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PREVALENCE OF VISCERAL SCHISTOSOMIASIS IN CATTLE SLAUGHTERED IN NORTH-EASTERN REGION OF BANGLADESH

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A B S T R A C T

A cross sectional study was conducted to estimate the prevalence and identify possible risk factors (season, sex) of *Schistosoma* in three north-eastern districts of Bangladesh namely Mymensingh, Sunamganj, Kishoreganj. Mesenteric sample of cattle from different slaughter houses were collected and examined for helminths which were identified as *Schistosoma* on accordance with Soulbsy, 1965. Total 67 (55.83%) out of 120 randomly selected samples were found positive for schistosomiasis. Cattle of Kishoreganj were mostly infected (67.50%), followed by Sunamganj (55.00%) and Mymensingh (45.00%). Regarding seasonal prevalence, samples collected during winter (63.33%) were more infected than summer (48.33%). Moreover, 58.69% of male and 46.42% of female were found infected. In conclusion, relatively high prevalence was recorded in the study areas based on the results obtained. Hence, control measures against schistosomiasis must be designed.

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INTRODUCTION

Schistosomiasis is a widespread blood trematode in tropical and subtropical regions of the world where many factor like climate, ecology and hygienic conditions favour their transmission (Lai et al., 2015). A wide range of mammals including cattle, buffalo, camel, goat, sheep, pig are susceptible to schistosome infection (Catalano et al., 2018). *Schistosoma indicum*, *S. spindale* and *S. nasale* are the species found in the mesenteric veins of ruminants (Soulsby, 1982), cause visceral schistosomosis and commonly occur in Bangladesh (Rahman et al., 1996). The freshwater snail, *Indoplanorbis exustus* appears to be the intermediate host for these above mentioned *Schistosoma* (Kumar and de Burbure, 1986). As an endemic disease at least 165 million cattle are infected with bovine Schistosomiasis worldwide (Upadhayay, 2005). Although, little or no clinical signs is seen over a short period, frequent *Schistosoma* infections can cause significant losses to the herd in the long term (Ravindran et al., 2007). The disease is chronic in nature and affects both productive and reproductive performances as well as predisposes the animals to other diseases (McCauley et al., 1984).

In Bangladesh, most of the study was carried out through the routine diagnosis of schistosomiasis which depends heavily on observation of clinical symptoms and fecal examination for eggs. These methods grossly miscalculate the prevalence and thus interfere with treatment and control strategies. There were few researches (Islam et al., 2012; Islam et al., 2014; Hossain et al., 2015) in different parts of Bangladesh which were conducted five years ago. Hence, the present study was undertaken to assess the recent prevalence of schistosomiasis from the mesentery of cattle in the north-eastern region of Bangladesh.

MATERIALS AND METHODS

Study period and area

The study was carried out over a period of six months from December 2019 to May 2020. The study period was divided into two seasons, namely the 'Winter' from December to February and the 'Summer' from March to May. Samples were collected from three districts of Bangladesh namely Mymensingh, Kishoreganj, Sunamganj, having enough marshy areas which favor the development of snails.

Collection of sample

For this study, mesentery of both small and large intestines were collected during evisceration and dressing of cattle from different slaughter house, located in the study areas. Total 120 mesenteries comprising 40 samples from each area were collected. Samples of each area were divided according to the season where 20 samples were collected during winter and rest 20 samples were from summer season. Samples were collected from the both sexes of cattle.

Sample processing

Each sample were cut into small pieces, immersed in normal saline and left undisturbed for 5-6 hours. Recovered *Schistosoma* were counted with naked eye and stored in 70% alcohol for further procedures (Sumanth et al., 2004).

Identification of *Schistosoma*

Collected helminths were preliminarily identified by preparing permanent slide examining under light microscope according to the keys and previous description (Soulsby, 1965). However, microscopic examination only can detect the genus of *Schistosoma.*

Statistical analysis

The data were first entered into Microsoft excel and was analyzed using SPSS 22 Statistical software program. The prevalence was calculated by dividing number of infected samples by total observed samples. Pearson's Chi-square (χ^2) test was used to determine the variation in the prevalence among areas, season and sexes. Statistical significance was set at $P<0.05$ to determine whether there are significant differences between the parameters measured between the groups (Ahmed et al., 2007).

RESULTS AND DISCUSSION

Post mortem examination of mesenteric vein of total 120 cattle showed that 67 (55.83%) were infected with *Schistosoma*. The intensity of the infection in cattle was 3 to 48 flukes per animal from our study samples. This observation is very close to Ravindran et al., 2014. Another study was conducted by Hossain et al., 2015, who found 62.50% infected cattle in Mymensingh, one of our study areas. This high prevalence might be due to a fact that most of the areas have wide marshy pastureland that creates an appropriate environment for the intermediate host (snail) and this result indicates that about half of the cattle population is infected with *Schistosoma*. However, Jeyathilakan et al., 2008 found 30.70% of infection rate in India. This variation might be due to the availability of intermediate host, rearing system, randomly taken samples, etc. (Mersha et al., 2012).

Area wise prevalence is shown in Table 1. The samples of Kishoreganj were infected mostly with *Schistosoma* (67.50%), followed by Sunamganj (55.00%) and Mymensingh (45.00%). However, no significant difference (P>0.05) was observed among those areas. But more than half number of cattle was infected in Sunamganj and Kishoreganj district. This might be due to the significant number of cattle in those area is slaughtered in traditional system. The stomach and intestinal contents including the blood and washed material are usually mixed with nearby water bodies. These could create an easy access for the eggs of *Schistosoma* from such animals to the snail intermediate host. In addition, the hygienic status of slaughter houses of those areas is very poor (Belayneh and Tadesse, 2012).

Table 1. Area wise prevalence of *Schistosoma* in cattle

Area	No. of sample observed	No. of infected	Prevalence (%)	χ^2	P value
Mymensingh	40	18	45.00%		
Sunamganj	40	22	55.00%	1.165	0.558
Kishoreganj	40	27	67.50%		

Table 2. Season wise prevalence of *Schistosoma* in cattle

Time period	No. of sample observed	No. of infected	Prevalence (%)	χ^2	P value
Winter	60	38	63.33%	0.777	0.377
Summer	60	29	48.33%		

Table 3. Sex wise prevalence of *Schistosoma* in cattle

Sex	No. of sample observed	No. of infected (%)	Prevalence (%)	χ^2	P value
Male	92	54	58.69%	0.388	0.533
Female	28	13	46.42%		

Most of the cattle were affected during the winter (63.33%) followed by summer (48.33%). Though there was a little variation in seasonal prevalence, no significant difference (P>0.05) was observed (Table 2). Bedarkar et al., (2000) also observed that the prevalence of *Schistosoma* was lowest in summer season amongst ruminants. This variation is very minor and might be due to the habitat to pastureland during winter where most of the infection is occurred (Atanew and Kelemu, 2020).

Prevalence of Schistosomiasis in male and female cattle was 58.69 and 46.42%, respectively, which showed no significant difference (P>0.05). Sex wise prevalence is accordance with Niaz et al., 2010 and Kamanja et al., 2011. This variation may be due to the social practice of keeping females under better management and feeding condition for milk production whether males are generally kept freely fed relatively poor diet which increases the susceptibility to parasitic infection (Houdijk and Athana, 2003).

CONCLUSION

The consequence of this study strongly suggests that the prevalence of schistosomiasis is relatively high in the cattle of the study area. Though sex and season were not that much significant, more than half of the cattle population was infected. The study also indicates that no measures were taken to control the disease. Therefore, detailed studies should be conducted on the epidemiology of the disease to control it properly.

COMPETING INTEREST

The author declares that there are no competing interests.

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