

PREVALENCE OF GASTROINTESTINAL HELMINTHES IN BUFFALOES IN BARISAL DISTRICT OF BANGLADESH

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ABSTRACT

A total 270 samples were collected from July 2012 to December 2012 from three upazilas (Barisal sadar, Bakergonj and Mehendigonj) of Barisal district to know the prevalence of gastrointestinal helminthes. Samples were collected in 10% neutral buffered formalin and shifted to Parasitology laboratory of the department of Pathology and Parasitology under the Animal Science and Veterinary Medicine (ANSVM) faculty of Patuakhali Science and Technology University. Samples were examined by direct smear method and simple sedimentation method of fecal sample examination technique. Among 270 samples 107 (39.6%) samples were found positive for gastrointestinal helminthes. Five types of helminthes were identified namely *Fasciola gigantica* (26.17%), Amphistomes (60.75%), *Neoascaris vitulorum* (1%), *Schistosoma bovis* (1%), *Trichostrongylus axei* (2%). The prevalence of mixed infection with *Fasciola gigantica* and Amphistomes was 9.34%. No cestode was found in this study. Comparative study among three different upazila shows highest prevalence in Barisal sadar (44%) and lowest in Mehendigonj (25%). Geographical location of different char island of Sadar upazila and season of sample collection may be the cause of highest prevalence of gastrointestinal helminthes in Sadar upazila of the district. Study period covered rainy season and part of winter season only. Highest parasitic ova were found in rainy season (44.32%) than winter season (29.41%). The age specific prevalence were 12.15%, 14.02%, 40.19%, 33.65% in 0-6 months, 7 months-2 years, 3 years- 6 years & 7 years - above respectively. History of administering anthelmintic (Levamisole hydrochloride) to the calf may be the cause of lowest prevalence of parasitic infection at early age in the study area. In this study, highest number (60.75%) of Amphistomes was found among positive cases. Some important Amphistomes of buffalo are *Paramphistomum*, *Cotylophoron*, *Gigantocotyle*, *Gastrothylax* etc. are difficult to differentiate through fecal sample examination. So, to understand the detail epidemiology, at least a year study using gross morphological examination with molecular characterization of helminthes is needed.

Key words: Prevalence, gastrointestinal helminthes, Barisal

INTRODUCTION

Buffalo is one of the potential animals that can boost meat production in Bangladesh. Total buffalo population in Bangladesh in 2007-08 is 1.3 million. Buffaloes are not only the main source of animal proteins but also their products such as bones, skins and goods made from them are of great economic importance. Buffalo meat is the healthiest meat among red meats known for human consumption since it is low in calories and cholesterol. Buffalo meat and milk are well comparable to cattle in many of the physicochemical, nutritional, functional properties and palatability attributes. Buffaloes are usually raised in extensive system in the coastal areas where large scale pasture land is available. There is no definite ideal management system of buffalo in coastal areas i.e. about housing, breeding, de-worming, vaccination, animal identification and record-keeping. Factors like diseases, genetic makeup, poor nutritional and management practices, environmental stress etc. are major constraints of livestock responsible for the low productivity of buffalo. Among all parasitic infections, mainly those caused by gastrointestinal helminthes are the major problems of our livestock and causes great economic loss to dairy industry by way of retarded growth, low productivity and increased susceptibility of animals to other infections. Economic losses are caused by gastrointestinal parasitism are in a variety of ways: they cause losses through lowered fertility, reduced work capacity, involuntary culling, a reduction in food intake and lower weight gains, lower milk production, treatment costs and mortality in heavily parasitized animals (Lebbie *et al.*, 1994). Chowdhury and Tada (1994) described the prevalence and other factors associated with helminthes of domestic animals in Indian subcontinent causing parasitic gastroenteritis. Watery diarrhea, weakness, weight loss, decreased milk production, reduced product quality, mortality and other secondary infections are caused by trematode parasites (Soulsby, 1982).

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Helminth parasites are potential health hazard to livestock population and produce enormous economic losses. Fascioliasis is distributed throughout the world (Blood *et al.*, 1990). A coprological survey of gastrointestinal parasites was done by Mamun *et al.* (2011) in buffalo in Kurigram district of Bangladesh and found 61.02% positive cases. He detected nine species namely, *Paramphistomum cervi* (29.24%), *Fasciola gigantica* (22.46%), *Schistosoma indicum* (1.27%), *Schistosoma spindale* (0.85%), *Toxocara vitulorum* (2.54%), Strongyles (0.85%), *Strongyloides* sp. (0.42%), *Eimeria* sp. (3.39%) and *Balantidium coli* (37.29%). A pathological investigation of liver of the slaughtered buffaloes in Barisal district was conducted by Ahmedullah *et al.* (2007) and 31.25%, 22.5% and 2.5% cases were infected with *Gigantocotyle explanatum* (amphistomiasis), *Fasciola gigantica* and hydatidosis respectively. Due to scarcity of pasture land, buffaloes are usually reared at very remote area of the district having limited access to research. This study describes the prevalence of gastrointestinal helminthes through fecal sample examination technique in buffalo in Barisal district of Bangladesh.

MATERIALS AND METHODS

Study area

Barisal district (Latitude: 22.75, Longitude: 90.36, Altitude: 4.) is located in south-central part of Bangladesh. The maximum annual average temperature is 35.1°C, minimum 12.1°C. The annual rainfall is 1955 mm, whereas, maximum rainfall is observed in Rainy season (July to October). A lot of rivers are passing away through Barisal district making different island. Natural pasture land makes the island suitable buffalo rearing area. Barisal District is divided into 10 different upazilas but buffalo is not reared at large scale in all upazilas. Depending on the availability of pasture land, buffalo is usually found at Barisal sadar, Bakergonj and Mehendigonj upazila. In Sadar upazila samples were collected from four places namely; Charpar-North, Charpar-South, Laharhat-I, Laharhat-II (nearer to Mehendigonj upazila).

Collection and examination of fecal samples

Two hundred and seventy (270) fecal samples were collected randomly from July 2012 to December 2012. Among 270 fecal samples, 185 samples were collected from Barisal sadar upazila, 45 samples from Bakergonj upazila and 40 samples from Mehendigonj upazila. Based on age the buffaloes were categorized into following groups: 0-6 months, >6months-2 years, >2years-6years and >6years- above. Age of the animals were determined by dentition and sometimes by asking buffalo owners. Samples were collected directly from rectum or immediately after defecation using plastic gloves. Physical examination of fecal samples and clinical signs of animals were recorded during feces collection. Collected fecal samples were preserved in neutral buffered formalin in a plastic jar. Samples were sent to the Parasitology laboratory of the department of Pathology and Parasitology under Animal Science and Veterinary Medicine faculty (ANSVM) of Patuakhali Science and Technology University (PSTU) for the identification of various ova and parasite. Fecal samples were screened by direct smear method and simple sedimentation method. The ova of parasites were identified from their morphological features (Soulsby, 1982).

RESULTS AND DISCUSSION

During this study July 2012 to December 2012 a total of 270 fecal samples were examined through fecal sample examination technique, of which 107 (39.6%) samples found positive for gastrointestinal helminthes. Five types of parasitic ova were detected namely *Fasciola gigantica* (26.17%), Amphistomes (60.75%), *Neoscaris vitulorum* (1%), *Schistosoma bovis* (1%), *Trichostrongylus axei* (1%). 9.34% (*Fasciola gigantica* + Amphistomes) (Figure 1). No cestode was found. Grossly, no adult worm was found in the feces of buffalo. The consistency of the feces varied from firm to liquid. No significant clinical signs were observed in these animals.

Similar results were reported by Jagannath *et al.* (1988) found 42.12% incidence of gastrointestinal helminthes in buffalo in Karnataka of India. Kashyap *et al.* (1997) also reported 40.03% prevalence of gastrointestinal helminthosis in buffaloes in Madhya Pradesh with prominent infection of Strongyle and *Haemonchus* sp. but in this report very few nematodes were found. However, more than 50% incidence of parasitic infections in cattle and buffaloes has also been recorded from gastrointestinal helminthosis Gujrat (Pethkar and Hiregaudar, 1972), Haryana (Chhabra *et al.*, 1978) and Rajasthan (Godara and Manohar 2004). On the otherhand, Mamun *et al.* (2011) reported 61.02% incidence of gastro intestinal helminth in Kurigram district of Bangladesh and Azam *et al.* (2002) found 64.41% incidence of internal parasite in buffalo in Pakistan. Cockrill (1974) stated that the buffalo is exposed to a higher risk of infection with snail borne helminthes due to its wallowing behavior.

More than 70 species of Amphistomes are detected in ruminants in the world. Most pathogenic species cause intestinal amphistomiasis. Adult amphistomes like *Explanatum* sp. have been found in the bile duct causing severe damage leading to fibrosis in the bile duct and liver (Sing *et al.* 1958). In liver, *Explanatum* sp. is attached by their acetabulum and produces granulomatous nodules that are infiltrated by numerous inflammatory cells (Ahmedullah *et al.*, 2007 and Haque *et al.*, 2011). Haque *et al.* (2011) also reported co-infection i.e., both *Fasciola gigantica* and *Explanatum* sp. in one liver that supports this report. In such cases *E. explanatum* were found to be restricted to main bile ducts whilst *F. gigantica* were localized deep in the intra hepatic ductules.

In this study, highest number of Amphistomes (60.75%) was found by fecal examination. But through fecal sample examination it is impossible to identify the parasite species using morphological analysis of ova alone. Morphological identification of adult parasite collecting from slaughtered animal may be the one option of species identification (Sey, 1991). But it requires specialized knowledge and techniques. The second internal transcribed spacer (ITS2) of ribosomal DNA has been shown to be a useful genetic marker for species identification of amphistomes (Lotfy *et al.*, 2010). In addition, PCR amplification of DNA from individual eggs obtained from three Amphistome species also useful in species identification (Itagaki *et al.*, 2003). Initially morphological characterization of amphistomes followed by molecular characterization is also possible (Ichikawa *et al.*, 2013)

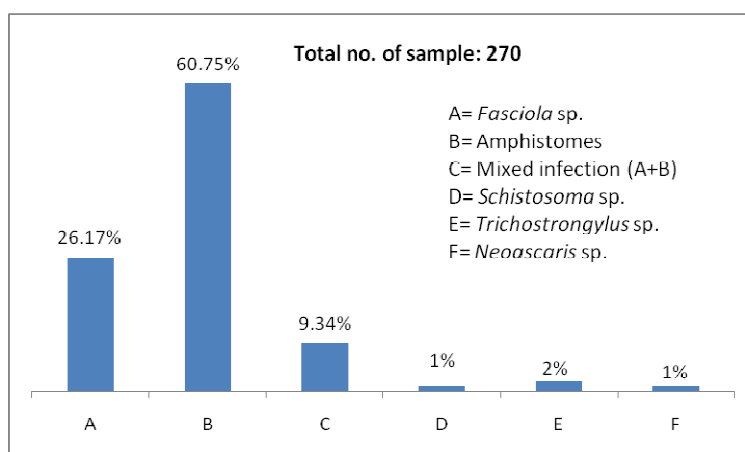


Figure 1. Prevalence of gastro intestinal helminthes in Barisal district

Comparative study of parasitic infection among different upazila

The study was conducted in three different upazilas of Barisal district namely, Barisal sadar, Bakergonj and Mehendigonj. Among different upazila highest prevalence was found in Barisal sadar (44%) and lowest in Mehendigonj (25%) (Figure 2). Season of sample collection with geographical distribution of the buffalo may be the cause highest prevalence of gastrointestinal helminth in buffalo in Sadar upazila.

Samples collected from different char island of Sadar upazila at rainy season (July-October) showed 44.32% gastro intestinal helminthes (82 positive cases out of 185) positive cases whereas, sample collected during winter from Mehendigonj (samples were collected in November) and Bakergonj upazila (samples were collected in December) showed lowest prevalence 33.33% (15 positive cases out of 45) and 25% (10 positive cases out of 40) respectively. This report is comparable with Mamun *et al.* (2011) who got highest prevalence in rainy season (71.17%) and lowest in winter season (57.27%) in Kurigram district of Bangladesh. Though the seasonal prevalence rate is higher than our report but overall infection rate in buffalo of Kurigram district (61.02%) was higher than Barisal district (39.6%).

Age related prevalence

From age related distribution, highest prevalence was found in 3years to 6 years of age (40.19%), lowest prevalence was found in 0-6 months of age (12.15%) and second most prevalence was found among buffaloes which are 7 years and above age (33.65%) (Figure3).

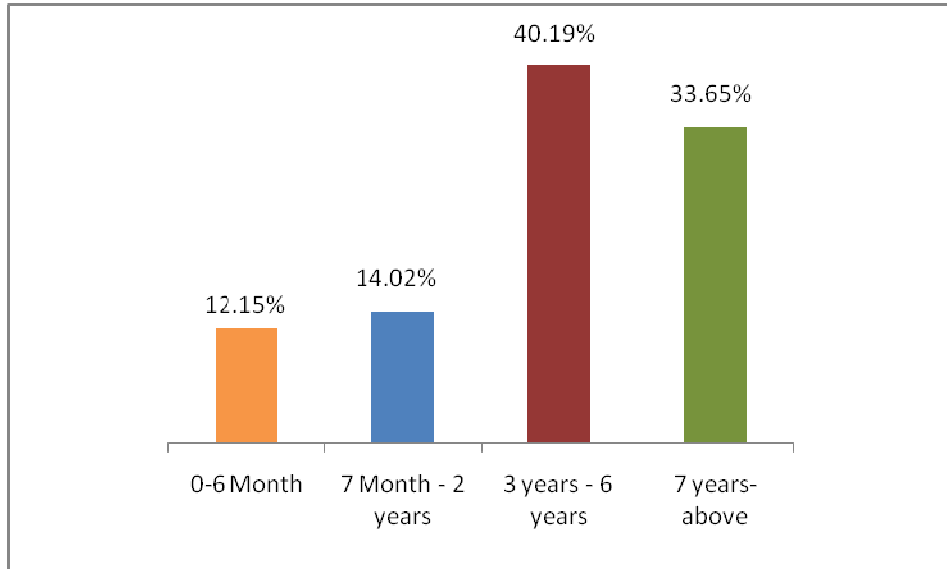


Figure 2. Age related prevalence of parasitic infection in buffalo in Barisal district



Figure 3. Ova of *Fasciola* sp.



Figure 4. Ova of *Paramphistomum* sp.

Similarly, Mamun *et al.* (2011) reported highest prevalence of endoparasite in young buffaloes (>2-5 years) than adult in Kurigram district of Bangladesh and Asif *et al.* (2007) also reported the higher prevalence of helminth in young than adult in Pakistan. The awareness program on calf mortality due to ascariasis was done through deworming campaign by veterinarian and paravet staff in the study area may be the cause of lower prevalence at young ages.

In conclusion, Amphistomes were more prevalent in buffalo in Barisal district. Usually this group of parasite is neglected during treatment and control strategy but important genera of this group like *Paramphistomum*, *Cotylophoron*, *Gigantocotyle*, *Gastrothylax* etc. causes substantial economic losses of buffalo production. Fecal examination technique can not differentiate the parasitic ova. So, accurate diagnosis is very important for proper control strategy. Due to limitation of fund the study was conducted in two seasons. Highest positive cases were found in rainy season than winter season. To make an effective control plan against gastrointestinal helminth a year round epidemiological study covering all the buffalo rearing island of South Bengal with proper diagnosis is warranted.

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