Prevalence of Bovine Trypanosomosis in Bure and Womberma Districts of West Gojjam Zone, North West Ethiopia

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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 i 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 [1]. 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 [2]. Bovine trypanosomosis is one of the most prevalent and important disease in Ethiopia limiting livestock productivity and agricultural development. Once it is estimated that about 38% of the national cattle herd affected or at risk of trypanosomosis infection [3]. 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 [4].

The disease is very economical because of it 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 [5]. There are also studies which show the disease to be equally important in non-tsetse infested highland part of the country [6].

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 [6, 7]. Since more than 90% of crop production in Ethiopia is dependent on animal draught power mainly
on plowing 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 [8].

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* [9].

The most important *Trypanosoma* species affecting cattle, sheep and goats in Ethiopia are *T. congolense*, *T. vivax* and *T. brucei*. 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 [3]. *T. vivax* infection can be transmitted mechanically by several tabanide and large number of biting flies [6]. Biting flies have been reported as the major cause of *T. vivax* infection in three highland districts bordering Lake Tana [10].

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 [11].

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 [10, 12-14] 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 Womberma 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
- 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 Womberma districts of West Gojjam zone of Amhara regional state, North West Ethiopia. Bure is located about 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. Womberma 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. 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 [16].

**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 et al. [14]. Body condition for each cattle was estimated based on Thrusfield [17] 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 Nicholson and Butterworth [18] with a 95% confidence interval and an expected prevalence of 50% and at 5% absolute precision.

\[ n = 1.96^2 p_{exp} (1 - p_{exp})/d^2 \]

where, \( n \) = sample size, \( p_{exp} \) = expected prevalence, \( d \) = desired absolute precision.

Methods
Paraclinical 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 [19].

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 prevalence of trypanosomosis with corresponding 95% confidence intervals is determined for different categories of study animals. 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 \( \Box < \Box 0.05 \) 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. 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
Table 1: Prevalence of bovine trypanosomosis based on host related risk factors

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

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

<table>
<thead>
<tr>
<th>Constraints</th>
<th>Bure Frequency (%)</th>
<th>Womberma Frequency (%)</th>
<th>Total Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disease</td>
<td>34 (57.6)</td>
<td>33 (80.5)</td>
<td>67 (67.0)</td>
</tr>
<tr>
<td>Grazing land</td>
<td>15 (25.4)</td>
<td>5 (12.2)</td>
<td>20 (20.0)</td>
</tr>
<tr>
<td>Drought</td>
<td>7 (11.9)</td>
<td>3 (7.3)</td>
<td>10 (10.0)</td>
</tr>
<tr>
<td>Feed shortage</td>
<td>3 (5.1)</td>
<td>0 (0)</td>
<td>3 (3.0)</td>
</tr>
</tbody>
</table>

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 (Table 2).

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.

**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 w ith 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 (Table 4). 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). Most of the owners that is 95.6% of the respondents in districts used...
Table 3: Major livestock diseases mentioned by respondents in the study districts

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

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

<table>
<thead>
<tr>
<th>Signs</th>
<th>Bure Frequency (%)</th>
<th>Womberma Frequency (%)</th>
<th>Total Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ruffled hair</td>
<td>50 (84.7)</td>
<td>40 (97.6)</td>
<td>90 (90.0)</td>
</tr>
<tr>
<td>Emaciation</td>
<td>45 (76.3)</td>
<td>39 (95.1)</td>
<td>84 (84.0)</td>
</tr>
<tr>
<td>Reduced feed intake</td>
<td>36 (61.0)</td>
<td>23 (56.1)</td>
<td>59 (59.0)</td>
</tr>
<tr>
<td>Coughing</td>
<td>9 (15.3)</td>
<td>4 (9.8)</td>
<td>13 (13.0)</td>
</tr>
<tr>
<td>Lacrimation</td>
<td>5 (8.5)</td>
<td>4 (9.8)</td>
<td>9 (9.0)</td>
</tr>
</tbody>
</table>

Fig. 1: Common sources of trypanocidal drugs for trypanosomosis treatment

Fig. 2: Frequency of Trypanosomosis treatment per year by trypanocidal drugs
diminazine aceturate and only 4.4% of the respondents used somethamidium for the treatment of disease. These drugs have been mainly sourced from drug stores, veterinary clinics and open markets (Figure 1). 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).

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).

**DISCUSSION**

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.* [20] who reported a prevalence of 2.10% from West Gojjam zone, North West Ethiopia and Abebayehu *et al.* [21] 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.* [22] in selected districts of East and West Gojjam 12.8% by and East Gojjam during early dry season 12.4% by Adane and Gezahegn [23]. 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.* [10] revealed that reproduction and development of biting flies is best suited to the climatic conditions prevalent during the heavy rainy seasons.
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 Dessalegn et al. [25] in intelemt woreda of Tigray, where 95.7% of the interviewed respondents responded that trypanosomosis was the most devastating disease of cattle and Seyoum [26] 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 [12]. Similarly, studies conducted in tsetse infested areas of Ethiopia [27, 28] 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 isomethamine 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 [26-29] 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.

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*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. [14] and Ayana et al. [20]. 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* [22]. 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 (Table 1). 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 Ayana et al. [20], Abebayehu et al. [21], Bishaw et al. [22] and Adane and Gezahen [23]. 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 by Ayana et al. [20] and Tesfaheywet and Abraham [24]. And it was in line with previous report by Bishaw et al. [22] 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. [22] and in line with the previous study by Ayana et al. [20]. 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.
The control measures in the areas did appear effective. This finding was in agreement with previous report by Kebede [29] 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 [26] 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 [30]. But it was lower than earlier report by Seyoum [26] 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 trypanosomes is 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 is 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 trypanosomes are an important disease and a potential threat affecting the health and productivity of cattle in the study areas. The major species of trypanosomes is 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.

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