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Article

Dynamics of clinical disease prevalence at cattle farm in Bangladesh Livestock Research Institute, Savar, Dhaka, Bangladesh from 2011 to 2014

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Abstract: Bangladesh Livestock Research Institute (BLRI) plays an important role of public service to animal welfare since the period of 1984. There are a lot of cattle with their proper records in this Institute's cattle farm but previously no report regarding the dynamics of disease prevalence was published. So this research was conducted to determine the prevalence of clinical diseases and manifestations of cattle recorded and breed susceptibility to such diseases in different seasons during the period of January 2011 to December 2014. A total of 1558 cattle (where Pabna was 906 and Red Chittagong Cattle was 652) were included under this study. Diagnoses of clinical diseases and disorders were based on clinical history, clinical findings and different laboratory tests. Among the clinical cases, the highest prevalence was determined in case of ring worm (3.11%) followed by diarrhoea (1.86%), bovine ephemeral fever (1.08%), pneumonia (0.96%), alopecia (0.81%), mange (0.37%), tympany/bloat (0.69%), fever (0.64), lameness (0.53%), arthritis (0.40%), mastitis (0.39%), malnutrition (0.26%) and posthitis (0.19%). Infectious diseases like foot and mouth disease (FMD), black quarter (BQ), anthrax and haemorrhagic septicemia (HS) were not found which may be due to regular vaccination and maintenances of strict biosecurity. In case of breed, higher prevalence (12.09%) was found in Red Chittagong Cattle (RCC) compared to Pabna (11.13%). Among the seasonal cases, winter season (5.21%) had higher prevalence than rainy season (2.26%) followed by summer season (1.65%) in case of RCC, while summer season (3.85%) had higher prevalence than winter season (3.74%) followed by rainy season (3.30%) in case of Pabna. It may be concluded that several diseases and disorders occurred in the BLRI cattle farm but major infectious diseases did not take place owing to improved management of the farm.

Keywords: dynamics; prevalence; clinical diseases; disorders; cattle

1. Introduction

Livestock plays an important role in the development of the traditional economy of Bangladesh. Bangladesh is a densely populated agricultural country with an acute shortage of meat and milk.

The contribution of livestock in gross domestic product (GDP) is about 16.23 % in Bangladesh (BBS, 2008). Bangladesh Livestock Research Institute (BLRI) is one of the most important and reliable sources of information about the diseases and disorders in cattle for the research purpose. There are some reports on clinical case records from Patuakhali Science and Technology University Veterinary Clinic, Babugonj, Barisal

(Rahman *et al.*, 2012), Chandanaish Upazila of Chittagong district, Bangladesh (Pallab *et al.*, 2012), Ulipur Upazila Veterinary Hospital, Kurigram (Kabir *et al.*, 2010), Bangladesh Agricultural University Veterinary Clinic (Samad, 2001; Samad *et al.*, 2002) and Teaching Veterinary Hospital (TVH) in Chittagong Veterinary and Animal Sciences University (Parvez *et.al.*2014,) This research works helps to describe the prevalence of clinical diseases and manifestations recorded in BLRI in the district of Dhaka, Bangladesh and in extension to control them in Bangladesh context. The prevalence represents existing cases at a specific moment and incidence measures how fast new cases occur. Prevalence of clinical diseases and disorders were analyzed on the basis of year, breed and season. So that an appropriate control strategy has to be designed and applied, which helps to prevent of these disease conditions in this farm and the prevalence represents existing cases at a specific moment and incidence measures how fast new cases occur.

2. Materials and Methods

2.1. Study area, animals and duration

The study was carried out on1558 cattle (Pabna 906 and RCC 652) at BLRI cattle farm, Savar, Dhaka, Bangladesh. The study work was conducted during the period from January 2011 to December 2014. The study period was divided into three seasons viz. summer (March to June), rainy season (July to October) and winter (November to February) on the basis of local climatic conditions.

2.2. Feeding management of animals

All animals were reared in semi-intensive method and allowed for grazing in the selected land of BLRI from 8 AM to 2 PM. The concentrate feeds were supplied as per standard feeding schedule.

2.3. Vaccination programme of the animals

The vaccination against FMD, anthrax, black quarter (BQ) and hemorrhagic septicemia (HS) was performed on regular basis in this farm.

2.4. Diagnosis and recording of diseases

The clinical history, clinical findings and relevant laboratory tests were considered for the diagnoses of diseases. The data were recorded properly in the particular register at the BLRI cattle farm, Savar, Dhaka, Bangladesh.

2.5. Data analysis

The data were analysed by using SPSS software version 12 (SPSS, Inc.,Chicago, IL, USA) for tdetermining the prevalence of clinical diseases.

3. Results and Discussion

During the study period (2011-2014) the following diseases and disorders were recorded and their prevalence was determined accordingly.

Pneumonia

The average prevalence of pneumonia in the farm irrespective of breeds and seasons was 0.96% (Table 1 and Figure 1) which was almost similar to the findings of Samad (2001), Parvez *et al.*, (2014) and Samad *et al.* (2002). On the other hand, Rahman *et al.*, (2012) recorded 5.1% pneumonia in cattle.

Regarding the breeds, the prevalence of pneumonia was noticed higher in the RCC breed (1.05%) than of Pabna breed (0.88%) (Table 2 and Figure 2).

Considering the seasons, in case of RCC the highest prevalence was found in winter season (0.44%) and the lowest was in summer season (0.11%); whereas in case of Pabna cattle the highest prevalence was found in rainy season (0.45%) and the lowest was in both summer as well as winter (0.3%) (Tables 3, 4 and Figures 3, 4). This observation contradicts with the report of Samad *et al.* (2002) who reported the highest percentage of pneumonia in cattle during winter (47.06%) in comparison to rainy and summer seasons.

Diarrhoea

The average prevalence of diarrhoea in the farm irrespective of breeds and seasons was 1.86% (Table 1 and Figure 1) which was much lower than the findings of Rahman *et al.*, (1999, 2012), Samad (2001), Hoque and

Samad (1996, 1997). This lower prevalence of diarrhoea in our farm may be due to hygienic management of the farm.
Regarding the breeds, the prevalence of diarrhoea was noticed higher in the Pabna breed (2.77%) than of RCC breed (0.60%) (Table 2 and Figure 2).
Considering the seasons, in case of RCC the highest prevalence was found in rainy season (0.30%) and the lowest was in summer and winter season (0.15%); whereas in case of Pabna cattle the highest prevalence was found in winter season (1.32%) and the lowest was in the rainy season (0.66%) (Tables 3, 4 and Figures 3, 4).

Tympany/Bloat
The average prevalence of tympany/bloat in the farm irrespective of breeds and seasons was 0.69% (Table 1 and Figure 1) which was remarkably less than the findings of Sutradhar *et al.*, (2000), Rahman *et al.*, (2012), Hossain *et al.*, (1994) and Samad (2001).
Considering the breeds, the prevalence of tympany/bloat was noticed higher in the Pabna breed (0.88%) than of RCC breed (0.54%) (Table 2 and Figure 2).
Regarding the seasons, in case of RCC the prevalence was 0.45% in summer season but no prevalence was in winter and rainy season; whereas in case of Pabna cattle the highest prevalence was found in winter and rainy season (0.33%) and the lowest was in summer (Table 3, 4 and Figure 3, 4) almost similar to the report of Rahman *et al.*, (1999).

Fever
The average prevalence of fever of unknown etiology in the farm irrespective of breeds and seasons was 0.64% (Table 1 and Figure 1). The percentage of occurrence of fever in this study was lower than the earlier reports of 5.1% to 12.1% cases of fever in cattle (Pharo, 1987; Hoque and Samad, 1996; Samad, 2001; Samad *et al.*, 2002; Rahman *et al.*, 2012).

In case of the breeds, the prevalence of fever was higher in the pabna breed (0.99%) than that of RCC breed (0.15%) (Table 2 and Figure 2).
Regarding the seasons, in case of RCC the prevalence of fever was only found in winter season (0.15%); whereas in case of Pabna cattle the highest prevalence was found in rainy season (0.44%) and the lowest was in winter (0.22%) (Table 3, 4 and Figure 3, 4). But Samad *et al.* (2002) reported higher percentage of fever in calves during rainy and summer seasons.

Alopecia
The mean prevalence of alopecia in the farm irrespective of breeds and seasons was 0.81% (Table 1 and Figure 1); while in case of the breeds, the prevalence was higher in the RCC breed (1.20%) than that of Pabna breed (0.55%) (Table 2 and Figure 2) which was mostly due to mineral deficiency.
Regarding the seasons, in case of RCC the prevalence of alopecia were 0.75%, 0.30% and 0.15%, respectively for summer, winter and rainy season; whereas in case of Pabna cattle these prevalence were 0.22%, 0.11% and 0.22%, respectively (Tables 3, 4 and Figures 3, 4).

Malnutrition
In this study, 0.26% prevalence of malnutrition was determined (Table 1 and Figure 1). It has been reported earlier in Bangladesh that 3.14% calves suffer from malnutrition (Samad, 2008). The percentage of occurrence of malnutrition in this study was lower than the earlier reports of 5.1% to 12.1% cases of fever in cattle (Pharo, 1987; Hoque and Samad, 1996; Samad, 2001; Samad *et al.*, 2002; Rahman *et al.*, 2012).
In respect of breeds, the prevalence of malnutrition was only found in the Pabna breed (0.44%) (Table 2 and Figure 2).
Regarding the seasons, in case of Pabna cattle the prevalence was equal (0.22%) both in summer and winter but no prevalence in the rainy season (Tables 3, 4 and Figures 3, 4) owing to feed sufficiency during rainy season.

Mastitis
The average prevalence of mastitis in the farm irrespective of breeds and seasons was 0.39% (Table 1 and Figure 1) which was almost similar to the findings of Nooruddin *et al.* (1986) and Rahman *et al.* (1999) who reported 0.37% and 0.65% clinical mastitis in cows. On the contrary, Sarker *et al.* (1999) and Samad (2001) who reported clinical mastitis in cows 0.89% and 0.71%, respectively.

In respect of breeds, the prevalence of mastitis was determined higher in the RCC breed (0.45%) than of Pabna breed (0.33%) (Table 2 and Figure 2).
Considering the seasons, in case of RCC the highest prevalence was found in summer season (0.30%) and the lowest was in winter season (0.11%); whereas in case of Pabna cattle the prevalence was equal (0.22%) both in summer and winter but no prevalence in the rainy season (Tables 3, 4 and Figures 3, 4). Conversely, Samad (2001) reported higher cases of clinical mastitis during summer (38.67%) and rainy (38.67%) seasons than winter (22.66%).

Posthitis
The mean prevalence of posthitis in the farm irrespective of breeds and seasons was 0.19% only (Table 1 and Figure 1); while in case of the breeds, the prevalence was higher in the Pabna breed (1.22%) than that of RCC breed (0.15%) (Table 2 and Figure 2). Samad (2001) recorded 0.31% of balanoposthitis in young bulls. However, Hossain *et al.* (1986) and Nooruddin *et al.* (1986) recorded 3.9% and 1.44% cases of posthitis in cattle, respectively.
Regarding the seasons, in case of RCC the prevalence of posthitis was only found in the rainy season; whereas in case of Pabna cattle 0.11% prevalence were only in the summer and rainy season, respectively (Tables 3, 4 and Figures 3, 4). Samad (2001) reported higher percentage of posthitis during rainy (42.42%), followed by summer (30.30%) and winter (27.28%) seasons.

Black quarter (BQ)
The was no prevalence of BQ in the farm (Table 1 and Figure 1). This may be due to routine vaccination and hygienic management of the farm. On the other hand, Rahman *et al.* (1999) and Samad (2001) who reported 0.31%, 0.46% and 0.23% incidence of BQ in cattle.

Arthritis
The average prevalence of arthritis in the farm irrespective of breeds and seasons was 0.40% (Table 1 and Figure 1) which is in agreement with the findings of Samad (2001). Regarding the breeds, the prevalence of arthritis was noticed higher in the Pabna breed (0.55%) than of RCC breed (0.15%) (Table 2 and Figure 2).
Considering the seasons, in case of RCC the prevalence was only found in winter season (0.15%); whereas in case of Pabna cattle the prevalence were 0.22%, 0.11% and 0.22%, respectively for summer, winter and rainy season (Tables 3, 4 and Figures 3, 4).

Anthrax
There was no prevalence of anthrax in the farm (Table 1 and Figure 1). This may be due to routine vaccination and hygienic management of the farm.

Hemorrhagic septicemia (HS)
There was no prevalence of HS in the farm (Table 1 and Figure 1). This may be due to routine vaccination and hygienic management of the farm. On the other hand, Samad *et al.* (2002) reported 0.7% prevalence of HS in cattle.

Foot-and-mouth disease (FMD)
There was no prevalence of HS in the farm (Table 1 and Figure 1). This may be due to routine vaccination and hygienic management of the farm. On the other hand, Samad (2001) and Rahman *et al.* (2012) reported 1.79% and 1.3% cases of FMD in cattle. Comparatively higher prevalence rates of FMD in cattle have been reported by Rahman *et al.* (1972), Hoque and Samad (1996), Sarker *et al.* (1999) and Rahman *et al.* (1999) who reported 5.71%, 10.05%, 8.58% and 5.78%, respectively.

Bovine ephemeral fever (BEF)
The average prevalence of arthritis in the farm irrespective of breeds and seasons was 1.08% (Table 1 and Figure 1) which is much lower than the findings of Sarker *et al.* (2013). Regarding the breeds, the prevalence of arthritis was noticed higher in the Pabna breed (1.54%) than that of RCC breed (0.30%) (Table 2 and Figure 2).
Considering the seasons, in case of RCC the prevalence was only found in summer season (0.30%); whereas in case of Pabna cattle the prevalence were 0.88%, 0.44% and 0%, respectively for summer, winter and rainy season (Tables 3, 4 and Figures 3, 4).

Ringworm

The average prevalence of ringworm in the farm irrespective of breeds and seasons was 3.11% (Table 1 and Figure 1). Samad *et al.* (2002) also reported dermatitis (9.64%) as the major skin disease of calves.

Regarding the breeds, the prevalence of ringworm was only found in the RCC breed (7.20%) (Table 2 and Figure 2) and the highest prevalence was found in winter season (4.05%) (Tables 3, 4 and Figures 3, 4).

Mange

The average prevalence of mange in the farm irrespective of breeds and seasons was 0.37% (Table 1 and Figure 1) which was almost similar to the findings of Samad (2001) who recorded 0.33% in cattle. Regarding the breeds, the prevalence of mange was only found in the Pabna breed (1.32%) (Table 2 and Figure 2) and the highest prevalence was found in the rainy season (0.88%) (Tables 3, 4 and Figures 3, 4).

Lameness

The average prevalence of lameness in the farm irrespective of breeds and seasons was 0.53% (Table 1 and Figure 1) although Sarker *et al.* (2013) found 6.18% prevalence of lameness in cattle. The prevalence was more in Pabna breed (0.66%) than that of RCC breed (0.30%) (Table 2 and Figure 2). The prevalence was the highest in summer in case of Pabna and in rainy season in case of RCC (Tables 3, 4 and Figures 3, 4).

Table 1. Overall clinical prevalence of diseases and disorders in cattle at BLRI Cattle farm (2011-2014).

Name of diseases and disorders	Prevalance of diseases and disorders (%)				
	2011($n_{1=}$403)	2012($n_{2=}$355)	2013($n_{3=}$378)	2014($n_{4=}$422)	Average
Pneumonia	0.5	0.52	1.12	1.68	0.96
Diarrhoea	1.75	4.16	0.56	0.96	1.86
Tympany/Bloat	0.75	0.78	0.28	0.96	0.69
Fever	0.75	0.78	0.56	0.48	0.64
Alopecia	0.75	1.3	0	1.2	0.81
BQ	0	0	0	0	0
Malnutrition	0.25	0.52	0.28	0	0.26
Posthitis	0.25	0	0.28	0.24	0.19
Lameness	0.5	1.04	0.56	0	0.53
Ringworm	7	2.08	3.36	0	3.11
Anthrax	0	0	0	0	0
Arthritis	0.25	0.78	0.56	0	0.40
Mange	1	0	0	1.92	0.73
FMD	0	0	0	0	0
Mastitis	0.75	0	0.56	0.24	0.39
HS	0	0	0	0	0
BEF	0.25	0	3.36	0.72	1.08

Table 2. Breed wise overall prevalence of diseases and disorders at BLRI Cattle farm (2011-2014).

Name of diseases and disorders	Prevalence (%) in Pabna breed ($N_{1=}$906)	Prevalence (%) in RCC breed ($N_{2=}$652)
Pneumonia	0.88	1.05
Diarrhoea	2.77	0.60
Tympany/Bloat	0.88	0.54
Fever	0.99	0.15
Alopecia	0.55	1.20
BQ	0	0
Malnutrition	0.44	0
Posthitis	0.22	0.15
Lameness	0.66	0.30
Ringworm	0	7.20
Anthrax	0	0
Arthritis	0.55	0.15
Mange	1.32	0
FMD	0	0
Mastitis	0.33	0.45
HS	0	0
BEF	1.54	0.30
Total	**11.13**	**12.09**

Table 3. Season wise overall prevalence of diseases and disorders of Pabna breed ($N_{1=}$906) at BLRI cattle farm (2011-2014).

Name of diseases and disorders	Prevalence of diseases and disorders (%) of Pabna breed		
	Summer Season (March-June)	Rainy Season (July -October)	Winter Season (November-February)
Pneumonia	0.11	0.33	0.44
Diarrhoea	0.77	0.66	1.32
Tympany/Bloat	0.22	0.33	0.33
Fever	0.33	0.44	0.22
Alopecia	0.22	0.22	0.11
BQ	0	0	0
Malnutrition	0.22	0	0.22
Posthitis	0.11	0.11	0
Lameness	0.33	0.22	0.11
Ringworm	0	0	0
Anthrax	0	0	0
Arthritis	0.22	0.11	0.22
Mange	0.33	0.88	0.22
FMD	0	0	0
Mastitis	0.11	0	0.11
HS	0	0	0
BEF	0.88	0	0.44
Total	**3.85**	**3.30**	**3.74**

Table 4. Season wise overall prevalence of diseases and disorders of RCC breed ($N_{2=}$652) at BLRI Cattle farm (2011-2014).

Name of diseases and disorders	Prevalence of diseases and disorders (%) of RCC breed		
	Summer Season (March-June)	Rainy Season (July -October)	Winter Season (November-February)
Pneumonia	0.30	0.45	0.30
Diarrhoea	0.15	0.30	0.15
Tympany/Bloat	0.45	0	0
Fever	0	0	0.15
Alopecia	0.75	0.15	0.30
BQ	0	0	0
Mastitis	0	0	0
Posthitis	0	0.15	0
Lameness	0	0.30	0
Ringworm	0.16	0	4.05
Anthrax	0	0	0
Arthritis	0	0	0.15
Mange	0	0	0
FMD	0	0	0
Mastitis	0.15	0.30	0.11
HS	0	0	0
BEF	0.30	0	0
Total	**2.26**	**1.65**	**5.21**

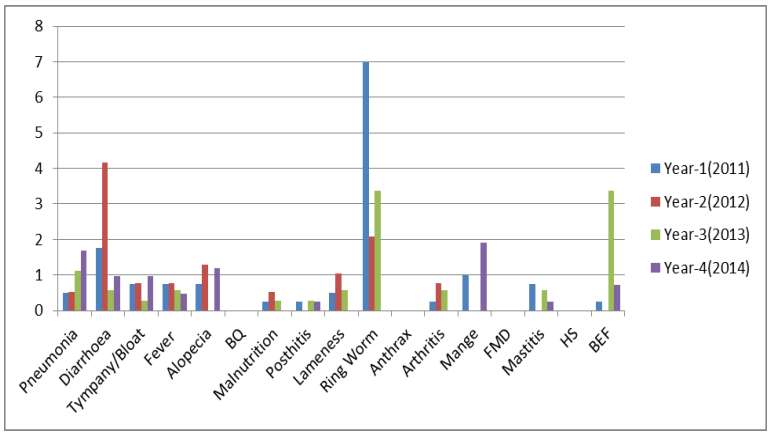

Figure 1. Year wise overall prevalence of clinical diseases and manifestation at BLRI cattle farm (2011-2014).

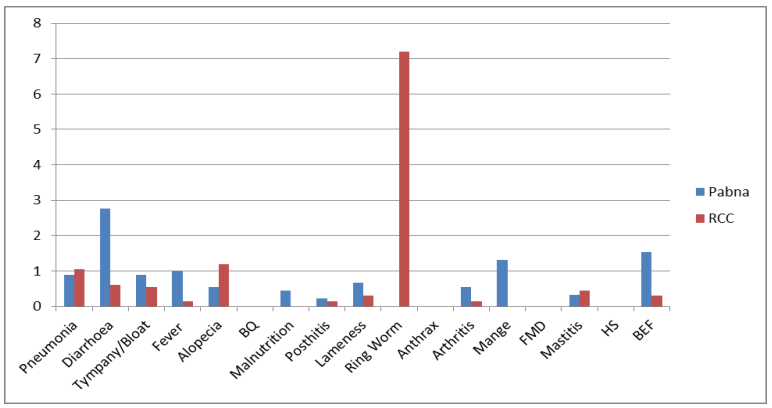

Figure 2. Breed wise overall prevalence of clinical diseases and manifestation at BLRI Cattle farm (2011-2014).

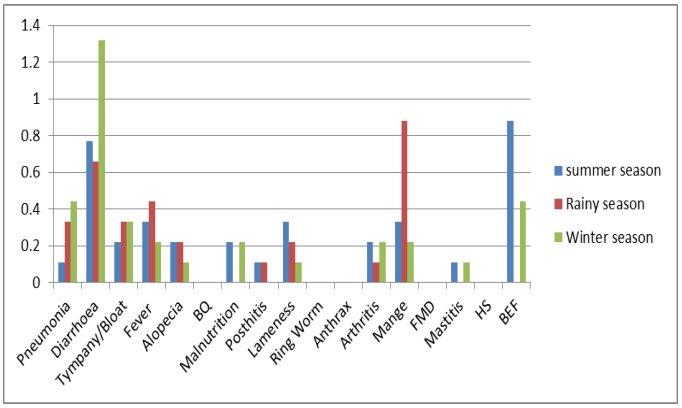

Figure 3. Season wise overall prevalence of clinical diseases and manifestation of Pabna breed at BLRI cattle farm (2011-2014).

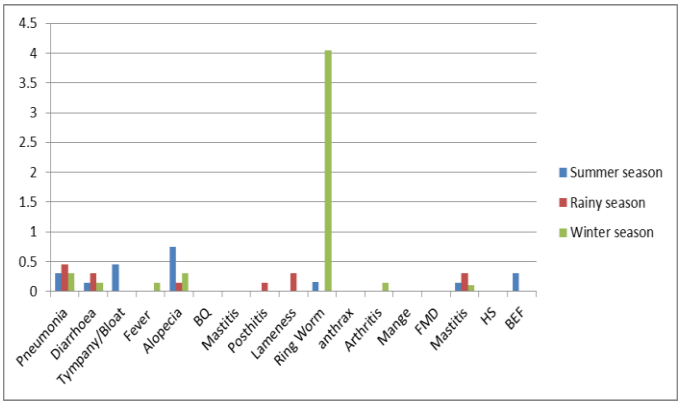

Figure 4. Season wise overall prevalence of clinical diseases and manifestation of RCC breed at BLRI Cattle farm (2011-2014).

4. Conclusions

The occurrence of diseases was recorded during clinical examination of sick cattle (Pabna and RCC) at BLRI cattle farm, Savar, Dhaka Bangladesh. From the study, it was observed that the highest prevalence (3.11%) in the farm irrespective of breeds and seasons was for ringworm followed by diarrhoea (1.86%) and pneumonia (0.96%). FMD, BQ, HS and anthrax were not found in this study due to regular proper vaccination and maintenance of strict biosecurity. In case of breed susceptibility, RCC (12.09% prevalence) was more susceptible to the diseases found than Pabna (11.13% prevalence). In respect of season, more prevalence was found in summer season (3.85%) and winter season (5.21%) for Pabna and RCC, respectively. However, it can be mentioned that several diseases and disorders occurred in the BLRI cattle farm but major infectious diseases did not take place owing to improved management of the farm.

Conflict of interest

None to declare.

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