Prevalence Of Gastrointestinal Parasites Of Sheep And Goats In And Around Bedelle, South-Western Ethiopia

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Citation

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Abstract

A study on GIT parasites of small ruminants was conducted from November 2007 to May 2008 in and around Bedelle with the objectives to determine the major GIT parasites and their prevalence in sheep and goats. In this study, a total of 384 fecal samples (219 sheep and 165 goats) were collected for qualitative and quantitative fecal examinations and 43 post mortem examinations in butcher house (23 sheep and 20 goats) were performed. The study found that 200 (91.32%) sheep and 153 (93.29%) goats were found to harbor eggs of GIT helminthes. Amongst the post mortem examinations performed, 21 (91.30%) sheep and 19 (95%) goats were found to be infected with two or more of GIT helminth parasites. All species and age groups were infected with identical parasite species, but with different levels of infection. Eight genera of nematodes with prevalence of 67.5% Haemonchus species, 46.1% Trichuris species, 48.8% Trichostrongylus species, 48.8% Oesophagostomum species, 30.3% Bunostomum species, 25.6% Ostertagia species, and 20.9% Chabertia species and 16.3% Strongyloid in both species in sheep and goats. Similarly two types of Cestodes were recovered with prevalence of 24.8 % Monezia species and 39.5% Avetellina species. There was no significant difference (P >0.05) in the prevalence of GIT helminthosis between sexes, ages and species of animals. Out of 338 sheep and goats examined 10.95% were massively affected, 48.52% moderately affected and 40.53% were lightly affected. The study showed that GIT parasites are major problems of small ruminants in the study area. Therefore; comprehensive study on GIT parasites, cost effective strategic treatment and awareness creation to the farmers should be instituted in the study area.

INTRODUCTION

Sheep and goats are mainly found in arid and semi- arid areas of sub-Saharan Africa. They play a vital role in rural economies through the provision of meat, milk, household income, manure and skin. Compared to cattle and camels, sheep and goats contribute a larger proportion of readily available meat in the diets of pastoralists. They have been estimated to provide up to 30% of the meat and 15% of the milk supplies in sub-Saharan Africa where thrive in a wide range of ecological regions often in conditions too harsh for the beneficial rearing of cattle. Small ruminants have also been reported to survive better under drought conditions than cattle due to their low body mass and low metabolic requirements which in turn minimize their water requirements and maintenance needed in arid and semi-arid areas. The frequent droughts and large tsetse infected areas in sub-Saharan Africa requires more small ruminants in order to supplement cattle production (Wesongah et al., 2003).

The estimated 25.01 million of sheep and 21.9 million of goats in Ethiopia (CSA, 2009) provide an important contribution to the national economy (Alemayehu et al., 1995). Although small ruminants represent a great resource for the nation, the productivity per animal is low. Small ruminant diseases, poor management and lesser efforts provided to improve the performance of the animals are to be responsible for the reduced productivity (Admosun, 1992).

Stomach and intestinal worms occur in all species of animals. Young and malnourished animals of both sexes and lactating animals are most suitable to these parasites. Stomach worms affect specially camels, goats and sheep. Different types of worms are transmitted when an animal eats grass or drinks water contaminated with larva or eggs. The problem is especially common in the rainy season (IIRR, 1996).

Even though, Ethiopia endowed with large number of sheep and goats population, little attempts has been made in the past to study the health aspect of these animals. Lack of well established data on the magnitude, distribution and

predisposing factors of small ruminant GIT helminthes in the study area initiated this study project. Therefore, the main objectives of this study were to identify the major GIT parasites of small ruminants and to determine the prevalence of those parasites in the study area in relation to different risk factors.

MATERIALS AND METHODS

STUDY AREA

The study was conducted from November 2007 to May 2008 in Bedelle Wereda, Oromia Regional State, Illubabor Zone. The area is located in an altitude of 2060 m.a.s.l. The mean annual rainfall of the area is 1857.7mm and the mean annual minimum and maximum temperatures are 12.4□C and 24.6□C respectively. Natural broad leaf forests and grasslands cover non-cultivated lands in the area. The main farming system in the area is mixed farming and small ruminants are the third most abundant animal species kept next to poultry and cattle (NMSA, 2010).

STUDY POPULATION

From a total of 21,160 small ruminants present in and around Bedelle Wereda (CSA, 2009) a sample size of 384 sheep and goats were randomly selected and subjected to qualitative and quantitative corpological examination. Out of which, sheep and goats comprised 219 (56.6%) and 165 (43.4%) respectively. All species, sex and age groups of local origin were included in this study. Adults are above one year and young are less than one year was considered in the study according to Tewdros (2007).

SAMPLE SIZE AND SAMPLING METHOD

Simple random sampling strategy was followed to collect feces from the individual animals. The sample size was decided based on formula described by Thrusfield (2005) with 95% confidence interval at 5% desired absolute precision and by assuming the expected prevalence of 50%. The estimated sample size was 384.

STUDY METHODOLOGY

Cross-sectional study method was followed in this study. Fecal samples were collected directly from the rectum of the each animal or during defecation with strict sanitation and placed in air and water tight vials and then taken to the laboratory. In the laboratory the samples were subjected to modified floatation and McMaster and to identify and egg count of GIT parasites following the standard procedures. Positive fecal samples were subjected to McMaster egg counting technique and the degree of infection was categorized based on Soulsby (1982) and Urquhart et al. (1996). The animals were then categorized as lightly, moderately and severely (massively) infected according to their egg per gram of faces (EPG) counts. Egg counts from 50-799, 800-1200 and over 1200 eggs per gram of feces were considered as light, moderate and massive infection respectively. Postmortem examination was also performed to identify adult parasites (Soulsby, 1982; Urquhart et al., 1996).

STATISTICAL ANALYSIS

All the data that were collected (age, species and degree parasitic infection) entered to MS excel sheet and analyzed by using SPSS version 16. Descriptive statistics was used to determine the prevalence of the parasites and Chi-square test (□2) was used to look the significant difference between age and species of the host with parasites. In all the analyses, confidence level was held at 95% and $P<0.05$ were set for significance.

RESULTS

Out of 384 animals (219 sheep and 165 goats) examined, 353 (91.9%) were harboring one or more GIT parasites. With respect to the species prevalence of GIT parasites, 200 (91.3%) sheep and 153 (93.8%) goats were found to harbor one or more parasites. In this study species, sex and age were considered as risk factors and revealed no significant difference ($P>0.05$) with the variation in species, age and sex of the animals (Table 1).

Figure 1

Table 1: Prevalence of GIT Parasites in relation to their sex, age and species of the animals

Risk factors	Total number	No. positive	Prevalence (%)	χ^2(P-value)
Male	130	115	94.26	2.46(0.117)
Female	254	238	93.70	
Total	384	353		
Adult	229	215	93.89	2.3321(0.127)
Young	155	138	89.032	
Total	384	353		
Ovine	219	200	91.32	0.5033(0.478)
Caprine	165	153	93.89	
Total	384	353	91.93	

The degree (severity) of parasitic infection was determined from the total fecal egg count. A total of 338 fecal samples were subjected to EPG count by using McMaster egg counting chamber and found 137 (40.53%) were lightly, 164 (48.52%) moderately and 37 (10.95%) massively affected.

An attempt was also made to see the existence of significant difference in degree of parasitic infection with the variation of species, sex and age of the animals. However, it was found that no significant difference (P >0.05) in the EPG count with the variation of risk factors (Table 2).

Figure 2

Table 2: Degrees of GIT Parasitic infection with different risk factors

Variable		Degree of infection			χ^2	P-value
		Light	Moderate	Massive		
Species	Ovine	88 (46.560%)	85 (44.97%)	16 (8.47%)		
	Caprine	49 (32.89%)	79 (53.02%)	21(14.09%)	7.3668	0.025
Age	Adult	81(39.135%)	103 (49.76%)	23(11.11%)		
	Young	56 (42.75%)	61(46.56%)	14 (10.69%)	1.4144	0.758
Sex	Males	45 (39.45%)	57 (50%)	12 (10.53%)		
	Females	92 (41.07%)	107 (47.77%)	25 (11.16%)	0.9787	0.946

Postmortem examinations were conducted in some butcher houses and restaurants to appreciate the adult parasites and to relate the coprological findings with the postmortem findings. The total number of animal examined was 43 (23 sheep and 20 goats). From these 21 sheep and 19 goats harbored one or more adult parasites. The overall prevalence of GIT parasites during postmortem examination was 93.01% (40) and the species level prevalence was 91.30% (21) and 95% (19) in sheep and goats respectively.

In this study ten types of GIT helminth parasites were identified during the study period based on their morphology described by Soulsby (1982) and Urquhart et al. (1996) (Table 3).

Figure 3

Table 3: Relative prevalence of GIT parasites examined in sheep and goats

Species of Parasites	Ovine		Caprine		Overall (%)
	No. +ve	(%)	No. +ve	(%)	
Hemonchus species	16	69.5	13	65	29 (67.44)
Trichuris species	11	47.8	9	45	20 (46.51)
Trichostrongylus species	10	43.5	11	55	21 (48.84)
Oesophagostomum species	12	52.2	9	45	21 (48.84)
Bunostomum species	6	26.1	7	35	13 (30.23)
Chabertia species	4	17.4	5	25	9 (20.93)
Ostertagia species	6	26.1	5	25	11 (25.58)
Strongyloids species	3	13.04	4	20	7 (16.28)
Monezia species	7	30.4	8	40	15 (34.88)
Avitellina species	9	39.1	8	40	17 (39.53)

DISCUSSION

The present study found that the prevalence of GIT helminthes was 91.32% and 93.29% and at post mortem analysis 91.30% and 95% in sheep and goats respectively. This result coincides with the results of (Gebreyesus, 1986; Esayas, 1988; Tesfalem, 1989; Melkamu, 1991; Bayou, 1992; Yoseph, 1993; Genene, 1994; Getachew, 1998; Hailelul, 2002). They have reported a prevalence of 96.38% in goats of Ogaden range lands, 90.41% and 82.13% in sheep and goats in and around Wolayita Soddo, 88.1% and 84.32% in sheep and goats in and around Mekele, 91.43% in sheep in and around Kombolcha, 90.94% and 94.85% in sheep and goats of Gonder, 92.23% and 94.1% in sheep and goats of Mendayo district of Bale, 93.22% and 92.24% in sheep and goats of four Awrajas of Eastern Shoa, 90.23% and 88.33% in sheep and goats of Buno province and 85.79% in sheep in and around Asella respectively.

Out of 338 sampled shoats 10.95% massively, 48.52% moderately, and 40.53% were lightly affected. There is no significant difference in EPG among different age groups, sex and species. Majority of infected animals had fecal egg count in the range of 50-800 EPG and only few proportions of animals had fecal egg count over 1200. This is inline with Amenu (2005) and Hailelul (2002) who reported higher prevalences of 94.29% and 86.67% with a mean EPG of 1045.8 and 1016 in sheep and goats respectively. The maintenance of high infection rates of GIT helminthes in shoats in the study areas was associated with the presence of favorable environmental conditions for the existence and development of the parasitic GIT helminthes larvae.

Out of 43(23 sheep and 20 goats) post mortem examination performed, 21 (91.30%) sheep and 19 (95%) goats were found affected with one or more of helminthes. This was agreed with Yoseph (1993) who reported 93.33% in sheep of Asella, Dereje (1992) who reported 9(90%) sheep and 10(98.18%) in goats in and around Wolaita Sodo, Genene (1994) 100% in sheep and goats of northern Omo, and Hailelul (2002) who reported prevalence of 100% and 95.24% in sheep and goats in and around Wollaita Soddo.

The prevalence of Heamonchus spp. was 69.5% and 65%in sheep and goats respectively. This was agreed with Hailelul (2002) who reported 61.63% and 54.76% in sheep and goats respectively in and around Wollaita Soddo, Ahmed (1988) who reported 88.23% prevalence in goats of East wollega zone at Mechara settlement area. This result is relatively higher than to the present finding. The difference between the findings of these studies might be due to difference in the age, sex and species of examined animals and also the climatic condition of the area.

The prevalence of Trichuris spp. was 47.8% and 45% in sheep and goats respectively. This result agreed with Hailelul (2002) and Esayas (1988) who have reported 36.04% in sheep and 28.57% in goats and 36.04% prevalence of Trichuris species in sheep and goats in and arround Wollaita Soddo and in goats of Ogaden respectively.

The prevalence of Trichstrongylus species during the qualitative fecal examination was 43.5% and 55% in sheep and goats in this study respectively. This result is inline with the work of Yoseph (1993) who reported prevalence of 54.76% in sheeps of Asella. This result also incoherence with Hailelul (2002) who reported prevalence of 22.09% in sheep in and around Wolaita Sodo and Esayas (1988) who reported prevalence16.59 in goats of Ogaden. The above authors reported relatively lower prevalence than the present findings. This difference might be attributed to the difference in animal species, age and environmental conditions for the parasitic stage of larvae growth.

Oesophagostomum species was detected on 52.2% and 45% of the sheep and goats in the study area respectively, and this was in agreement with Hailelul (2002) who reported prevalence of 74.42% in sheep in and around Wolaita Sodo and Esayas (1988) who reported prevalence of 61.13% in Ogaden goats. These results are relatively higher than the present finding and the difference between the findings of these studies might be due to the age and sex of animals examined.

Bonostomum species with prevalence of 26.1% and 35% recovered during qualitative fecal examination in sheep and goats respectively in the present study and this was in agreement with Esayas (1988) who reported 59.38% in goats of Ogaden, Hailelul (2002) who reported 41.86% in sheep in and around Wolaita Sodo and Yoseph (1993) who reported a prevalence of 40.48% in sheep of Asella.

The prevalence of 17.4% and 25% of Chabertia species recorded during the present study in sheep and goats respectively. This was incoherence with Yoseph (1993) who reported a prevalence of 2.88% in sheep in and around Asella. This difference may be also due to the age and species of examined animals. With the same fashion the prevalence of Ostertagia species in the present study was 26.1 % and 25%in sheep and goats respectively. This result relatively agrees with the work of Amenu (2005) who reported a prevalence of 15.6% in sheep and goats of three different agro ecological zones of southern Ethiopia.

Strongyloid species was detected in 13.04% and 20% of the sheep and goats in the study area respectively, and this was inline with the work of Amenu (2005) who reported a prevalence of 1.1% in sheep and goats of three different agro ecological zones of southern Ethiopia. This result is much lower than the present finding. This difference might be due to the difference age of examined animals and geographical and environmental location of the area.

The prevalence of cestode parasites, monezia species in this study was 30.4% and 40% in sheep and goats respectively. This result is inline with Hailelul (2002) who reported 26.04% in sheep and 23.81% in goats in and around Wolaita Sod and Esayas (1988) who reported 16.13% prevalence of monezia species in goats of Ogaden. The results by the above authors are relatively lower than the present finding. The difference might be due to the difference in age.

The prevalence of Avetellina species was 39.1% and 40% in sheep and goats respectively. This result is in agreement with Hailelul (2002) who reported 13.45% and 11.90% in sheep and goats in and around Wolaita Sodo, and Esayas (1988) who reported 7.86% prevalence of Avitellina species in goats in Ogaden. These results are lower than the present finding. The difference between the findings of this study might be due to the difference in the age of the examined animals.

CONCLUSIONS AND RECOMMENDATIONS

The present study conducted on small ruminant GIT helminthosis in and around Bedelle area shows that GIT helminthosis of shoats are the most prevalent disease in the area affecting the well being of the animals. During the present study an overall prevalence of 91.32% and 93.89% coroscopically and 91.30% and 95% by postmortem examination in sheep and goats respectively were harboring one or more GIT parasites. Species, age and sex were considered as risk factors; however there is no significant difference in the prevalence of the parasite due to these risk factors. EPG analysis was undertaken to know the degree of infection. Of the 338 animals examined 137(40.53%) were lightly, 164 (48.52%) moderately and 37(10.95%) massively affected. From the above findings and conclusive remarks the following recommendations are forwarded:

To get clear epidemiological picture of GIT parasitic helminth, comprehensive study should be launched in the area where sheep and goats are abundant and practically participating in cash incomes, sources of food, skin and

manure to farming communities and play significant role in these sector.

Strategic treatment is appropriate, effective and broad spectrum anthelmintic should be practice at the beginning and after the end of the rainy season. Such treatment regime is strategic to get rid of the parasites burden of the animals and minimize pasture contamination by dropping fecal egg count.

Additionally, the field veterinarians and stockowners should be aware of the importance and burden of GIT helminthosis in sheep and goats.

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