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Study on Prevalence of Ovine Fasciolosis in Kutaber Woreda, South Wollo, Amhara Region, Ethiopia

Kindu Wondmnew[1]*, Wossen Temesgen[2], Mohammed Hussien[3] and Yeshiwork Arega[4]

Kutaber Woreda Livestock Resource Development Office, Ethiopia

***Corresponding author:** Kindu Wondmnew, DVM, Kutaber Woreda Livestock Resource Development Office, Ethiopia

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ABSTRACT

A study was conducted to identify the current status of *Fasciola* infections in small ruminants in Kutaber. A total of 392 faecal samples from small ruminants were collected and subjected to sedimentation technique. Out of 392 faecal samples inspected, 133(33.9%) were positive for Fasciola. Prevalence of 50.7%, 24.3% and 21.5% were observed in poor, medium and good body condition respectively. In young and adult sheep prevalence of 29.8% and 35.2% were identified from faecal samples inspected respectively. The prevalence of Fasciolosis was various in different study areas. The highest prevalence was observed in Lewcho (45.6%) followed by Alansha (41.9%), Beshilo (30.0%), Doshign (29.0%), and Elsa (20.0%).When body condition was considered as a risk factor for the prevalence of Fasciolosis 50.7 %, 24.3% and 21.5% was found in poor, medium and good body condition respectively. The prevalence of Fasciolosis in male (24.0%) and female (23.9%) animal was recorded. Risk factors such as locality, age, body condition and sex did not show statistically significant variation on the prevalence of Fasciolosis (P>0.05).

Introduction

Kutaber has the largest livestock population in South Wollo zone including more than 69 720 cattle, 65 727 sheep, 53 304 goats, 18 005 Equines and 104 737 chickens [1]. In Kutaber sheep are among the dominant livestock species providing as source of cash income and food subsistence value. Despite the number of sheep, the contribution of this sub sector to the woreda's economy is relatively low.

Endoparasitic infection and management problems are known to be the main factors that affect productivity. Among endoparasitic infection Fasciolosis is one of the difficult problems in helminthology [2]. Fasciolosis is caused by Fasciolidae trematodes of the genus *Fasciola; Fasciola hepatica* and *Fasciolagigantica* which migrate in the hepatic parenchyma and establish themselves and develop in the bile ducts. It causes significant morbidity and mortality [3,4]. The clinical features of fasciolosis can have acute, sub-acute and chronic forms [5]. In Ethiopia *F. giganticais* found at altitude below 1800 meter above sea level. While *F. hepatica* is found at altitude between 1200-2560 meter above sea level [6]. Mixed infection by both species of *Fasciola* may occur where the ecology is conducive for replication of both intermediate hosts [2]. The snails of genus *Lymnaea* are mainly involved as an intermediate host in the life cycle of *Fasciola* [7]. *Lymnaeatruncatula* is the most common intermediate host for *F. hepatica* in different parts of the world [8]. The most important intermediate host for *F. gigantica*is *L. natalensis* and *L. auriallaria* [9].

The economic impact of Fasciolosis may vary greatly from year to year depending on the climate, management, level of infection, host immunity status and the age of animals [10]. Annual economic loss caused by the disease is mainly due to mortality (mild to heavy), cost of diagnosis treatment and condemned liver [11], reduced milk yield, fertility disorders and reduced meat production [12,13]. Several control methods against ruminant Fasciolosis such as avoiding the predisposing risk factors like marshy areas, grazing the animals in the irrigation points and drained water bodies. Other methods include a reduction in the number of intermediate snail host by chemical or biological means and strategic application of antihelmintics [14]. Therefore, the objective of this study is

a) To know the prevalence of ovine Fasciolosis in selected rural kebeles.

b) To generate base line data for future research.

c) To indicate control strategies of Fasciolosis.

Materials and Methods

Study Area

The study was conducted from November 2018 to April 2019 in selected rural districts of Kutaber to study the prevalence of ovine fasciolosis. Geographically the area is found in South Wollo zone, Amhara region. It is located at $11^0 12'36''$ -$11^0 18'36''$ N latitude and $39^0 31'12''$-$39^0 34'12''$ E longitude. Kutaber area poses highland and lowland areas. The average minimum and maximum rainfall ranges between 500 and 955ml in short and long rainy season. The average annual temperature is 22°C [15]. Mixed agriculture is the main occupation of the population of the area. The major livestock reared in the area are sheep, goat, cattle, poultry and equine. According to statistical data, Kutaber Woreda has livestock population of 69 720 cattle, 65 727sheep, 53 304goats, 18 005 Equines and 104 737 chickens [1].

Study Animals

The study was conducted on local breeds of sheep which were selected by simple random sampling technique in the study area. A total of 392 sheep were randomly examined following coproscopic procedures. All these animals were privately owned by smallholder farmers. The management system was traditional extensive system with minimum supplementary feed and veterinary care.

Sample Size Determination

To determine the sample size, a prevalence rate of 50% was taken into consideration since there was no research performed on ovine fasciolosis in the area. The desired sample size for the study was calculated by using the formula given by Thrusfield [16]. with 95% Confidence interval and 5% absolute precision.

$$N = \frac{(1.96)^2 \times P_{exp}(1 - P_{exp})}{D^2}$$

Where, n=Sample size;

P_{exp} =Expected prevalence;

D^2=Absolute precision;

Then,

$$N = \frac{(1.96)^2 \times 0.5(1 - 0.5)}{(0.05)^2} = 384$$

Accordingly, the estimated sample size was 384 animals.

Study Design and Sampling Techniques

A cross sectional study was conducted from November 2018-April 2019 in Kutaber district to determine the prevalence of fasciolosis. Simple random sampling method was employed to select the study population. During sample collection; all necessary risk factors related to ovine fasciolosis were properly recorded such as; age, sex, body condition and districts of sheep.

Coproscopic Examination

Fecal materials were collected directly from the rectum of each sheep. Sheep of all age groups and either sex were included in this study. All samples were obtained prospectively for the purpose of study from different sheep flock in each district mainly kept on traditional grazing of weeds, trees and seasonal green fodder. Each sample was clearly labeled with animal identification, place of collection, body condition, sex and age. Based on their dental eruption formula the age of the animal was determined and they were classified as young (less than two years) and adult (greater than two years). Then the sample was transported to Kutaber Livestock Development Office, Veterinary Clinic, parasitology laboratory, for detailed coproscopic examination. To detect fasciola eggs, sedimentation technique was used as described by [17]. For quantitative microscopic examination of *Fasciola* eggs, all fecal samples were processed by fecal centrifugal sedimentation method as described by Zajac and Conboy [18]. Fecal examination for *fasciola* egg was carried out using the sedimentation method described by Urquhart et al. [19].

Data Analysis

The result obtained were recorded and this data were entered into Microsoft excel worksheet. The data fed in to excel sheet were analyzed by using SPSS statistics 20 software. Descriptive statistics and pearson chi square test were employed to determine the prevalence of fasiciolosis and association of risk factors with the disease respectively. Level of significance was considered at $p<0.05$.

Result

Fecal examination conducted from November 2018 to April 2019 showed that from a total of 392 fecal samples examined, 133 (33.9%) was found to be positive for fasciola eggs. The prevalence among different age groups was adult (35.2%) and young 29.8%. Prevalence of fasciolosis in sheep was not significant (p=0.331) in young (29.8.0%) and adult (35.2%) (Table 1). The statistical analyses indicated that 33.3 % of males and 34.2% of females were positive for the infection. Statically analysis showed that there was not statistically significant (p=0.871) (Table 2). On the present study area prevalence of fasciolosis were found to be higher in sheep with poor body condition than those with medium and good body condition with prevalence of 50.7%. 24.3% and 21.5% respectively (Table 3). The prevalence of ovine fasciolosis in 5 district of Kutaber

districts were 41.9%, 29.0%, 30.0%, 45.6% and 20.0% respectively. The prevalence variation between studies District Table 4 showed the highest and the lowest were 45.6%& 20% in Lewcho and Elsa respectively (Table 4).

Table 1: Prevalence of ovine fasciolosis on age bases.

Age group	No of animals examined	No of positive	Prevalence (%)
Young (<2 year)	94	28	29.80%
Adult (>2 year)	298	105	35.20%
Total	392	133	33.90%

Note: X^2=0.946, P>0.05 (Statically not significant).

Table 2: Prevalence of ovine fasciolosis on sex bases.

Sex	No of animals examined	No of positive	Prevalence (%)
Female	275	94	34.20%
Male	117	39	33.30%
Total	392	133	33.90%

Note: X^2=0.871, P>0.05 (Statically not significant).

Table 3: Prevalence of ovine fasciolosis on body condition score.

Body Condition Score	No of Animals Examined	No of Positive	Prevalence (%)
Poor	150	76	50.70%
Medium	177	43	24.30%
Good	65	14	21.50%
Total	392	133	33.90%

Table 4: Prevalence of ovine fasciolosis on district bases.

District	No of Animals Examined	No of Positive	Prevalence (%)
Alansha	43	18	41.90%
Doshign	124	36	29.00%
Beshilo	110	33	30.00%
Lewcho	90	41	45.60%
Elesa	25	5	20%
Total	392	133	33.90%

Note: X^2= 10.881, P>0.05 (Statically not significant).

Discussion

Hepatic fluke infections cause considerable economic loss in livestock due to condemnation of organs and reduction of milk and meat production. Fasciolosisis one of the most prevalent helminthes infectious of ruminants in the different part of the world. It causes significant morbidity and mortality [4]. Ovine Fasciolosis exist in almost all regions of Ethiopia [20]. The present finding was in harmonies with previous reported prevalence by Dinka [21] in Assella, (32.7%), Chekol, et al. [22] in Wadela (33.85%) , Kasanesh, et al. [23] in Gondar (36.2%) , Eyob et al. (2014) in North shoa (35.94%),and Melkamu and Mulat [24] in South Wollo (35.68%,). The present finding was higher than Mathewos et al. (2014) in Alamata, Ethiopia, Musa (2009) in around Bahir-Dar, Henok and Mekonnen [25]in Hirna town with the prevalence of 24.2%, 15.8% and 14.6% respectively. This difference might be due to aggro ecological different, the favorable intermediate snail habitat in the area.

The present study was relatively lower than the other reports like Asrede and Shifaw [26] in Debre Birhan (50.8%), Molalegn et al. [27] in Dawa Cheffa, Kemissie (49%) and Basaznew et al. [28]in Yilmana Densa District West Gojjam (42.44%). This variation might be in different geographical location or management system variation of the smallholder farmers or lack of awareness about seasonal deworming of small ruminants in these areas. Climatic variations of supreme importance influencing factors for the epidemiology of fasciolosis [29]. The prevalence of fasciolosis in male and female sheep was recorded as 33.3% and 34.2% respectively. The results showed that prevalence of ovine fasciolosis was similar in female and male animals in the study areas. According to Chekol et al. [22] reports both sexes have been equally affected with fasciolosis and a higher prevalence of parasitic infection was not associated with sex (p> 0.05). The fact that prevalence of fasciolosis between male and female are not significantly difference, sex of sheep has not impact on the prevalence of fasciolosis. They exposed to graze and parasitic infection with equal rate. Sex did not show significant variation on the prevalence of *Fasciola*, similar finding was shown by Demil et al. [30]. This might also be due to grazing of both sex groups in similar *Fasciola* contaminated pasture land.

The prevalence between different age groups of animals were found to be statistically not significant (p=0.028). This might be due to grazing of young animals with the adults early after some days of parturition. The somewhat higher prevalence was recorded in the adults and relatively lowers in the young animals. This might be young animals are not usually allowed to go far with adults for grazing as reported by chekol et al. [22]. In the present study result indicated that relatively higher infection rate of fasciolosis were observed in sheep with poor body condition than medium and good body conditions. It indicates that fasciolosis disease causes reduction of body weight gains.

The prevalence between different districts was found to be statistically not significant (p=0.028). The Highest infection rate of fasciolosis were observed in Lewcho (45.6%) followed by Alansha (41.9%). This is due to the absence of veterinary attention and existence of favorable intermediate snail habitat, inLewcho and Alansha district respectively, exposed to parasitic hazards [31-32].

Conclusion and Recommendations

Fasciolosis is a major obstacle for sheep productivity by imposing direct and indirect losses in Kutaber District. The study has investigated the prevalence of ovine fasciolosis in sheep reared under extensive farming system in Kutaber district of the Amhara regional state, central Ethiopia. The result of the present study indicated that fasciolosis is a higher prevalent sheep disease in the study area. This parasitic disease is distributed in every district and considered as one of the major setbacks to sheep product utilization causing direct and indirect losses. The findings of the current study revealed that fasciolosis is still a health problem in the study area. Presence of favorable conditions like swampy area, stagnant water bodies, scarcity of feed, poor management practices and other concurrent diseases can facilitate the infectivity of the parasite in the area.

The present study suggests that;

a) Enlightenment campaigns on periodic dosing of sheep with anthelmintics prior/after rainy season.

b) Avoid grazing of sheep at swampy area.

c) Draining of stagnant water.

d) Improve herd health management practices.

e) Avoid scarcity of feed

Acknowledgement

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Conflict of Interest

No conflict of interest.

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