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Article

Prevalence of different dairy cattle diseases in selected dairy areas and farms of Bangladesh

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Abstract: The present study was designed to have a comprehensive epidemiological data of the circulating diseases in Pubna cattle in Pubna and sirajgonj districts of Bangladesh. Two sites were selected for the study as the Nucleus Breeding Hard (NBH); which is located in the BLRI-RS, Baghabari, Sahjadpur, Siragjang and the community; consists of three villages of Bera upazila of Pabna district namely Khar-bagan, Hatail-aralia and Char-sabolla. The total cattle population was 576 (506 in the community and 70 in the NBH). The overall weather was hot and humid. A total of 965 clinical cases of cattle of different age and sex were diagnosed during the period from July, 2017 to June, 2018.The descriptive statistics suggested that endo-parasites (15.67%), FMD (27.51%), non-specific diarrhea (7.73%) and post-partum anoestrus (7.78%) are the most prevailing diseases in the community and endo-parasites (21.82%), foot-rot (15.15%), non-specific fever (7.27%), dermatochalasis (5.45%) and conjunctivitis (4.85%) are the most prevailing diseases in the NBH. Population data shows that there was an endemic outbreak of FMD in the community between March to May 2018 where almost 50% cattle were affected by the disease though calf morbidity was low (2.69%) but all the affected calf died. Non-specific diarrhea was more common in older individuals (14% in over 3years old cattle) mostly in cows (14.2%) and occurred in summer (9.84%) and winter (8.81%) may be because of the ignorance of the farmers to supply clean water to their animals. Although, we routinely de-worm our cows in the community and in the NBH round the year we found many cases of parasitic gastro-enteritis in both the locations which suggested that our de-worming practice is not working. Repeated study of the same kind can provide us a large set of data on cattle disease prevailing in the area which may provides valuable insight to design and implement priority based research on specific disease and to take efficient control strategies against that disease.

Keywords: cattle diseases; prevalence; FMD; control strategies; epidemiology

1. Introduction

Bangladesh is an over populated, rural and agrarian country in the world (BBS, 2008). It also has the highest density of livestock (cattle, goats, sheep and buffaloes) in the world with an estimated 145 large ruminants/km^2 compared with 90 for India and 20 for Brazil. Despite declining acreage of pasture land, the livestock population is growing steadily in the country. Livestock are an integral component of agriculture in Bangladesh that supplies food, draft power and manure. About 20% of the human population is directly and 50% is partly dependent on the livestock sector (Bangladesh Economic Review, 2009). Bangladesh earns foreign currency by exporting several byproducts such as hides, skin, bone etc and now biogas is also producing from cattle dung. The contribution of livestock in the magnitude of Gross Domestic Product (GDP) is about 16.23 % in

Bangladesh (BBS, 2008). Cattle are very important component of the mixed farming system practiced in this country and health of cattle is one of the many factors that conspire against productivity of cattle production systems all over the world (Miranda, 2014). However, most of the animals in Bangladesh are weak and emaciated with non-satisfactory productive performance due to malnutrition and diseases. Among the various constrains in the development of cattle, both infectious and noninfectious diseases are the most important limiting factors that cause significant mortality of adult cattle and neonatal calves each year. It was reported that variation in different cattle breed, their sex and environmental factors greatly influence the disease prevalence in livestock of a specific area and cattle are of no exception (Islam *et al.,* 2014). Economic losses are attributable to decreased animal growth and productivity as well as frequent death of affected cattle.

2. Materials and Methods

The study area and the study period-The NBH is located in the BLRI-RS, Baghabari and the community consists of three villages of Beraupazilla of Pubna district namely Kharbagan, Hatalaralia and Charsabolla. The cattle population was 576 (506 in the community and 70 in the NBH). The overall weather was hot and humid and the area was in the AEZ 4,7&11. A total of 965 clinical cases of cattle of different breed and sex were diagnosed during the period from July 2017 to June 2018.

2.1. The Diagnosis of diseases

Diagnosis of diseases was made by general physical examination of animals, clinical signs, gross pathology and laboratory procedures. During general physical examination animal's body condition, behavior, posture, gait, locomotive disturbance, pulse, respiration, temperature, abdominal distension, defecation etc were observed and/or recorded. Examination of different parts and systems of the body of sick animals were performed by using the procedure of palpation, percussion, auscultation, needle puncture and walking of animals. Owner's complaints were taken into account while performing general physical examination of a sick animal. Animal's breed, sex, age etc were also recorded in registered book. Specific bacterial, viral, and fungal diseases were diagnosed on the basis of specific clinical signs and gross lesions. In some cases, confirmatory diagnosis were made by cultural and biochemical characteristics of causative organisms following standard procedure. Parasitic infestations were diagnosed by faeces examination under microscope as described previously (Soulsby, 1986). Blood smears were prepared and examined under microscope after Giemsa's staining according to the methods described elsewhere to confirm hem protozoan infestation. The handling of animals in the study was performed in accordance with current Bangladesh legislation (Cruelty to Animals Act 1920, Act No. I of 1920 of the Government of the People's Republic of Bangladesh). Diagnosis of diseases was made by general physical examination of animals, clinical signs, gross pathology and laboratory procedures. In some cases, confirmatory diagnosis were made by cultural and biochemical characteristics of causative organisms following standard procedure. Parasitic infestations were diagnosed by faeces examination under microscope as described previously (Soulsby, 1986). Blood smears were prepared and examined under microscope after Giemsa's staining.

2.2. Data analysis

Diagnosed diseases were categorized as infectious disease, parasitic disease, digestive disorder, respiratory disease, metabolic disease and other diseases for statistical analysis. Obtained data were analyzed by using statistical software 'SPSS-16.0' where descriptive statistics was expressed as proportion with 95% confidence interval (CI). A paired t-test was also performed.

3. Results

Circulating diseases identification was our main aim. Table 1 contains different diseases and their prevalence percentage in our study area.

Table 1 shows the prevalence of different dairy cattle diseases in community and on station (the NBH). The result of a paired t-test suggests that there is no significant difference in the pattern of disease occurrence in the two separate populations may be because in both the cattle population genotype is same (mostly local Pubna variety). The descriptive statistics suggested that Endo-parasites (15.67%), FMD (27.51%), Non-specific Diarrhea (7.73%) and Post partum anestrus (7.78%) are the most prevailing diseases in the community and Endo-parasites (21.82%), Foot-rot (15.15%), Non-specific fever (7.27%), Dermatochalasis (5.45%) and conjunctivitis (4.85%) are the most prevailing diseases in the NBH. Table.2 shows that FMD is the most prevailing disease in the community. Population data shows that there was an endemic outbreak of FMD in the community between March to May where almost 50% cattle were affected by the disease though calf morbidity was low (2.69%) but all the affected calf died. Non-specific diarrhea was more common in older individuals

(14% in over 3years old cattle) mostly in cows (14.2%) and occurred in summer (9.84%) and winter (8.81%). The incidence of post-partum anoestrus (14.43%) is the other important disease of the community may be because of the poor nutrition supply to the cows all through her life. Table.3 shows the most important on-station diseases. Non-specific fever was common in lighter cows (7.88% in less than 250 kg b wt. cows) may be due to malnutrition and in summer and winter season may be due to acclimatization failure in weak cows. Conjunctivitis and dermatochalasis are mostly found in calves in winter may be due to low humidity. Foot-rot was the disease of older and heavy individuals as shown in Table.3. Captivity may be the other important cause of these diseases.

Although we routinely de-worm our cow in the community and in the NBH round the year we found some cases of parasitic gastro-enteritis in both the locations. This need to be addressed and the causes should be explored.

Table 1. Comparative prevalence of different dairy cattle diseases between community and the NBH.

Disease category	Name of the disease	No. of identified cases		Prevalence % by cases		t- test	Prevalence % by population		t-test
		Community	On station	Community	On station		Community	On station	
	Aspiration pneumonia	2	0	0.21	0	0.702	0.40	0	0.528
General	Non-specific fever	32	12	3.41	7.27		6.32	17.14	
disorder	General debility(def)	45	7	4.80	4.24		8.89	10.00	
Parasitic	Blood protozoa	11	2	1.17	1.21	0.56	2.17	2.86	0.41
	Endo-parasite	147	36	15.67	21.82		29.05	51.43	
	Hump sore	2	14	0.21	8.48		0.40	20.00	
	Ecto-parasite	27	4	2.88	2.42		5.34	5.71	
	Maggot	25	5	2.67	3.03		4.94	7.14	
Viral	FMD	258	0	27.51	0.00	0.29	50.99	0.00	0.293
	Epimeral fever	31	1	3.30	0.61		6.13	1.43	
	Wart	7	1	0.75	0.61		1.38	1.43	
	Rabbis	2	0	0.21	0.00		0.40	0.00	
Bacterial	Anthrax	3	0	0.32	0.00	0.22	0.59	0.00	0.183
	HS	5	0	0.53	0.00		0.99	0.00	
	Dermatophilosis	9	9	0.96	5.45		1.78	12.86	
	Conjunctivitis	14	8	1.49	4.85		2.77	11.43	
	Pneumonia	8	0	0.85	0.00		1.58	0.00	
	Mastitis	17	2	1.81	1.21		3.36	2.86	
	BQ	4	0	0.43	0.00		0.79	0.00	
	Tetanus	1	0	0.11	0.00		0.20	0.00	
	Foot rot	5	25	0.53	15.15		0.99	35.71	
	Arthritis	6	1	0.64	0.61		1.19	1.43	
Digestive	Anorexia	23	3	2.45	1.82	0.37	4.55	4.29	0.515
	Ruminal acidosis	2	0	0.21	0.00		0.40	0.00	
	Constipation	1	3	0.11	1.82		0.20	4.29	
	Simple indigestion	1	0	0.11	0.00		0.20	0.00	
	Non specific Diarrhea	69	5	7.36	3.03		13.64	7.14	
	Blot	35	0	3.73	0.00		6.92	0.00	
Metabolic	Milk fever	10	0	1.07	0.00	0.99	1.98	0.00	0.839
	Grass tetany	3	0	0.32	0.00		0.59	0.00	
	Weak calf syndrome	15	5	1.60	3.03		2.96	7.14	
Reproducti	Retained Placenta	1	9	0.11	5.45	0.80	0.20	12.86	0.998
ve	UTIs	3	1	0.32	0.61		0.59	1.43	
	Repeat breeding	23	1	2.45	0.61		4.55	1.43	
	Post-partum anoestrus	73	2	7.78	1.21		14.43	2.86	
	Prolapse	1	1	0.11	0.61		0.20	1.43	
Surgical	Abscess	2	1	0.21	0.61	0.17	0.40	1.43	0.148
	Navel-ill	5	2	0.53	1.21		0.99	2.86	
	UPF	0	4	0.00	2.42		0.00	5.71	
	Hernia	2	0	0.21	0.00		0.40	0.00	
Others	Allergic reaction	7	1	0.75	0.61	-	1.38	1.43	-
	Congenital def.	1	0	0.11	0		0.20	0	

Table 2. Epidemiology of important community diseases.

Category	Endo-parasite		FMD		Non-specific diarrhea		Post-partum anoestrus	
	n	%	n	%	n	%	n	%
Types of cattle								
No infestation	715	74.09	707	73.26	715	74.09	595	61.66
Male calf	20	2.07	11	1.14	35	3.63	0	0.00
Female calf	15	1.55	15	1.55	45	4.66	0	0.00
Heifer	5	0.52	45	4.66	5	0.52	25	0.00
Cow	95	9.84	86	8.91	137	14.20	345	38.25
Bull	115	11.92	101	10.47	28	2.90	0	0.00
	965	**100**	**965**	**100**	**965**	**100**	**965**	**100**
Age								
No infestation	810	83.94	785	81.35	735	76.17	765	79.27
<1	20	2.07	20	2.07	55	5.70	0	0.00
1-<2	15	1.55	5	0.52	25	2.59	0	0.00
2-3	25	2.59	35	3.63	15	1.55	15	1.55
>3	95	9.84	120	12.44	135	13.99	185	19.17
	965	**100**	**965**	**100**	**965**	**100**	**965**	**100**
Body Weight								
No infestation	810	83.94	810	83.94	700	72.54	785	81.35
<100	35	3.63	20	2.07	75	7.77	0	0.00
100-200	35	3.63	25	2.59	80	8.29	0	0.00
>200	85	8.81	110	11.40	110	11.40	180	18.65
	965	**100**	**965**	**100**	**965**	**100**	**965**	**100**
Season								
No infestation	815	84.46	815	84.46	760	78.76	785	81.35
Summer	55	5.70	70	7.25	95	9.84	90	9.33
Winter	75	7.77	20	2.07	85	8.81	60	6.22
Rainy	15	1.55	55	5.70	20	2.07	25	2.59
Spring	5	0.52	5	0.52	5	0.52	5	0.52
	965	**100**	**965**	**100**	**965**	**100**	**965**	**100**

Table 3. Epidemiology of important on-station diseases.

Category	Endoparasite		Non-specific fever		Conjunctivitis		Dermatophilosis		Foot rot	
	n	%	n	%	n	%	n	%	n	%
Age										
No infestation	144	87.27	154	93.33	157	95.15	156	94.55	140	84.85
<2.5	4	2.42	3	1.82	8	4.85	8	4.85	0	0.00
2.50-3.50	12	7.27	7	4.24	0	0.00	1	0.61	12	7.27
>3.50	5	3.03	1	0.61	0	0.00	0	0.00	13	7.88
	165	**100.00**	**165**	**137.50**	**165**	**137.50**	**165**	**137.50**	**165**	**100.00**
Body weight		0.00		0.00		0.00		0.00		0.00
No infestation	144	87.27	154	93.33	157	95.15	156	94.55	140	84.85
<250	13	7.88	10	6.06	8	4.85	8	4.85	0	0.00
250-300	8	4.85	1	0.61	0	0.00	1	0.61	3	1.82
>300	0	0.00	0	0.00	0	0.00	0	0.00	22	13.33
	165	**100**	**165**	**100**	**165**	**100**	**165**	**100**	**165**	**100**
Season		0.00		0.00		0.00		0.00		0.00
No infestation	144	87.27	154	93.33	157	95.15	156	94.55	140	84.85
Summer	11	6.67	1	0.61	0	0.00	1	0.61	11	6.67
Winter	10	6.06	6	3.64	8	4.85	8	4.85	14	8.48
Rainy	0	0.00	4	2.42	0	0.00	0	0.00	0	0.00
Spring	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
	165	**100**	**165**	**100**	**165**	**100**	**165**	**100**	**165**	**100**

4. Discussion

To investigate the prevalence of dairy cattle diseases at our working area, a total of 965 clinical cases were diagnosed and categories them in nine categories among which the prevalence of endo-parasitic diseases (15.67% in NBH and 21.82% in community) were the highest. Although other researchers like (Badruzzaman *et al.*, 2015; Bhuiyan 2007 and Mannan *et al.*, 2009). Reported digestive disorder as the highest prevailing disease

we did not find so may be because of the natural resistance of these types of cattle to the digestive diseases especially under rural production systems. Overall prevalence of infectious diseases was 39.44% in community and 28.49% on station but if we exclude FMD from community and foot-rot from on-station the prevalence stands 11.93% in community and 13.34% on-station. Furthermore FMD did not occur on station as the cattle there were vaccinated but the community cattle were not vaccinated. This information clearly suggests that vaccination can successfully prevent FMD in these cattle and these cattle were well tolerated against most other infectious diseases. Our results are in agreement with the findings of (Bhuiyan, 2007) and (Mannan *et al*., 2009; Sarker *et al.,* 2011). reported prevalence of foot and mouth disease (25.07%) in Rajshahi district of Bangladesh which was in line with our 27.51% but (Badruzzaman *et al.,* 2015). found 4.74% in Chittagong district of Bangladesh. This variation might be due to different geographical locations and related environmental factors. In our study the prevalence of mastitis was 3.36% in community and 2.86% on station which is in line with the report of (Rahman *et al*., 2010 and Pallab *et al*., 2012). In case of hem protozoan parasites, prevalence was 2.17% in the community and 2.86% on station respectively. (Alim *et al.,* 2012) reported the overall prevalence of hem protozoan diseases as 12.02% in indigenous cattle, respectively where babesiosis and ana-plasmosis were predominant. A variation in hemoprotozoan disease prevalence with us is might be due to environmental factors, animal species and other related host factors. Females were more susceptible to infectious diseases than male cattle. Our results are in agreement with the findings of (Bhuiyan, 2007 and Mannan *et al.,* 2009). A good prevalence (25.91% in community and 15.72% on station) was recorded in digestive disease category of which non-specific diarrhea was the highest (13.64% in community and 7.14% on station) followed by anorexia (4.55% in community and 4.29% on station), blot (6.92% in community and 0% on station), constipation (0.2% in community and 4.29% on station). The prevalence of digestive disorders in our study was slightly lower than the report by (Pallab *et al.,* 2012; Rahman *et al.,* 1972; and Kabir *et al.,* 2010). In our area, most farmers are poor and cannot supply adequate feed to their cattle so the prevalence of digestive disorders are lower. The prevalence of reproductive diseases was recorded as 19.77% in community and 20.01 on station which was lower than the report by (Pallab *et al*., 2012). Who reported 6.20% prevalence may be because of natural service offered to the cows at both the location. Overall prevalence of metabolic diseases (5.53% in community and 7.14% on station) in our study was higher than that reported by (Pallab *et al.,* 2012). Who reported metabolic disease prevalence as 4.24%. Among the metabolic diseases, prevalence of weak calf syndrome was comparatively high on station which might be due to deficiency of micronutrients in stall feeding system.

5. Conclusions

According to our study, major diseases of cattle in our study area include FMD, digestive disorder, parasitic disease, skin disease of which FMD and parasitic diseases are predominantly prevalent diseases in both the location. Older female cattle are highly susceptible to most of the diseases. Our large set of data on cattle disease prevalence in the area may provides valuable insight to design and implement priority based research on specific disease and to take efficient control strategies against those diseases.

Conflict of interest

None to declare.

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