Ovine Fasciolosis Prevalence in Hidebu Abote Woreda, North Shoa, Ethiopia

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Abstract: Across-sectional study on the prevalence of ovine fasciolosis was conducted in Hidebu Abote woreda from June 2013 to September 2013. A total of 384 fecal samples were collected and coprollogically examined using sedimentation technique. Out of 384 sheep, 138 sheep were found to be positive for liver fluke infection (fasciolosis) with an overall prevalence rate of 35.94%. There was no statistically significant difference (p> 0.005%) in infection rates between male and females sheep while the difference in infection rate between the two age groups (adult and young sheep) was statistically significant (P< 0.05%). As a result of the present study there was no significant difference (P> 0.05) in prevalence among different months during the study period. The prevalence rate of fasciolosis in adult sheep (52.23%) was higher than in young sheep (24.67%). There was no statistically significant difference (p>0.05) in infection rate between poor and good body condition sheep. Among 184 sheep that showed good body condition, 33.69% were positive while 38% of poor body condition sheep were positive. The result of this study demonstrated ovine fasciolosis prevalence in Hidebu Abote Woreda, that might be induced major economic loss in the study area. Finally appropriate control strategies implemented in the study area are recommended to reduce the impact of fasciolosis on live stock production in the area.

Key words: Ovine  •  Fasciola  •  Hidabu Abote  •  Prevalence  •  Sedimentation

INTRODUCTION

The economy of Ethiopia is based on agricultural sector which contributes 40-50% of the gross domestic product (GDP) are 90% of the foreign exchange earnings and about 85-90% of the employment opportunities in the country [1]. The majority of agricultural output is generated from crop and live stock integrated production system. The live stock subsector alone contributes 12% the total and over 45% of the agricultural GDPs [2] over 85% and 90% of the farm and pastoral incomes respectively, are generated by or from live stock [3]. Ethiopian live stock population has reached about 52 million cattle, 33 million sheep, 30 million goats and 2.5 million camels [4] and it is the largest in Africa. However, the benefits derived from the live stock are far below the existing potential. Some factors are attributable to the problem including inadequate feed supply, high prevalence of animal diseases, poor genetic resources, lack of good husbandry practices and poor marketing. Nevertheless, animal diseases remain as one of the most important constraints to live stock development since they are distributed across all agro ecological zones of the country [5].

In the highlands of Ethiopia agriculture is the pillar of economy and is basically a subsistence crop livestock mixed farming system with considerable dependence on natural rain. The current trend towards food self-sufficient is through the use of irrigation as a means of increase food production to crop with rapidly increasing population of the country. Thus, implementation of irrigation projects will be expected to bring about changes in land use patterns and intensification of labor [6]. The increasing number of dams and irrigation canals built to boost energy and food production will also increases the number of potential snail habitats and with them the risk and incidence of fasciolosis [7]. Also the incidence of fasciolosis in Ethiopia domestic livestock is known to be relatively high. However, few attempts have been made to study the incidence of this parasitic problem in various sections of the parasitic burden, especially in relation to month of a year, rain fall
and temperature, altitude and other relevant factors. The importance of such information in planning the strategy of control programmed and also estimating the economic burden to the country as a result of this parasite cannot be over emphasized [8]. Ovine fasciolosis in Ethiopia is very frequent and cause a significant economic loss in production, decrease productivity and loss of body condition [9, 10]. Some authors have reported the prevalence of fasciolosis in sheep as 86.87% [11], 77.8% [12] and 88.58% [13] in different places of Ethiopia. However this important disease is not well addressed and assessed all over the country.

Therefore, the objectives of the study were;

- To determine the prevalence of ovine fasciolosis in some selected Pesant Associations in Hidebu Abote Woreda.
- To recommend significant control strategies applicable to the study areas.

MATERIALS AND METHODS

The Study Area: The studies were carried out in three selected Hidebu Abote peasant associations namely Yaya Deka Bora, Ariro Abado and Dire Bantu. Hidebu Abote district is located in Northern high lands of Oromiya regional state in North Showa Zonal administration at altitude range of 1100-2900 M with longitude of 9° 47' – 10° 11' North and 38° 27' - 38° 43' East. It is situated 147 km northern of Addis Ababa. The district has an estimated area of 48600 hectare. The temperature of the area varies between 20° – 24° with average 22° and annual average rain fall is around 800mm. The area has a subtropical (weyna Dega), Tropical (kola) and temperate (Dega) type of climatic division and accounting 50%, 44% and 6% respectively. According to Hidebu Abote district Agricultural office report, the total livestock population of this district was estimated at 75055 cattle, 24607 sheep, 40193 goat, 423 horse 11909 donkeys, 154 mules, 34980 poultry and 7846 bee hive colonies [14].

Study Design and Sample Size Determination: A cross sectional type of study was undertaken from June 2013 to September 2013 to determine the prevalence of fasciolosis in sheep. Since there was no previous estimated report for the prevalence of ovine fasciolosis in Hidebu Abote Woreda, its prevalence rate was expected to be 50% to get minimum sample size. The precision was decided to be 5% at 95% confidence level.

Thus for sample size estimation, the formula described by Thurs field [15] was used, i.e.

\[ N = \frac{1.96^2 (p)(1-p)}{D^2} \]

Where,

- \( n \) = sample size
- \( p \) = expected prevalence
- \( D \) = desired level of precision (5%)

There, \( n = \frac{1.96^2 (0.5)(1-0.5)}{0.0025} = 384 \) samples

Study Population and Sampling Method: The study animals were local breed sheep that were found in the Hindabu Abote district. A total of 384 sheep were included in the study using simple random sampling method. All sex and age groups were included in the study.

Study Methodology
Sample Collection and Processing Method: Fecal samples were collected directly from the rectum of individual animals using universal bottles and preserved in 10% formalin. After sample collection universal bottle was labeled with specific code number and age of the animal using a piece of water proof adhesive tape. Then the samples were submitted to Ejere veterinary clinic laboratory for coprological examination.

Coprological Examination: 3gm of each fecal sample were putted in to a mortar and crushed through with pestil then 42 ml of tape water were poured on it and mixed. The suspension was centrifuged at 1500 rpm for 2 minute. After centrifugation supernatant was removed carefully and the left sediment was resuspended again into 15ml of water then allowed for five minute to sediment. After supernatant carefully discarded, the sediment was stained using one drop of methylene blue. Finally drop of the stained sediment was transferred to a microscope slide and covered with cover slip to examine under microscope at 10x magnification [16].

Data Management and Analysis: The data were entered in Microsoft Excel 2013 and transferred to SPSS® Version 20 for statistical analysis. Prevalence was calculated by dividing the number of number of sheep positive for Fasciola egg by the sedimentation test by the total number of animals tested. The chi-square
statistic was used to measure the association between prevalence of the parasite and risk factors (age, sexes and body condition).

RESULTS

The prevalence rate recorded in the three Peasant associations was varying from 32% to 38%. Among 384 fecal samples examined by sedimentation test for Fasciola egg, only 138 samples were found to be positive for fasciolosis with an overall prevalence rate of 35.94%. Even though the association between infection rate and ecological (PAs) variation was not significant ($X^2=1.049$, $P=0.59$).

In this study Fasciola spp. was more prevalent in male than females (Figure 2) but there was not statistically significant ($X^2=1.049$, $P>0.05$). While the association between infection rate and animals age was ($X^2=30.6$, $P=0.00$) significant which revealed the disease was more prevalent in adult (52.23%) than in young animals (24.67%) (Figure 1). However, the association between infection rate and body condition was statistically ($X^2=0.77$, $P=0.38$) not significant (Table 1).

DISCUSSION

In Ethiopia, fasciolosis had been reported to be one of the major disease problems of live stock industry and existed in almost all regions [17]. However, there was no available report on the prevalence of ovine fasciolosis in Hidebu Abote Woreda supporting the present study. Based on studies conducted by several investigators on ovine fasciolosis prevalence in different parts of the country, the infection rate was 53.3% in Eastern Gojam [18], 90% in shoa and Gojam [19]. While, Bahru and Ephrem [20] reported an infection rate of 63%. In the present study the prevalence rate obtained in sampled ovine was lower than that of these previous works in other sites. This might be due to the difference in sample size as well as the agro ecological variation in different parts of the country. The prevalence rates and epidemiology of the disease varied significantly with locality and this might be attributed to the variation in the climate and ecological conditions [17, 20, 21].

The present work revealed that the prevalence of the disease in male and female sheep was 43.75% (42/96) and 33.33% (96/288), respectively. While in poor and good

Table 1: The Prevalence of ovine fasciolosis and its association with risk factor

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Detail</th>
<th>No of animal examined</th>
<th>Prevalence</th>
<th>$X^2$ and $P$- Value</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAS</td>
<td>Yaya Dekebora</td>
<td>200</td>
<td>38%</td>
<td>$X^2=1.049$, $P=0.59$</td>
<td>Not significant</td>
</tr>
<tr>
<td></td>
<td>Ario Abado</td>
<td>100</td>
<td>32%</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dire bantu</td>
<td>84</td>
<td>35.71%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ages</td>
<td>Young</td>
<td>227</td>
<td>24.67%</td>
<td>$X^2=30.6$, $P=0.00$</td>
<td>Significant</td>
</tr>
<tr>
<td></td>
<td>Adult</td>
<td>157</td>
<td>52.23%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td>Male</td>
<td>96</td>
<td>43.75%</td>
<td>$X^2=3.393$, $P=0.065$</td>
<td>Not significant</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>288</td>
<td>33.33%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Body condition</td>
<td>poor</td>
<td>200</td>
<td>76%</td>
<td>$X^2=0.77$, $P=0.38$</td>
<td>Not significant</td>
</tr>
<tr>
<td></td>
<td>good</td>
<td>184</td>
<td>62%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Fig 1: Infection Rates within Different Age Groups

Fig 2: Prevalence of Fasciola spp. within different sex groups
body condition sheep, it was 38% (76/200) and 33.69% (62/184), respectively. There was no statistically significant difference (p>0.05) between sexes, this implied that sex of the animal seemed to have no impact on the infection rate. Regarding the age wise prevalence, higher infection rate was observed (52.23%) in older animals than in younger animals (24.67%).

Significant variation in the prevalence of ovine fasciolosis of different age groups were observed (P<0.05). This was certainly because of that adult animal had repeatedly exposed to fluke infection than younger animals. The body condition in the prevalence of ovine fasciolosis had been studied in the study area and no statistically significant difference (p>0.05) was found between poor and good body condition of sheep.

On the other hand, Thomas [22] suggested that whenever development of the infective stage of such parasites occur outside the body of the host the physical factors in the environment are important in determining their survival and hence success in infecting the host. So the occurrence of fasciolosis is dependent on the presence of biotopes suitable for the parasite and is as such associated with specific ecological niches [23]. Therefore, the maintenance of high prevalence of ovine fasciolosis in the study area is strongly associated with the presence of favorable environments for the existence, multiplication and spread of intermediate host, snail.

CONCLUSIONS

Before the use of anthelmintics and other compounds for the treatment of fasciolosis, the most important prerequisite for efficient chemotherapy and chemoprophylaxis is a prior knowledge of the epidemiology of the disease based mainly on meteorological data and seasonal surveys in hosts. The present study indicated that ovine fasciolosis is a serious impediment for sheep rearing in the study area. So in view information, the following recommendations are forwarded.

- Strategic application of anthelmintics, eliminating the parasites from the host at the most appropriate time for effective prevention of pasture contamination.
- Application of anthelmintics in yearly rotation manner to prevent the development of anthelmintic resistance.
- Reduction of the number of intermediate host, snails by chemicals, drainage and other management practices or biological control measures.
- Reduction in the risk of infection by planned grazing management.

REFERENCES

11. Yilma, J., 1985. Study on ovine fasciolosis and other helminthes parasite at Holeta. DVM thesis. Addis Ababa University, Faculty of Veterinary Medicine, Debre Zeit, Ethiopia.


