Research Article

Cross Sectional Epidemiological Investigation on the Prevalence of Gastrointestinal Parasites of Small Ruminants in Sullah Upazilla of Sunamgonj District, Bangladesh

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Abstract | A cross-sectional epidemiological investigation was conducted from February 2014 to July 2014 with the objectives of estimating the prevalence of gastrointestinal parasites of small ruminants in Sullah Upazilla of Sunamgonj District, Bangladesh. The study population was comprised of 400 small ruminants (goat and sheep). The whole study area was divided into ten sub groups to facilitate the collection of fecal sample. From each area, 40 samples were collected irrespective of animal species. All fecal samples were collected from 200 goat and 200 sheep. In the laboratory, coprologically, the samples were subjected to sedimentation, floatation, Modified McMaster techniques. The overall prevalence for GIT parasitic infection in goat and sheep found 45.00% and 40.00%, respectively. The prevalence of various types of parasites in sheep and goats were: *Fasciola gigantica* (46.67%), *Paramphistomum cervi* (50%), *Haemonchus contortus* (35.56%), *Moniezia* sp. (35.56%), *Trichuris* sp. (13.33%), *Strongyloides* sp. (11.11%) and *Eimeria* sp. (37.78%) of goat and *Fasciola gigantica* (37.50%), *Paramphistomum cervi* (63.75%), *Haemonchus contortus* (20.00%), *Moniezia* sp. (30.00%), *Trichuris* sp. (23.75%) and *Eimeria* sp. (43.75%) of sheep (P<0.05). The study shows various species of helminths suggesting the ambient condition and the nature of sheep and goat rearing system are very favourable for the transmission and existence of the parasite species. Therefore, further broad aspect studies are essential to estimate the impact of gastrointestinal helminths infection on the rural small ruminants of Bangladesh.

Keywords | Prevalence, Small Ruminants, Gastrointestinal Parasites, Sample, Sullah

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INTRODUCTION

Gastro intestinal parasites like helminths and protozoan affect the health of the small ruminants like sheep and goats. When heavy infections occur those parasites drastically decrease the economic feedback from the small ruminants animal like milk yield reduction in goat and sheep which also interrupt with the digestion of essential macro minerals like calcium and vitamins for the milk production in the mammary glands (Murthy and Rao 2014). Small ruminants under intensive and extensive production systems are extremely susceptible to the effects of wide range of helminths (Abede and Esayas, 2001). The fleece quality even production is reduced in sheep because of deficiency in required amino acids which is essential for the growth of the wool and grease fleece. Most parasitic helminths infect their host respectively via oral route and live either at the mucosal surface or gastro intestinal tract of the host. The problem is greater in tropical analysed as risk factors countries with good rainfall (Mulcahy et al., 2004). For checking those types of parasitic problems the important function of the veterinarians is to become more aware

about the commonly occurred gastrointestinal parasites in their geographical locations. Through proper diagnosis and treatment the losses of the poor farmers will be mollify those who are directly dependent on the livestock for their existence. Regarding the above proceedings the occurrence study was planned to investigate the gastro intestinal parasites of small ruminants (sheep and goat) belonging to Sullha region, Sunamgonj district, Bangladesh. Sullah the haour area has ample of livestock resources and farmers to rear sheep and goats for their livelihood.

MATERIALS AND METHODS

Ethical Issue

Before sampling consent was obtained from the animal owners participating in the study and cautions were taken to ensure minimum stress to the animal during sample collection.

Site profile and Geographical Information

The study was conducted in haour basin of Sullah Upazilla of Sunamgonj district, Bangladesh. The Sullah Upazilla has 13881 units of household corresponds to area 260.74 km^2, (Location: 24.6264˚N 91.2500˚E. (http://en.wikipedia.org/wiki/Sullah_Upazila). It is bounded by Derai upazilla on the north, Itna and Ajmirigonj upazilla on the South. Baniachong and Ajmiriganj upazilla on the East, Khaliajuri upazilla on the West. Water bodies Main rivers: Surma, Piyain, Kalni; Chakui Beel, Banda Beel, Aria Beel, Ralia Beel, Katari Beel, Gachidoba Beel, Katari Beel and Gochidoba Beel are notable (Figure 1).

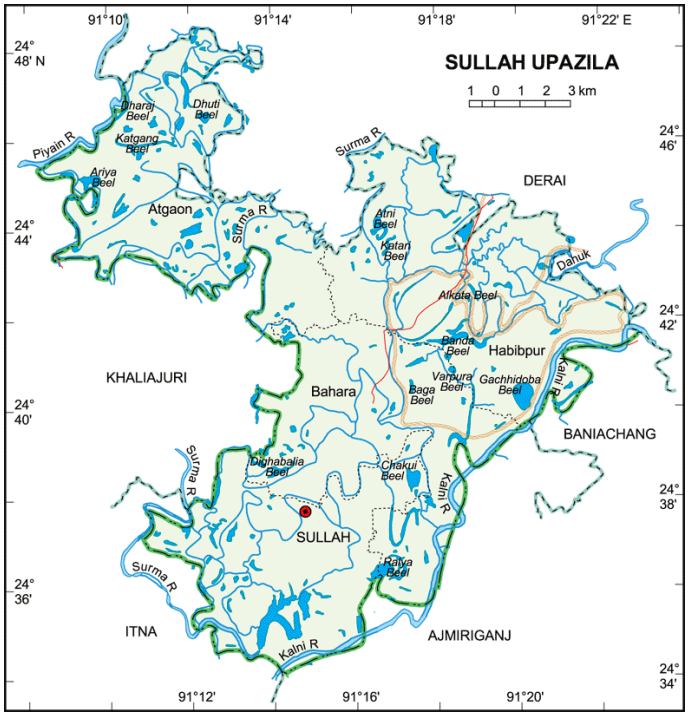

Figure 1: Geographical location of the study area

Study Period and Population

The study was conducted from February 2014 to July 2014 in haour basin of Sullah Upazilla of Sunamgonj district, Bangladesh. The whole Upazilla area was divided into ten sub groups to facilitate the collection of fecal sample. From each area 40 samples were collected irrespective of animal species. The study population was composed of small ruminants.

Sample Size Calculation

The sample size was calculated by using the formula for estimating prevalence according to (Houel H, 2004).

$$n = \frac{1.96^2 pexp(1 - pexp)}{d^2}$$

Where n = required sample size, p_{exp} = expected prevalence of the disease, d = allowable error of 5 %, and confidence level 95 %.

On the basis of information obtained through literature review the assumed prevalence of infection considered as 50% for ruminants and the population size was considered as 384. We wanted to be 95% sure to detect the infection if it present. Thus therefore we considered 400 small ruminants.

Parasitological Examination

The representative fresh fecal samples were collected per rectum from individual animals in dry and clean polythene bags and were brought to the laboratory after affixing a proper identification label. In the laboratory the samples were subjected to sedimentation, floatation, Modified McMaster techniques based on (Soulsby, 1982) and the eggs were identified by the techniques described (Saleque, 1999).

Statistical Analysis

Statistical analysis was performed by Logistic Regression procedure using SAS 9.2 and the level of significance was considered as ($P<0.05$) and win episcope for sample size detection.

RESULTS

Sheep and goats harbour a variety of gastrointestinal tract (GIT) parasites. The rates of parasitic infestations of small ruminants vary based on their animal species and regarding sex (Figure 2 and 3).

The animal examined in this study both male and female of goat and sheep. The proportion of examined are (55.00%) male and (45.00%) female for goat and (57.00%) male and (43.00%) female for sheep respectively (Table 1).

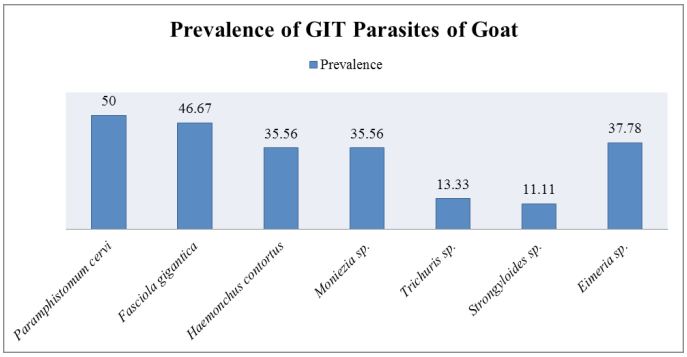

Figure 2: Prevalence of gastrointestinal parasites of goat

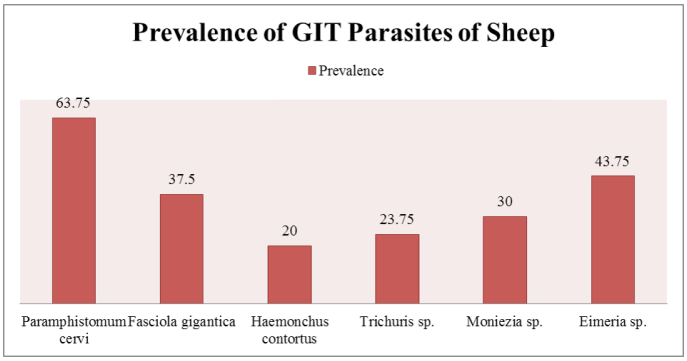

Figure 3: Prevalence of gastrointestinal parasites of sheep

Table 1: Percentages of male and female tested for the study

Animal Species	Sex		Total
	Male	Female	
Goat	110(55.00%)	90(45.00%)	200
Sheep	114(57.00%)	86(43.00%)	200

The overall prevalence for GIT parasitic infection in goat and sheep found during the study 45.00% and 40.00% respectively (Table 2).

Table 2: Overall prevalence of endo-parasites of small ruminants

Name of species	Total no of examined	Total no of infected	Overall prevalence
Goat	200	90	45.00%
Sheep	200	80	40.00%

The species of parasites were identified depending on the morphological characteristics of their eggs as *Fasciola gigantica*, *Paramphistomum cervi*, *Haemonchus contortus*, *Moniezia expansa*, *Trichuris* sp., *Strongyloides* sp., and *Eimeria* sp. The results were tabulated in Table 1 for goat and Table 2 for sheep. The prevalence of *Fasciola gigantica* (46.67%), *Paramphistomum cervi* (50.00%), *Haemonchus contortus* (35.56%), *Moniezia* sp. (35.56%), *Trichuris* sp. (13.33%), *Strongyloides* sp. (11.11%) and *Eimeria* sp. (37.78%) (Table 3) and *Fasciola gigantica* (37.50%), *Paramphistomum cervi* (63.75%), *Haemonchus contortus* (20.00%), *Moniezia* sp. (30.00%), *Trichuris* sp. (23.75%) and *Eimeria* sp. (43.75%) (Table 4).

DISCUSSION

Our study for the first time reported the prevalence of gastrointestinal helminths infection in small ruminants of very remote areas of Sunamgonj District of Bangladesh. We had found that the rural goat and sheep are heavily infected by helminths which will cause malevolent impact on the health and productivity of small ruminants.

In the present study, the highest prevalence of helminths was recorded in goats. The rate of helminths infection in goat varies from one part of the world to another. A variety of factors such as host age, sex and breeding status, grazing habits, the level of education and economic capacity of farmers, the standard of management and anthelmintic used can influence the prevalence of helminths (Asanji and Williams, 1987; Gulland and Fox, 1992).

The various species of endo-parasites recovered during present investigation have been reported by various researchers in different parts of the world (Pedreira et al., 2006; Nwosu et al., 2007; Raza et al., 2007). The prevalence studied in this area are correlated with the gastrointestinal parasites infection found elsewhere conducted by (Raza et al., 2007).

In this study the prevalence of Haemonchus sp. is 35.56% in goat and in sheep Haemonchus sp. 20.00% which is very similar to the study of gastrointestinal parasites of Ethiopia (Ibrahim et al., 2014; Lashari et al., 2015). The occurrence of *Moniezia* sp. is 35.56% that is very coherent to infection found in southern Ethiopia (Aragaw and Gebreegziabher, 2014) whereas prevalence rate of *Eimeria* sp. in present study is 44.75% similar to the study of *Eimeria* found in Pakintan (Kaur and Kaur 2008; Gadahi et al., 2009; Daniel et al., 2014).

The prevalence of *Strongyloides* sp. in this study is 11.11% shows relatively close to the study found in India (Yadav et al., 2005; Bhat et al., 2014; Singh et al., 2014), prevalence rate of *Trichuris* sp. found 13.33% in my study similar to prevalence found in West Harerghe Zone (Kaur and Kaur 2008, Tariq et al., 2008; Daniel et al., 2014). The rate of Fasciola infection is 37.50% which close to infection found by (Daniel et al., 2014). The prevalence of Fasciola sp., and Paramphistomum sp. in the present study was higher than the report of (Haque et al., 2011). The reason could be due to the agro-climatic conditions in Sunamgonj region with the presence of haour area near water bodies and abundant intermediate hosts during the rainy season.

Yadav et al. (2005) reported that the prevalence of Amphistomes (26.56 %) were predominant followed by Stron

Table 3: No of infected goat, prevalence and range of parasite species found in 200 goats in different areas of Sullah upazila of Sunamgonj district, Bangladesh

Upazilla	Helminths species	No. of Infected goat			Prevalence (%)	Min-Max
		Male (n=40)	Female (n=50)	Total (n=90)		
Sulla	*Paramphistomum cervi*	21	24	45	50.00	4-54
	Fasciola gigantica	22	20	42	46.67	6-62
	Haemonchus contortus	18	14	32	35.56	4-38
	Moniezia sp.	12	20	32	35.56	9-68
	Trichuris sp.	08	04	12	13.33	2-46
	Strongyloides sp.	06	04	10	11.11	3-34
	Eimeria sp.	16	18	34	37.78	8-76

Table 4: No of infected sheep, prevalence and range of parasite species found in 200 sheep in different areas of Sulla upazila of Sunamgonj district, Bangladesh

Upazilla	Helminths Species	No. of Infected sheep			Prevalence (%)	Min-Max
		Male (n=35)	Female (n=45)	Total (n=80)		
Sulla	*Paramphistomum cervi*	26	25	51	63.75	4-58
	Fasciola gigantica	16	14	30	37.50	7-37
	Haemonchus contortus	08	08	16	20.00	4-30
	Trichuris spp	10	09	19	23.75	3-22
	Moniezia spp.	14	10	24	30.00	4-28
	Eimeria spp.	19	16	35	43.75	6-46

gyloides sp. (08.43 %) in bovines belonging to Jammu region. Muraleedharan (2005), who reported the prevalence of gastrointestinal parasites among sheep (39.34 %) and goats (46.12 %) of southern Taluks of central dry zone of Karnataka during drought period. The prevalence rate of *Paramphistomum cervi* and *Fasciola gigantica* of goat and sheep found in this study showed no correlation with the result found by authors (Pathak and Pal 2008; Pant et al., 2009).

Limitation and Strength of the Study

In this study we were only able to do microscopic examination of stool because of lack most sophisticated resources such as PCR which might under estimate the true prevalence of infection. Moreover, the number of goat faeces examined was comparatively similar to sheep as because most of the farmers are interested to rear both goat and sheep due to production and benefit purposes. This produced result privileges us to envisage the overall parasitic infections that affect sheep and goats in most of the rural areas in Bangladesh.

CONCLUSION

The conducted study revealed various species of helminths infection in goat and sheep which suggest that the ambient condition and the nature of sheep and goat rearing system are very favorable for the transmission and existence of the parasite species in rural areas of Bangladesh. This condition of high worm loads can make the animal more prone to other organismal infection like bacterial and viral infection as well as the other domestic animals which acts as the vector of parasitic diseases. Therefore, further broad aspect studies are essential to estimate the impact of gastrointestinal helminths infection on the rural small ruminants in rural areas of Bangladesh.

CONFLICT OF INTEREST

The authors declare no conflict of interests.

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AUTHOR'S CONTRIBUTION

Muhammed Hossain has examined the faeces samples, written the whole manuscript and did all the revision and correction of the manuscript. AHM Musleh uddin supervised the whole manuscript. Md. Shafiul Alam helped in partial revision, Md. Jamal Uddin Bhuiyan, Kazi Meheta-

zul Islam, Tilak Chandra Nath and Real Datta helped in laboratory examination of the samples.

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