Asian Journal of Research in Animal and Veterinary Sciences

7(1): 47-51, 2021; Article no.AJRAVS.64459

Enteric Parasites in Sheep (*Ovis aries*) from Gabtoli Cattle Market, Dhaka

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Authors' contributions

This work was carried out in collaboration among all authors. Authors SM, HA and HK conceived and designed the study. Author HA performed the laboratory work. Authors RA, MM and HK wrote the first draft of the manuscript and author PB interpreted the data. All authors read and approved the final manuscript

Article Information

Editor(s):
(1) Dr. Osama Anwer Saeed, University of Anbar, Iraq.
Reviewers:
(1) Ahmed Mahmoud Abd El Tawab Mohamed Eid, National Research Centre, Egypt.
(2) Lisbeth Coromoto Rangel Matos, University of Zulia, Venezuela.
Complete Peer review History: http://www.sdiarticle4.com/review-history/64459

Original Research Article

Received 02 November 2020
Accepted 08 January 2021
Published 28 January 2021

ABSTRACT

Aims: The present study was conducted to determine the prevalence of enteric parasites in sheep (*Ovis aries*).
Methodology: A total of 96 sheep fecal samples were collected from Gabtoli cattle market, Dhaka from April to November 2017 to perform the present cross sectional study. Formol Ether Concentration technique was applied to process the collected stool samples.
Results: *Balantidium* sp. (41.67%; CPG 17.5±3) followed by *Entamoeba* sp. (37.50%; CPG 7.22±3) showed the maximum prevalence among protozoan parasites. *Fasciola* sp. (45.83%; EPG 45±5) and *Hymenolepis nana* (37.50%, EPG 17.22±7.5) were the most prevalent among trematodes and cestodes, respectively. *Ostertagia* sp. (50%; EPG 26.9±5) showed the uppermost prevalence among the nematodes. *Trichuris ovis* showed the highest intensity (53.7±13.5) followed by *Strongyloides* sp. (49.8±14). The lowest prevalence was recorded for *Giardia* sp. (8.33%; CPG 6±0.5). Male and female sheep were almost equally infected except for protozoans and cestodes, which was lower in female sheep.

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Conclusion: The results of this study suggest high prevalence of gastrointestinal parasitic infection in sheep (*Ovis aries*) from Gabtoli cattle market, Dhaka. Further effort is indispensable for a well-thought-out investigation and monitoring of enteric parasites in small ruminants to formulate operative control strategies.

Keywords: Enteric parasites; sheep; prevalence; protozoa; helminth.

1. INTRODUCTION

Enteric parasitic infection in small ruminants is a problem in commercial production system as it has a huge influence on growth and related cost of control trials [1]. Heavy infections with helminths lower the immunity of the animals [2] and these infections contribute to reduced milk and meat production [3]. As majority of the infected animals show very little obvious clinical signs due to parasitism and the effects are slow and chronic, therefore, the problems are often unnoticed and mistreated [4]. A proper understanding of the epidemiology of parasitic diseases is a precondition for the rational design for the effective preventive and control measures against the dreadful parasitic diseases. Hence, the present study was designed to investigate the enteric parasites prevalent in sheep from Gabtoli cattle market, Dhaka which will eventually assist the veterinarians estimating the risk. It will also create alertness among the owners to take appropriate control measures against parasitic infections.

2. MATERIALS AND METHODS

2.1 Area of the Study

A total of 96 sheep fecal samples (40 male sheep and 56 female sheep) from Gabtoli cattle market, Dhaka were collected and analyzed during April to November 2017. Parasitological examination was conducted in Parasitology Laboratory, Department of Zoology, University of Dhaka.

2.2 Collection and Preservation of Fecal Samples

Fecal samples were collected randomly from the sheep. Before collection, the animals were restrained properly. To avoid contamination, all possible hygienic measures viz. wearing apron, hand gloves and gumboot were taken. Fresh fecal samples were collected carefully from the ground just after defecation. About 20-25 grams of feces were collected carefully from each host. Each sample was preserved in 10% formalin.

2.3 Laboratory Screening

Formol Ether Concentration technique [5] was applied to identify the protozoan cysts and helminth eggs. By using a rod or stick, an estimated 1 gm of feces was emulsified in about of 4 ml of 10% formol water contained in a screw capped tube. 3-4 ml of 10% v/v formol water was added more and mixed by shaking for about 20 seconds. Then the emulsified feces were sieved and the fecal suspension collected in a tube. The sieved suspension was transferred in a centrifuge conical tube of strong glass of polypropylene and an equal volume of ether (3-4) ml was added. A stopper was attached to the tube and mixed for 1 minute. If using a vortex mixer, the tube should be left unstopped and mixed for at least 15 seconds. With a tissue or a piece of cloth wrapped round the top of the tube, the stopper was loosened. The tube was then centrifuged immediately at approx. 3000 rpm for 1 minute. After centrifuging, the parasite's eggs were sediment to the bottom of the tube and fecal debris was collected in a layer between ether and formol water. By using a stick, the debris layer was loosened from the side of the tube and the ether layer was discarded by inverting the tube. The sediment remained at the bottom of the tube. After mixing the sediments by a stick, it was transferred on the slides for microscopic examination.

2.4 Identification of Parasite Cysts/Eggs

Parasite cysts and eggs were identified with the help of compound microscope (10X objective) consulting Soulsby [6].

2.5 Statistical Analysis

Data were analyzed by SPSS 20.0 using F test. A *P*-value less than 0.05 was considered significant.

3. RESULTS AND DISCUSSION

Total 23 species of gastro-intestinal parasites comprising four species of protozoa, four species of trematodes, four species of cestodes and 11 species of nematodes were identified in the present study. Muraleedharan [7] carried out a study on the gastrointestinal parasites of livestock in a central dry zone of Karnataka, India and reported the prevalence of gastro-intestinal parasites among cattle (18.22%), buffaloes (20.85%), sheep (39.34%) and goats (46.12%). Sangma et al. [8] reported a very high rate of infection (81.1%) in sheep in Tangail district of Bangladesh. Suitable environment may have contributed to the infection of enteric parasites in the present study.

In the present study, *Balantidium* sp. (41.67%; CPG 17.5±3) was found as the most prevalent protozoan parasites followed by *Entamoeba* sp. (37.50%; CPG 7.22±3) and *Eimeria* sp. (33.33%; CPG 11.87±2) (Table 1). Gadahi et al. [9] found the highest prevalence was of coccidian parasites in sheep in Pakistan. Mohemed [10] reported *Eimeria* sp. (12%) in sheep slaughtered in Khartoum state, Sudan. Murthy and Rao [3] found *Eimeria* sp. (4.7%) in sheep and goat of Teleghana, Andhra Pradesh. Kandasamy et al. [11] observed *Eimeria* sp. and *Giardia* sp. as protozoa parasites infecting the sheep of Jaffna district.

Sheikh et al. [12] recorded high prevalence of trematodes (25.20%) in sheep of Gurez Valley, Kashmir. In the present study, *Fasciola* sp. showed the highest prevalence (45.83%; EPG 45±5) followed by *Dicrocoelium* sp. (29.17%; EPG 12.86±1.5) (Table 1). Islam and Taimur [13] found liver fluke (*Fasciola gigantica*) infection (8.82%) in free ranging sheep of Bangladesh. Sangma et al. [8] identified three species of trematodes in sheep of Tangail district of Bangladesh.

Hymenolepis nana (37.50%; EPG 17.22±7.5) showed the highest prevalence followed by *Dipylidium* sp. (20.83%; EPG 7.6±0.5) and *Moniezia* sp. (20.83%; EPG 17±2.5) in the present study (Table 1). Jan et al. [14] recorded cestode parasites (2%) in Peshawar, Pakistan which is much lower than the present study. Islam and Taimur [13] found 24.26% tapeworm infection in free ranging small ruminants of Bangladesh. Kelemework et al. [15] recorded prevalence of *Moniezia* sp. (13.67%) in sheep of Dire Dawa, Easrern Ethiopia. Samaddar et al. [16] found *Moniezia* sp. (4.76%) and *Taenia* sp. (0.49%) infections in goat in Rajbari, Bangladesh.

In the present study, *Ostertagia* sp. (50%; EPG 4.7±1.5) showed the highest prevalence followed by *Ascaris* sp. (41.67%), *Haemonchus* sp. (41.67%), *Trichostrongylus* sp. (41.67%), *Trichuris* sp. (37.5%; EPG 36.3±12), *Strongyloides* sp. (37.5%; EPG 49.8±14) (Table 2). Yeasmin et al. [17] found the highest infection of *Strongyloides* sp. in sheep of Bangladesh whereas Islam and Taimur [13] found *Trichostrongylus* sp. and *Haemonchus* sp. as the most prevalent nematodes. Tsotetsi and Mbati [18] found *Haemonchus* sp. and *Oesophagostomum* sp. as the dominant nematode genera infecting the cattle of various breeds, Merino sheep and Angora goats from northeastern Free State, South Africa. Geographical niches, temperature, climatic conditions, topography, rearing, management, breed of sheep and the variation in sample collection procedure may act as altering factors.

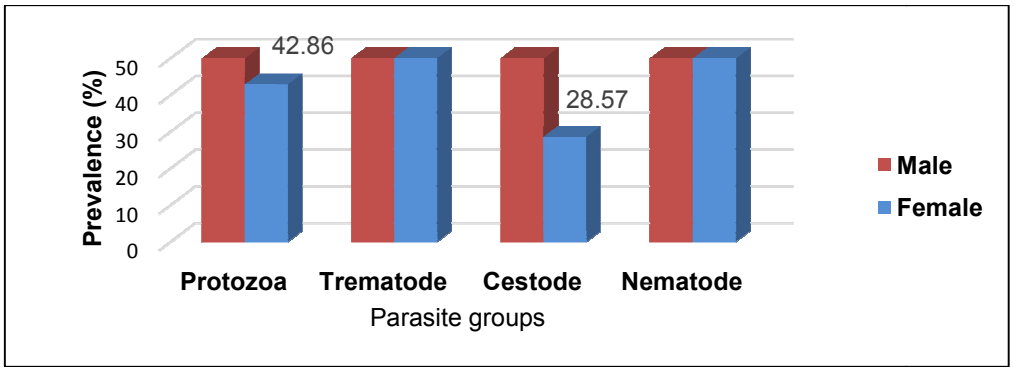

Fig. 1. Sex based prevalence of parasites in sheep from Gabtoli cattle market, Dhaka

Table 1. Prevalence of protozoan and helminth parasites in sheep from Gabtoli cattle market, Dhaka

Parasite species	No. of host examined	No. of host infected	Prevalence (%)	CPG/EPG
Protozoan				
Balantidium sp.		40	41.67	17.5±3
Eimeria sp.	96	32	33.33	11.87±2
Entamoeba sp.		36	37.50	7.22±3
Giardia sp.		8	8.33	6±0.5
Trematode				
Dicrocoelium sp.		28	29.17	12.86±1.5
Fasciola sp.	96	44	45.83	45±5
Paramphistomum sp.		16	16.67	11.25±1.5
Schistosoma sp.		24	25.00	4.67±1
Cestode				
Dipylidium sp.		20	20.83	7.6±0.5
Hymenolepis nana	96	36	37.50	17.22±7.5
Moniezia sp.		20	20.83	17±2.5
Taenia sp.		16	16.67	3.75±0.5

Table 2. Prevalence of nematode parasites in sheep from Gabtoli cattle market, Dhaka

Parasite species	No. of host examined	No. of host infected	Prevalence (%)	EPG
Ascaris sp.		40	41.67	36.3±12
Ancylostoma sp.		24	25.00	16.7±2.5
Bunostomum sp.		12	12.50	6±1.5
Chabertia sp.		12	12.50	16±1
Cooperia sp.		16	16.67	12.5±0.5
Haemonchus sp.	96	40	41.67	10±1.5
Oesophagostomum sp.		28	29.17	47.5±12.5
Ostertagia sp.		48	50.00	4.7±1.5
Trichuris ovis		36	37.50	53.7±13.5
Trichostrongylus sp.		40	41.67	46.8±13
Strongyloides sp.		36	37.50	49.8±14

Among 96 sheep hosts, 40 were male sheep and 56 were female. Cestode (28.57%) and protozoan (42.87%) infection was lower in female sheep (Fig. 1). Yeasmin et al. [17] reported that male sheep (81.5%) were more infected with helminths compared to female (72.7%) in Bangladesh. Rahman et al. [1] found higher infection rate in female (65.7%) compared to male (60.1%) small ruminants. Lack of immunity, improper food supplement, lack of sanitation and hormonal imbalance may be responsible for individual parasitic infection rather than sex of the host.

4. CONCLUSION

High prevalence of enteric parasites was found in sheep indicating likelihood of lack of immunity and absence or insufficiency of antihelminthic treatment. Additional studies with large sample size can depict the definite prevalence of enteric parasites.

CONSENT

The research assistant and the volunteers were well informed about the objectives of the study. As per international standard or university standard, sheep owners written consents have been collected and preserved by the authors.

ACKNOWLEDGEMENTS

The research was funded by Ministry of Science and Technology, Government of the People's Republic of Bangladesh. We are thankful for the support.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:
The peer review history for this paper can be accessed here:
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