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PREVALENCE OF BUFFALO DISEASES AND RESPONSE TO TREATMENT OF PARASITIC DISEASES

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A B S T R A C T

The study was conducted to investigate the buffalo diseases with relation to age, sex and seasonal variation and response to treatment of parasitic diseases with different commercial anthelmintic in Rangpur district of Bangladesh. The study was conducted for a period of one year from October 2021 to September 2022. A total of 197 clinically ill buffaloes were examined for diagnosis of diseases based on history, clinical findings, and microscopic examination of feces for parasitic egg detection. The diseases were categorized into different groups according to their etiology. In this study, the highest prevalence was seen by parasitic disease (50.7%) followed by bacterial diseases (21.3%), viral diseases (18.8%), external parasitic disease (3.6%), protozoan disease (2.5%) and lowest by metabolic disease (1.5%) and fungal (1.5%) respectively. The prevalence of diseases was significantly ($p< 0.05$) higher (49.3%) in above 2 years age group and lowest (15.2%) in 0 to 6 months age group. Disease prevalence was significantly ($p< 0.05$) more in male buffaloes (60.9%) and less (39.1%) in female buffaloes. Based on season, it was found that the prevalence of diseases was significantly ($p< 0.05$) highest in summer season (39.1%), moderate in winter season (35.5%) and lowest in rainy season (25.1%). Six species of gastrointestinal parasites were identified, they are *Fasciola gigantica* (20.3%), *Paramphistomum sp* (15.2%), *Haemonchus contortus* (3.0%), *Toxocara vitulorum* (7.6%), *Trichostrongyloides* sp (2.5%) and *Moniezia sp* (2.0%). Sixty buffaloes infected with parasitic disease were divided into six equal groups for anthelmintic treatment and each group contained

10 buffaloes and the efficacy was determined by EPG. Treatment with Nitroxynil (Oxinil ® Techno) @ 1.5 ml/ 50kg body weight against fascioliasis significantly ($p< 0.05$) reduce the EPG on day 7, 14 and 21 post – treatment as 54.04%, 70.68% 100% respectively and Triclabendazole (Fasinil® Techno) @ 15 mg/kg body weight also significantly ($p< 0.05$) reduce the EPG on day 7, 14, 21 and 28 post –treatment as 53.94%, 60.04%, 83.36% and 100% respectively. Treatment with Tetramisole (2gm) +Oxyclozanide (1.4 gm) (Tetranid ® Techno) @ 1 bolus / 150 kg body weight against nematodiasis was significantly ($p<0.01$) reduces the EPG of feces on day 7, 14, 21 and 28 post –treatment 52.61%, 59.28%, 72.80% and 100%respectively and Levamisole (Levavet ® Acme) @ 7.5 mg/ kg body weight against nematodiasis was significantly ($p<0.01$) reduces the EPG of feces on day 7, 14, and 21 post-treatment day 60.02%, 83.39% and 100% respectively. Anthelmintic treatment also increases the body weight of buffaloes after 3 months of treatment.

1. INTRODUCTION

Buffalo (*Bubalus bubalis*) is commonly known as the South Asian black gold, consisting of 97% of the world buffalo population. Buffalo is one of the important species of domestic livestock and the buffalo population of Bangladesh is about 13, 04,000 (DLS, 2009). Buffaloes have significant contribution to the agricultural economy of the country and are mainly use to produce meat, milk, and additionally for ploughing purpose especially in the rural areas where there is lack of modern mechanization (Islam *et al*., 2017). Difference in agro-climatic conditions, animal and pasture management significantly determine the incidence and severity of different parasitic diseases in a particular region (Rahman *et al.*, 2017).

Parasitic diseases are very important in buffaloes than other infectious diseases. These mainly include gastro-intestinal helminthiasis, coccidiosis and mange that causing parasitic gastroenteritis (Chowdhury and Tada,1994), watery diarrhea, weakness, weight loss, decreased milk production, reduced product quality, mortality and other secondary infections are caused by trematode parasites (Soulsby, 1982). More than helminths, buffaloes suffer from different intestinal protozoan infections (Azam *et al.*, 2002; Nalbantoglu *et al*., 2008). Moreover, some helminths of buffaloes are also transmissible (directly or indirectly) to humans where they can cause significant clinical diseases, such as schistosomiasis and fascioliasis in several countries (Wang *et al*., 2006; Tum *et al*., 2007).

The present study was designed to study the prevalence and risk factors of buffalo diseases and their response to treatment against anthelmentics.

2. MATERIALS AND METHODS

2.1. Study area and period

The study was carried out in different areas at Mithapukur upazila of Rangpur district. The study was carried out for a period of one year from October 2021 to September, 2022.

2.2 Procedure of examination of animal

General and physical examinations were performed by distant and close inspection of animals. For clinical examination the temperature, pulse and respiratory rate from each of the animals were recorded. The presented clinical findings of various diseases of buffalo and the owner complaint in relation to the diseases were also recorded carefully.

2.3 Collection of samples for fecal examination of egg

Fecal samples were collected from different buffaloes at mithapukur upazila livestock office, Rangpur for examination. Fresh fecal samples were collected. The sample was collected in an airtight container to prevent desiccation. 3-4 drops of 10% formalin were used to fix fecal samples.

2.4 Examination of fecal samples

The fecal samples were processed and examined in the laboratory. The ova/cyst of different parasites were identified according to the morphology and quantitative estimation were done by direct smear method, sedimentation method and modified Stoll's ova dilution technique as described by Soulsby (1982).

2.5 Anthelmintic treatment against parasitic infestation in Buffalo

The grouping system and treatment schedule were-

In case of **trematodal infestation- Group A:** 10 animals with Trematode infestation and treated with Nitroxynil (Oxinil ® Techno, Bangladesh Ltd.) administered subcutaneously @ 1.5 ml/50 kg body weight. **Group B:** 10 animals and treated with Triclabendazole (Fasinil® Techno, Bangladesh Ltd.) @ 15 mg/kg body weight orally. **Group C:** 10 infected animals kept as untreated control.

In case of **nematodal infestation- Group D:** 10 animals with Trematode infestation and treated with Nitroxynil (Oxinil ® Techno, Bangladesh Ltd.) administered subcutaneously @ 1.5 ml/50 kg body weight. **Group E:** 10 animals and treated with Triclabendazole (Fasinil® Techno, Bangladesh Ltd.) @ 15 mg/kg body weight orally. **Group F:** 10 infected animals kept as untreated control.

3. RESULTS

A total of 197 clinically ill buffaloes were investigated for disease prevalence. Out of 197 buffaloes highest 50.7% buffaloes were affected with helminth parasites (*Fasciola spp* 20.3%, *Paramphistomum spp* 15.2%, *Haemonchus spp* 3%, *Toxocara vitulorum* 7.6%, *Moniezia sp* 2% *and Strongyloides sp* 2.5%) followed by 21.3 % with bacterial disease (Mastitis 2.5%, Dermatophilosis 7.6%, Hemorrhagic Septicaemia 4.1%, Brucellosis 1%, Tuberculosis 1%, Colibacillosis 3%, Leptospirosis 1% and Salmonellosis 1%) 18.8% with viral disease (Foot and Mouth Disease 5.1%, BVD 2.5%, Rabies 1% and Ephemeral fever 10.2%) 3.6 % with external parasites (Tick 1.5%, Mite 1.5% and Lice 1.5%), 2.5% with protozoan diseases (Babesiosis 1%, Theileriosis 0.5% and Anaplasmosis 1%) and 1% with fungal and 1% with metabolic disease shown in (**Table 1**). The variation in the prevalence of diseases was statistically significant ($p<0.05$).

In the present study, all 197 buffaloes were categorized into 3 age categories viz., 0-6 month, 7 months to 2 year and 2 years to above. It was revealed that the highest prevalence of different diseases was found in 2 years of age to above (49.3%), moderate in 7 months to 2 years of age (35.5%) and lowest in 0 to 6 months (15.2%) shown in (**Table 2**). The study revealed that out of 197 buffaloes 150 male and 47 female buffaloes. Males were more affected (76.1%) than female (23.9%) buffaloes shown in (**Table 3**). The prevalence of disease in buffaloes was higher 39.1% in summer, moderate 35.5% in winter season and lowest 25.4% in rainy season and shown in (**Table 4**).

Out of 150 fecal samples, (66.67%) samples were found to be positive with the help of "Modified Stoll's Dilution Technique and 60 positive cases were taken for anthelmintic trial. In case of trematodal infestation- group A shown better result than group B (**Table 5**). In case of nematodal infestation- group D shown better result than group E (**Table 6**). The body weight increased after treatment with group A and group B against Trematodes is 9.52 % and 12.50% respectively. Body weight gain for the control group was1.31%. Similarly, the body weight increased after treatment with group D and group E against Nematode were 8.33 % and 10.81% respectively. Body weight gain for the control group was 2.63% (**Table 7**).

4. DISCUSSIONS

In this study, the highest prevalence of disease was seen by parasitic infestation is in conformity with the earlier reports of Nath *et al.,* (2016), Biswas *et al.,* (2014), Rahman *et al.,* (2012), Rahman *et al.,* (2017) and Ara *et al.,* (2021). Earlier studies by Condoleo *et al.,* (2010), Hossain (1991) and Saha *et al.,* (2013), however reported a much lower rate of infection which was possibly because of the differences in methods of selection of animals, epidemiological factors etc. The prevalence of bacterial disease in this study was 21.3 % which was similar with the report by Dhakal *et al.,* (2007), Cowan and Steel (1993) and higher than the findings of Costa (2002). The rate of infestation with viral was almost similar to the findings of Newaz *et al.* (2014), Eltom *et al.* (2020). The rate of infection with protozoan and other diseases are similar with the findings of Michel and Bengis (2012). In the present study, it was revealed that the prevalence of different diseases is maximum (49.03%) in 2 years age to above group because they produce milk and meat. In other aspect 7 months to 2 years are more susceptible to disease and disorder, which was similar with findings of Rahman *et al.,* (2017) and Regmi *et al*., (2020). In present study, it was revealed that maximum prevalence of disease was reported during summer season (39.09%) followed by winter (35.05%) and rainy (25.04%). In summer weather condition such as heavy temperature, rainfall, high humidity and heat waves may have an effect for increasing the chance of infectious diseases, which was similar with findings of Vohara *et al*., (2012), Qureshi et al., (2012) and Rahman *et al.,* (2017) and higher than the findings of Bachal *et al.,* (2000); Bhutto *et al.,* (2012) and lower the findings of Ara *et al.,* (2021). The prevalence was higher in males 76.1% than female 23.9%. The individuals (male) more susceptible to any infection due to their grazing area. This findings supported by Azhar *et al*. (2002), Alim *et al.,* (2004), Rahman *et al.,* (2017), Ara *et al.,* (2021) reported that sex variation in gastrointestinal parasitic infection.

The total reduction of fecal egg counts on the 21st day after treatment with Oxynil® was 100%. The 100% efficacy of Nitroxynil against fascioliasis on 21st day of post-treatment in buffalo is confirmed the previous observations of Rahman *et al.,* (2016) who also detected 100% reduction of fecal egg counts on 21st post-treatment day with single injection of Nitronex®. Khanam *et al.,* (2016) found this efficacy 84.5% against fascioliasis in goat. In this research on 14th day 69.30% reduction of fecal egg counts was observed. Rahman *et al.,* (2016), Islam *et al.,* (2005) studied the percentage of efficacy of Fasinil® against fascioliasis in cattle and 93.94% reduction of fecal egg count was recorded with Fasinil ®. This study recorded 100% efficacy of Levamisole (Levavet®) @ 7.5 mg /kg body weight orally against the gastro-intestinal nematodiasis on 21st day of treatment and the efficacy of Tetranid® was 100% on 28th days of post-treatment. More or less similar effectiveness of Tetranid with Oxyclozanide (Tremacid) 84.53%. Likewise, Prased *et al*., (2001), Coles and Stafford (2001)

observed similar results in buffaloes. Ashraf and Rahamatullah, (2002) served 100% efficacy of Levamisole against ascaridiasis in buffalo. In present study the body weight increased after treatment with Fasinil 9.52% and Oxynil 12.50% respectively. Body weight gain for control group was 1.31%. Similarly, the body weight increased after treatment with Levavet 8.33% and Tetranid 10.81% respectively. Body weight gain for control group was 2.63% all results are nearly similar to the findings of kumar *et al*., (1999), Islam *et al*., (2005); Rahman and Samad (2010).

5. CONCLUSIONS

In this study the among different diseases of buffaloes, the height prevalence of disease was seen by helminth infestation and lowest by metabolic and fungal disease. The prevalence of diseases was more in 2 years to above age group and less in 0 to 6 months aged buffalo. Disease prevalence was higher in summer than other seasons and male buffaloes are more affected with diseases than female buffaloes. Treatment with Nitroxynil (Oxynil ®) against trematode are more effective than Triclabendazole (Fasinex®) and treatment with Levamisole (Levavet ®) against gastro-intestinal nematodiasis are more effective than Tetramisole (2gm) +Oxyclozanide (1.4 gm) (Tetranid ®) after the same days of treatment.

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CONFLICT OF INTERESTS

The authors declare no conflict of interest.

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TABLES

Table-1: Prevalence of diseases of buffalo at Mithapukur upazila in Rangpur district

Types of disease (197)	Name of Disease	No. of affected animal	Prevalence (%)	Overall Prevalence (%)	Level of significance
Bacterial (42)	Mastitis	5	2.5	21.3	<0.001**
	Dermatophilosis	15	7.6		
	Hemorrhagic Septicaemia (HS)	8	4.1		
	Brucellosis	2	1.0		
	Tuberculosis	2	1.0		
	Colibacillosis	6	3.0		
	Leptospirosis	2	1.0		
	Salmonellosis	2	1.0		
Viral (37)	FMD	10	5.1	18.8	<0.001**
	BVD	5	2.5		
	Rabies	2	1.0		
	Ephemeral fever	20	10.2		
Protozoan (5)	Babesiosis	2	1.0	2.5	0.817 (NS)
	Theileriosis	1	0.5		
	Anaplasmosis	2	1.0		
Fungal (3)	Ringworm	3	1.5	1.5	
Helminth parasites (100)	*Fasciola spp*	40	20.3	50.7	<0.001**
	Paramphistomum spp	30	15.2		
	Haemonchus spp	6	3.0		
	Toxocara vitulorum	15	7.6		
	Moniezia sp	4	2.0		
	Strongyloides spp	5	2.5		
External parasites (7)	Tick	3	1.5	3.6	0.865 (NS)
	Mite	2	1.0		
	Lice	2	1.0		
Metabolic 3	Milk fever	3	1.5	1.5	

P<0.01 means significant at 1% level of significance,
NS means non-significant.

Table-2: Age-wise Prevalence of buffalo disease at Mithapukur upazila of Rangpur district

Total no. of buffalo	Age group	No. of diseased buffalo	Prevalence (%)	Level of significance
197	0 to 6 months	30	15.2	<0.001**
	7 month to 2 years	70	35.5	
	2 years to above	97	49.3	

P<0.01 means significant at 1% level of significance,

Table-3: Sex-wise Prevalence of buffalo disease at Mithapukur upazila of Rangpur district

Total no. of buffalo	Sex of buffalo	No. of diseased buffalo	Prevalence (%)	Level of significance
197	Male	150	76.1	<0.001**
	Female	47	23.9	

P<0.01 means significant at 1% level of significance,

Table-4: Season-wise prevalence of buffalo disease at Mithapukur upazila of Rangpur district

Total no. of buffalo	Season	No. of diseased buffalo	Prevalence (%)	P- Value
197	Summer (March-May)	77	39.1	0.011*
	Rainy Season (June-October)	50	25.4	
	Winter (November- February)	70	35.5	

P<0.05 means significant at 5% level of significance,

Table-5: Comparative efficacy of Nitroxynil (Oxynil ®) and Triclabendazole (Fasinil ®) against fascioliasis

Group of Animals	Drugs used	No. of Animals	Mean Egg per Gram (EPG) of feces				
			Pre-treatment (day-0)	Post-treatment (days)			
				7	14	21	28
Group-A	Oxynil	10	185.55	100.55 (54.19%)	30.55 (69.61%)	00.00 (100%)	00.00 (100%)
Group-B	Fasinil	10	170.60	80.6 (52.75%)	35.6 (55.83%)	6.6 (81.46%)	00.00 (100%)
Group-C	Control	10	160.70	180.7	210.70	220.80	245.70
P-value			**0.14**	**0.012**	**<0.001**	**<0.001**	**<0.001**
Level of significance			**NS**	*	**	**	**

**P value <0.01 and *P value <0.05

NS means not significant (P>0.05)

Table-6: Comparative efficacy of Levamisole (Levavet ®) and Tetramisole (2gm) +Oxyclozanide (1.4 gm) (Tetranid ®) against Nematodiasis

Group of Animals	Drugs used	No. of Animals	Mean Egg per Gram (EPG) of feces				
			Pre-treatment (day-0)	Post-treatment (days)			
				7	14	21	28
Group-D	Levavet	10	290.50	120.5 (58.5%)	24.5 (79.66)	00.00 (100%)	00.00 (100%)
Group-E	Tetranid	10	270.85	130.85 (51.68%)	53.85 (58.54%)	38.85 (72.14%)	00.00 (100%)
Group-F	Control	10	210.75	230.75	248.50	328.50	349.50
P-value			**0.056**	**0.001**	**<0.001**	**<0.001**	**<0.001**
Level of significance			**NS**	**	**	**	**

P<0.01 means significant at 1% level of significance,
NS means non-significant.

Table-7: Comparison of body weight in treated and untreated Buffalo

Group (n=5)	Drugs with dose per kg body weight	Body weight before treatment	Body weight After treatment	Change	Presentence of change
Group-A	Fasinil 15 mg/kg	420	460	40	9.52
Group-B	Oxynil 1.5 ml /50 kg	400	450	50	12.5
Group-C	Control	380	385	5	1.31
Group-D	Levavet 7.5 mg/kg	360	390	30	8.33
Group-E	Tetranid 1 bolus /150 kg	370	410	40	10.81
Group-F	Control	380	390	10	2.63