Prevalence Of Bovine Fascioliasis In Banja Woreda Of Awi Zone, Amhara Regional State, Ethiopia

Gezahegn Mesele[1], Melese Yenew[1, 2] and Mengestie Abebaw[1]

[1]College of Veterinary Medicine, Jigjiga University, P.O. Box.1020, Jigjiga, Ethiopia.
[2] Faculty of Veterinary Medicine, College of Medical and Health science, University of Gondar, P.o.box. 196, Gondar, Ethiopia,
melese2007yenew@gmail.com

Abstract: A cross-sectional study was conducted from November, 2015 to April, 2016 to determine the Prevalence of bovine fasciolosis in Banja woreda Awi zone, Amhra Regional State. A total of 384 fecal samples were examined, 191 (49.74%) were found to be positive for Fasciolosis. Sex, age, peasant associations, breed and body condition were taken into consideration where as 42% and 51% and prevalence were recorded for young and adult animals respectively. Similarly, 52.9% and 47.1% prevalence were recorded for male and female cattle respectively. However, no statistical significance (P > 0.05) was observed in male and female. The coprological examination was indicated highest in Enjibara (21.1%), followed by %), Akayita (19.8%), Kebelie 03 (19.8%), Kessa (19.8%.) and Batambi (19.5%). There was also no statistically significant difference (P > 0.05) in infection rate between these kebeles. The result of the study indicated that breed had significant difference (P < 0.05) with prevalence of (30.5 %) and (69.5 %) in cross and local breeds, respectively and also (40.6%) in poor (32%) in medium and (27.3 %) in good body conditions were recorded. So the result indicates there is statistically significant difference (P<0.05). In view of the current result, Fasciolosis could be considered as a major problem in Banja Woreda and surrounding areas as the ecological factors and management conditions are suitable both for the snail intermediate host and the parasite to be maintained. Therefore Strategic demworming and Integrated control approaches involving livestock owners has to be implemented in reducing the population and activity of snail intermediate hosts to enable maximization of long-term returns from such endemic areas. further studies should be conducted in the area of the research were also recommended.

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Introduction

Fasciolosis is a parasitic disease, which is caused by trematodes of the genus *Fasciola* that migrate in the hepatic parenchyma and establish in the bile ducts (Troncy, 1989). *Fasciola* is commonly recognized as liver flukes and are responsible for wide spread morbidity and mortality in cattle characterized by weight loss, anemia and hypoproteinemia. The two most important species are *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 (Urquhart *et al*., 1996).

In cattle, Fasciolosis causes a substantial economic loss which includes death, loss in carcass weight, reduction in milk yield, condemnation of affected liver, decline production and productive performances, exposure of animals to other diseases due to secondary complications and cost of treatment expenses. Both *F. hepatica* (high land) and *F. gigantica* (low land) type of liver flukes cause severe losses in Ethiopia where suitable ecological conditions for the growth and multiplication of intermediate host snails are available (Anne and Gary, 2006).

F. hepatica was shown to be the most important fluke species in Ethiopian livestock with geographical distribution ranging over three quarter of the nation except in arid north east and east of the country. The spatial distribution of *F.gigantica*was mainly localized in the western humid zone of the country that encompasses approximately one fourth of the country (Malone and Yilma, 1998). The disease is found in vast water logged and marshy grazing field condition. These provide suitable habitats year round for the snail intermediate hosts (Solomon and Abebe, 2007).

Fasciolosis is one of the most prevalent helminthes infections of ruminants in different parts of the world including Ethiopia (WHO, 1995., Okewole *et al*., 2000). In Ethiopia, *F. hepatica* and *F.gigantica* infections occur in areas above 1800 m and below 1200 m above sea level respectively which has been attributed to variations in the climatic and ecological conditions such as rainfall, altitude, and temperature and livestock management system. In between these altitude limits, both species coexists where ecology is conductive for both snail hosts, and mixed infections prevail (Yilma and Malones,1998).

The prevalence of fasciolosis due to *F.hepatica* and *F.gigantica* in Ethiopia has long been known and its prevalence and economic significance has been reported by several studies (Wondosen, 1990., Mulugeta*et al.,* 1993., Mezgebu, 1995). The prevalence of bovine fasciolosis has shown to range from 11.5 to 87% (Malone and Yilma, 1998). Fasciolosis is the priority disease in the highland and lowland areas of Amhara region (Solomon and Abebe,2007).

Even if there were some study and reports about bovine fasciolosis in and around Bahirdar and Dangla woreda. But there were no any documented (study) about bovine fasciolosis in Banja woreda, Awi zone. Therefore, the objective of this study is to determine the prevalence of bovine fasciolosis in Banja woreda and to assess the epidemiological risk factors that might contribute for fasciolosis and to generate valuable base line information for further information for further studies that will be conducted in the area.

Objective

- To estimate the prevalence of fasciolosis in Bovine in Banja Woreda, Awi Zone, Amhara Regional State.

2. Material Andmethod

2.1Study Area

The study was conducted from November 2015 to April 2016 in Banja District which is located in Awi zone of Amhara region. The district located at latitude of 11° 10'north and longitude of 36° 15' east and 122km far from the regional city Bahir Dar to south and 447km north to Addis Ababa. The average elevation of the district is 2560m above sea level and the mean annual rain fall is 1300mm. The annual mean temperature also varies from 12°C to 25°C with mean value of 18.5°C. The district has a total of 26 peasant association. Like other parts of the country agriculture is the main economic activity and livestock supports the crop production. The district is classified into one agro climatic zone, which is high land with wet and cool weather condition (Ethiopian Mapping Agency, 1982) (According to the 2010 census report, the district has 55,543 bovine, 59,510 sheep and goat and 23,523 equine).

2.2. Study Population

The study animals were local and cross breed of cattle in Banja district. The animals in the study period were kept under extensive management system of different age groups and body condition of both sexes. A total of 384 heads of cattle were randomly selected and subjected to qualitative coprological examination.

2.3. Study Design

A cross-sectional study was conducted from November, 2015 to April, 2016 to determine theprevalence of bovine fasciolosis and associated risk factors in Banja district. This was done by using laboratory examination employing sedimentation technique onfeces collected directly from the rectum of live animals (cattle).

2.4 Sampling Procedure

Faecal samples for parasitological examination were collected directly from the rectum of each animal, using disposable plastic gloves and placed in clean screw capped universal bottle and each sample was clearly labeled with animal identification, place of collection, body condition score, deworming history, sex and age. Fecal samples were presented with 10% formalin solution to avoid the eggs developing and hatching. In the laboratory, coprological examinations were performed and were kept at $4^{O}C$ until all are processed and examined. Sedimentation technique was used to detect the presence of absence of fluke eggs in the fecal sample collected. To differentiate between eggs of *Paramphistomum* species and *Fasciola* species a drop of methylene blue solution was added to the sediment. Eggs of *Fasciola* species show yellowish color while eggs of *Paraphistomum* stain methylene and shows grayish color.

2.5. Sampling Methods and Sample Size Determination

The animals were selected by using simple random sampling method. To determine the sample size, an expected prevalence of 50% was taken into consideration since there was no research work on fasciolosis in the area. The desired sample size for the study was calculated using the formula given by Thursfield (2005) with 95% confidence interval and 5% absolute precision. After calculated, the obtained sample size was 384.

$$n = \frac{1.962Pexp\ (1-Pexp)}{d^2}$$

Where Pexp = expected prevalence;
d= absolute precision;
n =sample size.

2.6. Data Analaysis and Management

The raw data generated from the study were entered into Microsoft Excel database organized and arranged using Microsoft Excel spread sheet computer program and were analyzed by SPSS Version 20. The prevalence of fasciolosis was calculated using the number of infected individuals divided by the number of cattle examined x 100. Chi-square was used to evaluate the association between fasciolosis with sex, age, breed, body condition, location of the cattle. In all statistical analysis, confidence level was held at 95% and P-value is <0.05 (at 5% level of significance) was considered as significant.

2.7. Coprological Examination

Fecal samples were collected directly from rectum of randomly selected cattle by hands protected by rubber gloves, using two fingers (i.e., middle and index fingers). Each sample was clearly labeled with animal`s identification, date and place of collection (location). Samples were packed and dispatched in cool box and then, transported to the Enjibara Laboratory by preserving with 10% formalin in the universal bottles to avoid development of eggs and hatching. In the laboratory, coprological examinations were performed and were kept at 4°c until all are processed and examined. In the laboratory, coprological examination was done to detect *Fasciola*species eggs using the standard sedimentation technique as described by Hanson and Perry (1994). The qualitative sedimentation technique was used for detecting trematode eggs in the fecal samples.

Results

In Banja district for the occurrence of fasciolosis,191 cattle were positive for *Fasciola* eggs, resulting in an overall prevalence of 49.74%. There was no statistically significant variation in the prevalence of bovine fasciolosis (P>0.05) in the selected peasant association. The prevalence recorded in Enjibara (21.1%), Akayita (19.8%), Batambi (19.5%), kebelie03 (19.8%), and Kessa (19.8%). The highest prevalence was recorded in Enjibara (21.1%) while the lowest in Batambi (19.5%) as shown in (Table1). But there was no statistically significant difference (P>0.05). Infection rate in local breeds (69.5%) was higher than cross breeds (30.5%) as shown in Table 2. There was statistically significant differences between the local and cross breeds of cattle on the prevalence of fasciolosis on fecal examination results (P=0.0).

In Sex, different level of prevalence 52.9% and 47.1 % was detected in male and female cattle respectively were found. However, there was no statistically significant difference (P > 0.05) in infection rates between the sexes as describe in Table2.

It was indicatedin young age (42%) followed by adult age (51%) and old age (7 %). Significant difference was observed in the prevalence among different age groups (P=0.005) as shown in Table2.

The body condition result indicated that there was statistically significant difference between cattle having good, medium and poor body condition (P=0.00), Higher prevalence of bovine fasciolosis was observed in poor body condition (40.6%) than medium (32%) and good (27.3%) body condition as described in Table 3.

Table1: Prevalence of bovine fasciolosis on Locality

Category	Variable	No.Sample	No. Positive	Prevalence	X^2	P.value
	Akayita	76	35	19.8		
	Batambi	75	43	19.5		
Site	Enjibara	81	34	21.1	5.058	0.281
	Kebelie03	76	42	19.8		
	Kessa	76	37	19.8		
	Total	384	191	100		

Not significant (P=0.281).

The prevalence bovine fasciolosis was higher in Enjbara (21.1. %) and lowest in Batambi (19.5 %).

Table 2. Prevalence of Bovine fasciolosis on breed, sex and age

Catigory	Variable	No.sample	No.posetive	Prevalence	X^2	P.value
Breed	Local	267	155	69.5	24.223	0.00
	Cross	117	36	30.5		
	Total	384	191	100		
Sex	Male	203	99	52.9	0.162	0.382
	Female	181	92	47.1		
	Total	384	191	100		
	Young	161	65	42	10.588	0.005
Age	Adult	196	113	51		
	Old	27	13	**7**		
	Total	384	191	100		

Infection rate in local breeds (69.5%) was higher than cross breed (30.5%), this could be due to differences in the management practices of the farmers. The local breeds are reared under traditional husbandry system and farmers give more attention to

cross-breed than local breeds because of their production differences

In Sex, different level of prevalence 52.9% and 47.1 % was detected in male and female cattle respectively. However, there was no statistically significant difference (P > 0.05) in infection rates between the sexes as describe in table 2. The prevalence of bovine fasciolosis was higher in age group between four and seven years (51%) than that of age groups three and below three year (42%) and age groups eight and above eight years (7%). High significant difference was observed in the prevalence of bovine fasciolosis among different age groups.

Table 3: Prevalence of bovine fasciolosis based on Body condition score

Catigory	Variable	No.sample	No.Posetive	Prevalence	X2	P.Value
	Poor	156	70	40.6		
Body condition	Medium	123	89	32.1	42.235	0.00
	Good	105	32	27.3		
	Total	384	191	100		

The prevalence bovine fasciolosis was higher in poor body condition (40.6%) than that of medium body condition (32.1%) and good body condition (27.1%). High significant difference was observed in the prevalence of bovine fasciolosis among different body condition.

Discussion

Out of total 384 fecal samples examined, 191(49.74%) were found to be positive for eggs of Fasciola. This result is in close relate with prevalence of 54.2% by (Edris et *al*., 2008), 52.00%, by (Yehenew. 1985) and (Melaku,2010) in Northeast Amhara region. However, the prevalence of the present study is significantly higher than the prevalence of bovine Fasciolosis reported by (Asmare and Samuel, 2015) at Dangila district, Awi administrative zone (30.02 %). These author studied area of management systems, controlling system and as well as climate-ecological condition are influence distribution of Fasciola to the present study area.

On the other hand, the prevalence of bovine Fasciolosis in the present study is lower as compared with the previous reports in different parts of Ethiopia (Mulualem.,1998) in south Gondar (83.08%), (Yadeta., 1994) in western showa (82.5%), (Dagne,1994) in and around Debre Berhan (80%). This variation wasdue to climate-ecological conditions such as altitude, rainfall, temperature and livestock management system which are suitable for environment survival and distribution of the parasite as well as intermediatehost. Since the prevalence of Fasciolosis is highly related to the favorable ecological factors for snailintermediate (Urquhart *et al.,* 1996).

The current study shows no statistically significant difference between areas in the prevalence of Fasciolosis (p=0.281). This is also in agreement with the works of Dalton (1999) (P=0.201). The absence of significance is most probably due to no variation in the presence of large marshy and/or water logged areas and also agro-ecological conditions such as moisture, rainfall, oxygen tension and temperature favoring the development of intermediate hosts and the parasite stage. Similarly, analysis of the fecal egg detection result showed no statistically significant difference between sexes. This might be due to common exposure to asimilar Fasciola contaminated pasture land by both sex groups and traditionally attributed to grazing and watering points. The detection of fasciola eggs was lower in the young and adult age groups. This is attributed to the fact that calves are often not driven with adult age groups to grazing and watering points.

They are kept at nearby village where the sources of feeding are much limited. This practice naturally reduces the chance of exposure in this age class.

In this study asignificant variation (P=0.005) was revealed in the prevalence of Fasciola between different age groups. This finding agreed with the works of (Solomon Woldemariam and Abebe Wossene, 2007) and (Ylma Jobre and Mesfin Ali, 2000). In older animals, decrease in infection rate (prevalence) at older stage of animals is the result of acquired immunity which is manifested by humeral responded and tissue reaction in bovine liver due to pervious challenge (Dwinger et al., 1982). It is also reported that the increase resistance (low prevalence) as age increase is most likely related to the high level of tissue reaction seen in bovine liver, server fibrosis which protect the passage of immature fluke, acquired resistance, thickening, stenosis and calcification of bile ducts, assumed un favorable site for adult parasites and consequently fasten their explosion.

There was significant association of body condition score with prevalence bovine Fasciolosis (P=0.00). Higher prevalence of Fasciola parasite was recorded in poor body condition animals comparedto medium and good body condition groups and this was in close related as reported by (Ayalew and Endalkachew, 2013). This poor body condition might be due to malnutrition, other concurrent disease or the current parasitic infection which leads to poor

immunological response to infective stage of the parasite.

The infection rate of bovine fasciolosis on the basis of breed showed statistically significant difference ($P < 0.00$). Infection rate in local breeds (69.5%) was higher than cross breed (30.5%), this could be due to differences in the management practices of the farmers. The local breeds are reared under traditional husbandry system and farmers give more attention to cross-breed than local breeds because of their production differences.

Conclusionandrecommendations

The present study was conducted on bovine Fascioliasis for aperiod of 5 month in Banja woreda indicated that Fasciolosis was the most wide spread and prevalent parasitic diseases affecting the health and productivity of animal with an overall prevalence of 49.74%. It was indicated that the Fasciola in the study were high in local breed of male, adult with poor body conditions. Fasciolosis was the disease of primarily concern in the site remarked by its priority list in the disease control program of the study areas because of theoccurrence is closely associated to the presence of suitable environmental conditions for the developmentof snails. Hence, this study may be valuable for the Banja Woreda and the country by providing data about prevalence of bovine fasciolosis in the area and consequently its economic significance.

Based on the above conclusion the following recommendations were forwarded to alleviate the existing problems and to promote the status of the cattle dependent people living in the study area.

- Avoiding animals grazing from marshy land may play considerable success for the control of fasciolosis in Bnaja Woreda.
- Farmers should be educated and informed about the importance of the disease control programs and regular deworming.
- further epidemiologicalstudy on biology and ecology of the intermediatehost so as to develop a substantial planningand implementation on the control strategies of the disease.

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Corresponding Author:
Dr. melese yenew and Dr. Gezahegn Mesele
College of Veterinary Medicine, Jigjiga, University, P.o.box.1020, Jigjiga, Ethiopia
Email: melese2007yenew@gmail.com

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