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The Preliminary Survey of the Prevalence of Bovine Fasciolosis in Quarit District, Northwestern Ethiopia

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Abstract: A cross sectional study was conducted to determine the prevalence rate of bovine fasciolosis in Quarit district between from September, 2010 to March, 2011. The study animals were bovine species and the sample size was 194 female and 206 male which makes a total of 400. The result indicates that the prevalence rate of bovine fasciolosis is 43.25% (173/400). Attempt was made to identify the species of fasciola responsible in the area. For this purpose about 23 liver fluke affected and rejected liver were examined and the result indicated that *Fasciola gigantica* (*F. gigantica*) accounts for 17. 39% (4/23), *F. hepatica* was found comprising 39.13% (9/23) and mixed infestation recorded was 43.48 %(10/23). The study has also tried to see the effects of associated risk factors such as age, sex and area and body condition in the prevalence rate of bovine fasciolosis. Hence, sex difference has no influence in prevalence rate of bovine fasciolosis. However, age group, body condition and area have paramount effect in the prevalence rate.

Key words: Bovine Fasciolosis · Prevalence · Quarit

INTRODUCTION

Bovine fasciolosis is an important disease of cattle, especially in the marshy areas of western Amhara part of Amhara region. Calves and yearlings are most commonly affected, by any age of animal may be susceptible to the effects of infection. Climate and availability of water bodies are the determinate factors play an important part in the epidemiology of the disease.

The disease is caused by fasciolidae trematodes of the genus fasciola which migrate in the hepatic parenchyma established and developed in the bile ducts. The two most important species are F. hepatica which is common in the temperate areas and cooler areas of high altitude in the tropics and sub tropics, while *F. gigantica* predominately found in the tropics [1].

The parasite needs an intermediate snail host to complete the life cycle. The snails of the Genus Lymnea are responsible for life cycle of fasciolosis. *L. natalensis* is and aquatic snail important for the life cycle of *F. gigantica* in Africa while *L. Truncatula* is the amphibious snail with the wide distribution throughout the world, the most common intermediate host of *F. hepatica* [2,3].

Acute fasciolosis is uncommon in cattle. But the common type of fasciolosis in cattle is the chronic form; the severity of the disease is dependent on the nutritional status of the host [4-5]. The clinical signs of chronic fasciolosis are variable and depend upon the number of metacercaria ingested weight loss is common. Anemia, edema and cahexia develop gradually. Diarrhea and constipation have also been described [2]. Fasciolosis have both diseases and economic impact. However, there was no any study done in this study site which could depict its prevalence, importance and its risk factors. Thus, this research was designed to quantify the prevalence of bovine fasciolosis and to identify risk factors for occurrence of bovine fasciolosis.

MATERIALS AND METHODS

Study Area: the study was conducted from September, 2010 to March, 2011 in Quarit District of west Gojjam administrative Zone of Amhara National Regional state. It is about 420 kms from Gondar the District receives average annual rainfall 900-1400mm. The altitude of the District ranges from 1500 up to 3200 meter above sea level.

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It has total surface area of 614.73Km$^{2.}$ The district is composed of 36%Dega and 64% Woina-Dega.

Study Animals: In Quarit district there are 71,987 cattle, 15,850 equine and about 83,678 sheep and goats and 38, 911 poultry. Animals are managed mixed farming system. 400 cattle are involved in this study.

Study Design: A across sectional study involving was done to investigate the prevalence of bovine fasciolosis and associated risk factors. And 400 animals of which 194 are female and 206 male. The variable of interest considered as an output variable versus risk factors was fecal fasciola status. The explanatory variables considered were age, sex and body condition.

Sampling Procedure: Four representative kebels of the District are selected by judgment. Sampling units were selected randomly. Approximately 10 gram fecal sample was collected directly from the rectum. Samples were by 5% formalin solution. At the same time animal identity including age, sex, body condition and Keble of the sampled animal was recorded. At the end of every day sample collection fecal samples were transported to Quarit veterinary clinic laboratory for examination [6].

Coprological Examination: In the laboratory, coproscopic examinations were performed to detect the presence of fasciola eggs according to standard techniques as described by Hanson and Perry [6].

Three grams of faces was weighed and immersed in to a tube containing 40-50 ml of tap water. It was thoroughly mixed. The material was allowed to sediment for 5 minutes. Suspending, sedimentation for 5 minutes and decanting the supernatant carefully was repeated once.

A drop of ethylene blue was added in to the sediment and a drop of the stained sediment transferred to microscope slide. Finally it was covered by cover slip examined for fasciola eggs by 4x and 10x magnifications.

Identification of Fasciola: The presence of fasciola was confirmed by finding of the eggs in the faces. They distinguished from the eggs of other flukes, especially the eggs of paramphistomes [4].

Body Condition Score and Age: Classification of animals according to their body condition score is done according to Nicholson and Butterworth [7] and classification of animals in to three age groups were done as seen in Bone [8].

Data Management and Analysis: Prevalence of bovine fasciolosis was expressed as percentage by dividing total number of samples or animals positive to fasciola eggs to the total number of samples of total number of animals examined. And that value of $P < 0.05$ is taken as significantly different.

RESULTS

Prevalence of Bovine Fasciolosis: The study conducted to Quantify the prevalence of fasciolosis in cattle, the animals considered to be positive for *F. species* when fecal sample examined was positive for fasciola egg. Hence in Quarit District out of a total of 400 cattle fecal sample was collected between September 2010 and January 2011 indicated that 173 animal was positive for fasciola ova. Therefore the prevalence rate of bovine fasciolosis in the District is 43.25% (173 of 400) as seen in table 1. Sex of cattle was tested as a risk factor for fasciolosis; different level of prevalence 43.3 % (84 of 194) and 43.2% (89 of 206) was detected in female and male cattle respectively. However, there was no statistical difference between sexes ($P > 0.05$).

Out of the total 400 animals examined, the highest prevalence rate 48.25% (69 of 143) was observed in cattle grouped in the age category between three and five years while the lowest prevalence rate 27.91% (12 0f 43) was observed in cattle grouped less than three years as shown in table 2.

Of the total cattle examined 184 of them were good in their body condition while the rest 216 were poor in their body condition. Higher level of *F. species* prevalence 49.54% (107. of 216) was poor in their body condition (Table 3). Infection rates of fasciolosis in poor body condition were higher than animals with good group.

All animals examined for fasciolosis was contributed from 4 kebeles namely, Gebeze Mariam, Harege, Enangia and Ashetie. Prevalence of *F. species* was evaluated among these kebels the Highest prevalence 45.92% (45 of 98) was obtained in Harege, while the lowest prevalence, 36.96% (34 of 92) was from Enangia (Table 4).

The species of fasciola involved in the study area from 23 liver examined *F.hepatica* (39.13%), *F.gigantica* (17.39 %) and mixed infection (43.48%) Table 5.

Table 1: Pervasiveness of cattle fasciolosis on sex basis

No	Sex of the cattle	Number of animals examined	Number of positive animal	Number of Negative animal	Infection rate %
	Female	194	84	110	43.30
	Male	206	89	117	43.20
	Total	400	173	227	43.25

χ^2 =0.000368

Table 2: Prevalence of Fasciolosis in different age groups of cattle

No	Age group in year	No of animals examined	No of +ve animals	No of -ve animals	Infection Rate %
1	< 3/three	43	12	31	27.91
2	3-5 year	143	69	74	48.25
3	> 5 year	214	92	122	42.99
	Total	400	173	227	43.25

Table 3: Prevalence of Bovine fasciolosis in poor and good body condition

No	Body condition	No of animals examined	No of +ve animals	No of -ve animals	Infection Rate %
1	Poor	216	107	109	49.54
2	Good	184	66	118	35.87
	Total	400	173	227	43.25

Table 4: Prevalence of Fasciolosis in four kebels

No	Keble	No of animals examined	No of +ve animals	No of -ve animals	Infection Rate %
1	Gebeze Mariam	116	52	64	44.83
2	Harege	98	45	53	45.92
3	Enangia	92	34	58	36.96
4	Ashetie	94	42	52	44.68
	Total	400	173	227	43.25

Table 5: *F. species* encountered in affected liver during post mortem examination of slaughtered animals

Species of fasciola	Number of positive liver	Infection rate (%)
F. hepatica	9	39.13
F. gigantica	4	17.39
Mixed infection	10	43.48
Total	23	100

DISCUSSION

In this cross sectional study of bovine fasciolosis, overall prevalence of 43.25% (173/400) was observed in Quarit district. Other previous studies in the country showed that bovine fasciolosis exists in different regions of Ethiopia [5, 9]. However, the prevalence rate, epidemiology and *F. species* involved vary with location. High prevalence rates of bovine fasciolosis have been reported as high as 86% in Keffa by Bahru and Ephraim [9], 84.4% at Bahir Dar abattoir by Fekadu [10], 57% at Soddo by Abunna *et al*. [11] and 46.58% at Jimma by Tolosa and Worku [12],. However, lesser prevalence rates were also recorded in other sites of the country such as 28. 63% in Hawassa by Rahmeto *et al.* [13] and 24.32% in Mekelle by Berhe *et al*. [14].

The variation in prevalence of bovine fasciolosis may be due to ecological conditions such the presence of intermediate host, the availability of marshy and river basins where cattle are accessible to them for grazing [4,5]. Infection rates of bovine fasciolosis at the level of the kebels of the study district also vary. Example, in Harege kebele it is relatively higher than Enangia this might be attributed to the existence of more favorable environment for both the snail intermediate host and so for the parasite. Thus the parasite prevalence's of these kebels is therefore 45.92% and 36.96% respectively.

When we see the sex wise prevalence of bovine fasciolosis it seems no difference exists. Example in female it is 43.3% and male it is 43.2% respectively. But age influences a role in that as age increases the acquired immunity also increase and there by the prevalence of fasciolosis will decrease [15]. As other possible explanation for this is as age increase it is most likely

related to the high level of tissue relation which is seen in bovine liver, sever fibrosis, which impedes the passage of immature flukes, acquired resistance, thickening, stenosis and calcification of bile ducts, assumed unfavorable site for adult parasites and consequently fastens their expulsion.

This study also depicts that higher infection rate of 48.25% in 3-5 years of age, 27.91% in age of < 3 years and 42.99% in the ages of greater than five years. However, analysis of the fecal egg detection result did not show statistically significant difference on the basis of sex as risk factor. This indicates that there is no difference between male and female animals [16,17] this might be due to grazing of both sex group in similar fasciola contaminated pasture land and traditionally animals are driven to pasture regardless of sex.

In different parts of Ethiopia, similar results in dictating inverse correlation of prevalence and age of cattle were reported by Rahmeto *et al*. [13] as the age increases to reach the adult stage that means second group (3-5) years of age), so the magnitude of infection rate expands to a higher level. And as the age of the increases, the possibility moves towards new environment increases, which is an exposure to *F. species* contaminated pasture lands and water points.

F. species involved in causing the disease in the study area was found to be F. *hepatica* and *F.gigantica* which accounts 39.13% and 17.39% respectively. This is explored from postmortem examination of 23 animals. But mixed infection was also found and accounts 43.48%.

CONCLUSION

Fasciolosis is one of the major livestock diseases in the study area in particular and in Ethiopia in general. The present study indicated that fasciola is the most widely distributed fluke in Quarit District.

Recommendations:

- Water holes should be managed, where ever possible, to prevent both falling of water with excrement from infected animals and the developmental of *Lymnea natalensis*.
- Carpological examination should be repeated due to intermittent expulsion of fasciola eggs and difficult of detecting early infection.
- Strategic uses of anthelmintic should be performed to reduce pasture contamination with fluke eggs. Here proper year round study should be conducted, so as to elaborate time of the year beneficial to apply anthelmintic.

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