



Research Article

Incidence of Gastrointestinal Parasitism in Cattle in Gazipur, Bangladesh

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Abstract | The present study was conducted to investigate the incidence of gastrointestinal parasitic diseases in cattle that were sick and brought to veterinary hospitals for treatment. Fecal samples were collected from the rectum and examined by direct smear method and helminths identified by the presence of characteristic eggs in the feces. This study was carried out with three age groups: calves (<1 year), young (1–3 years), and adult (>3 years) and three different consecutive seasons (winter, summer, and rainy) during the periods of January 2018 to December 2018. The highest incidence was found in infestation with *Fasciola* spp. (43.63%) followed by *Toxocara* spp. (35.75%) and *Haemonchus* spp. (7.87 %). The rainy season showed the highest degree of parasitic occurrence (45.55%) compared to summer (32.12%) and winter (22.42%) seasons. A higher incidence of *Fasciola* spp. (46.66%) was found in the rainy season whereas *Toxocara* spp. (45.94%) in winter and *Haemonchus* spp. (15.09%) in summer. The percentages of *Fasciola* spp. (57.14%) infection was more in adult cattle while *Toxocara* spp. (68.88%) were predominant in calves. A higher percentage of infection was recorded in females than in males. The results of the study provide an epidemiological forecast in the distribution of gastrointestinal parasitism in different age groups of cattle and seasonal variation of occurrence which can assist the clinicians for the diagnosis of such parasitic infections and necessary steps for prevention and control measures against them.

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Introduction

Parasitic infection is a major impediment to health and livestock production in tropical and sub-tropical countries including Bangladesh (Islam *et al.*, 2020; Kakar and Kakarsulemankhel, 2008). All age groups of cattle are infected by a diverse set of

gastrointestinal parasites (Alim *et al.*, 2012; Islam *et al.*, 2020). Although these infections are always not injurious with high mortality in cattle, their effects are commonly characterized by retarded growth, low productivity and increased susceptibility of animals to other infections (Radostits *et al.*, 2006). These parasitic infestations are associated with overall

economic losses in the livestock industry (Bary *et al.*, 2018; Rinaldi *et al.*, 2011). Despite having significant losses from gastrointestinal parasitic infections, the problems are often ignored because the majority of the infected animals show subclinical or chronic infections (Raza *et al.*, 2010).

Among the factors affecting the health and productivity of cattle, gastrointestinal parasitism is one of the leading obstacles in the cattle industry in Bangladesh (Admasu and Nurlign, 2014). Among the gastrointestinal parasites; coccidian, ascarid, strongyle, *Setaria*, and amphistomes were mostly in tropical and temperate countries like India, Bangladesh, South Africa, Sri Lanka, Italy, and Mongolia, with a prevalence rate ranging from 20 to 96% (Gwaze *et al.*, 2009; Hassan *et al.*, 2011; Lone *et al.*, 2011; Sharma *et al.*, 2009; Sharma and Busang, 2014). Various epidemiological studies of gastrointestinal parasites in cattle have been conducted in different parts of Bangladesh (Ahmed *et al.*, 2015; Alim *et al.*, 2012; Sardar *et al.*, 2006), and has been shown that gastrointestinal parasitic infestation varies depending on the prevailing climatic conditions and farm management practices. Therefore, it is important to map out the parasitic infestation accurately in different agro-climatic zones for taking appropriate control measures. As far as we are aware of there is very scanty information on the seasonal prevalence of gastrointestinal parasitic infections in cattle in Bangladesh. The prevalence of parasitic infection depends on ecology, geographical and climatic condition prevailing in Bangladesh (Hossain *et al.*, 2004). Since Gazipur is the central place of Bangladesh, so its geo-climatic conditions represent the whole of Bangladesh. In addition, this district has a rich source of cattle, so, it is the time demand, to conduct a thorough study regarding the occurrences of gastrointestinal parasitic diseases and their co-relation with seasonal variance. Therefore, the present study has been undertaken to investigate the prevalence of gastrointestinal parasitic infections in cattle presented at upazila veterinary hospital of Gazipur with various alignments and the specific objective was to determine their incidence and evolving the strategic and tactical methods of control.

Materials and Methods

Study period and area

The fecal samples were collected from cattle in the

upazila veterinary hospital, Gazipur from January 2018 to December 2018.

Study questionnaire

To record the information of the animal, a questionnaire was developed where owner name and address, patient age and sex, and prescription such as anthelmintic treatment, ration formulation are mentioned. Although the questionnaire was written in English, it was translated to bangle (our native) language during a face-to-face interview with the owner of the patient hen the as well as samples collection.

Sample collection

The clinical samples of cattle were collected after examining the clinical status of the animal by the veterinary surgeon at the veterinary hospital. Fecal samples were collected from the rectum of the animals having digestive disturbances. The samples were then examined immediately.

Sample examination

Sample examination was performed as previously described by (Siddiki *et al.*, 2010). Briefly, two or three thin smears were prepared with the feces for each cattle and then examined under the microscope with low power objectives (10X). Positive cases were diagnosed based on the characteristic morphological feature of eggs of helminth parasites (Soulsby, 1982). The results of fecal sample examination were then recorded according to age, seasons, and sex of animals.

Calculation

The collected data were entered and managed in an MS Excel worksheet. The proportion of different parasitism was expressed as a percentage by dividing the total number of cattle positive to a specific parasitic egg to the total no of cattle examined.

Results and Discussion

The data were recorded based on the season of the year and the age of the animals. The year was arbitrarily divided into Summer (March to May), Rainy (June to October), and Winter (November to February) seasons, and the animals were categorized into 3 age groups: calves (<1 year), young (1-3 year) and adult (>3 years).

Table 1 shows the overall prevalence of gastrointestinal

parasitic diseases in cattle in Gazipur Sadar. The prevalence of *Fasciola* spp. was (43.63%) followed by *Toxocara* spp. (35.75%) and *Haemonchus* spp. (7.87 %). The highest incidence of parasites was observed in the rainy season (45.55%) followed by summer (32.12%) and winter (22.42%) which is shown in Table 2. These findings are well consistent with the observations of (Alim *et al.*, 2012) and (Hassan *et al.*, 2018). Lacking optimum moisture and temperature for the development of larvae in the pasture during the hot and cold season lowers and lowest the prevalence during summer and winter respectively. In the rainy season, the abundant rainfall and availability of an intermediate host of trematode favor the migration and development of the infective stage in snails. Here, it was shown that, the highest prevalence of *Fasciola* spp. (46.66%) in rainy season were found in line with the reports of (Ghosh *et al.*, 2016; Radostits *et al.*, 2006). Infection with *Haemonchus* spp. were predominant in the summer season agreed with the observation of (Pfukenyi *et al.*, 2007) and (Urquhart *et al.*, 1996). They mentioned relatively high temperature and humidity are suitable for the larval development and survival in the pasture of such parasites. On the other side, the highest prevalence of *Toxocara* spp. (45.94%) were found in the winter season which is negatively correlated with the other studies (Alim *et al.*, 2012).

Table 3 shows the prevalence of gastrointestinal parasitic diseases in cattle in three different age groups. The prevalence of parasitic infection in adult cattle (over 3 years) was higher which might be due to longer periods of grazing times (Sardar *et al.*,

2006). In addition, some predisposing factors like lactation, pregnancy, nutritional deficiency might be accounted for higher infection in adult cattle (Radostits *et al.*, 2006). The calves under one-year-old had a significantly higher prevalence of *Toxocara* spp. (68.88%) infection than young and adult. This study strongly supported the findings of (Avcioglu and Balkaya, 2011) who reported higher infection at 0-12 months of age group. The high prevalence of this parasitic infection in calves might be related to prenatal infection through the transfer of third larval stage (L3) and poor hygienic conditions during the post-natal period (Dorny *et al.*, 2015; Roberts *et al.*, 1990). Regarding *Fasciola* spp., the prevalence of infection found in adult cattle agrees with those reported by (Sardar *et al.*, 2006; Alim *et al.*, 2012) conducted in Bangladesh who reported that *Fasciola* spp. were highest in the age group more than 36 months. Infection with *Bunostomum* spp. (8.00%) were higher in the young group (1-3 years) possibly due to sudden exposure to grazing land containing a huge number of larvae of parasites.

Table 1: Overall prevalence/occurrence of gastrointestinal parasitic infection in cattle.

S. No.	Parasite species	No of infection	Prevalence
1	<i>Fasciola</i> spp.	72	43.63%
2	<i>Toxocara</i> spp.	59	35.75%
3	<i>Strongyloidosis</i> spp.	7	4.24%
4	<i>Bunostomum</i> spp.	6	3.63%
5	<i>Hemonchus</i> spp.	13	7.87%
6	<i>Paramphostomum</i> spp.	8	4.84%
	Total	165	

Table 2: Prevalence/occurrence of gastrointestinal parasitic infections in different seasons.

Season	Different parasitic load						Total	% infestation
	<i>Fasciola</i> spp.	<i>Toxocara</i> spp.	<i>Strongyloidosis</i> spp.	<i>Bunostomum</i> spp.	<i>Haemonchus</i> spp.	<i>Paramphistomum</i> spp.		
Winter	15 (40.54%)	17 (45.94%)	1 (2.70%)	2 (5.40%)	2 (5.54%)	-	37	22.42
Rainy season	35 (46.66%)	25 (33.33%)	4 (5.33%)	2 (2.66%)	3 (4.00%)	6 (8.00%)	75	45.55
Summer	22 (41.50%)	17 (32.07%)	2 (3.77)	2 (3.77%)	8 (15.09%)	2(5.40%)	53	32.12
Total							165	

Table 3: Prevalence/occurrence of gastrointestinal parasitic infections in different age groups.

Age group	Different parasitic load						Total	% infestation
	<i>Fasciola</i> spp.	<i>Toxocara</i> spp.	<i>Strongyloidosis</i> spp.	<i>Bunostomum</i> spp.	<i>Haemonchus</i> spp.	<i>Paramphistomum</i> spp.		
Calf (< 1Year)	9 (20.00%)	31(68.88%)	1 (2.22%)	2 (4.44%)	1(2.22%)	-	45	27.27
Young (1-3 Year)	28 (56.00%)	12(24.00%)	3 (6.00%)	4 (8.00%)	1 (2.00%)	2 (4.00%)	50	30.30
Adult (> 3)	40 (57.14%)	13(18.57%)	4 (5.71%)	3 (4.28%)	7 (10.00%)	3 (4.28%)	70	42.42
Total							165	

Table 4: Prevalence/occurrence of parasitic diseases in different sex groups.

Sex group	Different parasitic load						Total	% infestation
	<i>Fasciola</i> spp.	<i>Toxocara</i> spp.	<i>Strongyloidosis</i> spp.	<i>Bunostomum</i> spp.	<i>Haemonchus</i> spp.	<i>Paramphistomum</i> spp.		
Female	80 (64.00%)	20 (16.00%)	10 (8.00%)	5 (4.00%)	7 (5.60%)	3 (2.40%)	125	75.75%
Male	20 (50.00%)	8 (20.00%)	4 (10.00%)	6 (15.00%)	2 (5.00%)	-	40	24.24%
Total							165	

Overall, the sex-specific prevalence of gastrointestinal parasitic infestation was more predominant in female than male cattle (Table 4). These findings are in agreement with the other study reported by (Raza *et al.*, 2007, 2010). *Strongyloidosis* spp. and *Bunostomum* spp. infection was found higher in a male animal. The changing of occurrence of such parasitic infections in male and female animals might be due to the alteration in sample size (Bachal *et al.*, 2002), lowered resistance of female animals or temporary loss of acquired immunity near parturition (Garcia *et al.*, 2007), and insufficient feed supply against their higher needs (Hansen and Perry, 1994; Raza *et al.*, 2010).

Conclusions and Recommendations

It can be concluded from the current study that the occurrence of gastrointestinal helminth parasites was highest in rainy season followed by summer and winter. In the species wise comparison, *Fasciola* spp. was highly prevalent while the occurrences of *Bunostomum* spp. were the lowest. Age specific prevalence of gastrointestinal helminthes *Fasciola* spp. were found more in adult cattle *Toxocara* spp in calf less than one year. Higher percentages of helminthes infections found in female cattle as compared to male. However, this study provides some epidemiological ideas in the occurrence of such diseases in cattle and aware the farmers to take necessary preventive and control measures against them.

Novelty Statement

As far as we are aware that this is the first report of gastrointestinal parasitism in large animal in Gazipur district, Bangladesh. The study provide an epidemiological forecast in the distribution of gastrointestinal parasitism in different age groups of cattle and seasonal variation of occurrence.

Author's Contribution

FK and MSA conceived and designed the study and

wrote the manuscript. AM and MMR performed the experiments. AY, MAZ and MAI contributed to review the manuscript. MSA supervised and approved it for final publishing.

Conflict of interest

The authors have declared no conflict of interest.

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