

Prevalence of Lungworm Infection in Small Ruminants in Ambo Town

¹Yimer Muktar, ¹Abdallahi Abdureman and ²Solomon Shiferaw

¹College Veterinary Medicine, Haramaya University, Ethiopia, Po. Box: 138

²Department of Veterinary Laboratory Technology,
College of Agriculture and Veterinary Sciences, Ambo University, P.O. Box 19, Ambo, Ethiopia

Abstract: A cross sectional study was conducted in Ambo town from March 2012 to May 2013 with the objective of determining the prevalence lung worm infection and associated risk factors in small ruminants in Ambo town. Fecal samples were collected from 205 animals (124 sheep and 81 goats) of the same breed to examine first stage larva (L1) by using modified Barman technique. The overall prevalence of lungworm infection in the area was 41.95% by coprology. Also the prevalence of lungworm infection was 41.9% and 42% in sheep and goats in fecal examination respectively. Age, sex, species, area and body condition were the assumed potential risk factor for the occurrence of lungworm infection, using chi square analysis, only body condition was statistically significant ($P < 0.05$) risk factor with infection of lungworm and the others were not significant risk in the current study. There is high prevalence of lungworm infection in the study area warns stake holders should therefore, during the control and treatment of small ruminant lung worm infection, animals feeding condition to keep in good body condition, should be considered as potential risk factors for the occurrence of the disease. Future studies should be link with postmortem examination for accurate diagnosis of lungworm infection.

Key words: Ambo Town • Prevalence • Lungworm • Small Ruminant

INTRODUCTION

Ethiopia is one of the countries with the largest numbers of livestock in Africa and livestock production plays major role in the overall development of Ethiopian Agriculture. The number of livestock in Ethiopia approximately 44.3 million cattle, 46.9 million small ruminants, more than 4 million camels and 4.5 million equine and 40 million poultry [1].

Sheep and goats provide as much as 30% of the meat and milk consumed in sub-Saharan Africa and is found on smallholdings throughout the continent. Helminthes parasites of ruminants are ubiquitous with many tropical and subtropical environment of the world including Ethiopia providing nearly perfect condition for their survival and development, although these parasites widely prevalent, the clinical sign they showed in infected animal less obvious than sign of other livestock disease [2].

Lungworm can result infection of lower respiratory track usually resulting verminous bronchitis or verminous

pneumonia. Almost half of all sheep deaths and morbidity on farms in Ethiopian highlands are caused by pneumonia and endoparasites [3]. Control of these parasites is therefore, essential, for releasing the potential of small ruminant production. For proper implementation of control measures, knowledge of parasitic diseases and their dynamics must be studied. The occurrence of lung worm infection varies from place to place depending on relative importance of the factors involved. In this regard no detail investigation of lungworm infection was performed so far in Ambo town. The present study was therefore, designed with the objectives of estimating the prevalence of lungworm infection and to assess the associated risk factors in the study area.

MATERIALS AND METHODS

Study Area: The study was carried out in the three Kebeles of Ambo town. Ambo is the capital city of West Shoa Zone of Oromia Regional state. The town is located 114km away from Addis Ababa. Geographically the town

is located between 8° 47' -9°2' N altitude and 37°32' -38°3'E longitude. The altitude ranges from 1380-3330m a.s.l. The climatic conforms to the Ethiopian Woyna dega. The average annual rain fall is 900mm (800-1000mm) and the average minimum and maximum annual temperature ranges between 15-29°C respectively. There are four seasons: these are short rain season (From February to April), short dry season (From end April to June), long wet season (From June to September) and long dry season (From October to February). (Agricultural Agency of Ambo woreda, 2012).

The town is divided in to three Kebeles, the main occupation of the population in these Kebeles are mixed farming system. Livestock species include: cattle, sheep, goat, mule, horse, donkey and Poultry. The number of small ruminants in the town is 2120 from these 1285 sheep and 835 goats of the population. The majority of them are local breeds.

Study Animal: The study animal for this investigation was small ruminants selected from three kebeles of Ambo town. In this town small ruminant of all age group and both sex was considered to determine the prevalence of lung worm infection in the town.

Study Design: A cross sectional study type was carried out from March 2012 to May 2013 to estimate the prevalence of lung worm infection in small ruminants and investigated risk factor of lung worm infestation in Ambo town.

Sample Size Determination: The total number of animals required for this study was calculated based on the formula given by Thrusfield [4]. Since there were no information in the study area it is possible to take 50% of expected Prevalence, so the sample size was calculated as.

$$n = \frac{1.96^2 P_{ex} (1 - P_{ex})}{d^2} \text{ where,}$$

n= required sample size

d= desired absolute precision level at 95% confidence interval (0.05)

The calculated sample size was 384, but due to limitation of time 205 animals (124 sheep and 81 goats) were tested.

Methods: All the three kebeles within the town was selected and herds within each kebeles were selected based on accessibility and the willingness of the owner.

Based on the number of the animals found within the herd: If the number of the animals are equal or less than four all are included and greater than four, animals are randomly selected from the herd. The animals are grouped into young (3months to 2 years), adult (2years- 4 years) and old (Above 4years) depending up on their dentations. The body condition scoring of small ruminants were studied may be ranked as good, medium and poor [5].

Study Methodology: The selected animal was examined for the presence of lungworm using coprology and their origin (Site), age, sex, breed, species of the animal and body condition of each animal was properly recorded.

Fecal Examination: The study was carried out by collecting feces using glove through rectum and transported to the Ambo University Veterinary Laboratory. The collected sample was processed by using modified Barman, technique and examined for the presences of larvae (L1) by using Stereomicroscope.

Data Analysis: The data obtained from laboratory test was recorded on spread sheet Ms-excel and analyzed using SPSS-soft ware program of version 20. Chi- square test (X^2) was applied to show the variation between different risk factors. P - Value less than 0.05 was considered to be statistically significant.

RESULTS

Coprology: The result of present study showed that the overall prevalence of lungworm infection in small ruminants at Ambo town was 41.95%. From 205 animals (124 sheep and 81 goats) coprology showed the prevalence of lungworm infection to be 41.9 % in sheep and 42% in goats. The prevalence in both sheep and goats are almost similar and the difference was statistically insignificant ($P > 0.05$).

Association of Different Risk Factors with Prevalence of Lungworm Infection: Association of various risk factors with lung worm infection is described in Table 2 in relation to coproscopic result. In this study area, age and sex became statistically insignificant ($p > 0.05$) in relation to coproscopic result while body condition scoring became significant ($P < 0.05$).

Table 1: Prevalence of lungworm infection in small ruminants

Species	No of examined	No of positive	Prevalence (%)	95%CI
Ovine	124	52	41.9	33-51
Caprine	81	34	42	31-53
Total	205	86	41.95	35-49

Table 2: prevalence of lungworm infection with different risk factors

Risk factors	No. animals	No. positive (%)	X ²	P- value	
Area(kebele)	kebele 1	54	21(38.9)	0.34	0.85
	Kebele 2	76	32(42.1)		
	Kebele 3	75	33(44)		
Species	Ovine	124	52(41.9)	0.00	0.99
	Caprine	81	34(42)		
Sex	Male	91	37(40.7)	0.11	0.74
	Female	114	49(43)		
Age	Young	152	63(41.4)	0.71	0.70
	Adult	41	19(46.3)		
	Old	12	4(33.3)		
B/C	Poor	49	38(77.6)	46.83	0.00**
	Medium	74	34(45.9)		
	Good	82	14(17.1)		

** Highly significant, B/C =Body Condition

DISCUSSION

The present result (41.95%) was recorded by fecal examination in the study area is agree with the previous studies [6] reporting a prevalence of 44% and 50% from Bahir Dar and around Kombolcha and Dessie respectively. However, a relatively higher prevalence of 58% was reporting in Assela by [7]. Similarly, the relative importance of this disease in sheep and goats was studied by other authors.

Although it is not statistically significant, a relatively higher prevalence was recorded in kebele 2 (42.7%) and kebele 3 (44%) than kebele 1 (38%). This moderate variation may be related with the difference in their management and grazing system. Regarding species of the study animals' almost similar prevalence of lung worm infection was recorded in the study area.

The prevalence rate of lungworm infection was relatively higher in female (43%) than male (40.7%) animal even if the difference is not statistically significant. The different prevalence between female and male animals might be due the fact that the resistance to infection decrease at the time of parturition and during early lactation in the case of female animal.

With regard to age, adult animals of both species and sexes were found more affected by lung worm infections

than the rest of age category. However, the difference was statistically insignificant ($p > 0.05$). This result agrees with the previous study which was done in Northern Ethiopia [8]. This variation could be related with the adult animals moving long distance for searching of feed which leads to exhaustion and loss of immunity /body condition that potentially increase the susceptibility of animals.

The Present study showed that the prevalence of lungworm infection is higher in poor body condition (77.6%) than medium (45.9%) and good (17.11) and this may be due to the low level of immunity in animals having poor body condition. the result is in agreement with the reports of [9, 10]. Different prevalence was observed between poor, Medium and good body conditioned animals and the difference was statistically significant. Animals of good body condition are more able to resist lungworm infection than others. The reason for this could be due to the fact that poorly nourished animals appear to be less competent in getting ride off infection although it is usual for well fed animals provided that the right environmental conditions are made available [11]. In conclusion, this study revealed the importance of lungworm infection in the study area though the short study period which is three months of the year and lack of repetitions during the study may have some limitation on the results.

CONCLUSIONS

Small ruminant lungworm infections are found to be an important problem in the study area. The present study conducted on lungworm infection in Ambo town showed that lungworm is one of the prevalent diseases in small ruminants. The estimation of lungworm prevalence by using coprology has some limitation among this limitation; during hypobiosis it is difficult to detect this parasite by fecal examination. Different risk factors such as species, sex, area and ages have been found not statistically significant, but body conditions have been statistically significant with lungworm infection. Therefore during the control and treatment of small ruminant lungworm infection feeding managements and body condition should be considered as potential risk factor for the occurrence of the disease. Further detail epidemiological and seasonal study should be carried out, on lungworm infection and hypobiosis period, so as to design appropriate control strategies on the area.

Therefore, based on the above conclusion the following recommendation are forwarded

- The field veterinarians and stock owners should be aware of the importance and burdens of lungworm in the area and an appropriate control and prevention measures should be taken.
- Good management of small ruminant should be practiced.
- Further detail epidemiological and seasonal study should be carried out, so as to design appropriate control strategies on the area.
- It is feasible, future studies should be link with postmortem examination.

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