

Study on prevalence of ovine Paramphistomiasis in Kutaber Woreda, South Wollo, Amhara Region, Ethiopia

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ABSTRACT: A study was conducted to identify the current status of Paramphistomum infections in small ruminants in Kutaber. A total of 384 fecal samples from small ruminants were collected and subjected to sedimentation technique. Out of 384 fecal samples inspected, 150 (39.1%) were positive for Paramphistomum. The prevalence rates of 36.5 and 30.8% were observed in good and medium body condition, respectively. In adult and young sheep, the prevalence rates of 40.9 and 33.3 were identified from fecal samples inspected, respectively. The highest prevalence of Paramphistomiasis was observed in Lewcho (50.0%) followed by Beshilo (44.5%) and Elsa (42.1%). The lowest incidence of Paramphistomiasis was observed in Alansha (19.0%). Based on age groups, the highest prevalence rate was 40.9% observed in age category of adult and the lowest prevalence rate 33.3% was observed in young. When body condition was considered as a risk factor for the prevalence of Paramphistomiasis, 49.5, 30.8 and 36.5% was observed in poor, medium and good body condition respectively. The prevalence of Paramphistomiasis in male (33.9%) and female (41.3%) was recorded. 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.

Keywords: District, Kutaber, Paramphistomiasis, prevalence.

INTRODUCTION

Gastrointestinal parasitism is the major health problems that severely limit the productivity of animals (Biu et al., 2009). Parasitism in sheep is a substantial problem plaguing farmers. Parasitic gastroenteritis continues to pose a serious health threat and limitation to the productivity of small ruminants. The associated morbidity, mortality, and cost of treatment and control measures on a clinical and sub-clinical level (Martinez-Gonzalez et al., 1998;). Due to improper care, unhygienic environment, extreme climate and close contact with infected animals, ruminants get infected with a variety of parasites (Gadahi et al., 2009).

The Paramphistomiasis adversely affect ruminants, causing hematological and biochemical disturbances, anorexia, weight loss poor reproductive performance, leading to decrease resistance to diseases which can lead to and even cause severe mortality thus leading to heavy loss (Ngategize et al., 1993). Economically, a decrease in profitability of up to 15% and weight loss of up to 50% due

to gastrointestinal parasite have been reported (Shahnawaz et al., 2011) Whereas, paramphistomes play a vital role in ruminant diseases world-wide (Soulsby, 1982), particularly in sheep which caused by *Paramphistomum (P) cervi*, resulting the occurrence of anaemia (Urquhart et al., 1992).

Paramphistomosis (or amphistomosis) is a disease caused by digenean trematodes of *Paramphistomatidae* family which infested the rumen of ruminants worldwide. Clinical disease is confined to warmer tropical and sub-tropical areas (Horak, 1971). There are certain geographical regions in which livestock population needs to be examined for the presence of paramphistomum. But the overall occurrence of parasites in digestive tract, their variation in relation to age and sex of sheep and their seasonal dynamics was not studied adequately. Thus, the objectives of this study were to determine the prevalence of paramphistomiasis and to know the relationship of paramphistomiasis with age, sex, body condition.

MATERIAL AND METHODS

Study area

The study was conducted from November 2018 to April 2019 in selected rural district near Kutaber town to study the prevalence of ovine paramphistomiasis. Geographically, the area is found in South Wollo zone, Amhara regional. It is located at 11°12'36" to 11°18'36"N latitude and 39°31'12" to 39°34'12"E longitude. Kutaber area poses highland and lowland areas. The average minimum and maximum rainfall ranges between 500 and 955 ml in short and long rainy season. The average annual temperature is 22°C, (KADO, 2018). Mixed agriculture is the main occupation of the population of the area. The major livestock reared in the area are sheep, goat, cattle and equine. According to statistical data, Kutaber Woreda has livestock population of 69,720 cattle, 65,727 sheep, 53,304 goats, 18,005 equines and 104,737 chickens (KLRDO, 2018).

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 paramphistomiasis done in the area. The desired sample size for the study was calculated by using the formula given by Thrustfield (2005) with 95% Confidence interval and 5% absolute precision.

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

Where: N = Sample size; P_{exp} = Expected prevalence and D2 = Absolute precision;

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

Sample collection

Fecal samples were collected directly from the rectum of 384 sheep between November 2018 to April 2019. These animals were randomly selected from 5 nearby districts of Kutaber. Samples were transported to Kutaber Livestock Development Office, Veterinary Clinic, Parasitology Laboratory, for detailed colposcopic examination.

Fecal examination

Microscopic examinations of fecal samples were carried out using standard laboratory methods of sedimentation techniques. Eggs were identified using the light microscope and classified as described by Urquhart et al. (1987).

Statistical analysis

Data collected on prevalence and numbers of Paramphistomiasis in faecal samples of sheep were statistically analyzed using SPSS statistics 20 software such as percentage and Chi square test. The test statistics (Chi Square) was applied at $p < 0.05$ level of significance.

RESULTS

The overall prevalence rate of Paramphistomiasis in kutaber was 39.1%. A total of 384 sheep were sampled in the area, 150 sheep were infected with paramphistomum while 234 were negative. The prevalence of paramphistomiasis based on gender is found to have higher rate of infection in female 111 (41.3%) than male 39 (33.9%). There was statistically significant association ($p < 0.05$) between occurrence of infection based on sex of sheep sampled. The prevalence among different age groups was 40.9% for adult sheep and 33.3% young sheep (Table 1). Prevalence of paramphistomiasis in different age groups of sheep was not significant ($p > 0.05$).

The statistical analyses indicated that 33.9% of males and 41.3% of females were positive for the infection (Table 2). Statistical analysis showed that there was statistically significant ($p < 0.05$).

In the present study area, prevalence of paramphistomiasis was found to be higher in sheep with poor body condition than those with medium and good body condition with prevalence of 49.7%, 30.8% and 36.5% respectively (Table 3).

The prevalence rate of ovine paramphistomiasis in five Kutaber districts was Alansha (19.5%), Doshign (32.3%), Beshilo (44.5%), Lewcho (50.0%) and Elsa (42.1%). The prevalence variation between studies district (Table 4) showed the highest and the lowest were 50.0% and 19.5% in Lewcho and Alansha respectively.

DISCUSSION

The overall prevalence rate of (39.1 %) paramphistomosis was found in examined small ruminant that reared in Kutaber near by clinics. While, the Lower findings were reported by Melaku and Addis, (2012) in Debrezeit to be 28.9% and Tsegabirhan et al. (2015) to be 23.7%, in Ashange, Tigray. The variation between studies districts were detected, where the highest prevalence (50%) was observed in in Lewcho but the lowest incidence (19.5%) reported in Alansha. The main reason of this variation is due to the differences in agro ecology and awareness to use of antihelmentics.

It was observed that the prevalence of paramphistomum infections was higher in females (41.3%) than in male (33.9%) sheep. This finding is in agreement with the earlier study of Mazid et al. (2006) in Bangladesh who recorded

Table 1. prevalence of ovine paramphistomiasis based on age.

Age group	No of animals examined	No of positive	Prevalence (%)
Young (<2 year)	93	31	33.3%
Adult (>2 year)	291	119	40.9%
Total	384	150	39.1%

($\chi^2=1.692$, $P>0.05$ (Statically not significant)).

Table 2. prevalence of ovine paramphistomiasis based on sex.

Sex	No of animals examined	No of positive	Prevalence (%)
Female	269	111	41.3%
Male	115	39	33.9%
Total	384	150	39.1%

($\chi^2=0.871$, $P<0.05$ (Statically significant)).

Table 3. prevalence of ovine paramphistomiasis based on body condition score.

Body condition score	No of animals examined	No of positive	Prevalence (%)
Poor	149	74	49.7%
Medium	172	53	30.8%
Good	63	23	36.5%
Total	384	150	39.1%

($\chi^2=12.125$, $p<0.05$ (Statically significant)).

Table 4. Prevalence of ovine paraphistomiasis based on district.

District	No of animals examined	No of positive	Prevalence (%)
Alansha	41	8	19.5%
Doshign	124	40	32.3%
Beshilo	110	49	44.5%
Lewcho	90	45	50%
Elesa	19	8	42.1%
Total	384	150	39.1%

($\chi^2=14.981$, $p<0.05$ (Statically significant)).

higher prevalence of helminth infection in females than in male sheep. Similar trend of higher infestation rate reported in earlier work with goats where females (75.0%) were found more susceptible to *Paramphistomum* infestation than males (67.5%). Likewise, in another study, significantly higher prevalence in females (41.61%) than males (27.45%) were recorded (Tariq, 2008). The reason for higher prevalence of paramphistomum infection in the females can be assumed that the alteration in the physiological condition of the females during pregnancy, lactation and parturition as well as stresses leading to immune suppression may be associated with this phenomenon. Higher level of prolactin and progesterone hormones makes the female individual more susceptible

to any infection (Lloyd, 1983). In other way the males were kept for a shorter period of time than females in the farmer house.

It was revealed that the prevalence of *Paramphistomum* was higher in poor (49.7%) than medium (30.8%) and good (36.5%) body conditioned sheep. This revealed that nutritional condition of sheep had significant ($p<0.005$) effect with *Paramphistomum* infection. The higher prevalence of *Paramphistomum* infection was recorded in poor (49.7%) sheep than that in good (36.5%) sheep. This finding is in agreement with the earlier study of Lapage (1962) who found that malnourished animals are more susceptible to any infection as they are immunocompromised. The present study also agrees with the findings

of Etter et al. (1999) who reported that in immunocompromised animal, the fecundity of parasites is usually increased.

Age of the host had an effect on the prevalence of Paramphistomum in sheep. The Prevalence of Paramphistomiasis was higher in adult sheep (40.9%) than young (33.3%). There was no statically significant difference ($p>0.05$) in the prevalence of Paramphistomiasis with respect to the age. In other studies, Young animals had a low prevalence rate than adult which agrees with those of Melaku and Addis (2012) in adult 30.5% and young 15.1% and Tsegabirhan et al. (2015) in adult 34.72% and young 11.11%. The reason behind of this low infestation in young than adult sheep may be due to less exposure of the young sheep to the parasite than adult.

Conclusion and recommendations

Paramphistomiasis is a major obstacle for sheep productivity, imposing direct and indirect losses in Kutaber District. The study has investigated the prevalence of ovine paramphistomiasis 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 paramphistomiasis 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 paramphistomiasis is still a health problem in the study area. It is therefore suggested that:

1. campaigns on periodic dosing of sheep with anthelmintics should be encouraged.
2. improve herd health management practices should be practiced.
3. scarcity of sheep feed should be avoided.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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