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A CROSS-SECTIONAL STUDY ON BOVINE INFECTIOUS DISEASES IN NORTHERN BANGLADESH

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ABSTRACT
Bangladesh is mainly an agro-based nation where livestock plays a pivotal role in accelerating the economic growth by producing egg, milk, meat, hides and skins. It also plays a central role in rural socio-economic development as the majority of households are directly engaged in rearing of livestock and performing various functions such as providing food, traction, energy, essential and recreational transportation for life and leisure. Bangladesh has high density of cattle population constantly confronted with various restrictions in dairy sector. In particular, infectious diseases negatively impacts on health, productivity, profitability and trade as well as decimation of genetic improvement towards desirable traits. Taken above facts into consideration an investigation was carried out on cattle populations at Dhamoirhat animal hospital, Naogaon from July to December 2021. Among the infectious diseases trends of occurrence was more for the diseases like mastitis, colibacillosis, foot rot, calf scour, BQ, tetanus, HS, FMD, LSD, Wart, coccidiosis, babesiosis, anaplasmosis, balantidiasis, fascioliasis and ascariasis etc. The mastitis occurred the most (13.5%), while salmonellosis and brucellosis were least prevailed ones (0.5%). LSD being a viral one prevailed at noticeably higher @ 21.5% and the prevalence of wart was only 0.5%. From the peak to the least prevalence of protozoan diseases ranges between 4.5% to 1%. The ascariasis was the most prevalent parasitic diseases @ 13.25% whereas stephanofilariasis was the least (2.75%) in occurrence. Besides year round higher prevalence of mastitis, no noticeable seasonal fluctuations occurred in other bacterial, viral, protozoal and parasitic diseases. In this investigation it was revealed that infectious and parasitic diseases are causing a great production loss of cattle which collectively liable for a severe economic havoc. This was indeed a general investigation on the bovine diseases, these findings are striking, however, further studies are warranted in order to elucidate in-depth into it.

1. Introduction

Bangladesh is predominantly an agricultural country, where livestock remains a key sub-sector in

accelerating the economic growth by producing egg, milk, meat, hides and skins. In particular it plays a central role in the development of rural socio-economic system as the majority of households are directly engaged in rearing of livestock (DLS, 2022). Besides food livestock is also providing traction, energy, essential and recreational transportation for life and leisure. Now biogas is being produced from cattle dung and serves an alternative to fossil gas. Bovine diseases affect production and health of cattle also negatively impacts on profitability plus trade, as well as can decimate years of genetic improvement towards desirable production traits. FMD is considered to be the **most economically important trans-boundary viral disease of cattle** both at national, regional and local household levels because it impedes livestock productivity and limits the country's potential to participate in international trade **(**Badruzzaman et al., 2015). FMD is also highly contagious to cloven hoofed animals like cattle, sheep, deer, elk, moose, reindeer, goat, swine as well as other ruminants rendering a huge financial havoc to the farmers. On top of that the susceptibility of giraffe and elephants to FMD has also been well documented (kitching, 2005). Although cattle are performing a vital role in Bangladesh, maximum of them are emaciated and frequently affected with several types of diseases owing to compromised management practices as well as geo-climatic vulnerability. Among the various constrains in the development of cattle, diseases are the most important limiting factors that cause significant mortality of adult cattle and neonatal calves each year (Debnath et al., 1995).

It was reported that variation in different cattle breed, their sex, season and environmental factors greatly influence the disease occurrence in cattle (Sarker et al., 2011; Badruzzaman et al., 2015). Bovine ephemeral fever (BEF) is a non-contagious arthropod borne disease of cattle and water buffaloes caused by the Bovine Ephemeral Fever Virus (Nandi and Negi, 1999). The disease is distinguished by the sudden onset of fever, stiffness, lameness, and depression, along with an excessive morbidity and mortality. Recovery usually takes place 3 to 4 days after the commencement of clinical indications, the term "ephemeral" is used (Uren, 1989). Bovine illnesses not only affect the average performance of animals in terms of production but also have an effect on the national financial system. The simultaneous objective of both boom-oriented and goal-oriented packages is required to eradicate poverty in Bangladesh. A key tool for successfully completing this important task could be the development of cattle sub-sectors in Bangladesh. Large investments in innovative programs for livestock development targeted at the poor may be necessary, along with completing a thorough follow-up of that program on livestock generated poverty alleviation at marginal farmers' level. As a result, regular research must be done on those issues. Taking the above salient economic, livestock health, and productivity into consideration the current project has been undertaken to investigate the contemporary scenarios of bovine infectious diseases at Dhamoirhat, Naogaon.

2. Materials and Methods

2.1 Study area and study period

This study was undertaken at the Veterinary Hospitals of Dhamoirhat Upazila. An overall of 400 clinical instances of cattle were diagnosed during the period from July to December 2021.

2.2 Procedure

2.2.1 General examination

Body condition score (BCS), behavior, posture, gait, superficial skin, salivation, Nasal discharge and locomotive disturbances were observed by distant visual examination of the patient.

2.2.2 Physical examination

Different outside elements of the body of each of the animal were clinically examined. Close observation techniques were performed with diverse aids.

2.2.3 Clinical examinations

The animals were clinically examined at veterinary hospital and temperature, pulse and respiratory rate from each of the animals were recorded. The presented clinical manifestations of various diseases of cattle along with the farmers complain in relation to the diseases were recorded carefully.

2.2.4 Statistical Analysis

Based on our experimental layout diagnosed diseases were categorized as infectious, parasitic, and other diseases and all the data were carefully transferred to the latest version of Statistical package for Social technological know-how (SPSS) software and analyzed through unpaired *t*- test where the *p* value <0.05 was considered significant.

3. Result

3. 1 Prevalence of bacterial disease of cattle at studied area

Among the bacterial diseases the mastitis was observed to be the highest (13.5%) and the colibacillosis ranked second highest (11%) prevalent disease. Salmonellosis and brucellosis were the least prevalent diseases (0.5%). The other bacterial diseases prevalent in the studied area viz. foot rot (3.5%), calf scour (2%), Hemorrhagic Septicemia (1%), Tetanus (1%) and BQ (1%) (Table-1).

Table1: Prevalence of bacterial diseases of cattle at studied area

Name of diseases	Diseased cattle surveyed (n=400), Bacterial=136	Prevalence (%)	Level of significance (p<0.05)
Mastitis	54	13.5%	
Colibacillosis	44	11%	
Foot rot	14	3.5%	
Calf Scour	08	2%	
Hemorrhagic Septicemia	04	1%	0.1139 NS
Tetanus	04	1%	
BQ	04	1%	
Salmonellosis	02	0.5%	
Brucellosis	02	0.5%	

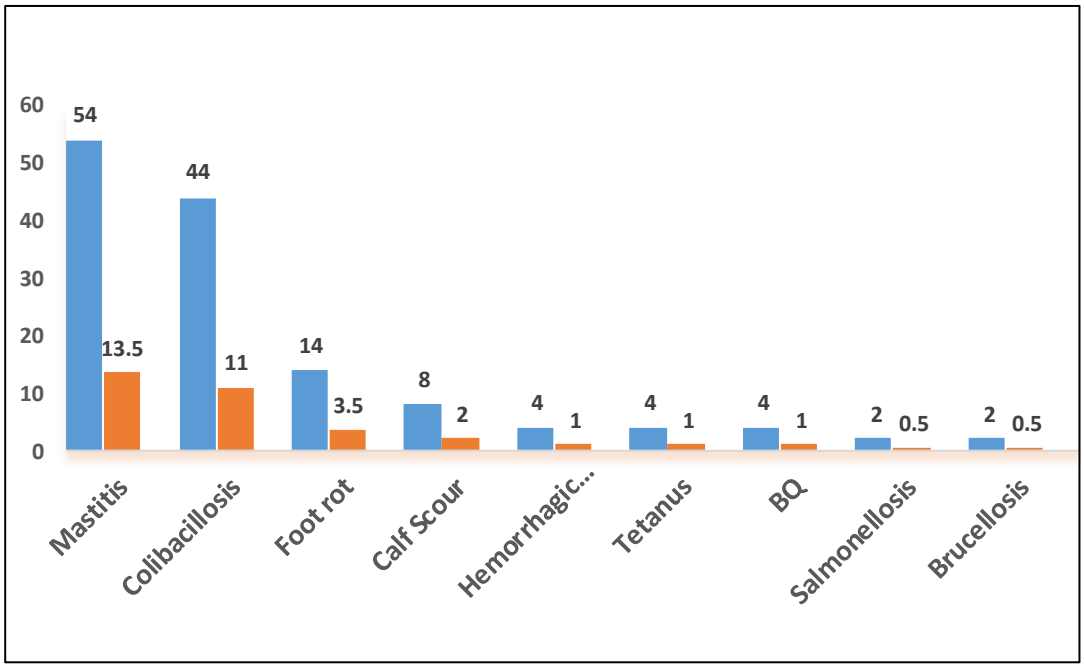

Figure 1: Prevalence of bacterial diseases of cattle at studied area

3.2 Prevalence of viral diseases of cattle at studied area

Official record in the studied area reveals three viral diseases like FMD, LSD and Wart were more prevalent. Amongst them LSD was prevalent at noticeably higher rate of 21.5% in the studied area. The second highest occurrence was FMD (7.5%) and followed by the wart at a rate of 0.5% (Table-2).

Table 2: Prevalence of Viral diseases of cattle at studied area

Name of diseases	Diseased cattle surveyed (n=400), Viral=118	Prevalence (%)	Level of significance ($p<0.05$)
LSD	86	21.5%	
FMD	30	7.5%	0.3109
Wart	02	0.5%	NS

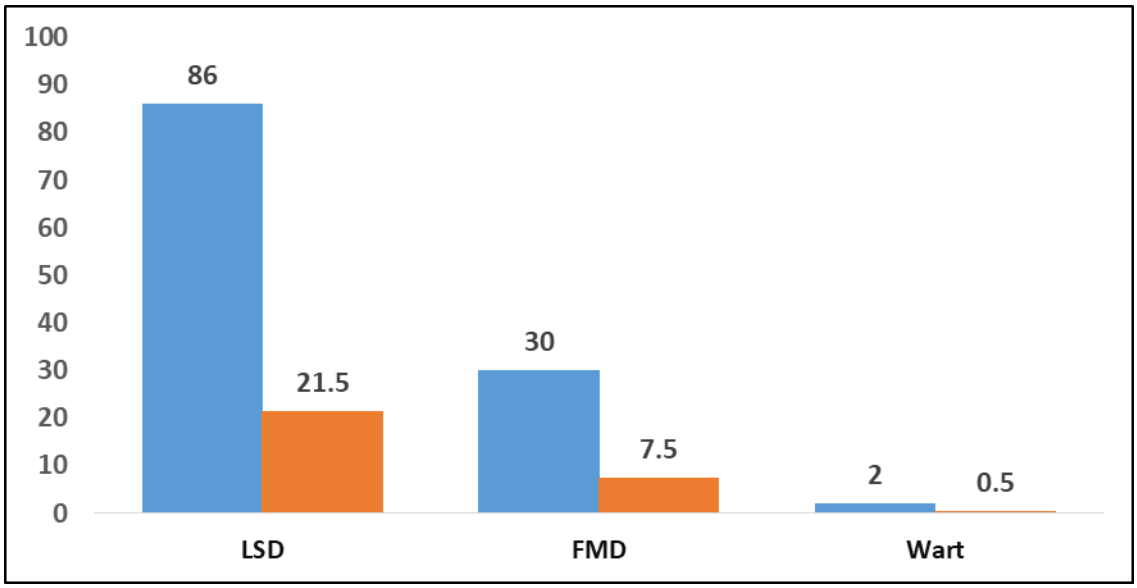

Figure 2: Prevalence of viral diseases of cattle at studied area

3.3 Prevalence of bovine protozoan diseases.

Among the protozoan diseases, prevalence of coccidiosis was highest (4.5%) in the study area. Whereas the lowest prevalence was documented in Balantidiasis (1%). The babesiosis and anaplasmosis occurred at 3% and 2% rates respectively.

Table 3: Prevalence of bovine protozoan diseases of cattle

Name of diseases	Diseased cattle surveyed (n=400), Protozoan=42	Prevalence (%)	Level of significance (p<0.05)
Coccidiosis	18	4.5%	0.0430 *
Babesiosis	12	3%	
Anaplasmosis	08	2%	
Balantidiasis	04	1%	

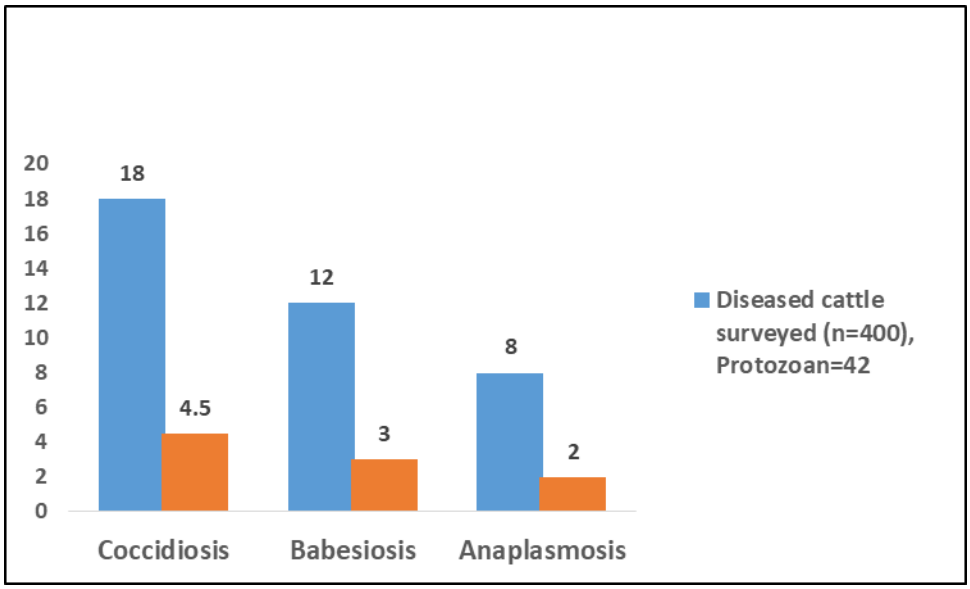

Figure 3: Prevalence of bovine protozoan diseases of cattle

3.4 Prevalence of ecto and endo parasitic diseases of Cattle

Ascariasis was prevalent more in Dhamoirhat area @ 13.25% followed by fascioliasis and lice infestations at 5% rate whereas stephanofilariasis was least (2.75%) in occurrence in that area (Table 4).

Table 4: Prevalence of ecto and endo parasitic diseases of cattle

Name of diseases	Diseased cattle surveyed (n=400), Parasitic=104	Prevalence (%)	Level of significance (p<0.05)
Fascioliasis	20	5%	0.0867 NS
Stephanofilariasis	11	2.75%	
Ascariasis	53	13.25%	
Lice infestation	20	5%	

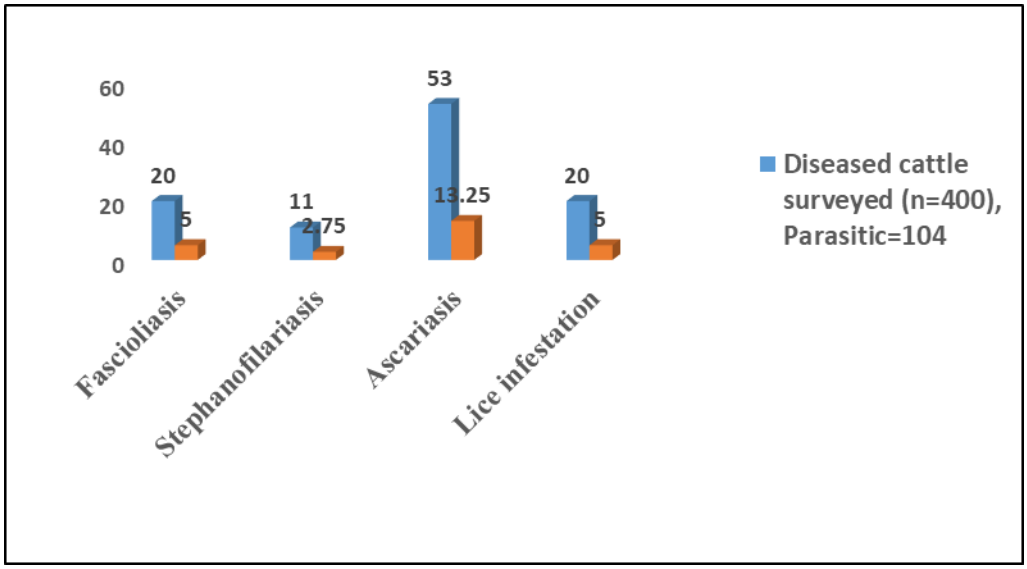

Figure 4: Prevalence of ecto and endo parasitic diseases of cattle

4. Discussion

In this study a total of 400 samples were taken from the working hospital at Dhamoirhat, Naogaon and were subjected to categorization into different kinds, like Bacterial, Viral, and Parasitic diseases. In this investigation among the bacterial diseases mastitis was prevalent at the highest level (13.5%) followed by colibacillosis (11%), foot rot (3.5%), calf scour 2(%), Hemorrhagic Septicemia, Tetanus and BQ @ 1% each whereas salmonellosis and brucellosis prevalent the least @ 0.5% each. Current finding is comparable with the investigation carried out by Sarwar et al (2019) who noticed BQ (6.26%) and Hemorrhagic Septicemia prevalent at lowest level (0.92%). BQ prevalence (1%) in this study was little higher than 0.67% reported by Mohammad et al., (2017). This disease was reported to be prevalent more 6.26% by Sarwar et al (2019). Assuming heterogeneous management, variable climatic conditions, farmers' awareness as well as associated vet supports played key role behind such fluctuations in BQ occurrence. In this study, LSD was found to be prevalent at highest level (21.5%) followed by FMD (7.5%) and Wart or papillomatosis occurred least (0.5%). While comparing these results to that of Sarwar et al (2019) who reported Foot and mouth disease (FMD) (7.94) and wart (4.89%), noticeably a higher degree of variability. This could be due to dissimilarity on the population density and sample size, geography as well as quack versus professional vet supported service to be reckoned with. Samad (2001) and Rahman et al., (2012) on the other hand reported (1.79%), (1.3%) and (2.5%) cases of FMD in cattle population respectively. Another study conducted by Badruzzaman et al., (2015) in Chittagong district of Bangladesh revealed lower value (4.74%). Contrariwise, a completely different scenario was observed by Sarker et al., (2011) and Mannan et al., (2009) who reported that prevalence of foot and mouth disease (25.07%) in Rajshahi district and 24.51% at Meghna upazila of Comilla respectively and evidently such a high disease percentages were associated with FMD endemics in those respective areas. Among the protozoan diseases Coccidiosis was prevalent more (4.5%) followed by Babesiosis (3%), Anaplasmosis (2%) and the Balantidiasis occurred the least (1%). Babesiosis was prevalent @ 3% compared to (7.02%) and (5.94%) as reported by Sarwar et al (2019) and Aulakh (2005) respectively. In case of ecto and endo parasitic diseases ascariasis remained to be placed asymmetrically in higher position (13.25%) followed by Fascioliasis and lice infestation @ 5% as well as stephanofilariasis occurred to the least (2.75%).

Worthy to note, Pallab et al., (2012) reported (26.79%) parasitic diseases to all clinical cases of which (10.13%) in cows, (5.22%) in bulls and (11.43%) in calves.

5. Conclusion

This investigation revealed that a wide range of infectious disease like viral, bacterial, protozoan and parasitic diseases are causing a great production loss in the cattle population. Cattle were found to be vulnerable to the mastitis@13.5%. Other bacterial diseases like colibacillosis, foot rot, calf scour, HS, Tetanus, BQ, salmonellosis and brucellosis also remained prevalent there at varying degrees. Among the viral infectious diseases LSD had a dramatic effect on the performance of the cattle. Noticeably a large section @21.5% of cattle are affected with this emerging disease. As seen elsewhere, some other viral diseases like FMD and wart also remained endemic in the study area. Although coccidiosis prevailed the highest @4.5% and balantidiasis the least @1% yet protozoan diseases follows usual trends and there had been no significant variability of occurrence observed. Ascariasis was the most prevalent@13.25% parasitic nematode disease in the study area. Because of the availability of snail host fascioliasis like other low-lying areas of Bangladesh remained one of the key parasitic maladies to the cattle of Dhamoirhat. Thus, based on the observations we need to address mastitis, LSD, Coccidiois and ascariasis on the priority basis. We can reduce the occurrence of mastitis by keeping the udder clean in the wet season. Other measures such as an ideal floor for milking, regular cleaning of the floor, cleanliness of the milkman, regular teat-dipping at milking, immediate treatment of the new clinical cases, identification of sub-clinical mastitis and dry cow therapy may drastically reduce the occurrence of mastitis. Cattle should be vaccinated against LSD, besides necessary vet support farmers should be given appropriate extension service on the modern hygienic measures for controlling coccidiosis and ascariasis. Other disease specific course of action has to be ensured to improve the health status of the cattle population at Dhamoirhat. This general investigation on the bovine diseases elicited striking findings however, further studies are warranted in order to elucidate in-depth into it.

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Conflict of interests

The author declares no conflict of interest with any individual or parties.

References

Aulakh, G.S., Singla L. D., Kaur, P. & Alka (2005). Bovine babesiosis due to Babesia bigemina Haematobiochemical and therapeutic studies. The Indian journal of animal sciences, 75(06), 617-622.

Badruzzaman, A.T.M., Siddiqui, M.S.I. Faruk, O.F., Lucky, N.S. Zinnah, M.A., Hossain, F.M.A. & Rahman, M.M. (2015). Prevalence of infectious diseases in cattle population in Chittagong district of Bangladesh. International Journal of Biological Research, 3, 1-4.

Debnath, N.C., Taimur, M.J.F.A., Saha, A.K., Ersaduzzaman, M., Helaluddin, M., Rahman, M.L., Roy, D.K. & Islam, M.A. (1995). A retrospective study of calf losses on the central dairy cattle breeding station in Bangladesh. Preventive Veterinary Medicine, 14, 43-53.

DLS (2022). Livestosk Economy at a glance, 2021-2022 Annual Report of the Department of livestock Services, Dhaka, Bangladesh (*dls. gov.bd*)

Kitching, R.P., (2005). Global epidemiology and prospects for control of Foot and mouth disease. In BWJ, Mahy, Ecls, Foot and mouth disease virus. Springer Verlag, Manitoba, Canada, PP, 133-148.

Mannan, M.A., Siddique, M.P., Uddin, M.Z. & Parvez, M.M., (2009). Prevalence of Foot and Mouth Disease (FMD) in cattle at Meghna Upuzilla in Cumilla in Bangladesh. Journal of Agricultural University, 72, 317-319.

Mohammad, M.O., Rahman, M.S., Hoque, M.F., Rumi, N.A. & Afrah O.H. (2017). Study on prevalence of bovine diseases at sadar upazila in Dinajpur district of Bangladesh. Asian Journal of Medical and Biological Research, 3 (4), 446-453.

Nandi, S. & Negi, B.S. (1999). Bovine Ephemeral Fever: A review of comparative Immunology, Microbiology and Infectious Diseases, 22 (2), 81-91.

Pallab, M.S., Ullah, S.M., Uddin, M.M. & Miazi, O.F. (2012). A cross sectional study of several diseases in cattle at Chandanaish Upazilla of Chittagong district, Bangladesh. Scientific Journal of Veterinary Advances, 1, 28-32.

Samad, M.A. (2001). Observations of clinical diseases in ruminants at the Bangladesh Agricultural University Veterinary Clinic. Bangladesh Veterinary Journal, 35, 93-120.

Sarker, S., Talukder, S., Haque, M.H., Islam, M.H. & Gupta, S.D. (2011). Epidemiological study on Foot and Mouth Disease in Cattle: Prevalence and risk factors assessment in Rajshahi, Bangladesh. Wayamba Journal of Animal Science, 3, 71-73.

Sarwar, G. (2019). Investigation of bovine infectious and non-infectious diseases in Chapainawabganj, Bangladesh. MS Thesis published in the Department of Veterinary and Animal Sciences, University of Rajshahi-6205, Bangladesh.

Uren, M.E., (1989). Bovine Ephemeral Fever. Aust. Vet 3, 66(8), 233-236.