Status of amphistomiasis in cattle at Joypurhat district of Bangladesh

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Abstract

In Bangladesh, livestock are affected by different types of helminth parasites of which amphistomiasis in cattle is known to be widespread and death may occur in some cases. An experiment was conducted to investigate the status of amphistomiasis in cattle, 64 visceral and 360 faecal samples were collected from different areas of Joypurhat district during May 2009 to April 2010. Faecal and visceral sample examinations showed 70.8% and 90.6% infection with amphistomiasis, respectively. It was observed that age had a significant influence on the prevalence of amphistomiasis. In faecal samples, higher prevalence was observed in adult cattle (84.9%) followed by the young (77.3%) and lowest in calf (16.7%). On the basis of examination of visceral sample, females (93.8%) were found to be significantly more infected than male (89.9%) with the amphistome. The prevalence of amphistomiasis in crossbred cattle (90.9% in faeces and 93.9% in viscera) was significantly higher than indigenous cattle (62.2% in faeces and 89.8% in viscera). The calculated odds ratio implied that the crossbred cattle were 1.6 times (viscera) and 4.2 times (faeces) more affected than indigenous cattle. Prevalence rate was higher in rainy season (79.2% in faeces and 95.5% in viscera) followed by winter (68.3% in faeces and 90% in viscera) and summer (65% in faeces and 86.4% in viscera) season, but with no significant effect on the prevalence of amphistomiasis. Feeding habit had significant effect on the prevalence of amphistomiasis. Pasture grazing cattle (82.5%) were more (2.9 times) affected than stall feeding cattle (59%).

Key words: Amphistomum, cattle, Joypurhat district

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Introduction

Bangladesh has 22.9 million cattle population of which 0.9 million are in Joypurhat district (Anon 2008). Cattle are the main source of animal protein as they give meat, milk and also source of draft power, hides etc. (Anon 2008). The Government of Bangladesh has recently given priority in cattle rearing that encouraged the rural people to consider livestock keeping as commercial enterprise. But in Bangladesh there are many constrains in cattle production, among them malnutrition and parasitism are the major limiting factors (Jabber and Green 1983). The losses due to parasitism take in the form of mortality, low general health condition, retarded growth, low output of work, decrease in the production of milk and meat (Faiz 1972).

In fact, cattle of Bangladesh are affected by various types of helminth parasites (Rahman and Razzak 1973; Rahaman and Mondal 1983). Among the helminths, amphistomiasis in cattle is known to be widespread in Bangladesh (Rahman et al. 1997; Rahman and Mondal 1983; Hosain and Baki 1987; Rabbani, 1992 and Saifuzzaman, 1996). In cattle, amphistomiasis has been found to be associated with diarrhoea, loss of body condition, rough hair coat, dullness, weakness, loss of appetite, intestinal haemorrhages, denudation and destruction of rumen papillae, anemia, reduced milk and meat production, reduced productive capacity, intermandibular swelling and death of the individual in severe cases (Chandrasekharan et al. 1982).

Considering economic importance and pathological effects, emphasis has been given to the control of this malady. Although the epidomiology of amphistomiasis vary from different agro-ecological areas and it is considered as a prerequisite for planning an effective control measures. However, the epidemiological study of amphistomiasis has not yet been investigated properly in cattle at Joypurhat area. Considering all these points, the present investigation was therefore, undertaken to examine the status of amphistomiasis at Joypurhat district of Bangladesh.

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Materials and Methods

The investigation was carried out during the period from May, 2009 to April, 2010 at different areas of Joypurhat district of Bangladesh. For this purpose, 360 cattle were selected randomly and the age of the cattle was determined by examining the teeth (Sharma, 1981). During collection of samples the age, sex, breed, place of farming and season (summer, rainy and winter) of the year were carefully recorded. The cattle were catagorized into three groups: calf (>6 months to 1.5 years); young (>1.5 to 3 years); and adult (>3 years). Fresh faecal samples from 120 cattle were examined in each season from different villages of Joypurhat district. 64 visceral samples of slaughtered cattle of both sexes were collected and examined for amphistomiasis as described by Soulsby (1982). A total of 265 aquatic snails were collected from different pools, canals, ponds, beels, irrigation channels, rice fields and the edge of the river during pre-monsoon and post-monsoon period. The snails were examined for the presence of amphistomes cercariae by the technique of Malek and Cheng (1974).

The influences of age, sex and season on the prevalence of paramphistomiasis were analyzed by chi-square (χ^2) test as described by Mostafa (1989). Odds ratio were calculated according to the formula given by Schlesselman (1982).

Results and Discussion

Overall prevalence of amphistomiasis in cattle

The present investigation revealed a high percentage of amphistomiasis (90.6% in slaughtered cattle, and 70.8% in faecal sample) in cattle at Joypurhat area of Bangladesh (Table1), which is supported by the earlier findings of Mondal et al. (2002) who reported that about 100% ruminant were affected with amphistomiasis, through visceral examination. The present finding is near about similar to the earlier findings of Uddin (1999) who reported 72.2% prevalence of amphistomiasis through visceral examination. The result is higher than the earlier report of Rahman and Razzak (1973). This variation in the prevalence of amphistomiasis in cattle may be due to agro ecological conditions, animal husbandry practices, lack of deworming practices, wrong method of deworming, prevalence of infected intermediate snail hosts, selection of samples, techniques of sample collection etc.

Table 1. Overall prevalence of amphistomiasis in cattle

Points	No. samples examined	No. positive cases	Prevalence (%)
Faecal sample	360	255	70.8
Visceral sample	64	58	90.6

Age-related prevalence of amphistomiasis in cattle

In this study, it was observed that the infection rate of amphistomes was significantly ($p<0.05$) higher in adult (84.9% in faecal sample and 94.9% in visceral sample) than in young (73.3% in faecal sample and 84% in visceral sample) and calf (16.7% in faecal sample) (Table 2).

Table 2. Age-related prevalence of amphistomiasis in faecal sample and slaughtered cattle

*Age group	Samples examined	Positive cases	Prevalence (%)	Odds ratio	χ^2-value
Faecal sample					
Calf	54	9	16.7	Young vs Calf=13.8	17.3**
Young	120	88	73.33	Adult vs young=2.1	
Adult	186	158	84.94	Adult vs Calf=28.2	
Slaughtered cattle					
Young	25	21	84	Adult vs Young =3.5	9.9**
Adult	39	37	94.9		

**Calf, >6 m – 1.5 yrs.; Young, >1.5 yrs. - 3 yrs., Adult, >3 yrs.; **, p<0.01*

This result is in agreement with the earlier findings of Alim et al. (2004) and Okafor et al. (1988). Alim et al. (2004) reported the infection rate is increased with the increases of age which was 7.8% in calf and 65.6% in older cattle. Okafor et al. (1988) noted that prevalence of amphistomiasis was significantly ($p<0.05$) higher in cattle more than two years old (57%) than calf (13.2%). Ambrase et al. (1986) reported that older cattle were 2.2 times more infected than younger cattle. The author also reported that heavy infection was found in cattle more than five years of age. But this result is in

contrast with the previous report of Mohiuddin et al. (1986) who reported that there was age limit in the prevalence of amphistomiasis. The reason for this variation is difficult to explain but it might be due to an immunological phenomenon (Baily 1971), grazing habit and management practice. Method of study, selection of sample may also be associated with this variation.

Sex-related prevalence of amphistomiasis in cattle

There were significant differences in the rate of infection in male and female. The present study showed that the female (75.5% in faecal sample and 93.8% in visceral sample) were relatively more susceptible than the males (65% in faecal sample and 89.6% in visceral sample) (Table 3) which is supported by the findings of Alim et al. (2004) who reported the female cattle (52.8%) were more commonly affected than male (47.5%). This result is in agreement with the earlier report of Saifuzzaman (1996) in cattle, who reported the female (37.5%) were more affected with amphistomiasis than male (24.9%) and Uddin (1999) recorded that prevalence of amphistomiasis was higher in females (75.9%) than males (65%). However, this finding is dissimilar with the findings of Khan et al. (2008), who reported the prevalence of amphistomiasis in cattle is higher in males (29.7%) than female (23.6%).

Table 3. Sex-related prevalence of amphistomiasis in faecal sample and slaughtered cattle

Sex group	Samples examined	Positive cases	Prevalence (%)	Odds ratio	χ^2-value
Faecal sample					
M	160	104	65%	F vs. M = 1.3	15.3**
F	200	151	75.5%		
Slaughtered cattle					
M	48	43	89.6	F vs. M = 1.7	7.9**
F	16	15	93.8		

*M, male; F, female; **, p<0.01*

The higher percentage of infection in the females may be due to the alteration in the physiological condition of the cattle during pregnancy and lactation (Production activity) and also the lack of feed supplement for production, which may lead to the lowering of body resistance of the females. Method of study, selection of sample may also be associated with this variation.

Breed-related prevalence of amphistomiasis in cattle

This study showed that breed of cattle had significant effects on the prevalence of amphistomiasis (Table 4). The cross bred cattle (90.9% in faecal sample and 93.3% in visceral sample) were relatively more affected than indigenous cattle (62.2% in faecal sample and 89.8% in visceral sample). This finding is very difficult to compare due to unavailability of published literature in cattle. The higher prevalence rate in cross bred cattle may be due to the adaptive capability with environment, and physiology of digestive tract (Cohen and Watten 1967) and also feeding habit of cattle. It is suggested that cross breed cattle were mostly prone parasite infection (Baily 1971).

Table 4. Breed-related prevalence of amphistomiasis in faecal sample and slaughtered cattle

Breeds	No of samples examined	No. positive cases	Prevalence (%)	Odds ratio	χ^2-value
Faecal sample					
CB	110	100	90.9	CB vs. IND = 4.2	18.5**
IND	250	155	62.2		
Slaughtered cattle					
CB	15	14	93.3	CB vs. IND = 1.6	7.3**
IND	49	44	89.8		

*CB, crossbred; IND, indigenous; **, p<0.01*

Seasonal prevalence of amphistomiasis in cattle

It was observed that seasonal fluctuation of the year had significant ($p<0.05$) effect on the prevalence of amphistomiasis (Table 5)**.** The seasonal prevalence of amphistomes fluke infection in cattle was recorded higher in the rainy (79.2% in faecal sample and 95.5% in visceral sample) followed by the winter (68.3% in faecal sample and 90% in visceral sample) and summer season (65% in faecal sample and 86.4% in visceral sample), which is supported by the earlier reports of Uddin (1999), who reported the highest prevalence of amphistomiasis is in rainy season (83.6%) followed by winter (69.2%) and lower in summer (64%) season. The present findings

is an agreement with the earlier reports of Singh et al. (2009), who reported that the incidence of amphistomiasis was highest during the rainy (74.4%) followed by winter (57.2%) and summer season (24.4%). This finding also supported with the finding of Suhardono (2008), who reported the infection rate was highest during post monsoon (78.8%) than winter (63.4%) and lowest in summer (62.3%). However, Manna, et al. (1994) reported that the highest incidence of amphistomiasis was in the summer season (52.3%). This variation might be due to different climatic factors such as temperature, rainfall, humidity etc, which influenced the availability of intermediate host, other agro-climatic condition, ecology of the vector and host and geographical location of the experimental area.

Table 5. Seasonal prevalence of amphistomiasis in faecal sample and slaughtered cattle

Seasons	Samples examined	Positive cases	Prevalence (%)	Odds ratio	χ^2-value
Faecal sample					
Summer	120	78	65	R vs. S = 2.0	2.9
Rainy	120	95	79.2	R vs. W = 1.8	
Winter	120	82	68.3	S vs. W = 1.2	
Slaughtered cattle					
Summer	22	19	86.4	R vs. S = 3.3	3.1
Rainy	22	21	95.5	R vs. W = 1.2	
Winter	20	18	90	S vs. W = 1.4	

Summer (March-June); rainy (July-October); winter (Nov.-Feb.); There exist no significant associations of the season with the prevalence of amphistomiasis; the proportions of infected cattle in different seasons were insignificantly.

Feeding-habit related prevalence of amphistomiasis in cattle

The present study revealed that, the feeding habit of cattle had significant ($p<0.05$) effect on prevalence of amphistomiasis (Table 6). Cattle on pasture (82.5%) were significantly ($p<0.05$) more infected than stall fed (59%) cattle, which is similar with the previous report (Alim et al. 2004) who reported the higher rate of amphistomes infection was in grazing cattle (68%) than stall feeding cattle (22.2%). The present finding also is in agreement with earlier reports of Pandit et al. (2004), who recorded prevalence of infection was higher in unorganized groups (75.5%) of cattle than organized groups (72.5%). It might be due to close contact of host (cattle) and matacearіae (infective) stage, managemental practice and ecology of intermediate host (snail) and parasite.

Table 6. Feeding habit-related prevalence of amphistomiasis in cattle

Feeding habit	Samples examined	Positive cases	Prevalence (%)	Odds ratio	χ^2-value
Grazing	160	132	82.5	Grazing vs Stall = 2.9	11.3**
Stall feeding	200	123	59		

***, p<0.01*

Intensity of infection of amphistomes cercariae in cattle

From the present study, it observed that the highest, 40.3% cattle had the eggs per gram (EPG) range between 401-800 while only 1.7% cattle had EPG over 1600 (Table 7).

Table 7. Intensity of infection of amphistomiasis by counting in cattle

Eggs/gram	No. positive cases	Percentage (%)
100-400	67	18.6
401-800	145	40.3
801-1200	24	6.7
1201-1600	13	3.6
>1600	6	1.7

The finding is in agreement with Solusby (1983), who suggested that the presence of 100-200 EPG of trematods in cattle can causes infection. The finding is in contrast with the finding of Bachal et al. (2002), who reported that highest 18% cattle had the EPG range from 100-400 while, 3.5% cattle shade EPG range above 1600. This finding also contrasts with the findings of Jithendan and Bhat (1999). They reported that the faecal egg counts of flukes ranged from 50-300 in cattle. This variation may be due to geographical location, environmental

pollution of research area, and also technique of sample collection and examination.

Seasonal prevalence of amphistomes cercariae in snail

The higher prevalence of amphistomes cercariae in snails was found during post monsoon (6%) than pre monsoon (4.3%) period (Table 8). The emergence of cercariae from the snails in December and January indicated that the snails were infected in October and November. The seasonal high prevalence of amphistomes cercariae in the snails found in this study confirms the reports of Mondal et al. (2002) who reported there was significant variation in the distribution of vector snails in the different season of the year. The present finding of snail infection rate with amphistome cercariae was higher than the reports of Rahman et al. (1997), who observed the prevalence of amphistomes cercariae infection in snail was 2.4%. This variation is difficult to explain, but it might be due to geographical location of experimental area and climatic factors etc.

Table 8. Seasonal prevalence of amphistome cercariae in the snail

Season	Samples examined	Positive cases	Prevalence (%)	Odd ratio
Pre-M	115	5	4.3	Post-M vs Pre-M = 1.4
Post-M	150	9	6	
Total	265	14	5.3	

Pre-M, pre-monsoon, Post-M, post-monsoon

Conclusion

The prevalence of amphistomiasis in cattle was significantly affected by breed, age, sex and feeding habit but seasons of the year had no significant effect. The prevalence rate was higher in crossbred, female, adult and pasture grazing than indigenous, male, calf and stall feeding cattle, respectively. Prevalence of amphistomiasis was higher in rainy season than summer and winter season.

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