

Prevalence of Ovine Fasciolosis and Associated Risk Factors in and Around Liban Jawi Wereda; Babbich Town, Ethiopia

Leta Muleta, Amanuel Diribi and Getachew Delesa

Doctor of Veterinary Medicine, Animal Health Control and Drug Dispenser,
Liban Jawi Wereda Office, Ethiopia

Abstract: Ovine Fasciolosis is one of the major factors that reduce sheep production productivity in Ethiopia. A cross sectional study was conducted on randomly selected sheep in and around Liban Jawi Wereda; Babbich town, Ethiopia during the period from April 2021 to July 2021 to determine the prevalence of parasite infestation with associated risk factors. From the total of 384 examined sheep, 144 were infected by ovine fasciolosis which give an overall prevalence 37.5%. Analysis of potential risk factors has revealed that the rate of infection was significantly higher in older sheep (42.5%) as compared with younger sheep (30.1%)($P < 0.05$). Also the rate of infection was also significantly higher in sheep with low body condition score (69.8%) than medium (45.5%) and good body condition (26.6%) ($P < 0.05$). On the other hand the difference was not statistically significant ($p > 0.05$) between parasitic infections with sexes of sheep. But relatively higher prevalence of the disease in female 42.1% than male 33.8% animals was recorded. In conclusion the present finding has demonstrated that ovine fasciolosis was one of the prevalent parasitic disease in sheep rearing area. Therefore further epidemiological investigation on the diagnosis, control and prevention method and its economic impacts are required.

Key words: Babbich • Fasciolosis • Ovine • Prevalence • Risk Factor

INTRODUCTION

Ethiopia possesses the largest livestock population in Africa, with an estimated population of 7.8 million equines, 1.2 million camels, 59.5 million cattle, 59.5 million chickens, 30.7 million sheep and 30.2 million goats [1]. 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-sectors to the national economy is relatively low due to multitude constraining factors including malnutrition, disease improper health care and other management problems [2]. The parasitic disease produces a serious health trait and limits the productivity of livestock due to the associated morbidity and mortality. Ovine Fasciolosis is one of the major factors that reduce sheep production productivity in Ethiopia [3].

Fasciolosis is one of the important parasitic diseases in tropical and subtropical countries which limit productivity of ruminants [4]. *F. hepatica* and *F. gigantica* are the two liver flukes commonly reported

to cause fasciolosis in ruminants. It causes significant morbidity and mortality. Both the highland (*F. hepatica*) and the low land (*F. gigantica*) types of liver flukes cause severe losses in many parts of Ethiopia where suitable ecological conditions for the growth and multiplication of intermediate host snails are found [5]. Thus, the two Fasciolid species overlap in many Africa and Asian countries. In Ethiopia, the annual losses due to ovine fascioliasis were estimated at 48.4 million Ethiopian Birr per year, of which 46.5%, 48.8% and 4.7% were due to mortality, productivity (weight loss and reproductive wastage) and liver condemnation at slaughter, respectively [3].

Treatment of infected animals will largely depend on the correct use of appropriate and registered anthelmintic. Triclabendazole is the most effective anthelmintic drug which can be destroys or kills all stage of Fasciola. Fasciolosis may be controlled by reducing the populations of the intermediate snail host, or by appropriate anthelmintic treatment and the population of snail should be destroyed by applying Molluscicide and

destroying the environment that suit for snail's reproduction. Several reports have to indicated that fasciolosis is a serious problem for sheep production in Ethiopia causing considerable economic losses. Extensive work has been done on the prevalence of ovine fasciolosis in many parts of Ethiopia, but the status of ovine fasciolosis in the study area has not yet been reported. These losses can be reduced substantially by fasciolosis control programs that may be including the use of anthelmintics, grazing management and nutritional supplementation. Therefore the objective of the study was to estimate the fluke current prevalence rate and risk factors associated with the disease in and around Liban Jawi Wereda; Babbich town, Ethiopia.

MATERIALS AND METHODS

Study Area: The study was conducted from April 2021 to July 2021 in and around Liban Jawi Wereda; Babbich town. According to Liban Jawi wereda natural resource maintainance and climatic change office, Babbich is located in the west of the capital city of the Federal Democratic Republic of Ethiopia, Addis Ababa and capital city of Oromia regional state at a distance 162 Kms. The altitude of the town ranges from 1300-25600 meters above sea level. The mean annual maximum and minimum temperature of the town are 18.87°C and 23.7°C respectively. The livestock population of the area comprises of 73228 cattle, 24503 Equine, 51764 shoat, 90, 025 poultry and 13158 beehives. The main farming system in the area is mixed farming [6].

Study Animals: A total of 384 heads of ovine were randomly selected from different flock of sheep in and around Babich town, Ethiopia for qualitative Coprological examination.

Study Design: A cross-sectional study was conducted from April 2021 to July 2021 in and around Liban Jawi Wereda; Babbich town to determine the prevalence and assess associated potential risk factors of the disease.

Sampling Technique and Sample Size Determination: Simple random sampling technique was employed to select the study animals. The total number of ovine required for the study was calculated based on the formula given by Thrus field [7]. By rule of thumb where there is no information for an area, it is possible to take 50% expected prevalence. In this study 50% expected prevalence with 5% desired level of precision and 95% of confidence interval was used to calculate the sample size using the following formula.

$$n = \frac{1.96^2 \cdot P_{\text{exp}}(1 - P_{\text{exp}})}{d^2}$$

where,

n = required sample size

P_{exp} = expected prevalence = 50%

d = desired absolute precision = 5%.

Therefore, the total sample size was estimated to be 384.

Study Methodology

Fecal Sample Collection: A total of 384 fecal samples were collected during the entire period of the study, directly from the rectum of selected animal using a gloved hand and place into a universal bottle containing 10% formalin. During sampling information on sex, health status, body condition and approximate age of individual animals was recorded based on Gatenby [8].

Laboratory Examination: Sedimentation technique was used to detect the presence or absence of fasciola egg 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 where eggs of Fasciolaspecies show yellowish colour while eggs of Paramphistomum species stain by methylene blue [9].

Data Management and Analysis: All raw data generated from this study was coded and entered in MS Excel database system. Using Statistical Package for Social Science (SPSS) version 20 Computer program, data was analyzed. The prevalence of fasciolosis and associated risk factors was calculated as the number of infected individuals divided by the number of cattle examined x 100. Categorical data was analyzed with the Pearson's Chi-square (χ^2) test to measure the association between prevalence of the parasite with the potential risk factors as a statistical tool. For all analysis, P < 0.05 was considered as significant differences between the parameters measured.

RESULTS

From the total of 384 fecal sample examined for fasciolosis 144 (37.5 %) were found to be positive for fasciola egg by coprological examination. The result revealed that the prevalence of ovine fasciolosis was 42.1% in females and 33.8% in males, respectively. There was no statistically significant difference between the sex and the occurrence of the disease (P > 0.05) (Table 1).

Table 1: Prevalence of ovine fasciolosis on sex basis

Sex	Animal examined	Positive animal (%)	Prevalence	χ^2	Df	p-value
Male	213	72	33.8%	4.193	2	0.123
Female	171	72	42.1%			
Total	384	144	37.5%			

Table 2: Prevalence of ovine fasciolosis between Ages

Age	Animal examined	Positive animals	Prevalence	χ^2	Df	p-value
Adult	228	97	42.5%	7.332	2	0.026
Young	156	47	30.1%			
Total	384	144	37.5%			

Table 3: Prevalence frequency of ovine fasciolosis among body condition

BCS	Animal examined	Positive animal	Prevalence	χ^2	Df	p-value
Good	218	58	26.6%	42.578	4	<0.001
Medium	123	56	45.5%			
Poor	43	30	69.8%			
Total	384	144	37.5%			

Table 4: Prevalence frequency of ovine fasciolosis among clinical sign observance

Clinical sign observance	Animal examined	Positive animal	Prevalence	χ^2	Df	p-value
Show clinical sign	134	46	34.3%	1.478	2	0.06
Apparently health	250	98	39.2%			
Total	384	144	37.5%			

DISCUSION

Several studies showed that ovine fasciolosis in particular poses the major constraints to small ruminant production causing significant economic losses in Ethiopia. The present study was designed to determine prevalence and assess risk factors associated with Ovine fasciolosis. The study showed that ovine fasciolosis is a common parasite of sheep in the study area. The overall rate of infestation among 384 of sample examined was 37.5 %. The prevalence of the disease in the study area may be attributed to the favorable ecological factors for the snail intermediate host and the parasite. The area is water lodged swampy and marshy area which is suitable for the intermediate host (snail) to continue the lifecycle [10]. This result was in agreement with report of Biruk and Dawit [11] 39.3% in Ambo but it is higher than report of Desalew and Abaineh [12] 18.75% in Merawi town North West of Ethiopia and previous report by Mamaru and Nibret [13] who reported prevalence of 18.2 % in Dembecha District, northwest Ethiopia. These finding were lower than the finding of Molalegne [14] in Kemisese and Yadeta [15] in western Shoa who reported the fasciolosis infection rate of 45.6%, 49% and 73% respectively. This difference may be due to ecological, climatic differences and altitude among the localities [16]. In this study the prevalence of the disease in female

(42.1%) animal is higher than male (33.8%) animals. The higher exposure risk of females may be due to physiological differences, such as stress, pregnancy, lambing [17]. There was non-significant difference ($P > 0.05$) between the two sexes indicating that sex seems no effect on the prevalence of the disease. Similar results have been reported by Molalegne [14] and Katama [17] This could be associated with similar management, feeding practices and grazing on same pastures with similar exposure risk of infection. Moreover, it might also be that fasciolosis is not a disease directly related to animal reproductive system. On the other hand the current finding disagrees with the report of Solomon [18], Biruk and Dawit [11] and Alemu [19] who's suggested that none significantly, Fasciolosis equally affect both sexes and males actually had shown higher infection prevalence than females respectively.

Analysis of age related prevalence of Fasciola species in the study animals revealed a statistically significant difference ($p < 0.05$) in distribution of the disease across age categories of the sheep. The prevalence of the parasites in adult and young sheep was 42.5 % and 30.1 %, respectively. This finding was consistent with reports of Molalegne [14], Desalew and Abaineh [12] and Ejara [20] which indicate there were significant association between age group in fasciola infections and it was surprising because kids

have maternal immunity and the fact that young animals are not allowed to go far with adult animals for grazing/feeding reducing the chance of exposure to infective metacercaria as compared to adults. On the other hand this study disagrees with the findings of Ejara [20] and Kindu [21] who reports there was no significant association between ages.

In this study, the association between ovine fasciolosis and body condition scores was statistically significant ($p < 0.05$) and sheep with poor body condition scores were the most infected. The present findings in body condition scores were in agreement with the report of Molalegne [15] Ahmed [3], Biruk and Dawit [11] who reported 73.7% in poor and 38.5% in medium body condition of sheep, 19.5% in poor and 2.8% in medium body condition scores and 66% in poor and 42% in medium body condition categories respectively. The highest fasciolosis prevalence in these sheep might be because the poor body conditioned sheep possess the less resistant and are therefore more susceptible to infectious diseases or else fasciolosis causes' progressive weight loss, lack of appetite and the sheep became weak.

This study also shows that the higher prevalence was observed in apparently healthy animals than animals with clinical sign. However, there was no statistically significant association ($p > 0.05$). This might be due to the period of study conducted at early entrance of summer season and Fasciolosis occurs commonly as a chronic disease and severity sometimes depends on the nutritional status of the host in which clinical sign is not developed at time of infection [11].

CONCLUSION AND RECOMMENDATION

The study was conducted on bovine fasciolosis by using coprological techniques in and around Liban Jawi wereda Babich town. Ovine fasciolosis was found prevalent in the study areas with significant relation among different ages and body condition. This has been hindrance to the livestock production by causing remarkable direct or indirect losses in the study areas. Therefore strategic use of anthelmintic should be performed to reduce pasture contamination with fluke eggs and Farmers should be aware of the transmission methods and control strategies of fasciolosis. In addition further epidemiological investigation on economic significance, prevalence, species, composition and risk factor is needed in the study area.

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