

ORIGINAL ARTICLE

Knowledge, perceptions, and practices of deworming and parasitic disease control activities among peri-urban livestock keepers in Barishal district, Bangladesh

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Abstract

Background: Bangladeshi farmers are not getting optimum outcomes from livestock farming due to various obstacles in farming, including a lack of modern technological and scientific knowledge. Therefore, this research was aimed at comprehending the knowledge, perceptions, and practices of deworming and parasitic disease control activities among peri-urban livestock farmers in the Barishal district of Bangladesh.

Methods: Data on the knowledge, perceptions, and practices of deworming and parasitic disease control activities of 207 peri-urban livestock farmers were collected randomly from different areas of the Barishal district. A pre-tested questionnaire was administered via a face-to-face interview between June 2020 and December 2020 to collect data. The frequencies were expressed in percentage (%) and the association between farmer's education and knowledge of parasitic disease prevention, control, and deworming activities were evaluated by crosstab analysis in IBM SPSS software (version 25).

Results: The study revealed that 27.5% of the farmers provided impure water to their animals. Almost 100.0% of farmers were found to wash their hands before and after contacting the animals. About 29.0% of farmers were not accustomed to cleaning the farms and excreta regularly. Only 18.8% of respondents permitted their animals to co-graze with other animals. Approximately 45% of participants used anthelmintics regularly, and 32.4% of participants were informed of the scheduled deworming practices for their animals. Surprisingly, 96.6% of respondents never participated in deworming and parasitic disease control training programs. However, 100% of farmers agreed that parasitic disease control is essential for profitable farming and increasing production.

Conclusion: A large proportion of farmers rear their livestock without deworming practices, and they are not aware of helminthiasis control and prevention. Therefore, intensive extension work is needed to educate them on helminthiasis and deworming activities.

Keywords: Questionnaire; deworming; anthelmintics; helminthiasis; extension

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Introduction

Helminthiasis of animals and humans can be dangerous and sometimes even fatal (Haenlein *et al.*, 2020). In many developing countries worldwide, it is continuously creating serious health hazards and complications for humans and animals. It adversely affects economic growth by decreasing the production of animals and foods of animal origin, including milk, meat, and eggs. Multiple worm infections are often caused by grazing on contaminated grass and drinking contaminated water (Charlier *et al.*, 2020; Forbe *et al.*, 2017; Winter *et al.*, 2018). The helminth eggs evolve into the pathogenic stage, relocate to the pastures, and infect the grazing animals (Van Dijk *et al.*, 2010). Nematodes, cestodes, and trematodes are the most common internal parasites that infect livestock, causing various ailments, including diarrhea, stagnant development, malnutrition, loss of weight, poor appetite, and even death (Vande Valde *et al.*, 2018; Bosco *et al.*, 2020; Squire *et al.*, 2018; Williams *et al.*, 2019; O. Folorunso *et al.*, 2019).

The environmental parameters, such as moisture, soil properties, temperature, and rainfall, are essential for the development and propagation of parasitic larvae (Shadman *et al.*, 2020; Abdela *et al.*, 2016; Rohr *et al.*, 2020). With global climate change over time, these environmental parameters are also shifting, altering the pathogenesis of different parasitic diseases. In addition, inappropriate anthelmintic drug application anthelmintic resistance (AR) has become a worrisome issue in the world (Cristel *et al.*, 2017; Rawlinson *et al.*, 2018; Hodgkinson *et al.*, 2019; Kalkal *et al.*, 2020). Several scholars have already ensured the AR against gastrointestinal nematodes (GIN) and described the detrimental consequences of AR on livestock health and production (Wondimu *et al.*, 2019; Ploeger *et al.*, 2018; Claerebout *et al.*, 2019; Kelleher *et al.*, 2020; Rashid *et al.*, 2018; Ramos *et al.*, 2016). It is, therefore, of great importance for livestock owners to control common worms through efficient oversight of anthelmintics.

Otherwise, it will pose a deleterious effect on the livestock economy.

In the present world, livestock is one of the most crucial sources of agricultural wealth across many developing countries and is an excellent source of earnings for the impoverished community (Rehman *et al.*, 2017). It offers economic and food safety, employment, foreign profit, agricultural service, transport, and so forth. Besides, it contributes substantially to improving the sociocultural status of communities (Duguma *et al.*, 2012; Randolph *et al.*, 2007). In order to obtain these privileges, people from developing countries are intimately related to livestock rearing. Since Bangladesh is a developing country, the majority of households rear livestock for poverty mitigation and satisfaction of food demand. It is pretty mentionable that parasitism is still a handicap for this community. Therefore, the study was undertaken to observe the status of appropriate deworming and worm control practices among peri-urban livestock owners and to comprehend their knowledge, perceptions, and awareness of the prevention and management of parasitic diseases.

Materials and methods

Study area

The study was carried out in randomly selected four villages (Pratappur, Madhabpasha, Rahmatpur, and Katurakati) of Barishal district located around the city.

Study period

The study was conducted from September to December 2020 for 6 months.

Data collection

A pre-tested questionnaire was administered by interviewing the farmer in person. The questionnaire was divided into four segments: the demographic profile; deworming practices; knowledge and perception of worm control; and deworming activities. During data collection,

each farmhouse was visited by the authors to confirm the accuracy of the data.

Data input and analysis

The frequencies were expressed in percentage (%) and the association between farmer's education and knowledge of parasitic disease prevention, control, and deworming activities was evaluated by crosstab analysis using IBM SPSS (Statistical Package for Social Sciences) software (version 25).

Results

Table 1 represents the demographic profile of the respondents (207) in the study. The demographic profile indicated that the average age (range) of the respondents was (23–70) years. This also identified that all the farmers were in the productive age range. Out of 207 farmers, 5.8% were illiterate and only 4% completed post-graduate education. As a primary occupation, most of the farmers (30.4%) were laborers, followed by businesses (26.6%), jobs (29.0%), and agriculture (14.0%). In the case of secondary earning sources, 85.5% of farmers were reported to have no secondary occupation. In this study, more females (82.1%) were found to be involved and spend most of their time in farm activities. A similar finding was also reported earlier (Rahman *et al.*, 2008).

About 73% of respondents supplied tube-well water to their animals. In addition, 56.2% of subjects positively replied that their animals grazed near damp places. The molluscan operates as an intermediate host in the typical trematode development cycle. As we know, the adult parasites lay eggs that come out with the feces of the animals into the environment. When the feces of the animals are exposed to molluscan as an intermediate host in water, the eggs of the parasite switch into the larval stage (miracidium) and complete asexual reproduction. Metacercaria

is the infective stage of trematodes that forms only after asexual multiplication in the intermediate host. As a result, the animals having the opportunity to graze near watery places and getting impure water supplies were believed to become more infected with helminths. Dong *et al.* (2005) documented the contribution of snails to the propagation of trematodes and some effective snail control techniques to reduce schistosomiasis (Yi *et al.*, 2005). Almost 100% of farmers claimed to wash their hands before and after contacting the animals.

Similarly, about 100 % of farmers did not wash their hands before and after distributing the feed to the animals. This type of practice and perception affects hygiene, posing both animal and human health at risk of helminthiasis. The study also revealed that about one-third of the farmers (29.0%) did not regularly clean dung from farm sheds and premises. On the other hand, 71.0% of farmers maintained a good farm hygiene by removing dung. Besides this, 72.9 % of respondents did not shift bedding materials regularly. As a result, the excrement is observed to be mixed with bedding materials. Unless the droppings are not cleaned regularly, infected animals release parasitic eggs with feces, infecting other herd animals.

About 19% (39/207) of total participants allowed their animals to co-graze with other animals. Likewise, a finding showed that half of the respondents (121/229) allowed alpacas with other domestic animals in Australia (Rashid *et al.*, 2019). This type of husbandry practice increases the possibility of exposure to multiple gastrointestinal nematodes (GINs) of other domestic animals. A combined grazing system is one of the leading causes of increased GIN infection (Rashid *et al.*, 2019). However, most participants (81.2%) responded negatively to co-grazing, which was entirely satisfactory for farming. It was observed that 55.6 % of the farmers did not use anthelmintics for their animals. This may have been due to a lack of

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proper knowledge and awareness of deworming and anthelmintics.

On the contrary, 44.4% of farmers used anthelmintics regularly. However, the awareness and knowledge among the respondents about the

use of anthelmintics for controlling GINs were much higher in research conducted in Australia (Rashid *et al.*, 2018).

Table 1: Demographic profile of the respondents

Variables		Value	
Total number of respondents		207	
Age in years (range)		23-70	
	Category	Frequency	Percent (%)
Education	Illiterate	12	5.8
	Primary	58	28.0
	Secondary	104	50.2
	Higher secondary	22	10.6
	Graduation	8	3.9
	Post-graduation	3	1.4
Primary occupation	Business	55	26.6
	Job	60	29.0
	Labor	63	30.4
	Agriculture	29	14.0
Secondary occupation	Bussiness	5	2.4
	Job	1	0.5
	Labor	2	1.0
	Agriculture	22	10.6
	No Secondary occupation	177	85.5

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Spend most of the time on farm activities by-	Male	37	17.9
	Female	170	82.1

Table 2: Farmer’s personal hygiene and management practices in relation to parasitic disease transmission

Variables	Categories	Frequency	Percent (%)
Source of water in the farm	Tube-well	150	72.5
	Pond	52	25.1
	Canal/ Lake	2	2.4
Hand washing before and after contacting the animals	Yes	205	99.0
	No	2	1.0
Washing hands before and after distribution of feed to the animals	Yes	205	99.0
	No	2	1.0
Regular dung cleaning	Yes	147	71.0
	No	60	29
Regular shifting of bedding materials	Yes	151	72.9
	No	56	27.1
Grazing near to watery places	Yes	137	56.2
	No	70	33.8
Co-grazing with other livestock	Yes	39	18.8
	No	168	81.2
Using of deworming agents or anthelmintics regularly according to the schedule	Yes	92	44.4
	No	115	55.6

Table 3 represents the results of farmers' understanding of parasitic disease prevention, control, and deworming activities. A tiny number (9.2%) of respondents were found to have knowledge of the mode of parasitic disease spread and transmission. It suggests that the majority of individuals still have a lack of knowledge and understanding of worm

proliferation. About 73% of the farmers were not aware of parasitic disease prevention activities. Similarly, 82.1% of participants in the study were not aware of the worm control measures. It can be assumed that most of them do not have the proper information and knowledge to prevent and control worm infection. A significant portion (67.6%) of farmers had never heard of

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deworming agents (anthelmintics). About 97% of the respondents did not attend any seminars on parasitic disease control and deworming practices. This justifies that there is still a majority of the peri-urban population without adequate knowledge and information about worm

control and deworming activities. As a result, a large livestock population suffers from helminthiasis, which depresses the livestock economy.

Table 3: Farmers' knowledge and understanding regarding parasitic disease prevention, control, and deworming activities

Question	Response	Frequency	Percent
Do you know the sources of worm proliferation?	Yes	19	9.2
	No	188	90.8
Are you aware of parasitic disease prevention activities?	Yes	56	27.1
	No	151	72.9
Do you know how to control parasitic disease infection?	Yes	37	17.9
	No	170	82.1
Have you heard about deworming agents and anthelmintics?	Yes	67	32.4
	No	140	67.6
Are you informed of the deworming schedule for your animals?	Yes	67	32.4
	No	140	67.6
Have you attended any seminars on parasitic disease control and deworming activities?	Yes	7	3.4
	No	200	90.6

Table 4: Farmer's perceptions regarding parasitic disease prevention and control

Questions	Response	Frequency	Percent
Do you agree that pasture management is important for parasitic disease prevention?	Yes	137	66.2
	No	25	12.1
	Not sure	45	21.7
Do you think that it is necessary to control parasitic diseases for efficient animal production?	Yes	155	74.9
	No	7	3.4
	Not sure	45	21.7
Hygiene is important for the prevention of parasitic diseases. What is your opinion?	Agreed	201	97.1
	Denied	6	2.9

About 66% of the total respondents understood the importance of pasture management for the prevention of parasitic diseases. This survey revealed that 74.9% of subjects agreed that

controlling parasitic diseases is necessary for efficient animal production. About 97.0% of the total respondents agreed with the importance of hygiene to prevent parasitic diseases.

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Results presented in Table 5 showed that most of the respondents (50.2%) had accomplished secondary education, and a good number of respondents had knowledge of worm sources, proliferation, prevention, and control. On the other hand, illiterate respondents did not know the sources of the proliferation of worms. Very few people (8.33%) had knowledge of the prevention and control of worms. Farmers who finished primary and higher secondary education never attended any seminars on worm control and deworming activities. It implies that many

qualified people finished primary and higher secondary education but had no complete understanding of deworming activities.

It is essential to mention that the study was carried out quickly using a small number of samples due to a lack of funds. The exploitation of a large sample size in a long time frame and a more comprehensive analysis should be carried out in the future to strengthen the current findings.

Table 5: Association between farmer's education and knowledge of parasitic disease prevention, control, and deworming activities

Variables	Education N (%)					
	Illiterate	Primary	Secondary	Higher Secondary	Graduation	Post-Graduation
Do you know the sources of worm proliferation?						
Yes	0 (0.0)	3 (5.17)	10 (9.62)	3 (13.64)	3 (37.50)	(0.0)
No	12(100.0)	55 (94.83)	94 (90.38)	19 (86.36)	5 (62.50)	3 (100.0)
Are you aware of worm prevention activities?						
Yes	1 (8.33)	12 (20.69)	29 (27.88)	10 (45.45)	3 (37.50)	1 (33.33)
No	11 (91.67)	46 (79.31)	75 (72.12)	12 (54.55)	5 (62.50)	2 (66.67)
Do you know how to control worm infection?						
Yes	1 (8.33)	7 (12.07)	19 (18.27)	7 (31.82)	2 (25.0)	1 (33.33)
No	11 (91.67)	51 (87.93)	85 (81.73)	15 (68.18)	6 (75.0)	2 (66.67)
Are you informed of the deworming schedule for your animals?						
Yes	3 (25.0)	17 (29.31)	31 (29.81)	9 (40.91)	6 (75.0)	1 (33.33)
No	9 (75.0)	41 (70.69)	73 (70.19)	13 (59.09)	2 (25.0)	2 (66.67)

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Have you ever attended any seminar on deworming activities?	1 (8.33)	0 (0.0)	4 (3.85)	0 (0.0)	1 (12.5)	1 (33.33)
Yes	11 (91.67)	58 (100.0)	100 (96.15)	22 (100.0)	7 (87.5)	2 (66.67)
No						

Conclusion

The study was undertaken to examine and evaluate the knowledge, perceptions, and practices of deworming and parasitic disease control activities among the peri-urban livestock keepers in the Barishal district. The research findings revealed the poor understanding of the respondents about helminthiasis in animals and the prevention and control of worm infestation. Since Bangladesh is an agriculture-based developing country with a vast population dependent on livestock production, the department of livestock services must propagate information to educate farmers about parasitic diseases and their prevention and control measures.

Competing Interest

The authors declare that they have no competing interests.

Authors' contribution

AS designed the experiment, reviewed the literature, analyzed the data, and wrote the draft of this manuscript. MAR was involved in data collection. MAS and MMRR supervised, conceptualized, and revised the final manuscript.

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