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Clinical Incidence of Diseases in Cattle and Goat at Different Area of Bera Upzilla in Pabna District of Bangladesh

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Abstract

Ruminant, especially cattle and goats constitute the major portion of the livestock which are usually suffered from a wide range of diseases. Hence, this study was designed to determine clinical cases of cattle and goat in relation to different parameter. A total of 106 sick ruminants (cattle = 56, goat = 50) in different area of Bera upzilla, Pabna were investigated during March to September, 2016. The parasitic infestation (32.1%) in cattle and viral diseases (36%) in goat were higher. In relation to sex, the disease frequencies were higher in female goat of 56.0% and reproductive diseases in female cattle of 66.7%. Among the clinical case, 70% was in black bangle goat. On the other side, the vaccination and grazing system had strong significant (p<0.01) association with disease frequencies having the chi-square value of 36.036 and 35.617, p<0.01, with Phi (φ) coefficient of 0.583 and -0.580 respectively. Besides this, the male owner of clinically sick animal was higher of 71.40% for cattle and 52% for goat with chi-square value, (N=106) = 4.244, p<0.05, φ coefficient of 0.20 indicating a significantly moderate association. However, these two ruminants (cattle and goat) are mostly vulnerable to parasitic infestation and viral diseases.

Keywords: Prevalence; Diseases; Cattle; Goat; Pabna.

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1. Introduction

In Bangladesh, livestock is an indispensable component of the diverse farming structure practiced for the centuries where contribute about 12 % to agricultural GDP (Gross Domestic Products) and 3 % in our national economy [1]. Besides this, livestock furnish about 36 % of total animal protein required in our everyday life [2]. Besides this, the higher demands for milk, meat and especially for skin in the local as well as foreign markets focused the livestock rearing as a remarkable source of income for vulnerable

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groups of people and the existing socioeconomic condition of the country [3]. Moreover, more than 10 million people are directly depending on livestock for their livelihoods [4]. It is regrettable that the large numbers of ruminants were infected by different diseases in every year, which not only causes the huge loss in the farmer's level but also can affect country's economy [5].

Ruminant, especially cattle and goats constitute the major portion of the livestock reared in Bangladesh basically in rural areas where most of the animals are maintained by traditional management system. Besides this, poor hygienic condition with inappropriate of bio-security practices and vaccination are also responsible for different diseases and reproductive failure of cattle and goat [3,6]. As a result, most of our animals are being weak, unhealthy, emaciated and the productive performances are not in satisfactory level.

Cattle are usually suffered from a wide range of diseases including different systemic diseases, metabolic disorder and reproductive problems as well. Mortality of cattle due to several diseases is mostly occurred in village areas of Bangladesh [7]. It was reported that variation in different cattle breed, their sex, season and environmental factors greatly influence the disease prevalence in cattle [8,9]. Small ruminants especially goat is very important in rural economy and has the potentially using as a tool for poverty reduction in Bangladesh [10]. It is considered as the poor man's cow [11] reared in backyard system by rural farmers, especially the poor women or children as an integral part of the farming system [12]. Different types of diseases both infectious and non-infectious are significant problems in goat rearing in our country. A great damage caused by infectious diseases and also creates nutritional deficiency and disturbances in fertility. Lack of proper care and overall faulty husbandry practices are also responsible for higher goat mortality in the prevailing production system [13]. It has been reported that about 10% animals die annually because of diseases [14].

Although some reports on clinical cases were published in considering to different geographical location, but similar report on cattle and goat are limited in Bera upazila of Pabna district of Bangladesh [15]. Additionally, an update report on diseases prevalence of cattle and goat are very essential for strategic control of diseases. With these backgrounds, the present study was conducted to investigate the prevalence of clinically occurring diseases and disorders of the cattle and goat in relation to different parameter.

2. Materials and Methods

2.1. *Study area, period and sample size*

The study was carried out in different area of Bera upzilla of Pabna districts during the period from March 2016 to September 2016. The animals were suspected to be affected with different diseases. The presumptive diagnosis of diseases was done on the basis of owner's complaint, clinical history, clinical signs and findings of fecal sample examination for parasitic cases. This study was on 106 clinically sick ruminants (cattle = 56, goat = 50) of different ages.

2.2. *Physical and clinical examination*

The sick animals were diagnosed by using different techniques of physico-clinical examination. To perform the physical examination of animals, first of all, the animals were inspected from a distance using the techniques followed by Radostits *et al*. [16]. And then the different parts and system of the body of each of the sick animals were in considered for close observation and abnormalities were detected according to the different methods described by Rosenberger [17]. Moreover, the specific bacterial, viral, parasitic and fungal diseases were diagnosed on the basis of specific clinical signs and gross lesions as per techniques described by Jones *et al*. [18], Khan [19] and Soulsby [20]. Owner's complaints were taken into account while performing the physical examination of a suspected animal.

2.3. *Questionnaire design and data collection*

On the farm visit, a pre-structured questionnaire was used to collect relevant information of livestock. A closed ended (categorical) questionnaire was designed according to standard methods. Data were collected with the permission of the owners by face to face interaction with the responded owner, repeated questioning, observation of animal and livestock based recording. The diseases history-based data were collected very carefully following the procedure described by Balamurugan *et al*. [21]. Data were also sought out from the clinical cases of different diseases on animal of the farmers.

2.4. *Statistical analysis*

Data that were collected had been stored into MS Excel (Microsoft office Excel-2010, USA) and finally transferred to Statistical Package for Social Sciences (SPSS) version 25.0 for analysis. The association between the categorical explanatory variable with outcome were estimated by by Pearson's Chi-square. The association was considered as significant if the $p \leq 0.05$. On the other hand, when more than 20% of cells of 2×2 contingency table had expected count less than 5, the *p*-value of continuity correction was considered but when the table other than the 2×2 contingency then *p* value of Fisher exact tests was accounted. The mean was compared by Kruskal wallis test.

3. Results

The distribution of different diseases in cattle according to their sex and breed is presented in Table 1, where there was no significant ($p>0.05$) association. The diseases prevalence was 53.57 % and 46.43 % in male and female cattle, while 62.50 % was in cross breed and 37.50 % in local. Nevertheless, a total of 56 clinical cases were recorded and among them the parasitic infestation was higher (32.1 %) in cattle. The parasitic diseases are more prone in male of 66.70 % where reproductive diseases were more common in female of 66.70 %. Among the diseases, parasitic infestation was high in local cattle of 55.56 %

where bacterial diseases were more prominent in cross breed cattle of 87.50 %. On the other hand, Table 2 shows the diseases frequencies in goat where a total of 50 cases were recorded and viral diseases were more prominent (36 %) during the study. In relation of sex, the proportion of diseases frequencies was higher in female goat of 56.00 %. Between the male and female goat, the male goats were suffering with metabolic diseases of 66.67 % while 100 % reproductive diseases patient was female goat. In breed variation, 70 % diseased goat was black bangle and rest of was Jamunapari goat. Moreover, the metabolic diseases were more prevalent in black bangle goat of 100 % and the viral diseases were 44.44 % in Jamunapari.

Table 1. Frequencies of diseases in cattle according to their sex and breed.

Diseases and Condition in Cattle	Cases		Sex					Breed				
	N	%	Male		Female		$\chi 2$	Local		Cross		$\chi 2$
			N	%	N	%		N	%	N	%	
Bacterial	8	14.3	5	62.5	3	37.5		1	12.50	7	87.50	
Viral	10	17.9	4	40.0	6	60.0		4	40.00	6	60.00	
Reproductive	12	21.4	4	33.3	8	66.7	4.406c	2	16.7	10	83.3	7.211c
Parasitic	18	32.1	12	66.7	6	33.3		10	55.56	8	44.44	
Metabolic	8	14.3	5	62.5	3	37.5		4	50.00	4	50.00	
Total	56		30	53.57	26	46.43		21	37.5	35	62.5	

[a]Pearson's chi-square test; [b]After continuity correction; [c]Fisher exact tests; **Significant at 1 % (p<0.01), *Significant at 5 % (p<0.05); N=Number; $\chi 2$= chi-square value.

Table 2. Frequencies of diseases in goat according to their sex and breed.

Diseases and Condition in goat	Cases		Sex					Breed				
	N	%	Male		Female		$\chi 2$	BB		JP		$\chi 2$
			N	%	N	%		N	%	N	%	
Bacterial	10	20	5	50.00	5	50.00		8	80.00	2	20.00	
Viral	18	36	6	33.33	12	66.67		10	55.56	8	44.44	
Reproductive	4	8	0	0.00	4	100	6.061[c]	3	75.00	1	25.00	3.677[a]
Parasitic	15	30	9	60.00	6	40.00		11	73.33	4	26.67	
Metabolic	3	6	2	66.67	1	33.33		3	100.00	0	0.00	
Total	50		22	44.00	28	56.00		35	70.00	15	30.00	

[a,] Pearson's chi-square test; [b,] After continuity correction; [c,] Fisher exact tests; ** Significant at 1% (p<0.01), *Significant at 5% (p<0.05); N=Number; $\chi 2$= chi-square value.

As the Table 3 shows, the occurrence of clinical case in association with the deworming, vaccination and grazing system practices where the vaccination and grazing system had strong significant (p<0.01) association with diseases frequencies having the chi-square value, $\chi 2(1, N=106) = 36.036$ and 35.617, p<0.01, with Phi (φ) coefficient of 0.583 and -0.580 respectively. As seen in Fig. 1 (B), the goat with no vaccines was more likely to have diseased than the vaccinated goat. Similarly, the Fig. 1 (D) indicates the goats' grazed in flock is more prone to diseases (92 %) than in individual but in cattle the individual grazing animal was more likely to diseases of 64.3 %. Furthermore, 62.5 % cattle with deworming were clinically sick but reverse was in goat where 58 % goat

without deworming was clinically sick. Additionally, 89.3 % and 92 % of cattle and goats were dehydrated found clinically sick.

Table 3. Frequencies of diseases in cattle and goat according to deworming, vaccination, grazing system and dehydrating status.

Variable	Level	Cattle		Goat		$\chi 2$
		N	%	N	%	
Deworming	Yes	35	62.5	21	42.00	4.455[a] *
	No	21	37.5	29	58.00	
Vaccination	Yes	33	58.9	2	4.00	36.036[a] **
	No	23	41.1	48	96.00	
Grazing system	Flock/Herd	20	35.7	46	92.00	35.617[a] **
	Individual	36	64.3	4	8.00	
Dehydration	Yes	50	89.3	46	92.00	0.288[a]
	No	06	10.7	4	8.00	

[a]Pearson's chi-square test; [b]After continuity correction; [c]Fisher exact tests; **Significant at 1 % (p<0.01), * Significant at 5 % (p<0.05); N=Number; $\chi 2$= chi-square value.

As is observed in Table 4, the demographic data of farmers where only the genders and educational status was reported. The diseased animal was recorded high in male owner of 71.40 % for cattle and 52 % for goat. This association was significant with the chi-square value, (1, N=106) = 4.244, p<0.05, with Phi (φ) coefficient of 0.20 indicating a moderately strong relationship. The Fig. 1 (A) shows the male owners having cattle and goats were more likely have diseased. Though the educational status was no significant (p>0.05) but about 50 % of the cattle and 46 % of the goat owner was SSC passed which proportion was higher among the study population.

Table 4. Farmers demography on diseases of cattle and goat.

Variable	Level	Cattle		Goat		$\chi 2$
		N	%	N	%	
Gender	Male	40	71.40	26	52.00	4.244[a] *
	Female	16	28.60	24	48.00	
Education	None	4	7.1	10	20.00	5.149[c]
	Primary	20	35.7	16	32.00	
	SSC	28	50.0	23	46.00	
	HSC	2	3.6	1	2.00	
	Higher	2	3.6	0	0.00	

[a]Pearson's chi-square test; [b]After continuity correction; [c]Fisher exact tests; **Significant at 1 % (p<0.01), * Significant at 5 % (p<0.05); N=Number; $\chi 2$= chi-square value.

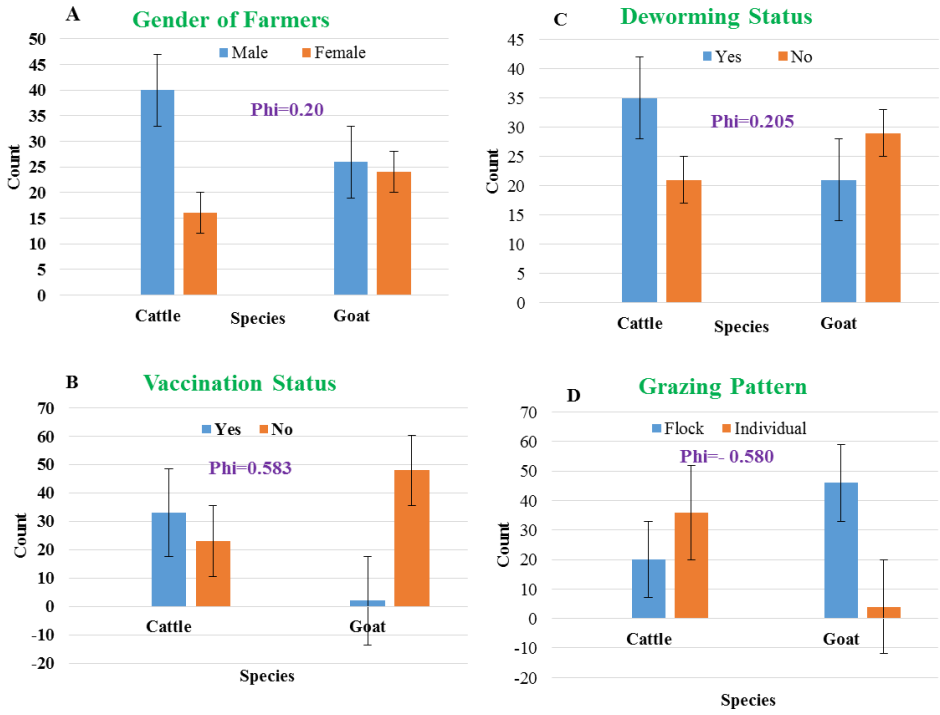

Fig. 1. Association of diseases frequencies with (A) Genders of farmer, (B) Vaccination status, (C) Deworming status and (D) Grazing pattern of cattle and goat.

As the Table 5 shows, there was no significant (p>0.05) difference among the bacterial, viral, reproductive, parasitic and metabolic diseases on the aspects of age, body weight, Heart rate, respiration rate and pulse rate except body temperature where viral diseases patient had significantly (p<0.05) higher than reproductive and metabolic diseases patient. Same result was observed in case of goat where only patient of different diseases only differed significantly (p<0.05) for their recorded body temperature (Table 6).

Table 5. Physiological status of clinically sick cattle.

Diseases and Condition in Cattle	Mean ± SE					
	Age (months)	Body Weight (kg)	Heart rate/ minute	Pulse rate/ minute	Respiration rate/minute	Body temperature (°F)
Bacterial	13.88± 2.42	102.50±17.40	77.00±3.05	67.88±2.65	27.38±1.32	102.60^{ab}±0.48
Viral	11.40±1.10	76.20±11.63	80.30±2.80	71.40±1.63	26.40±0.97	103.18^{a}±0.35
Reproductive	20.29±4.67	78.57±4.59	83.00±1.23	75.43±1.07	27.14±1.79	101.49^{b}±0.19
Parasitic	18.67±2.09	91.11±8.59	81.44±1.16	73.33±1.03	26.94±0.90	102.16^{ab}±0.28
Metabolic	15.00±3.51	98.00±21.31	77.40±1.03	70.00±1.92	25.60±1.44	101.56^{b}±0.37
Level of Significance		NS	NS	NS	NS	*

^{abcde}Same alphabet in the column are not statistically different; **Significant at 1 % (p<0.01), * Significant at 5 % (p<0.05), SE= Standard error of mean

Table 6. Physiological status of clinically sick goat.

Diseases and Condition in Goat	Mean ± SE					
	Age (months)	Body Weight (kg)	Heart rate/minute	Pulse rate/ minute	Respiration rate/minute	Body temperature (°F)
Bacterial	13.00±1.09	14.20±1.20	83.30±1.50	74.90±1.03	24.00±2.13	103.50±0.40
Viral	10.44±1.40	14.89±0.95	84.56±0.99	74.56±0.51	25.78±1.31	103.64±0.34
Reproductive	10.00±0.91	14.75±1.03	81.00±0.58	76.50±0.50	24.00±3.00	102.50±0.20
Parasitic	11.47±1.16	15.40±1.06	80.67±1.00	74.53±0.90	22.87±1.33	102.35±0.17
Metabolic	12.00±1.73	12.33±0.33	84.00±3.51	75.33±1.67	23.67±1.20	102.90±1.12
Level of Significance		NS	NS	NS	NS	*

[abcde]Same alphabet in the column are not statistically different; **Significant at 1 % (p<0.01), * Significant at 5 % (p<0.05), SE= Standard error of mean.

4. Discussion

This study revealed that the prevalence of parasitic diseases and viral diseases was high in cattle and goat respectively. The authors Rahman *et al*. [22] who found 50.4 % of parasitic diseases in cattle while Lucky *et al*. [23] reported 26.58% in cattle. Our result is close to these findings with little variation, which might be due to regional specificity. Similarly, our study shows, the viral diseases were highest prevalent in goat. This is in line with the findings of other authors, Lucky *et al*. [23] and Meher *et al*. [24] who specially reported the prevalence of PPR (Peste Des Petits Ruminants) in goat about 27.94 % and 54.41 % respectively. Among the viral diseases of goat, PPR is common in most of the cases. Additionally, the female goat was more prevalent than male which support the findings of Lucky *et al*. [22]. In case of breed variation, the cross-breed cattle was more in number as clinically sick than the local breed cattle which is in agreement of Hossain *et al*. [25] while the report of Parvez *et al*. [26] disagree with us where they reported exotic cattle breed were less prevalent than the local. On the other hand, Meher *et al*. [27] reported higher prevalence of subclinical mastitis in cross breed cattle. The disease mastitis is more common in high milk yielding cattle and goat and caused by a wide range of bacteria, virus also fungus. However, these variations of result might for dissimilarities in number of patient animal, different bacterial or viral disease and also regional diversity of cattle rearing system. In case of goat, the black bangle goats were more affected than Jamunapari breed goat. In this case the findings support the result of Parvez *et al*. [26] who reported that the diseases prevalence was 41.45 % in Black bangle goat and 31.60 % in Jamunapari goat. Vaccination and deworming are more appropriate approach to control or reducing the diseases. Another authors, Islam *et al*. [28] observed that higher mortality rate in unvaccinated cattle which support our result in case of sick goat. But in case diseased cattle, comparatively the higher proportion was vaccinated. This variation in cattle could be for higher proportions of recorded clinical cases were non infectious diseases. In another survey of Rabbi *et al.* [29], the higher proportion of goat was not dewormed amounting 209 of 302 cases which are in agreement with our findings. The authors, Rabbi *et al*. [29] also reported more proportion of goat grazed individually which discord to our findings because rearing system of goat differ from region to region. Most

of the cattle were individual grazed which may be the result for cattle rearing system. In our study, most of the owners of cattle and goat were male which is in accordance with Hossain *et al*. [25] who stated that highest (78.47 %) respondents were male. The authors also reported the educational status of the owners where he found most of them are in primary level amounting 41.43 % which is dissimilar to our findings where the most proportion was in SSC level. However, the young age's cattle and goat were more prevalent to viral diseases which may be due to lack of immunity. Meher *et al*. [24] found that about 51.00 % young goat were prevalent to PPR. Similarly, Alam *et al*. [1] reported highest (10.32 %) proportion of goat was prevalent to PPR. These findings suggest our result indirectly. The cattle clinically sick with viral diseases had high body temperature which may be due to viral replication into host body.

5. Conclusion

In every year various diseases are prevailing among the animals especially in cattle and goats that may hamper the production of animals and make loss of the farmer. These two animals are mostly vulnerable to parasitic infestation and viral diseases especially FMD and PPR respectively. However, the findings of the current study could be considered as baseline works which may assist the veterinarian and investigator to implement further strategy for effective control and treatment of specific infection and disorders in cattle and goats. Moreover, this study would be helpful for future investigation of clinical cases diseases in other parts of Bangladesh. In future, further investigation on infectious disease along with the farmer's demography with large sample size may be conducted to find out the source of various diseases in animal.

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