Article

Study on prevalence of bovine diseases at sadar upazila in dinajpur district of Bangladesh

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Abstract: The study was conducted to investigate the status of cattle diseases with relation to seasonal variation in Dinajpur district of Bangladesh. A total of 11402 clinical cases were registered for the clinical diagnosis and therapeutic purposes at sadar upazila veterinary hospital in Dinajpur district of Bangladesh during the period of March, 2016 to February, 2017. Disease diagnosis was made on the basis of owner’s statement, general examination and clinical signs. Diagnosed diseases were categorized as general clinical disorders, parasitic diseases, viral diseases, bacterial diseases, venereal disease, and metabolic disorders. According to study the highest (64.15%) prevalence was by parasitic disease followed by bacterial diseases (10.67%), viral diseases (8.97%), metabolic disease (7.61%), and venereal disease (6.60%). In respect of seasons, the prevalence of both bacterial diseases and viral diseases were significantly (p<0.01) higher (13.88%) and (12.10%) in summer season respectively. Whereas the parasitic diseases were significantly (p<0.01) higher (68.65%) in winter season. On the basis of season, it was found that the overall prevalence of diseases was highest in summer season (47.87%) followed by rainy season (30.10%) and comparatively lower in winter season (22.03%).

Keywords: prevalence; cattle; diseases; season

1. Introduction

Bangladesh is predominantly an agricultural country where livestock sector plays a pivotal role in accelerating the economic growth. Bangladesh has high density of cattle population, it is about 23.12 million and now-a-days dairy farming has great importance in economic sector. However, dairy farming in Bangladesh frequently focus in different constrains. Bovine diseases affect production, cattle health, impacts negatively on profitability and trade, and can decimate years of genetic improvement towards desirable production traits (Boland et al., 2010). Among the different diseases available in this Dinajpur district include Foot and mouth disease (FMD) which is a severe, highly contagious viral disease of livestock with significant economic impact. The disease affects cattle, swine, sheep, goats and other cloven-hoofed ruminants. Furthermore, elephant, and giraffe are susceptible to FMD (Kitching, 2005). 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). BEF is characterized
by the sudden onset of fever, stiffness, lameness and depression with a high morbidity and 1% mortality (Mackerras et al., 1940). Recovery usually occurs within 3 to 4 days of the onset of clinical signs, hence the term "ephemeral" (Uren, 1989). The disease is mostly severe in the more valuable classes of cattle such as bulls, pregnant and lactating cows (Young and Spradbrow, 1990). Babesiosis is caused by intra-erythrocytic protozoan parasites of the genus Babesia which infects a wide range of domestic and wild animals and occasionally man. The disease is distributed world-wide (Bock et al., 2004). Infection of cattle with Anaplasma marginale causes bovine anaplasmosis, a mild to severe hemolytic disease that results in considerable economic losses to both dairy and beef industries. A. marginale undergoes a complex developmental cycle in ticks that begins by infection of gut cells, and transmission to susceptible hosts occurs from salivary glands during feeding (Ge et al., 1996; Kocan, 1986; Kocan et al., 2004). The prevalence of parasitic infection depends on ecology, geographical and climatic condition prevailing in Bangladesh (Hossain et al., 2004). Gastrointestinal nematodes (Haemonchus, Trichostrongylus and Stroglus) cause impaired digestion and also affect the absorption of minerals particularly the Calcium and Phosphorus (Speedy, 1992). Like other diseases, parasitic infection or concurrently occurred infections cause economic losses in terms of mortality, stunted growth, loss of body weight gain, poor quality of skin due to ectoparasitic in particular, decreased milk and meat production (Dewan et al., 1979; Ahmed et al., 1994). Among the trematode infections, two Fasciola species Fasciola hepatica and Fasciola gigantica are involved in both animal and human fascioliasis (Mas et al., 1999) of these only Fasciola gigantica are available in Bangladesh. The major endemic area for Fasciola gigantica is largely tropical region of Africa and many areas of Asia including India, Pakistan, Bangladesh (Shelmon and Barwari, 1978). In Bangladesh the report on fascioliasis are mostly on cattle, sheep, goat and buffalo (Kendall, 1954; Garrels, 1975 and Okiluddin, 1996). As bovine diseases are very much important disease in aspect of Bangladesh, it is not only affect the production performance of animal but also affect the national economy so the present study focuses the prevalence of disease in cattle in sadar upazila of dinajpur district.

2. Materials and Methods

2.1. Study area and study period
The study was conducted at veterinary hospital at Sadar upazila in Dinajpur district of Bangladesh for a period of one year from March, 2016 to February, 2017. The animals were brought at upazila veterinary hospital for the treatment purposes were examined for the prevalence of bovine diseases in cattle. A total of 11402 cattle population were recorded during the study period. Various types of bovine diseases were registered where bacterial disease, viral and parasitic disease and metabolic and venereal disease were recorded.

2.2. Procedure of examination of animal
2.2.1. General examination
Body condition score (BCS), behavior, Posture, gait, superficial skin, salivation, nasal discharge, locomotion disturbances were observed by distant visual examination of the patient.

2.2.2. Physical examination
Examination of different external parts of the body of each of the animal clinically, attended at hospital were done by using various close observation techniques.

2.2.3. Clinical examination
For clinical examination the temperature, pulse and respiratory rate from each of the animal were recorded. The presented clinical findings of various diseases of cattle and the owners complaint in relation to the diseases were also recorded carefully.

2.3. Prevalence
Prevalence were calculated as number of cases of disease divided by population at risk and multiple by 100.

\[
\text{Prevalence rate} (\%) = \frac{\text{No. of cases of disease}}{\text{population at risk}} \times 100
\]

2.4. Statistical analysis
The collected data was analyzed by a statistical software namely, SPSS version 22. Associations between explanatory variables season and prevalence were done by chi-square test. In all analysis, 95% confidence intervals and p<0.05 were set to indicate significance.
3. Results
3.1. Prevalence of bovine bacterial diseases
The overall prevalence of bacterial diseases in cattle were 10.67 % among these the highest prevalence of bacterial diseases (6.08 %) were found by mastitis followed by anthrax (1.89%), dermatophilosis (1.29%) and the lowest prevalence (0.67%) by black quarter, followed by hemorrhagic septicemia (0.75%) as shown in (Table 1).

Table 1. Prevalence of bovine bacterial diseases.

<table>
<thead>
<tr>
<th>Disease name</th>
<th>No. of animal examined</th>
<th>No. of positive</th>
<th>Percentage (%)</th>
<th>Percentage by category (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anthrax</td>
<td>11402</td>
<td>215</td>
<td>1.89</td>
<td></td>
</tr>
<tr>
<td>BQ</td>
<td>11402</td>
<td>76</td>
<td>0.67</td>
<td></td>
</tr>
<tr>
<td>H.S</td>
<td>11402</td>
<td>86</td>
<td>0.75</td>
<td>10.67</td>
</tr>
<tr>
<td>Dermatophilosis</td>
<td>11402</td>
<td>147</td>
<td>1.29</td>
<td></td>
</tr>
<tr>
<td>Mastitis</td>
<td>11402</td>
<td>693</td>
<td>6.08</td>
<td></td>
</tr>
</tbody>
</table>

3.2. Prevalence of bovine viral diseases
The overall prevalence of viral diseases in cattle were 8.97%. Among viral diseases the highest prevalence (5.79 %), were found in Ephemeral fever followed by foot and mouth disease (3.10%), whereas the lowest prevalence (0.09%) were documented in rabies as shown in (Table 2).

Table 2. Prevalence of bovine viral diseases.

<table>
<thead>
<tr>
<th>Disease name</th>
<th>No. of animal examined</th>
<th>No. of positive</th>
<th>Percentage (%)</th>
<th>Percentage by category (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FMD</td>
<td>11402</td>
<td>353</td>
<td>3.10</td>
<td>8.97</td>
</tr>
<tr>
<td>Rabies</td>
<td>11402</td>
<td>10</td>
<td>0.09</td>
<td></td>
</tr>
<tr>
<td>E fever</td>
<td>11402</td>
<td>660</td>
<td>5.79</td>
<td></td>
</tr>
</tbody>
</table>

3.3. Prevalence of bovine parasitic disease
The overall prevalence of parasitic diseases in cattle were 64.15%. Parasitic diseases was further subdivided in to protozoa, external parasite and internal parasite. Under protozoa diseases the highest prevalence (8.55%) was found in coccidiosis while the lowest (0.29) was found in Theileriosis. In general, the prevalence of protozoa disease was (2.90%). Again, under internal diseases the highest prevalence (12.86%) was observed roundworm followed by Fascioliasis (10.28%) while the lowest prevalence (7.17%) was observed in tapeworm. All the prevalence of internal parasite was (30.31%). Furthermore, under external parasite diseases, the highest prevalence (10.77%) was witnessed in lice whereas the lowest prevalence (5.46%) was detected in Tick followed by mite (6.26%). Totally the prevalence of external parasite was (22.49%) as shown in (Table 3).

Table 3. Prevalence of bovine parasitic disease.

<table>
<thead>
<tr>
<th>Disease name</th>
<th>No of animal examined</th>
<th>No of positive</th>
<th>Percentage (%)</th>
<th>Category Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Babesiosis</td>
<td>11402</td>
<td>76</td>
<td>0.67</td>
<td></td>
</tr>
<tr>
<td>Theileriosis</td>
<td>11402</td>
<td>33</td>
<td>0.29</td>
<td></td>
</tr>
<tr>
<td>Anaplasmosis</td>
<td>11402</td>
<td>210</td>
<td>1.84</td>
<td></td>
</tr>
<tr>
<td>Coccidiosis</td>
<td>11402</td>
<td>975</td>
<td>8.55</td>
<td></td>
</tr>
<tr>
<td>Fascioliasis</td>
<td>11402</td>
<td>1172</td>
<td>10.28</td>
<td></td>
</tr>
<tr>
<td>Roundworm</td>
<td>11402</td>
<td>1466</td>
<td>12.86</td>
<td></td>
</tr>
<tr>
<td>Tapeworm</td>
<td>11402</td>
<td>817</td>
<td>7.17</td>
<td></td>
</tr>
<tr>
<td>Tick</td>
<td>11402</td>
<td>623</td>
<td>5.46</td>
<td></td>
</tr>
<tr>
<td>Mite</td>
<td>11402</td>
<td>714</td>
<td>6.26</td>
<td></td>
</tr>
<tr>
<td>Lice</td>
<td>11402</td>
<td>1228</td>
<td>10.77</td>
<td></td>
</tr>
</tbody>
</table>
3.4 Prevalence of metabolic and venereal diseases
The overall prevalence of metabolic and venereal diseases in cattle were 14.22%. The highest prevalence of metabolic and venereal diseases (7.61%) was observed from metabolic disease while the lowest (6.60%) was found in Venereal disease as shown in (Table 4).

Table 4. Prevalence of metabolic and venereal diseases.

<table>
<thead>
<tr>
<th>Disease name</th>
<th>No of animal examined</th>
<th>No of positive</th>
<th>Percentage (%)</th>
<th>Category Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metabolic diseases</td>
<td>11402</td>
<td>868</td>
<td>7.61</td>
<td>14.22</td>
</tr>
<tr>
<td>Venereal disease</td>
<td>11402</td>
<td>753</td>
<td>6.60</td>
<td></td>
</tr>
</tbody>
</table>

3.5. Prevalence of bovine viral diseases based on season
There was significant variation of bovine viral diseases in relation to the season of the year. In summer season the highest prevalence of bovine viral disease (8.61%) was observed from Ephemeral fever followed by Foot and mouth disease (3.38%) and Rabies (0.11 %). Similarly, in rainy season the highest prevalence of bovine viral disease (7.40%) was observed from Ephemeral fever followed by Foot and mouth disease (2.80%) and Rabies (0.24 %). Additionally, in winter season, the highest prevalence of bovine viral disease (3.85%) was observed from Ephemeral fever followed by Foot and mouth disease (3.09%) and Rabies (0.05%) shown in (Table 5).

Table 5. Prevalence of bovine viral diseases based on season.

<table>
<thead>
<tr>
<th>Disease Name</th>
<th>Summer (n=2753)</th>
<th>Rainy (n=2540)</th>
<th>Winter (n=6109)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of animals affected</td>
<td>Percentage (%)</td>
<td>No. of animals affected</td>
</tr>
<tr>
<td>FMD</td>
<td>93</td>
<td>3.38</td>
<td>71</td>
</tr>
<tr>
<td>Rabies</td>
<td>3</td>
<td>0.11</td>
<td>6</td>
</tr>
<tr>
<td>Ephemeral fever</td>
<td>237</td>
<td>8.61</td>
<td>188</td>
</tr>
<tr>
<td>Total</td>
<td>333</td>
<td>12.10</td>
<td>265</td>
</tr>
</tbody>
</table>

p-value (Chi-square Test) 34.224(0.000)
Level of Significance **

** Highly significant (p≤ 1%)

3.6. Prevalence of bovine bacterial diseases based on season
In summer season the highest prevalence of bovine bacterial disease (4.90%) was detected from Mastitis followed insignificantly by Anthrax (4.65%) although the lowest (0.69 %) was found in Black Quarter (BQ) the rest of bacterial disease showed intermediate. Moreover, in rainy season the highest prevalence of bovine bacterial disease (3.66%) was identified from Mastitis while the lowest (0.59%) was found in Black Quarter (BQ) and the rest were intermediate. Furthermore, in winter season, the highest prevalence of bovine bacterial disease (7.61%) was observed from Mastitis whereas the lowest (0.29%) was observed in H.S. the result showed that mastitis was the most prevalence bacterial disease in all the seasons as shown in (Table 6).

Table 6. Prevalence of bovine bacterial diseases based on season.

<table>
<thead>
<tr>
<th>Disease Name</th>
<th>Summer (n=2753)</th>
<th>Rainy (n=2540)</th>
<th>Winter (n=6109)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of animals affected</td>
<td>Percentage (%)</td>
<td>No. of animals affected</td>
</tr>
<tr>
<td>Anthrax</td>
<td>128</td>
<td>4.65</td>
<td>45</td>
</tr>
<tr>
<td>BQ</td>
<td>19</td>
<td>0.69</td>
<td>15</td>
</tr>
<tr>
<td>H.S</td>
<td>36</td>
<td>1.31</td>
<td>32</td>
</tr>
<tr>
<td>Dermatophilosis</td>
<td>64</td>
<td>2.32</td>
<td>55</td>
</tr>
<tr>
<td>Mastitis</td>
<td>135</td>
<td>4.90</td>
<td>93</td>
</tr>
<tr>
<td>Total</td>
<td>382</td>
<td>13.88</td>
<td>240</td>
</tr>
</tbody>
</table>

p-value (Chi-square Test) 273.317(0.000)
Level of Significance **

** Highly significant (p≤ 1%)
3.7. Prevalence of metabolic and venereal diseases based on season

There was significant variation of bovine metabolic and venereal diseases in relation to the season of the year. In summer season the highest prevalence of other bovine disease (6.10%) was observed from metabolic disease while the lowest (5.16%) was found in Venereal disease. Contrarily in rainy season the highest prevalence of other bovine disease (10.87%) was observed in metabolic disease. Also in winter season, the highest prevalence of other bovine disease (7.37%) was observed in Venereal disease while the lowest (6.51%) was detected in metabolic disease shown in (Table 7).

<table>
<thead>
<tr>
<th>Disease Name</th>
<th>Summer (n= 2753)</th>
<th>Rainy (n=2540)</th>
<th>Winter(n=6109)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of animals</td>
<td>Percentage (%)</td>
<td>No. of animals</td>
</tr>
<tr>
<td>Metabolic</td>
<td>168</td>
<td>6.10</td>
<td>187</td>
</tr>
<tr>
<td>Venereal</td>
<td>142</td>
<td>5.16</td>
<td>276</td>
</tr>
<tr>
<td>Total</td>
<td>310</td>
<td>11.26</td>
<td>463</td>
</tr>
</tbody>
</table>

p-value (Chi-square Test) = 14.391(0.001)

** Highly significant (p≤ 1%)

Table 7. Prevalence of metabolic and venereal diseases based on season.

3.8. Prevalence of bovine parasitic diseases based on season

There was significant variation of bovine parasitic diseases in relation to the season of the year. Among parasitic diseases protozoa was subdivided in to subcategory. Under protozoa, in summer season the highest prevalence of bovine parasitic disease (8.43%) was observed from Coccidiosis and the lowest (1.09%) was observed from Babesiosis. Similarly, in rainy season the highest prevalence of bovine parasitic disease (5.75%) was observed from Coccidiosis while the lowest (0.43%) was detected from Babesiosis. Likewise, in winter season, the highest prevalence of bovine parasitic disease (9.77%) was observed from Coccidiosis and the lowest (0.31%) was observed from Theilariaosis. Under internal parasitic disease, in summer season the highest prevalence of bovine parasitic disease (14.53%) was observed from roundworm whereas the lowest (5.19%) was observed from tapeworm. In rainy season, the highest prevalence of bovine parasitic disease (13.23%) was observed from roundworm whereas the lowest (7.87%) was observed from Fascioliasis. In winter season, the highest prevalence of bovine parasitic disease (13.88%) was observed from Fascioliasis whereas the lowest (7.53%) was observed from Theilariaosis. Under external parasite diseases, in summer season the highest prevalence of bovine parasitic disease (9.73%) was observed from lice whereas the lowest (5.88%) was observed from mite. In rainy season, the highest prevalence of bovine parasitic disease (11.81%) was observed from lice whereas the lowest (7.51%) was observed from mite. In winter season, the highest prevalence of bovine parasitic disease (10.88%) was observed from lice whereas the lowest (3.73%) was observed from tick shown in (Table 8).

<table>
<thead>
<tr>
<th>Disease Name</th>
<th>Summer (n= 2753)</th>
<th>Rainy (n=2540)</th>
<th>Winter (n=6109)</th>
<th>Chi-square (p-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of animals</td>
<td>Percentage (%)</td>
<td>No. of animals</td>
<td>Percentage (%)</td>
</tr>
<tr>
<td>Protozoa</td>
<td>Babesiosis</td>
<td>30</td>
<td>1.09</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Theilariaosis</td>
<td>0</td>
<td>0.00</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Anaplasmosis</td>
<td>0</td>
<td>0.00</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Coccidiosis</td>
<td>232</td>
<td>8.43</td>
<td>146</td>
</tr>
<tr>
<td>Internal</td>
<td>Fascioliasis</td>
<td>304</td>
<td>11.04</td>
<td>200</td>
</tr>
<tr>
<td>parasite</td>
<td>Roundworm</td>
<td>400</td>
<td>14.53</td>
<td>336</td>
</tr>
<tr>
<td></td>
<td>Tapeworm</td>
<td>143</td>
<td>5.19</td>
<td>214</td>
</tr>
<tr>
<td>External</td>
<td>Tick</td>
<td>189</td>
<td>6.87</td>
<td>206</td>
</tr>
<tr>
<td>parasite</td>
<td>Mite</td>
<td>162</td>
<td>5.88</td>
<td>145</td>
</tr>
<tr>
<td></td>
<td>Lice</td>
<td>268</td>
<td>9.73</td>
<td>300</td>
</tr>
<tr>
<td>Total</td>
<td>1728</td>
<td>62.77</td>
<td>1572</td>
<td>61.89</td>
</tr>
</tbody>
</table>

** Highly significant (p≤ 1%)
4. Discussion

4.1. Prevalence of bovine bacterial diseases
In this study the overall prevalence of bacterial diseases was (10.67%) in which the highest prevalence was noticed in mastitis (6.08%) followed by anthrax (1.89%), Dermatophilosis (1.29%), hemorrhagic septicemia (0.75%) and black quarter (BQ) (0.67%). According to the bacterial diseases category the present result was lower than the result of Juti et al. (2015) who reported that the overall prevalence of bacterial diseases in Dinajpur were 15.27% in which highest prevalence was observed in dermatophilosis (10.43%), followed by (1.76%), mastitis (0.73%), black quarter (0.59%). Nath et al. (2010) reported that the prevalence of dermatophilosis 13.55% which higher than this study. Badruzzaman et al. (2015) reported prevalence of dermatophilosis 0.19% which significantly different from this result and mastitis was 1.30% which is lower than this result. Dissimilar results were reported by Karim et al. (2014) who described that prevalence of mastitis and black quarter were 1.1% and 1.4% respectively.

4.2. Prevalence of bovine viral diseases
The prevalence of FMD in this study was (3.10%) which was slightly higher than the results of Samad (2001) and Rahman et al. (2012) who reported 1.79%, 1.3% and 2.5% cases of FMD in cattle respectively. But our results are significantly different from the recent report of Bangladesh as 4.74% and 0.27%. Sarker et al. (2011) and Mannan et al. (2009) reported that prevalence of foot and mouth disease (25.07%) at Rajshahi district and 24.51% at Meghna upazila of Comilla respectively which was higher than this study. Badruzzaman et al. (2015) conducted a study in Chittagong district of Bangladesh and they found that prevalence of foot and mouth disease as 4.74% and 0.27%.

4.3. Prevalence of bovine parasitic diseases
In our present study, the prevalence of ectoparasite of cattle was 22.49% in which the highest prevalence was recorded in lice (10.77%) followed by mite (6.26%) and tick (5.46%). This result is greater than the findings of Magona et al. (2015) reported that the prevalence of ectoparasitic infection were showed 1.96% in all clinical cases that was lower than my finding. Rony et al. (2010) conducted a study in Gazipur of Bangladesh, and recorded 68.49%, 65.5%, 65.4% and 64.07% prevalence of tick infestation in cattle, respectively which was higher than my result. Ghosh et al. (2007) reported 80% cattle affected by ticks in Bangladesh, India and Pakistan. Aulakh (2003) reported the prevalence of babesiosis as 5.94% in India, which is higher than the results of present study. Subclinical infection of A. marginale in cattle has been reported frequently from many parts of the world as a concurrent infection with other blood parasites like Theileria and Babesia (Afridi et al., 1985). This observation is not consistence with Badruzzaman et al. (2015) who reported that the prevalence of parasitic disease as 30.64% of which, in summer 12.78 %, in rainy 9.79%, winter 8.07%. in Chittagong district and Pallab et al. (2012) who reported 26.79% parasitic diseases to all clinical cases, of which 10.13% in cows, 5.22% in bulls and 11.43% in calves. Rahman et al. (2012) conducted a study at the Patuakhali Science and Technology University Veterinary Clinic and reported parasitic disease prevalence as 50.4% which is significantly lower from my study results. Rahman et al. (1972), Das and Hashim (1996) reported that prevalence of maggot-infested wounds 11%, and 2.20% respectively in cattle from Bangladesh although our observation was slightly different from them.

4.4. Prevalence of metabolic and venereal diseases
In this study, the highest prevalence of cattle disease (7.61%) was found in metabolic disease. Dissimilar findings were reported by Badruzzaman et al. (2015) reported that prevalence of milk fever as 1.26% which is lower than our observation.

5. Conclusions
The present study revealed that various infectious diseases like viral (8.9%), bacterial diseases (10.67%), parasitic diseases (64.15%), protozoa, internal parasite and external parasite were found in the cattle population in Dinajpur district of northern Bangladesh. Among the bacterial diseases the highest prevalence was found in Mastitis (6.08%) however within viral diseases the most prevalence disease was Ephemeral fever (5.79%). In case of parasitic diseases, the highest prevalence was observed in internal parasite. All bovine diseases, parasitic diseases were highly prevalence (64.15%) which counted in this study more than half of the cattle being studied.
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Conflict of interest
None to declare.

References


