

Prevalence of Ovine Fasciolosis in Oda Bultum Woreda, Western Hararghe, Ethiopia

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Abstract: A cross-sectional study on the prevalence of ovine fasciolosis was conducted in Oda Bultum Woreda from November 2010 to February 2011. A total of 384 faecal samples were randomly collected directly from the rectum of individual animals. Parasitological investigation was performed using sedimentation technique. From a total of 384 coprologically examined sheep, 175 animals were found positive for fasciolosis with an overall prevalence of 45.6%. Gode Hora, Midegdu and Borema Peasant Associations (PAs) accounted for 42.9%, 45.7% and 47.8%, respectively. The difference in the prevalence in the three PAs was not statistically significant ($p>0.05$). In the present study the prevalence of fasciolosis was computed for the different age, sex and body condition categories. The prevalence rate of fasciolosis in adult sheep (53.1%) was higher than in young sheep (40.1%) and the difference was statistically significant ($P<0.05$). However, there was no significant difference ($P>0.05$) between the two sex groups. The prevalence of fasciolosis, in the present study was significantly higher ($p<0.05$) in sheep with poor body condition than good body condition ones with overall prevalence of 51.6% and 37.6%, respectively. It was concluded that ovine fasciolosis was prevalent, thus posing major economic loss in the study area. Hence, control strategies targeted on the parasite and the intermediate host as well as implementation of appropriate grazing management in the study area are warranted.

Key words: Fasciolosis • Ovine • Prevalence • Sheep • Ethiopia

INTRODUCTION

Ethiopia possess the largest livestock population in Africa, with an estimated population of 7.8 million equines, 1 million camels, 47.5 million cattle, 39.6 million chickens, 26.1 million sheep and 21.7 million goats [1].

Small ruminants play a significant role in maintaining household stability by providing meat, milk, skin and wool, generate cash income and play traditional social and religious roles [2]. Among the small ruminants in Ethiopia, sheep are the dominant livestock, providing up to 63% of cash income and 23% of the food subsistence value obtained from livestock production [3]. Regardless the large size of the sheep population in the country and the huge potential therein; the productivity per animal and the contribution of this sub-sector to the national economy is relatively low due to multitude of constraining factors including malnutrition, diseases, improper health care and other management problems [4, 5].

Both infectious and parasitic diseases are common traits that affect productivity [5, 6]. Parasitic infections pose a serious health threat and limit the productivity of livestock due to the associated morbidity and mortality [7]. Vast numbers of parasitic diseases are incriminated to play a detrimental role in hampering small ruminant production leading to serious economic loss [8]. Gastro-intestinal helminthosis is considered as one of the major parasitic problem that constrained livestock improvement programs in Ethiopia. One of the helminthosis that causes immense direct and indirect losses especially in domestic ruminates is fasciolosis [6, 9]. Fasciolosis is one of the most prevalent helminths infections of ruminants in different parts of the world. Particularly in its sub clinical forms where it has been shown to reduce growth rates, feed conservation, fertility and milk yield [10, 11].

Fasciolosis is caused by digenean trematode of the genus *Fasciola* consisting of two species usually implicated in causing the disease namely *F. hepatica* and

F. gigantica. Ruminants are the natural hosts for *Fasciola* among which sheep and cattle suffer the highest infection [11, 12]. Fasciolosis is an economically important disease leading to huge financial losses due to morbidity and mortality and also due to liver condemnation thereby contributing to loss in productivity of livestock industry in Ethiopia [13-15]. Ahmed *et al.* [15] reported an annual loss of 48.4 million Ethiopian Birr (1 US\$ =2.07 ETB) per year due to ovine fasciolosis.

Considerable work has been done on the prevalence and economic significances of ovine fasciolosis in many parts of Ethiopia [9, 15-19]; however, no report so far has been published on the level of fasciolosis in the present study areas, where sheep are important assets to the local farmers. Hence, the current study aimed to determine the prevalence of ovine fasciolosis in Oda Bultum Woreda, Western Hararghe, Ethiopia.

MATERIALS AND METHODS

Study Area: The study area namely, Oda Bultum Woreda is located in eastern high lands of Oromiya regional state in west Hararghe Zonal Administration. It is situated 364 km East of Addis Ababa and 38 km from Zonal city, Chiro. The study area is located at an altitude between 1200m-2400m with an average altitude of 1780m. The temperature of the area varies between 22°C -28°C with average 25°C and the annual average rain fall is around 1200mm. The area has a subtropical (Weynadega), tropical (kola) and temperate (dega) type of climate division and accounting for 31%, 65% and 4% respectively. The livestock population of the Woreda is estimated at 96,491 cattle, 12,020 sheep, 42,132 goats, 16,710 donkeys, 163 mules, 54,416 poultry, 7,012 camels and 10,942 bee hive colonies [20].

Study Animals and Sampling Method: Indigenous sheep kept under traditional extensive management system in the area were used for the study considering different age, sex and body condition groups. The sample size was determined by the formula described by Thrusfield [21]. Accordingly, at 95% confidence level and precision of 5% the total sample size was determined to be 384. Three Peasant Associations (PAs) were purposely sampled and with the assumption of 1-5 sheep in one flock study animals from the PAs were then systematically selected from the flock and examined.

Sample Collection and Coprological Examination: Random Faecal samples were collected directly from the

rectum of 384 sheep and placed into sampling bottle and preserved in 10% formalin. Samples were taken to Baddessa Veterinary Clinic Laboratory. In the Laboratory, coproscopic examination was performed according to the sedimentation technique described by Hansen and Perry [22]. Records of age, sex and body condition score of individual animals were made during sample collection. Age and body condition score of the animal was determined by the method used by Gatenby [23]. Accordingly age of the animals was classified as young (up to 2 years) and adults (above 2 years), while the body condition score was classified as good and poor.

Statistical Analysis: Prevalence was defined as the proportion of the number of sheep positive for *Fasciola* egg by the sedimentation test to the total number of sheep tested, which was expressed in percent [21]. The chi-square (X^2) statistic was used to measure the association between prevalence of the parasite and independent variables (age, sexes and body condition scores) using SPSS version 20. In all analysis, 95% confidence interval and $P < 0.05$ was set for significance.

RESULTS

Overall Prevalence: From a total of 384 examined sheep fecal samples, 175 samples were found positive for *Fasciola* eggs with an overall prevalence of 45.6%. The prevalence of fasciolosis recorded in the three Peasant Associations (PAs) were 42.9%, 45.7% and 47.8% in Gode Hora, Midegdu and Borema, respectively. This difference in the prevalence was not statistically significant ($p > 0.05$) (Table 1).

Prevalence by Age Group of Animals: The infection rate between young and adult animals was compared. It was observed that the prevalence of fasciolosis was significantly higher in adult (53.1%) than young (40.1%) animals ($p < 0.05$) (Table 2).

Prevalence by Sex Groups: The overall prevalence of fasciolosis in male and female sheep was 43.2% in male and 48.1 in female. Although the prevalence was relatively higher in female sheep the difference was not statistically significant ($p > 0.05$) (Table 3).

Prevalence by Body Condition Score: In the present study the prevalence of fasciolosis was found to be higher in sheep with poor body condition than those with good body condition ones with an overall prevalence of

Table 1: Prevalence of ovine fasciolosis on site basis

PAs	No. Examined	No. Positive	Prevalence (%)	χ^2 (P-value)
Gode Hora	121	52	42.9	0.600(0.738)
Midegdu	127	58	45.7	
Borema	136	65	47.8	
Total	384	175	45.6	

Table 2: Prevalence of ovine fasciolosis on age group basis

Age Groups	No. Examined	No. Positive	Prevalence (%)	χ^2 (P-value)
Young	222	89	40.1	6.378(0.013)
Adult	162	86	53.1	
Total	384	175	45.6	

Table 3: Prevalence of ovine fasciolosis on sex basis

Sex	No. Examined	No. Positive	Prevalence (%)	χ^2 (P-value)
Male	199	86	43.2	0.925(0.357)
Female	185	89	48.1	
Total	384	175	45.6	

Table 4: Prevalence of ovine fasciolosis on the basis of body condition score

Sex	No. Examined	No. Positive	Prevalence (%)	χ^2 (P-value)
Poor	219	113	51.6	0.925(0.357)
Good	165	62	37.6	
Total	384	175	45.6	

51.6% and 37.6 % respectively. The difference in the prevalence in the two categories in body condition score was statistically significant ($p < 0.05$) (Table 4).

DISCUSSION

The present study revealed an overall prevalence of 45.6% (175/384) in the study area. This finding is in agreement with Bitew *et al.* [19] and Yilma [17] who reported prevalence of 49% in Kemisse and Holeta, respectively. The result of the present study was relatively lower than the reports from different parts of the country. Prevalence of 90% in Shoa and Gojam by Bergeon [24], 73% in western Shoa by Yadeta [9], 63% by Bahru and Ephrem [25] and 53% by Beyazen [26] in Eastern Gojam has been reported. But the current infection prevalence is higher than the prevalence of 35% in Walisso by Rahmato [27], 30% in Ziway by Adem [10], 13.4% in Nekemte by Wessise [18] and 13.2% in the middle Awash River basin by Ahmed *et al.* [15]. The differences in the prevalence might be related to the variation in the agro-climatic condition, management system, in the different study areas. Prevalence rates and epidemiology of the disease vary significantly with locality and this attributed mainly due to the variation in the climate and ecological conditions [8, 28]. The prevalence of fasciolosis in the different PAs of the study areas were 42.9 in Gide Hora, 45.7 in Midegdu and 47.8

in Borema, showing no statistical differences ($p > 0.05$). The statistically insignificant difference of the prevalence between the different PAs might be attributed to the similarity of the altitude and other ecological conditions. Yilma and Malone [29] indicated altitude to be one of the determinant factors for the difference in distribution of fasciolosis.

Prevalence of fasciolosis with regard to sex was 48.1 % and 43.2% in female and male animals respectively. The difference was not statistically significant ($p > 0.05$). The fact that prevalence of fasciolosis was not significantly different between male and female sheep may indicate that sex of the animals has no impact on the prevalence because both sexes are allowed to graze and are equally exposed to the infection. Similar observations have been made in several studies [15, 19, 30].

The present study indicated that an infection rate of fasciolosis was significantly ($P < 0.05$) higher in adults than young sheep. This finding was in consent with other reports [15, 19, 31]. The lower prevalence rate in young sheep might be due to the management system of sheep in the study area where they are not allowed to go far with adults for grazing hence reducing the chance of exposure to the infective larvae of *Fasciola* worm. Moreover Ahmed *et al.* [15] suggested that the higher risk of exposure of adult might be due to physiological differences including stress, pregnancy and nutritional imbalances.

The results of the present study indicated that higher infection rate of fasciolosis was recorded in sheep with poor body condition than good body condition animals. Fasciolosis has been incriminated as the cause of weight loss [32] and is an important sign of the disease [33].

CONCLUSION

In general the present study revealed a higher prevalence of ovine fasciolosis indicating that fasciolosis is an important disease that could potentially hinder the productivity of sheep in the study area and tremendously affect the rural economy at large. Hence, strategic application of anthelmintics, eliminating the parasites from the host at the most appropriate time for effective prevention of pasture contamination, coupled with reduction of the number of intermediate host, snails by chemicals, drainage and other management practices or biological control measures should be employed. Furthermore, Reduction in the risk of infection by planned grazing management especially during high out break months, by the application of zero grazing (cut and carry) and tethering of animals should be practiced in the study area.

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