



Occurrence of Haemonchosis in goats under management practices in the northwestern Bangladesh

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ABSTRACT

The aim of this study was to determine the influence of management practices including deworming status, housing and feeding system of the goats on the occurrence of Haemonchosis. For this purpose, 720 goats were examined for haemonchosis in different areas of Rajshahi district by clinical, coprological and postmortem examination. A questionnaire was prepared including information viz. name, address of farmer, deworming status, housing and feeding system of goats to achieve the goals of the study. The study revealed that goats without having anthelmintic treatment (none) had a higher prevalence of 71.5% followed by those given anthelmintics in an irregular basis, 56.5% and the least occurrence, 25% in those given anthelmintics regularly. The goats housed in muddy floor were found to be more susceptible to haemonchosis (62.0%) than slatted (woody barn) housed goats (38.0%). It is indicated that haemonchosis was significantly ($P < 0.001$) influenced by the feeding system of goats. Animals used to graze in the field had the highest prevalence 67.2% than stall feeding 15.3%. The study suggested that the lack of de-worming, grazing and muddy housing are vital determinant in the occurrence of haemonchosis. Animal are highly susceptible to the factors and significantly ($P = 0.000$, $P < 0.001$) influenced to haemonchosis and requires special attention. Thus, effective deworming programme and management must be maintained in order to upgrade the health status and maximize the benefits from the animal.

INTRODUCTION

Although the number of livestock specially small ruminants are high in Bangladesh but the owners of these animals get very few benefits because of parasitic or infectious diseases, inefficient productions systems, lack of balanced nutrition, improper housing and outdated management practices. Goat is important livestock species all over the globe and especially in tropical and subtropical regions. It has a pivotal role in small scale farming and rural economy of developing societies by generating employment and supplementing house hold income. Goats are primarily raised for milk, meat, hair and leather production (Hassan et al., 2011). Goat requiring little inputs, play vital role in rural economy

through provision of meat, milk, blood, cash income, accumulating capital, fulfilling cultural obligations, manure, and contribute to the national economy through the export of live animals, meat and skins (Amenu, 2005). The climatic conditions of our country are very favourable for the survival and development of the all stages of parasites outside the host on the pastures round the year. Parasitic infestations are the major veterinary problems in most of the developed & under development countries of the world. Among the problems encountered, parasitism is the major cause hindering the development and productivity of livestock population in the country (Dewan et al., 1979; Nooruddin et al., 1987; Shahiduzzaman et al., 1999). The agro-ecological and geo-climatic conditions of Bangladesh are highly favourable for

growth and multiplication of parasitic diseases in goat (Huq and Sheikh, 1968). Parasites also reduce voluntary feed intake, efficiency of feed utilization and increase the endogenous loss of protein in the gastrointestinal tract (Alexandre and Mandonnet, 2005). Goats due to improper management and unhygienic conditions are suffering from various parasitic diseases. The diverse agro climatic, animal husbandry practices and pasture management largely determine the incidence and severity of various parasitic infections in grazing animals (Jithendran and Bhat, 1999).

Gastrointestinal parasitic infection is a major hindrance for livestock production. Among these haemonchosis is a serious health problem of goats rendering high morbidity, loss of production and mortality of infected animals. Haemonchosis is an enteric parasitic disease caused by nematode of the genus *Haemonchus* commonly called 'Stomach-worm' or 'Wireworm' or 'Blood worm' under the order Trichostrongyloidea. Nematodes of the genus *Haemonchus* parasitize the abomasum of wild and domestic ruminants. Losses caused by these diseases to goat husbandry are significant (Waller and Chandrawathani, 2005). Infection with *H. contortus* is referred to as haemonchosis (Mehlhorn, 2008). Information on the prevalence and epidemiological pattern of the helminthic diseases in different climatic zones of the country provide a basis for evolving strategic and tactical control of these diseases (Jithendran and Bhat, 1999). Several scientists reported that haemonchosis, was the highly prevalent and pathogenic gastro-intestinal nematode and most economically deteriorating disease of goats (Maqsood et al., 1996; Mortensen et al., 2003; Shahiduzzaman et al., 2003; Qamar, 2009; Nuruzzaman et al., 2012; Akkari et al., 2013). *Haemonchus* has become the most serious parasite affecting small ruminants throughout the world (Kaplan and Vidyashankar, 2012). The diverse agro-climatic conditions, animal husbandry practices and pasture management, largely determine the type, incidence and severity of various parasitic diseases (Mohanta et al., 2007; Tariq et al., 2010). Anthelmintics such as mebendazole, albendazole, fenbendazole and oxcylozanide had been continuously and extensively used for deworming ruminants in our country for several years. Methods to control *H. contortus* must attempt the break the life cycle of

the worm, whether through anthelmintics, animal management, or pasture management (Hepworth et al., 2006). Anthelmintics, drugs that remove the parasite from the intestines, are the most common method for managing *H. contortus*. Chemical anthelmintics are often used to combat haemonchosis, because they are cheap, simple and cost effective; but parasite resistance to them is growing, (Stear et al., 2007). Management practices are an important option to improve the resilience and resistance of goats in controlling parasites (Nor-Azlina et al., 2011).

The Effective and efficient parasite control is only possible after survey has provided enough information for understanding the existing factors like management practices such as deworming status, system of housing and feeding system of goats which influence disease transmission. Few research works have been done about the haemonchosis of goats in Bangladesh but there is no published report on Haemonchosis in goats under different management practices in Rajshahi of Bangladesh till now. For the above reason bear in mind this study was done for the assessment of the susceptibility of goats under different management practices. The present study was taken to acquire knowledge about the different management practices that influence the prevalence of haemonchosis in the goats of the study area are very important and crucial for developing control programs that are appropriate for parasitologists and small farmers and to provide base line data for planning future research and control strategies. Keeping in view the importance of this nematode the study was designed to record the occurrence of haemonchosis under different managerial conditions of Rajshahi, Bangladesh.

MATERIALS AND METHODS

Study design

The present study was designed to assess the epidemiology of Haemonchosis of goats under different management practices in district of Rajshahi, Bangladesh and was conducted at the laboratory of Veterinary and Animal Sciences, University of Rajshahi during the period of one year (March 2011 to February 2012). In this cross-

sectional study, a total 720 goats were randomly selected from the villages, farms, pastures, veterinary hospitals and abattoirs in different areas of Rajshahi and Noagon district and examined for *Haemonchus* spp. infection.

Data collection

The information on deworming status, housing and feeding system of goats have been recorded through survey schedule. A total of 720 goats from the private and government goat farms, villages and slaughter houses of Rajshahi and Noagon district have been selected for the determination of prevalence of *Haemonchus* spp. infection in goats. These goats were grouped according to their management practices like i).Deworming status – Not done (382), Irregular (186) and Regular (152) basis; ii).Type of housing – Muddy (362) and Slatted (woody barn), 358 goats and iii). Feeding system – Stall feeding (131) and Grazing (589).

COLLECTION OF SAMPLE

Faecal samples were collected by a two-finger procedure from the rectum of goats and were collected in 10% formalin in suitable airtight containers, such as screw-cap bottles and plastic bags, and labeled carefully with the host's sex, age and management factors. Abomasa were collected after slaughtering and evisceration of the goat in nearby slaughter houses in the study area. The monthly collection of faecal samples and abomasa were brought to the laboratory of Animal Husbandry and Veterinary Science, University of Rajshahi for the identification of eggs of *Haemonchus* spp. and grossly visible adult *Haemonchus* spp. respectively. The qualitative fecal examination was carried out by different methods (sedimentation, differential floatation and quantitative examination) as per Soulsby (1982).

DATA ANALYSIS

Descriptive statistics were calculated and presented as table and graphs. For the epidemiological studies, the prevalence of

Haemonchus spp infection was calculated. The association between independent factors (deworming status, housing and feeding systems) and continuous dependent variables (prevalence and intensity of *Haemonchus* spp infection). Analysis of data by some computer packages like SPSS version, 19 and compared using Analysis of variance (ANOVA) by Duncan Multiple Range Test (DMRT) made by Steel and Torrie, 1980.

RESULTS AND DISCUSSION

The higher incidence of parasitic infections in domestic animals in a grazing system lowers productivity, leading to important economic losses. Management practices are an important option for the controlling of haemonchosis in goats.

Effects of housing system on haemonchosis

Goats housed in slatted (woody) floor had a significantly low, 38.0% *Haemonchus* spp infection rate as compared to housed in muddy floor, 62.0% (Table 1). Hassan *et al.* (2011) from Bangladesh and Jugessur *et al.* (1998) from India provided similar report on village goats. This variation of haemonchosis among the housing system of goats due to the low level of hygiene which favours re-infestation. Poor and unhygienic housing is one of the causes of losses as it is in the dung of animals that parasites survive and affect young animals (Ficarrelli, 1995). The low levels of infection were detected in animals reared in an intensive system and were kept in wooden barn with raised floor that were cleaned regularly. In muddy housing, there were close contact of faeces with animals as well as infective stage of parasites contaminate with the grasses or feeds of animals resulting parasitic infection. The variation of the present result compared to other researches may be due to the climatic change of the region, type of floor, feeding system, hygienic management and other management practices of animal.

Table 1
Effects of housing system on the prevalence of haemonchosis in goat.

Housing system	No. of sample examined (n=)	No. of positive sample (n=)	% of haemonchosis	Chi-square value	Significance value
Muddy floor	362	258	62.0		
Woody (Slatted) floor	358	158	38.0	58.583	0.000 (***)

n= Total number of observation, ***Significance at 0.1% level (P<0.001)

Effects of de-worming status on haemonchosis

Goats without anthelmintic treatment (none) had a higher, 71.5% prevalence followed by those given anthelmintics as irregular basis, 56.5% and least 25% prevalence in those given anthelmintic regularly (Table 2). In this study, goat without anthelmintic treatment was higher prevalence of haemonchosis because *Haemonchus* worms were not under controled, easily survive within the abomasums of goat. Parasitic disease control failures were temporarily alleviated by higher drug doses and more frequent treatment as resistance developed, the beneficial effect of this strategy was short lived. The exclusive use of anthelmintics to control nematodes has selected worm populations that simultaneously exhibit increasing levels of resistance to several classes of anthelmintics (Van Wyk et al., 1997; Fontenot et al., 2003) and in some cases to all major anthelmintic activity groups (Van Wyk et al., 1997a, b). Goats with regular anthelmintic treatment was the lowest prevalence rate due to continued use of anthelmintics has the effect of increasing the frequency of resistant alleles in parasite populations due to the selective effect of the drugs, and anthelmintic resistance has become sufficiently widespread and serious as to threaten the viability of sustainable small ruminant production in many countries (Waller, 1999). Assoku (1981) found that routine prophylactic drenching at regular intervals with different anthelmintics has a significant lowering effect on the total worm burden. The misuse and or widespread intensive use of sometimes poor quality synthetic or semi-synthetic anthelmintics,

inappropriate route of administration and massive re-exposure has lead to development of high level multiple anthelmintic resistance against the three main families of anthelmintic drugs, namely, Benzimidazoles, Macrocyclic lactones and Imidazothiazoles (Lloyd et al., 2000; Hertzberg et al., 2000; Chandrawathani et al., 2003; Melo et al., 2003). Ivermectin as well as albendazole and fenbendazol (both benzimidazoles) have produced the highest levels of resistance, and resistance with levamisole and moxidectin is increasing (Burke, 2005; Schoenian, 2013). However, the failure of anthelmintics to control GIT nematodes may also be due to reasons other than resistance, such as poor maintenance of drenching equipment, and under-dosing due to errors in assessing body mass (Taylor et al., 2002). When farmers treat all animals in a herd with a chemical anthelmintic only the worms that are resistant to its specific mechanism will survive to reproduce. As a result, parasite resistance to the drug grows over time (Burke, 2005). Actions that cause increased resistance include frequent dosing, under-dosing to save money, inappropriate administration, wrong anthelmintic choices, and massive re -exposure to the parasites (Machen et al., 1998). This finding is in line with Adhikari et al. (2017) who studied prevalence of haemonchosis and was found to be more in non-dewormed (40.32%) than that of dewormed (5.26%) goats, the study was statistically significant (P=0.000, P<0.05) which was due to the effective deworming. Deworming was found to be significant in controlling *Haemonchus* infection.

Table 2
Effects of de-worming status on the prevalence of haemonchosis in goat.

De-worming status of goat	No. of sample examined (n)	No. of affected sample (n)	% of Haemonchosis	Chi-square value	Significance Level
Regular	152	38	25.0	62.023	0.000 (***)
Irregular	186	105	56.5		
None	382	273	71.5		

n= Number of observation, ***Significant at 0.1% level (P<0.001)

Table 3
Effects of feeding system of goat on the prevalence of haemonchosis in goat.

Feeding system of goat	No. of sample examined (n=)	No. of affected sample (n=)	% of haemonchosis	Chi-square value	Significance Level
Stall-feeding	131	20	15.3	34.112	0.000 (***)
Grazing	589	396	67.2		

n= Number of observation, ***Significant at 0.1% level (P<0.001)

Effects of feeding system on haemonchosis

Goats managed under feeding system, grazing feeding was the highest prevalence, 67.2% than stall-feeding, 15.3% (Table 3). The present study indicated that haemonchosis was significantly (P<0.001) influenced by the feeding system of goats. This is in agreement with the author Bilal *et al.* (2009) who reported that the higher incidence of worm infestation in grazed animals as compared to stall fed animals might be due to picking of worm eggs shed by the infected animals during grazing through faeces. The infection was lower in stall-feeding goats possibly due to the less faecal contamination with *Haemonchus* eggs because usually concentrate feeds and vegetable wastes were fed by the household and intensively reared goats.

CONCLUSION

From the study, it is concluded that de-worming is not done basis, muddy housing management and grazing goats are highly susceptible to haemonchosis than any other management practices of goats.

RECOMMENDATION

Regular disposal of faeces must be required and good sanitary conditions should be provided for reducing the contamination of environment or housing. If possible muddy housing should be avoided. Goats should be grazing at clean pasture after de-worming. The owners of goat should be trained for improving the management and management practices on their farms. Deworming was found to be significant in controlling *Haemonchus* infection. Further researches are mandatory. Faecal examination must be done periodically to assess the effect of anthelmintic used. Veterinarians should be consulted before using any anthelmintic for correct dosing to prevent anthelmintic resistance. Farmers should be given awareness generation programs. Replication of such study in large scale and in other areas is to be carried out. So, Owner's of farm and farmer's of goat should be great care for the management and better control of this disease condition in and around other areas of Bangladesh.

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