

Research Article

Prevalence of Small Ruminant Helminthiases in and Around Tullo District in Western Harerghe Zone, Eastern Ethiopia

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Cross-sectional study conducted from November 2014 to April 2015 in Tullo district, west Harerghe zone eastern Ethiopia. A total 384 faecal sample from shoat (189 sheep and 195 goats) were collected and coprologically examined. The study revealed that the overall prevalence of Helminthiases was 53.9%. The kebele level Helminthiases was 69%, 57.1%, 56%, 44.59% and 42%, in Odabalina, KiraKufis, Lubudakeb, Ifabas and Midedu respectively having statically Significant difference ($p < 0.05$). The species level prevalence Helminthiases as 52.91% and 54.87% in sheep and goats respectively, but not statically, significance difference as observed. The sex level prevalence of Helminthiases was 51.49% and 56.59% in male and female, but no statically significant difference ($p > 0.05$) irrespective their species. The age related prevalence was shown that 28.57%, 58.45% and 56.82% in age less than one, between 1-3 and greater than 3 years having statically significant difference ($p < 0.05$). Body condition related prevalence shown that 37%, 75.47% and 100% in good, medium and poor body condition respectively it having statically Significant difference ($p < 0.05$). *Stroggylis* were the most prevalent Parasites encountered in the area followed by monezia, so nematodes rank highest followed by cestode and trematode.

Keywords: Helminthiases; Prevalence; Floation; Sedimentation; Small ruminant

Introduction

Ethiopia possess the largest livestock population in Africa, with an estimated population of 7.8 million equines, 1 million camels, 47.5 million cattle, 39.6 million Chickens, 26.1 million sheep and 21.7 million goats with the livestock ownership currently contributing to the livelihoods of estimated 80% of the rural Populations [1].

But this extensive livestock resource is not exactly exploited because of many constraints, of which poor animal production and management, improper evaluation of animal health importance due to various individual parasitic diseases and inadequate knowledge of epidemiology of parasites which have relative relevance to determine the distribution of the disease and scope of control measures to be applied Helminthiases is one of important parasitic disease contributing to losses of productivity [2-42].

Worldwide parasitic Helminth are major cause of losses in productivity and health problem of goat and sheep and are usually associated with huge economic losses especially in resource poor region of world [10]. Parasitic Helminth also causes immunosuppression and as a result enhances susceptibility to other disease [21,30-59].

The problem is more severe in tropical countries due to very favorable environmental condition for parasitic transmission, poor nutrition of host animal and poor sanitation in facilities where animals are housed. As a result disease caused by helminthes remain one of the major impediment to small ruminant production in the

tropics [33-37].

In tropics, up to 95% of sheep and goats are reported to be infected with Helminth of *haemonchus* and *trichostrongylus* are the two commonly the local management conditions before rational control measures can be designed. This implies several years of epidemiological studies before measures can be implemented [24].

Nematode infections in cattle result in high production losses through poor weight gain and reduced milk yield but the gastrointestinal tracts of animals harbor variety helminthes, which causes clinical and sub clinical parasitism. Helminthes adversely affect the health status of animals, which may because of economic losses to the livestock industry [39].

Helminthes are recognized as by for the most significant part of diseases in livestock sector [60]. The most important predisposing factors of helminthes infection are grazing habits, climates, nutritional deficiency, pasture management, immunological status of animal, presence of intermediate host and vector, the number of infective larvae and eggs in the environment [46].

To take the control measures assessment and epidemiological surveillance. The prevalence of nematode parasite by different diagnostic methods like fecal examination. Determination and identification of specific specimens method is important [61]. Prevention and control of the parasites that infect sheeps and goats are becoming increasingly difficult to over use and improper availability

Table 1: Prevalence of Helminth infection among the peasant association.

Parameters	Peasant association					Species		
	Lubu Dekab	Odabalina	Kira Kufis	Midegadu	Ifabas	Ovine	Caprine	Total
No. examined	75	78	77	80	74	189	195	384
No. infected	42	54	44	34	33	100	107	207
Prevalence (%)	56	69	57.14	42	44.59	52.91	54.87	53.91
	Peasant association: $X^2=14.6000$, $P\text{-Value}=0.006$					Species: $X^2=0.1487$, $P\text{-Value}=0.700$		

Table 2: Association among parasitic infection, sex and age of animals by chi square.

Parameters	Sex		Age		
	Male	Female	<1 year	1/3 year	>3 year
No. examined	202	182	56	284	44
No. infected	104	103	16	166	25
Prevalence (%)	51.49	56.59	28.57	58.45	56.82
	Sex: $X^2=1.0054$, $P\text{-Value}=0.316$			Age: $X^2=16.09764$, $P\text{-Value}=0.000$	

of anthelmintic, which result in increasing resistance by parasites to common antihelminthics [45]. Therefore the study was designed: to determine the prevalence of helminthiasis in small ruminant.

Materials and Methods

Study area description

The study conducted in Tullo district. it is located 371km from, the capital city Addis Ababa, 45km from Chiro zonal town. The district characterized by main seasons in a year. The dry season (Bega) which extends from January to the ends of April and longer in season (Keremt) that extends from July to the ends of September. The district has daily mean temperature ranging from 180°C-260°C and mean annually rainfall ranging from 550m-800m. a.s.l (above sea level). The agro-ecological zone of the district highland (Dega) 40%, amid highland (weynedega) 57% and 3% kola. The topography of the district medium highland 1500m. a.s.l, highland 1500-2500 m and very high land >2500m. a.s.l and relative humidity 21.9%-65%. Climate conditions of altitude 1500-3100 m. a.s.l the sobio type of the district lay 43%, sand 55% and silt 2%. The major crop cultivation is sorghum, maize, barley, teff and wheat. The livestock populations of the District are 125915 cattle, 37973 goats, 13177 sheep, 171499 poultry, 5905 donkey and 338 horses and 274 mules. The total area coverage of the District is 45679 hectares of which 30275 hectare is cultivated land; 6325 hectare is forested land, and 253 is bush land and 1000 miscellaneous land. The district has 33 peasant associations and 3 towns with total human population of 14648, of which male 71691 and female 74798 [5,62-69].

Study population

The study were carried out from November 2014 to April 2015 in Tullo district, on naturally infected sheep and goats of indigenous breed that are kept under the traditional extensive management system from five peasant associations of Tullo district (Lubudakeb, Kirakufis, Odabalina, Midedu and Ifabas) were randomly selected for coprological examination. During this time, different age, sex and body condition from randomly selected peasant association of Tullo district were included. The peasant associations are selected based on their accessibility to transport 384 (100 sheep and 107 goats) were examined over the study period are categorized in to three age group

young, adult and older (<1 year, 1-3 year and >3) respectively based on farmers response and observations made during sampling. Again body conditional so categorized as good, medium and poor [14,70-75].

Study design

A cross-sectional type of study was used to determine the prevalence of helminthiasis. It involves categorization of the study population according to their specific geographic origin (PAS), body condition score (BCS), sex, species and age to estimate the prevalence of helmentiasis and assess the associated potential risk factors.

Sampling methods

A simple random sampling or lottery method was conducted to collect fecal sample from individual study animals among selected peasant association from the total of 33 peasant associations in Tullo district.

Sample size determination

Since there was no record of previous prevalence in the study area, the sample size was determined by taking 50% expected prevalence using the formula described by [57] accordingly a sample of 384 (for both sheep and goat) was considered for the study. The number of animals required for the study was determined using the formula give therefore; expected prevalence of 50% with required precision (0.05) was used. Based on this formula 384 animal were included in the study.

$$N = (1.962 \times P^{EXP} (1 - P^{EXP})) / D^2$$

where N =required sample size, P^{EXP} =expected prevalence, D =desired absolute precision

Sampling strategy

Fecal samples were collected directly from the rectum for coprological examination, of each sheep and goat using disposable plastic gloves and placed in clean screw-capped universal bottle and each sample was clearly labelled with species, age, sex, sampled site and body condition score and processed. Faecal samples were preserved with 10% formalin solution to avoid the eggs developing and hatching and the sample was forwarded to Hirna regional

veterinary laboratory [76-81].

Study methodology

Coprological examination: Parasitological examination was done by flotation techniques following the standard procedures for nematode parasites. In addition, for eggs of liver flukes, coproscopy examination was performed according to the sedimentation technique described by [24].

Data analysis

Data and information about small ruminants' helmentith were entered into Microsoft Excel spreadsheet and analyzed by SPSS version 20.0 software. Descriptive statistics were used to summarize. The prevalence was calculated for all associated risk factors as the number of infected individuals divided by the number of individuals sampled multiplied by 100. Factors thought to be associated with the prevalence of helmentith infection were analyzed by Pearson's chi-square test to account for confounding and interaction between variables. In the analyses, the confidence level was held at 95% and P-value less than 0.05 was considered as significant.

Result

A fecal sample was collected from sheep and goat of five selected peasant associations and examined by using the flotation and sedimentation. Among five Pas, significant difference $P < 0.05$ was found in the distribution of gastro intestinal helminthes infection of examined animals. The highest prevalence of Helminthiasis was found in Odabalina and the lowest in Midegdu. The gastrointestinal helmentith was higher in Goat than in sheep but not significant (Table 1).

Relatively higher prevalence of helminthes is observed in female animal compared to above one male but the difference is not significant $P > 0.05$. Finding was also similar in sheep and goat irrespective of their spaces animals less than one year is found to be less susceptible to Helminthiasis as compared to the above one year with significance $p < 0.05$ (Table 2).

Concerning the prevalence of Helminth infection in different body conditioned animals higher prevalence is observed in poor than medium and good animals. Thus a significant association in prevalence was shown among animals with different body condition score $p < 0.05$. Consequently, animals with poor and medium body condition score were associated with a high relative risk of being infected with GIT Helminth parasites than good body conditioned animals (Table 3).

The most prevalent Helminth parasite species found during the study period irrespective of Host are strongyles by mixed infection Monezia, Strongyloides species (3.4%), Fasciola (3.1%) the lowest was Paraphistomum (1.8%) and Trichuris (1.8%) respectively.

Conclusion

Since epidemiology is the foundation on which control of parasitic diseases has to be based. There is no recent data available on the prevalence of Helminthiasis in small Ruminants of the Tullo district, therefore this study are indicative for other small ruminant herds under similar management in this environment. In general, the overall prevalence of gastro intestinal Helminth parasites in the study

Table 3: Association of parasitic infection between body conditions of animal.

Parameters	Body condition				χ^2	P
	Poor	Medium	Good	Total		
Examined	37	106	241	384	78.0821	0
Infected	37	80	90	207		
Prevalence (%)	100	75.47	37.34	53.91		

area indicates gastrointestinal helminthiasis to be important health problem due to its high prevalence and occurrence of polyparasitism (mixed infection). The present study showed a considerable relation between study location, age groups and different body condition. In both sheep and goats, the nematode parasites were the most predominant parasites followed by cestod and the trematode. The majority of sheep and goats were infected by two and more parasite types with some animals showing pure infection. Strategic deworming of animals, when conditions are most favorable for larval development on the pasture, using broad spectrum anti-helminthic since polyparasitism is a common problem. Moreover, proper pasture and animal management is a key component to managing gastro intestinal helminthes in sheep and goat operations. Rotation grazing is used in interval and avoids communal grazing with other animals to avoid cross parasite contamination. Professional advices regarding preventive and control measures against gastro intestinal helminthes should be prominent to prevent drug abuses.

Acknowledgement

The author would like to thank the staff of Hirna Regional Veterinary Laboratory for their support during research.

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