of Trypanosomosis and means of transmission in the districts is important. Moreover, awareness creation on the risk of trypanocidal resistance and drug handling is essential.

Veterinary supervision is inadequate so that improvement of the sector is important to alleviate the disease and to avoid or reduce the illegal using of drugs. Control measures have been implemented so far should have continuity unless it results is questionable.

ANNEX

Questionnaire format to collect data on trypanosomosis

This questionnaire format is designed to gather information on the perception of farmers of the impact of trypanosomosis and its control operations on cattle production in Awi Zone of the Amhara Regional State. After introducing the scope and the objectives of the study, selected farmers will be asked for their full consent to participate in the interview. Only, those willing to participate will be considered for the questionnaire survey. All information each respondent provides and his/her name will remain confidential.

General information

Respondent No-----, Date-----, Zone, Woreda-----, Peasant Association (Kebele) -----Altitude of the area-----

1. Major constraints of Livestock

1.1. What are the major constraints of livestock/cattle in your area? Feed shortage-----, disease-- grazing land-----, drought-----, other-----

1.2. If livestock diseases are one of your problems, what types of diseases commonly prevail in your area (mention three of them in order of importance)?

1-----2-----
-----3-----

2. Trypanosomosis

2.1. Do you know the disease trypanosomosis? Yes-----No-----

2.2. Which livestock species is affected mostly by trypanosomosis? Cattle-----
-small ruminants-----, equines-----, all-----

2.3. What are the main clinical signs observed when an animal is affected by Trypanosomosis? -----

2.4. What is the status of the disease since you know the disease? Getting better-----
-, No change----, getting worse-----, expanding-----, I don't know-----

3. Control

3.1. Is there any Trypanosomosis and fly control operation in this area? Yes----, No----

3.2. If yes to Q3.1, what method (s) is employed? Treatment of affected animals---- Fly control----- Others specify-----

3.3. If you use treatment, where are the common drug sources? Veterinary clinics-----

Drug stores----- Open markets and illegal sources-----Others-----

3.4. Who are giving the treatment? Myself/family member----- Animal health personnel-----, other people-----

3.5. Which drugs are most commonly used in the area (Name, type, color etc)? Modern, specify-----, Traditional-----

3.6. Is the treatment effective or not effective? -----

3.7. How many times can an animal get similar treatment in a year? -----

3.8. Are there traditional method of treatment and management practices for controlling and prevention of trypanosomosis? -----

LIST OF ABBREVIATIONS

BWOARD: Bure Woreda Office of Agriculture and Rural Development

ILRDA: International Livestock and Rural Development Agency

LSD: Lumpy Skin Disease

MARD: Ministry of Agriculture and Rural Development

NTTICC: National Tsetse and Trypanosomosis Investigation and Control Center

OAU: Organization of African Union

OIE: Office international des epizooties

OWWARD: Office of Womberma Woreda Agriculture and Rural Development

SPSS: Statistical Product and Service Solutions

ACKNOWLEDGEMENTS

My greatest acknowledgement and heartfelt gratitude goes to my advisor Dr. Getachew Terefe who gave me not only reference material, intellectual guidance but his precious time and his noble idea and patientness for proper conduct of this research and advice what I should be in the rest of my life I said again thank you for everything you did for me.

I would to thank you very much Dr. Yaregal Tadesse for technical and ideal support upon reading and correction of my paper and for everything that he did for me.

I would also like to thank my friend Aysheshim Mebrat for his intellectual and guidance editing of this paper.

REFERENCES

Abebayehu, T., Eshete, H., Berhanu, M., Rahmeto, A. and Solomon, M. (2011). Mechanically transmitted bovine trypanosomosis in tselemt Woreda, western Tigray, and northern Ethiopia. *Journal of Agriculture*, **6**: 10- 13.

Abebe, G. (2005). Trypanosomosis in Ethiopia. *Ethiopian Journal of Biological Science*, **4**: 75.

Adane, M. and Gezahegn, M. (2007). Bovine trypanosomosis in three districts of East Gojjam Zone bordering the Blue Nile River in Ethiopia. *Journal of Infection in Developing Countries*, **1**: 321-325.

Ayana, M., Tesfaheywet, Z. and Getnet, F. (2012). A cross-sectional study on the prevalence of bovine trypanosomosis in Amhara region, northwest Ethiopia. *Livestock Research for Rural Development*, **24**:1-8.

Berhan, M. (1999). Study on the prevalence of bovine trypanosomosis and assessment of drug resistance in Ghibe valley south west of Ethiopia, DVM thesis submitted to AAU, FVM, Debre zeit, Ethiopia.

- Bitew, M., Amedie, Y., Abebe, A. and Tolosa, T. (2011).** Prevalence of bovine trypanosomosis in selected areas of Jabitehenan district, west Gojjam of Amhara regional state, northwestern Ethiopia. *African Journal of Agricultural Research*, **6**: 140-144.
- Bishaw, Y., Wudu, T., Nuria, Yideg. And Sefinew, A. (2012).** Prevalence of bovine trypanosomosis in Womberma districts of west Gojjam zone, northwest Ethiopia. *Ethiopian Veterinary Journal*, **16**: 41-49.
- Bwoard (2013).** Bure woreda office of agriculture and rural development profile document.
- Cecchi, G., Mattioli, R., Slingenbergh, J. and Delarocque, S. (2008).** Land cover and tsetse fly distributions in sub-Saharan Africa. *Medical and Veterinary Entomology*, **10**: 1365-2915.
- Cheremet, T., Sani, R., Speybroeck, N., Panandam, J., Nadzr, S. and Bossche, P. (2006).** A comparative longitudinal study of bovine trypanosomiasis in tsetse-free and tsetse-infested zones of the Amhara Region, northwest Ethiopia. *Veterinary Parasitology*, **140**: 251–258.
- Dagnachew, Z. (1982).** Trypanosomiasis in Ethiopia. Proceedings of the 3rd International Symposium on Veterinary Epidemiology and Economics, Pp: 485.
- Dessalegn, W., Etsay, K. and Getachew, A. (2005).** Study on the assessment of drug resistance on trypanosome vivax in tselemit woreda, Tigray, Ethiopia. DVM thesis submitted to AAU, FVM, Debre Zeit, Ethiopia.
- Getachew, A. (2005).** Review article. Trypanosomosis in Ethiopia. *Ethiopian Journal of Biological Society*, **4**: 75-121.
- Holms, P., Maudlin, I, and Miles, M. (2004).** The trypanosomosis. Wallingford, UK: CAB International publishing, Pp: 1-634.
- ILRDA (1992).** Immune responses and pathogenesis of bovine trypanosomosis. Proceeding of a workshop organized by ILRAD in collaboration with FAO from 23-27 November 1992, Nairobi. Kenya.
- Kebede, E. (2012).** Prevalence of bovine trypanosomosis and farmer's perception of the disease in selected districts of East and West Gojjam, North West Ethiopia. DVM thesis submitted to AAU, FVM, Debre Zeit, Ethiopia.
- Mekuria, S. and Gadissa, F. (2011).** Survey on bovine trypanosomosis and its vector in Metekel and Awi zones of Northwest Ethiopia. *Acta Tropica*, **117**: 146–151.
- MARD (2007).** Livestock Development Master Plan Study, Phasel Report-Data Collection and Analysis, Volume B-Meat Production, Government of Ethiopia, Pp: 156.
- Nicholson, M. and Butterworth, M. (1986).** A guide to condition scoring of zebu cattle. International livestock centre for Africa (ILCA), AA, Ethiopia, Pp: 29.
- NTTICC (2004).** Annual report on tsetse and trypanosomosis survey, Bedelle, Ethiopia.
- OAU (2001).** Trypanosomosis, Tsetse and Africa. The year book report (2001).
- OIE (2008).** Trypanosomosis (tsetse-transmitted). Terrestrial Manual. *Office International des Epizooties (OIE)*, Paris, France, pp: 12.
- Oward (2004).** Office of Wemberma Wereda agricultural and rural development profile document.
- Shimelis, D., Aran, K. and Getachew, A. (2005).** Epidemiology of tsetse transmitted trypanosomosis in Abay (Blue Nile) basin of North West Ethiopia. Proceeding of the 28th meeting of the international scientific council for trypanosomosis.
- Shimelis, D. (2004): Epidemiology of bovine trypanosomosis in the Abay basin areas of northwest Ethiopia, Pp: 2.
- Sinshaw, A., Abebe, G., Desquesnes, M. and Yoni, W. (2006).** Biting flies and trypanosome vivax infection in three highland districts bordering Lake Tana,

Ethiopia. *Veterinary Parasitology*, **141**:35-46.

Seyoum, Z. (2012). Farmers perception of the impacts and prevalence of bovine trypanosomosis and tsetse fly in Baro Akobo and Gojeb River basins, south west Ethiopia. Msc thesis submitted to AAU, FVM, Debre Zeit, Ethiopia.

Tesfaheywet, Z. and Abraham, Z. (2012). Prevalence of bovine trypanosomosis in selected district of ArbaMinch, Southern Ethiopia. *Global Veterinarian*, **8**: 168-173

Tesfaye, D., Speybroeck, N. and Deken, R. (2011). Economic burden of bovine trypanosomosis in three villages of Metekel zone, northwest Ethiopia.

Tropical animal health production, **44**: 873-879.

Tewelde, T., Abebe, G., Afework, Y, and Zessein, K. (2004). Application of field methods to assess isometamedium resistance of trypanosomes in cattle in western Ethiopia. *Acta Trop*, **90**: 160-170.

Thrusfield, M. (2007). *Veterinary Epidemiology* 3rd ed., Blackwell Scientific, London, Pp: 225-228.

Wint, W., Shaw, A., Cecchi, G., Mattioli, R. and Robinson, T. (2010). Animal trypanosomiasis and poverty in the Horn of Africa Workshop Report. IGAD Livestock Policy Initiative, July 6–7, 2010 at Regional Centre for Mapping of Resources for Development (RCMRD).

Corresponding author: Dr. Gashaw Getaneh, Addis Ababa University, College of Veterinary Medicine and Agriculture, Addis Ababa, Ethiopia

Email: gashaw_getaneh@ymail.com