Prevalence of Cattle Schistosomiasis and Associated Risk Factors in Fogera Cattle, South Gondar Zone, Amhara National Regional State, Ethiopia

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Abstract

The study was conducted from September 2010 to January 2011 in Fogera district Northwest Ethiopia. A cross-sectional study was conducted on a total of 270 local cattle of Fogera breeds to determine the prevalence of cattle schistosomiasis and associated risk factors. Simple random sampling technique was used to select the study animals in three peasant associations (PAs). These were Nabega, Shaga and Kokit. Sedimentation technique was applied for the recovery of schistosoma eggs from fresh fecal samples collected directly from rectum and preserved at 40c. Study parameters such as sex, age, husbandry practice, epidemiology and agroecologies were considered. Out of 270 fecal samples examined, 37(13.70%) were found to be positive for schistosomiasis. Nabega showed higher prevalence (17.78%) than other two study sites. From the total of 37 positive samples, 20(15.38%) were males and 17(12.17%) were females. There was no significant statistical variation in sex and age groups. The prevalence of schistosomiasis in calf (< 2 years), young (2-5 years) and adult (> 5 years) were 12(17.65%), 11(12.64 %) and 14(12.48%) respectively. From the result it is concluded that cattle schistosomiasis is one of the major health problems in the district. Therefore, control of schistosomiasis based on drug treatment (strategic anthelmintics practice), snail control and appropriate sanitation measures were recommended.

Keywords: Fogera breed; Schistosomiasis; Snail; Sedimentation; Prevalence; Fogera district

Introduction

Schistosomiasis (Bilharziasis or blood fluke) is a parasitic disease of circulatory system in animals. Important predilection sites for this parasite is the mesenteric, portal vein and typically in other organs of the final host. It is distributed in the tropical and sub-tropical countries. It is common in Africa, Asia and southern Europe. In tropics and sub-tropical countries the disease has significance effect (endemic) on domestic livestock production (Bont, 1995).

Veterinary important species of schistosoma that cause major impact on domestic animals include Schistosoma bovis (ruminants in Africa and Asia), Schistosoma leiperi (cattle in Africa), Schistosoma spindale (ruminants, horse and pigs in Asia), Schistosoma nasalis (ruminants and horse in India), Schistosoma indium (horse, cattle and goats in India buffalo), Schistosoma japonicum (human, Cat, and mammals in Asia) and Schistosoma margrebowiei (horses, ruminants and elephants in Africa) (Dwight *et al.*, 2003, Kassaw, 2007).

In Ethiopia, various epidemiological studies were conducted on cattle schistosomiasis were indicative of the epidemicity of the disease particularly in large stagnant water bodies and marshy free grazing areas. The prevalence of schistosoma bovis has reported from different regions of the country by fecal examination. For example, in Bahir Dar it was 33.8% report by Solomon (2008) and 28% in Kemissie by Ameni *et al.* (2001) were evident.

Cattle schistosomiasis is one of the major constraints of animal disease of Fogera district livestock production as it causes mortality, low fertility, retard growth, poor productivity (poor conversion rate), low milk yield and increased susceptibility to other parasitic or bacterial disease (Dargie, 1980).The epidemicity and high prevalence of bovine schistosomiasis in this district may be due to prevailing factors. Therefore, the major objective

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of this study is to address the risk factors in the district and the present prevalence rate in Fogera cattle.

Materials and methods

Study Area:

The study was conducted from September 2010 to January, 2011 in Fogera district which is situated in northwest Ethiopia, South Gondar Zone. It is located at 110581N latitude and 37041'E longitude. The capital of the district is Woreta which is located at 605 km from Addis Ababa and 55km from Bahir Dar and 115Km from Gondar. The altitude of the district ranges from 1774 to 2410 m.a.s.l. and the mean annual rain fall varies between 1,103-1,336 mm with the average annual temperature range from 10.30C to 27.20C. The district is bounded by five other districts (Libo Kemkem to the north, Ebinate Northeast, Farta to the East, Estie to the Southeast, Dera to the South and Lake Tana to the west). The district consist of 27 peasant associations (PAs) and five urban kebeles. It is bordering Lake Tana with water bodies of 23,354 hectar (FWAROD, 2009). Out of 27 PAs; eight of them found on the lowland marshy stagnant water bodies, rich in vast irrigation (canals), swampy and Lake Tana bordering areas.

The three PAs; Nabega, Shaga and Kokit which have been using extensive free grazing husbandry system near Lake Tana and surrounding districts. The number of cattle population in the district is about 201, 000 (CSA, 2008).

Study Population:

The sample unit of study population was local Fogera cattle breed from three PAs' (Nabega, Shaga and Kokit) which have a huge livestock population available and extensive free grazing animal husbandry practice is exhibited on both sexes and three age groups (calf, young and adult).

Study methodology and sample size determination:

Across-sectional study was conducted to determine the prevalence of cattle schistosomiasis by sedimentation technique. Simple random sampling method was used to select the study animals in the three selected peasant associations. The sample size of the study was calculated according to Thrusfield (2005) using 95% confidence interval and 0.05 absolute precision (P-value). The required sample size was determined by 12.5% prevalence of bovine schistosomiasis conducted previously by Zelalem (2010) in the study area. Thus a total of 270 cattle with three age categories classified arbitrarily (Calf: below 1 years, Young: between 2 and 5 years and Adult: above 5 years were randomly selected).

Study Design

Coprological Study:

To determine the presence or absence of bovine schistosomiasis; eggs in feces, fresh fecal samples were collected from the rectum of each animal. Collected samples were placed in universal bottles containing 10% formalin for preservation and transported to Bahir Dar Animal Health Diagnostic and Investigation Laboratory. Then samples were processed using techniques indicated by (Hansen and Perry, 1994; Urquhart *et al.*, 1996).

Environmental Assessment:

Cattle schistosomiasis is dependent on environmental factors such as moisture, rain fall, temperature, water bodies (stagnate, swampy, marshy) and snail intermediate hosts. Husbandry practice such as grazing system, keeping animals whether they are kept all together and/ or separately, feeding (contaminated pasture with larva) and drinking areas.

Data Analysis:

Collected data was entered in to Microsoft office excel spread sheet and analyzed using SPSS statistics (Version 17.0) software program. Chi-square statistics was used to determine the significance of variation and the P value greater than 0.05 was taken as statistically significant and less than 0.05 were taken as insignificant at 95% confidence interval.

Results

Coprological examination of 270 samples indicated

that 13.7% were positive for schistosoma eggs (Fig.1). The prevalence of cattle schistosomiasis in three PAs of the district was 17.78%, 12.22% and 11.19% in Nabega, Shaga and Kokit respectively (table 1). However, there was no statistical significance variation exist in these PAs (x^2= 5.823, P = 0.57).

Fig. 1. Eggs of schistsoma from coprological examination of animals in the study area (all are taken from compound light microscope of magnification (100x)

Table 1. Prevalence of cattle schistosomiasis in three selected peasant associations (PAs)

Risk Factors	Results		Prevalence (%)	χ^2	P-value
	Total examined	Positive			
Origin					
Nabega	90	16	17.78		
Shaga	90	11	12.22	5.823	0.57
Kokit	90	10	11.19		
Age					
Calf*	68	12	17.65		
Young	87	11	12.64	2.508	0.375
Adult	115	14	11.28		
Sex					
Male	130	20	15.38	1.77	0.196
Female	140	17	12.14		
Total	270	37			

* Calf (less than one year), young (1-5 years) and adult (greater than five years)

The prevalence of cattle schistosomiasis related to the three age groups 17.65% in calf, 12.64% in young and 12.28% in adults were observed. There was no statistically significant variation (P > 0.05) observed the prevalence of the disease among age groups.

The prevalence of cattle schistosomiasis according to sex; 15.38% in male and 12.14% in female were observed. The prevalence was greater in male than the female but there was no significance variation between sex groups.

Discussion

Schistosomiasis was claimed to be an important disease in different age and sex groups of cattle in the study area. This study revealed 13.70% prevalence of the disease is recorded due to agro-ecology and poor husbandry practice of the study kebeles which favor for snail intermediate hosts. The present study showed that higher prevalence of cattle schistosomiasis when compared with other studies such as Lo and Lemma (1973) who reported 1.5% and 5.5% prevalence rates in Gewanie and Awassa respectively. The difference could be due to epidemiology, agroecology, husbandry practice (animal management) and climatic variation of the areas. The result of this study is almost comparable with the prevalence studies in Bahir Dar 12.3% (Amro, 1993), 10.93% (Almaze, 2007) and in Fogera 12.5% (Zelalem, 2010). However, the prevalence of this study is lower than other previous studies conducted in Bahir Dar 33.8% (Solomon, 1985), 17.4% (Yalelet, 2004), 29% (Hailu, 1999), 24.73 %(Solomon, 2008) and in Kemissie 28% (Amen et al., 2001) by fecal examination. The difference in the prevalence of schistosomiasis is lower in the present study. It may be due to lower stagnant (swampiness) water, marshy, and higher drainage for rice cultivation and irrigation practice in the study PAs which is not more favorable for development and multiplication of snail intermediate hosts.

The Prevalence rate of this study showed that more number of males (15.38%) than females (12.14%) in the study kebele but there is no significant variation (P > 0.05) between two sexes and the prevalence rate of calves (17.65%) is slightly greater than adults (12.28%). The slight variation may be because of cattle less than 2 years old has no immunity to resist the new infection than others

and graze at marshy area throughout the day (Urquhart et al., 1997).

The result showed relatively higher prevalence of cattle schistosomiasis in Nabega (17.78%) Kebele than Shaga (12.22%) and kokit (11.19%). The variation in the prevalence of the disease may be the higher degree of swampiness (marshy-stagnant water), larger boundary border to Lake Tana, the number of rivers and moisture is higher than others. Urquhart et al. (1996) has reported that logged water, poorly drained areas with acidic soil are often endemic to schistosomiasis.

Acknowledgement

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