Study on the prevalence of Bovine fasciolosis in Hulet Ejju Enesie District East Gojjam Zone, Northwest Ethiopia

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Abstract: A cross sectional study was conducted to determine the prevalence of bovine fasciolosis and associated risk factors in Hulet Ejju Enesie District from July 2018 to January 2019. Simple random sampling technique was employed to select the study animals. A total of 384 faecal samples were collected and subjected to coprological examination. Sedimentation technique was used to detect fasciola egg. Based on the coprological examination the overall prevalence of bovine fasciolosis was 39.6%. Sex, age, peasant association and body condition were taken into consideration where 41.2% and 37.6% were recorded for female and male cattle, respectively. The prevalence that was determined from coprological examination was highest in Ayen Birhan (40.6 %) followed by Hibre Selam and Beza Bizuhan (39.6%), and Debir Mekial (38.6%). However, there was no statistical significant variation ($P > 0.05$) in the prevalence of fasciolosis based on sexes and localities of the animals. The result of the study indicated that age and body condition had significant difference ($P < 0.05$) as greater magnitude of infections were detected in poor body condition (77.7%) and adult age group (44.3%).
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1. Introduction

Fasciolosis is an economically important parasitic disease, which caused by trematodes of the genus Fasciola that migrate in the hepatic parenchyma, and establish and develop in the bile ducts (Troncy, 1989). Fasciola is commonly recognized as liver flukes and they are responsible for wide spread morbidity and mortality in cattle characterized by weight loss, anemia and hypoproteinemia, reduced production of meat, milk, wool, and expenditures for anthelmintics. The two most important species, Fasciola hepatica found in temperate area and in cooler areas of high altitude in the tropics and subtropics and Fasciola gigantica, which predominates in tropical area. The snail of the genus Lymnae natalensis and Lymnae truncatula are known as intermediate host in life cycle of fasciolosis. Infection with Lymnea truncatula is usually associated with herds and flocks grazing wet marshy land (Payne, 1990). F. gigantica is usually endemic in lower regions while F. hepatica is endemic in the high lands (Boray, 1982). Fasciola gigantica is a fresh water snail and infection with this species is associated with livestock drinking from snails infected watering places as well as with grazing wetland. Huge amount of snails are found in grazing area and river. Most of the farmers of this area use river's water for the drinking purpose of their cattle. Farmers in this area reared high yielding animal for the fattening and milk production. Parasitic diseases often prevent them from attaining optimum productivity. However, the magnitude of bovine fasciolosis is not well addressed in Hulet Ejjue Enesie district where the present study was conducted. There for the objective of this study was designed to estimate the current prevalence of bovine fasciolosis in the study areas.

2. Materials and Methods

2.1 Study area

The study was conducted from July 2018 to January 2019 in Hulet Ejjue Enessie district East Gojjam Zone, northwest Ethiopia. The areas were selected purposively by considering the importance of fasciolosis in bovine. The district has highland, midland, and lowland agro-ecologies. Hulet Ejjue Enessie is located in the East latitude and longitude of 11°15'(11.25°) north 37°45'(37.75°) east. With an elevation vary from 1200 to 3500m.a.s.l. The rainfall distribution varies from year to year and across seasons. Accordingly the annual rainfall distribution varies between 1150mm to1189mm. The long rain season extends from June to September followed by a dry season October to February. The shorter rainy season lasts from March to May. The daily temperature varies from 8^0c to 30^0c with the average temperature of 22^0c. (HEEDAO, 2018)

2.2 Study Animals

Indigenous bovine comprising of 384 local breeds, kept under extensive management system, owned by smallholders, was used for the study.

2.3 Study Design

A cross-sectional study design was used to determine the prevalence of bovine fasciolosis in the study area.

2.4 Sample Size Determination

Simple random sampling method was implemented for sampling of bovine. Sample size for the study was calculated using the formula given by (Thrusfield, 2005) with precision level of 5%, confidence interval of 95% and the expected prevalence of 50%, since there was no similar study done previously on the study area. Accordingly, the required sample size was 384.

n=1.962*Pexp (1-Pexp)/d2

Where n=require sample size, Pexp=expected prevalence, CI=confidential Interval (95%), d=desired absolute precision (5%).

2.5 Sample collection and fecal examination techniques

Three hundred eighty-four faecal samples were collected from the rectum of each animal using disposable plastic glove. All samples were kept in clean sampling bottles containing 10% formalin as a preservative and labeled with the necessary information appropriately. The samples were transported to Hulet Ejju Enesie district animal health clinic laboratory for examination. Then, the samples were processed in the laboratory using the sedimentation technique (Anne *et al*., 2012). Identification of *Fasciola* eggs was done using a standard microscope with x10 objective magnification. To differentiate between eggs of *Paraphistomum* species and *Fasciola* species a drop of methylene blue solution was added to the sediment. Eggs of *Fasciola* species show yellowish brown color with an indistinct operculum and embryonic cells while eggs of *Paramphistomum* species is large and show transparent egg shell with distinct operculum and clear embryonic cells (Urquhart *et al*., 2007).

2.6 Data Management and Analysis

Descriptive statistics was used to analyze the sample data. Overall prevalence was calculated by dividing the number of positive animals by the total number of animals examined and times 100. Chi-square (÷2) test was used to asses weather there is a statistical significant difference in Fasciola infection between sex, age, peasant association and body condition. A statistically significant association between variables was considered to exist if the calculated p-value is less than 0.05 with 95% confidence level.

3. Results

Variable	Categories	Number Examined	Number Positive	Prevalence %	χ 2	P-value
Species	Bovine	384	152	39.6	0.5237	0.469
Sex	Female	206	85	41.2		
	Male	178	67	37.6	0.5237	0.469
Age	Young	89	39	43.8		
	Adult	221	98	44.3		
	Old	74	15	20.3	14.3039	0.001
Body condition	Poor	63	49	77.7		
	Medium	257	98	38.1		
	Good	64	5	7.8	65.6691	0.000
Peasant Association	Hibre Selam	96	38	39.6		
	Beza Bizuhan	96	38	39.6		
	Ayen Birhan	96	39	40.6		
	Debir Mekial	96	37	38.6	0.0871	0.993

4. Discussion

The present study indicated that, over all prevalence of bovine fasciolosis was (39.6%). This result is relatively higher when compared with the prevalence (27.1%) reported by Rahmeto Abebe (1992) in Wolliso, (28.63%) by Mulugeta Birhane (2008) at Hawassa. But it is lower than (90.65%) reported by Yilma Jobre and Mesfin Ali (2000) at Gondar and (46.58%) Tadele Tolossa and Worku Tigre (2007) in jimma. This great variability shown is probably due to the ecological and climatic differences between different locations throughout the country and examination technique. One of the most important factors that influence the occurrence of fasciolosis in an area is availability of the suitable snail habitat (Soulsby, 1982; Urquhart *et al*., 1996). The prevalence of fasciolosis with regard to body condition was (77.7%) poor, (38.1%) Medium and (7.8%) Good body conditions. It was higher in poor body conditions than medium and good body conditions. It was statistically significant ($p < 0.05$). The probable reason could be due to the fact that animal with poor body condition are relatively less resistant compared with that of medium and good body conditions and are

consequently susceptible to various disease including fasciolosis and may be created by lack of essential nutrients and poor management (Kasanesh *et al*., 2017). Out of the total 384 fecal samples examined (39.6%) were found to be positive for eggs of *Fasciola* species. This result is very close to the findings of (37.2%) by Solomon Woldemariam and Abebe Wossene (2007) in Mecha & Fogera and (33.42%) by Yilma Jobre and Mesfin Ali (2000) in Gondar. Prevalence of *Fasciola* infection among the different localities was (39.6%) in Hibre Selam, (39.6%) in Beza Bizuhan, (40.6) in Ayen Birhan and 38.6% in Debre Mekial areas were recorded which showed insignificant ($p > 0.05$). This could be attributed to the presence of similarity of large marshy and/or water logged areas and agro-ecological conditions such as altitude, rainfall and temperature favouring the development of intermediate hosts and the parasite stages. Analysis of the fecal egg detection result didn't show statistically significant difference between two sexes as risk factor ($P>0.05$). This indicates that there is no difference in acquiring *Fasciola* infection between male and female animals (Solomon Woldemariam and Abebe Wossene, 2007). This might be due to common exposure to a similar *Fasciola* contaminated pasture land by both sex groups and traditionally animals are driven to pasture regardless of sex. In this study, a significant variation ($P<0.05$) was revealed in the prevalence of *Fasciola* between different age groups. This finding agrees with the works of Solomon Woldemariam and Abebe Wossene (2007); and Yilma Jobre and Mesfin Ali (2000). The detections of *Fasciola* eggs were lower in old age group (20.3%). This is probably due to the fact that old age groups are not often driven with young and adult age groups to grazing and watering points due to fattening purpose they are kept at a nearby village and regularly dewormed. This practice naturally reduces the chance of infection in this age class.

5. Conclusion and Recommendation

The present study indicated that fasciolosis is an endemic parasitic disease affecting the health and productivity of animal in the study area. Moreover, the study area is suitable for the survival of the snail which worsened the situation for the future. Therefore, strategic application of fluckicide and avoiding animals grazing from marshy land plays considerable success for the control of fasciolosis in these study areas.

Based on the above conclusion the following recommendations are forwarded:

- Strategic use of anthelminthic should be performed to reduce pasture contamination with fluke eggs.
- Aware of the transmission methods and control strategies of fasciolosis to the owner.
- Further epidemiological investigation on economic loss should be needed in the study area.

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