Original Research Article

Investigations on the Prevalence of Poultry Diseases in the Barishal District of Bangladesh

ABSTRACT

This study was performed in an attempt to investigate the prevalence of poultry diseases in the Barishal district of Bangladesh. A total of 863 (n=863) poultry birds of different ages either dead or sick were examined for the study. History, clinical signs, and post-mortem findings were considered for the diagnosis of the diseases. Among the diseases, the overall prevalence of infectious bursal disease (IBD) was found highest (18.08%) followed by salmonellosis (15.41%), newcastle disease (ND) (13.33%), mycoplasmosis (CRD) (12.28%), colibacillosis (10.31%), coccidiosis (7.53%), infectious bronchitis (7.18%), aspergillosis (5.68%), omphalitis (2.55%), fowl cholera (2.43%), infectious coryza (2.09%), fowl pox (1.51%), necrotic enteritis (1.16%), and marek's disease (0.46%). Salmonellosis (17.79%) was found to be the most prevalent disease in layer chickens followed by ND (14.42%), colibacillosis (12.98%), CRD (11.30%), IBD (10.10%), coccidiosis (7.45%), infectious bronchitis (5.77%), fowl cholera (5.05%), infectious coryza (4.33%), aspergillosis (4.09%), fowl pox (3.13%), omphalitis (1.44%), necrotic enteritis (1.20%), and marek's disease (0.96%). In the case of broiler chickens, the highest prevalence was recorded in IBD (27.87%), followed by CRD (15.41%), infectious bronchitis (12.46%), salmonellosis (12.13%), aspergillosis (8.20%), ND (7.54%), colibacillosis (6.89%), omphalitis (5.25%), coccidiosis (2.62%), and necrotic enteritis (1.64%). In sonali chickens, the prevalence was recorded highest in ND (22.54%) followed by IBD (20.42%), coccidiosis (18.31%), salmonellosis (15.49%), colibacillosis (9.86%), CRD (8.45%) and aspergillosis (4.93%). Based on seasonal variations, it was found that most of the diseases occurred in the summer (39.75%) followed by (32.33%) and (27.93%) respectively in winter and rainy season. This study suggests that appropriate vaccination, strict biosecurity, proper hygienic management, and other preventive measures should be taken into consideration for effective control of the diseases to establish sustainable development of poultry farming in these areas.

Keywords:Disease prevalence; layer; broiler; sonali; necropsy; Bangladesh.

1. INTRODUCTION

At present, the poultry farming is an established, money making business opportunity in Bangladesh. It is a very commercially successful business for both persons and entrepreneurs. The economic system of our country is based on mostly agriculture and agriculture-related products. Poultry products like meat and eggs are the main source of animal protein for the people of Bangladesh [1].37%of the total meat production in

Comment [21051182G1]: May include year of the data collection in the title, eg: 2018-2019.

Comment [21051182G2]: Please add year duration of the data collection in your study. Eg: 2018-2019.

Comment [21051182G3]: Please elaborate CRD for the first time use.

Comment [21051182G4]: Please don`t start with number. Rephrase the sentences.

Bangladesh is fulfilled by the poultry meat only. It is found that poultry supplies about 22-27% of the total demand of animal protein in the country [2]. As an important medium, the poultry sub-sector promotes the agricultural growth and diminishes the malnutrition for the people in Bangladesh [3]. Poultry enterprise has been developed rapidly in recent years. Poultry not only plays an important role in narrowing the gap between the demand and supply of protein of animal origin but also provides an efficient means of income generation [1]. It is very easy to start poultry farming because of requiring less investment in comparison to other livestock farming. Persons having less income can also start the business on a small scale. Poultry farming offers opportunities for fulfillment or part time employment particularly women, children or elderly person on the farm operation [4]. However, in Bangladesh the poultry diseases are considered as one of the major restrictions to develop the poultry industry [5]. Loose bio-security, defective vaccination, age of the birds, poor hygienic condition of the farms, poultry breed, types of farming, farm size, types of floor, farmers' experiences are closely correlated with the frequently occurred diseases of poultry [6, 7]. In a particular area, the prevalence of the diseases depends on various factors like geographical conditions, management practices by the farmers, immunization status of the farms, quality of the chicks, biosecurity status of the farms and hatcheries, social awareness etc. The age of the chicken and the weather of a particular area are also important factors that are related to disease prevalence [8]. Barishal district is consideredan important zone for poultry rearing especially for layer and then equally important for rearing broiler and sonali chickens. During the last few years, several emerging diseases and some unknown causes threat the poultry industry and causes huge economic losses to the farmers. For establishing a commercial poultry farm in a particular area, the prevalence of the diseases is strongly kept in mind for careful consideration. However, very few investigations have been made on the prevalence of poultry diseases in these areas. Therefore, the present study was undertaken to investigate the prevalence of poultry diseases in Barishal district of Bangladesh which will provide baseline data for effective prevention, and control of the diseases in rural poultry.

Comment [21051182G5]: Explain what is the sonali chickens and purpose of this chicken breed.

2. MATERIALS AND METHODS

2.1 Study area and duration

This research work wascarried out at the different areas of Barishal district in Bangladeshto investigate the prevalence of poultry diseasesduring the period from October 2018 to September 2019. The study was conducted at the Department of Poultry Science, Faculty of Veterinary, Animal and Biomedical Sciences, Khulna Agricultural University, Khulna-9100, Khulna, Bangladesh.

2.2 Sample size and collection

A total of 863 (n=863) either dead or sick birds were collected from various poultry farms in different areas of the Barishal district.According to the standard animal care guidelines, the live birds were sacrificed by giving minimum pain.All the data about the location of the farm, flock size, age, sex, breed,and season, time of sample collection, clinical history, clinical signs, and postmortem findings were recorded properly.

2.3 Experimental design

The diagnosis of different diseases was made on the basis of clinical history, clinical signs, and post-mortem findings.To study the overall prevalence of the diseases, the types of the birds was not taken into consideration. But, all the birds were divided into three groups such as layer, broiler and sonali chickens while studying breed wise prevalence. The total study

Comment [21051182G6]: How the diagnosis confirmation was made? Any laboratory test was done and please mention in the material and methods.

period was categorized into three conventional seasons, namely summer (March-June), winter (November-February) and rainy (July-October) to investigate the seasonal prevalence of the diseases smoothly.

2.4 Data analysis

All the data obtained during the study were entered into a spreadsheet program of Microsoft Excel 2010 for data summary and analyzed to calculate the prevalence of the diseases with the help of Microsoft office excel worksheet 2010.

3. RESULTS

The present study showed the prevalence of different diseases in commercial chickens at Barishal district of Bangladesh. A total of 863 birds were examined in this study. The overall prevalence of IBD was highest (18.08%) followed by salmonellosis (15.41%), ND (13.33%), CRD (12.28%), colibacillosis (10.31%), coccidiosis (7.53%), infectious bronchitis (7.18%), aspergillosis (5.68%), omphalitis (2.55%), fowl cholera (2.43%), infectious coryza (2.09%), fowl pox (1.51%), necrotic enteritis (1.16%), and marek's disease (0.46%). Highest prevalence 17.79%, 27.87%, and 22.54% was recorded in salmonellosis, IBD, and ND, respectively in layer, broiler, and sonali chickens (shown in Table 1).

Table 1. Overall prevalence of the diseases in commercial chickens

Name of the diseases	Identified cases (n)	Overall prevalence (%)
Colibacillosis	89	10.31
Omphalitis	22	2.55
Salmonellosis	133	15.41
Fowl Cholera	21	2.43
Infectious Coryza	18	2.09
Necrotic Enteritis	10	1.16
Infectious Bursal Disease	156	18.08
Infectious Bronchitis	62	7.18
Newcastle Disease	115	13.33
Fowl Pox	13	1.51
Marek's Disease	04	0.46
Mycoplasmosis	106	12.28
Aspergillosis	49	5.68
Coccidiosis	65	7.53
Total	**863**	**100.00**

Salmonellosis (17.79%) was found to be the most prevalent disease in layer chickens followed by ND (14.42%), colibacillosis (12.98%), CRD (11.30%), IBD (10.10%), coccidiosis (7.45%), infectious bronchitis (5.77%), fowl cholera (5.05%), infectious coryza (4.33%), aspergillosis (4.09%), fowl pox (3.13%), omphalitis (1.44%), necrotic enteritis (1.20%), and marek's disease (0.96%). In the case of broiler chickens, the highest prevalence was recorded in IBD (27.87%), followed by CRD (15.41%), infectious bronchitis (12.46%), salmonellosis (12.13%), aspergillosis (8.20%), ND (7.54%), colibacillosis (6.89%), omphalitis (5.25%), coccidiosis (2.62%), and necrotic enteritis (1.64%). In sonali chickens, the

Comment [21051182G7]: Please mention as full name for the first time appear.

Comment [21051182G8]: Please mention as full name for the first time appear, Newcastle disease (ND).

Comment [21051182G9]: Mention as full sentence for first time appear.

Comment [21051182G10]: Add duration of year. Please add footnote for (n)= number of case

prevalence was recorded highest in ND (22.54%) followed by IBD (20.42%), coccidiosis (18.31%), salmonellosis (15.49%), colibacillosis (9.86%), CRD (8.45%) and aspergillosis (4.93%), respectively (shown in Table 2).

Table 2.Prevalence of the diseases in commercial chickens in relation to breeds

Comment [21051182G11]: Add year of duration. Add footnote (n)= number of case.

Name of the diseases	Identified cases (n)	Layer		Broiler		Sonali	
		No. of cases (n)	Prevalence (%)	No. of cases (n)	Prevalence (%)	No. of cases (n)	Prevalence (%)
Colibacillosis	89	54	12.98	21	6.89	14	9.86
Omphalitis	22	06	1.44	16	5.25	00	0.00
Salmonellosis	133	74	17.79	37	12.13	22	15.49
Fowl Cholera	21	21	5.05	00	0.00	00	0.00
Infectious Coryza	18	18	4.33	00	0.00	00	0.00
Necrotic Enteritis	10	05	1.20	50	1.64	00	0.00
Infectious Bursal Disease	156	42	10.10	85	27.87	29	20.42
Infectious Bronchitis	62	24	5.77	38	12.46	00	0.00
Newcastle Disease	115	60	14.42	23	7.54	32	22.54
Fowl Pox	13	13	3.13	00	0.00	00	0.00
Marek's Disease	04	04	0.96	00	0.00	00	0.00
Mycoplasmosis	106	47	11.30	47	15.41	12	8.45
Aspergillosis	49	17	4.09	25	8.20	07	4.93
Coccidiosis	65	31	7.45	08	2.62	26	18.31
Total	**863**	**416**	**48.20**	**305**	**35.34**	**142**	**16.45**

In the present study, 5.45%, 2.90% and 1.97% prevalence of colibacillosis is found respectively in summer, winter and rainy season. 1.16%, 0.81% and 0.58% prevalence of omphalitis was found subsequently in summer, rainy and winter season.In our study, rainy season (6.60%) was found to be the most prevalent for salmonellosis followed by 4.98% and 3.82% respectively in summer and winter season.For fowl cholera, highest prevalence (1.39%) was recorded in summer followed by 0.58% and 0.46% in rainy and winter season respectively.Seasonal prevalence of infectious coryza was found more in winter (1.16%) than rainy season (0.93%).According to the findings of our study, necrotic enteritis is prevalent almost all the year round but mostly prevalent in summer (0.58%) followed by

Comment [21051182G12]: Please rephrase the sentences. Avoid start with number.

winter (0.35%) and rainy season (0.23%). IBD is mostly prevalent in summer (8.46%) followed by winter (5.68%) and rainy season (3.94%).3.48%, 2.09% and 1.62% prevalence of IB was found respectively in winter, rainy and summer season.In our investigation, highest prevalence of ND found in summer season (6.37%) followed by rainy (4.98%) and winter season (1.97%).Summer (0.93%) was found highly prevalent season for fowl pox followed by rainy (0.35%) and winter season (0.23%).Marek's disease was highly prevalent in summer (0.35%) followed by rainy (0.12%) and winter season (0%).CRD is prevalent almost all the year round but summer (4.98%) is found to be the most prevalent followed by winter (4.52%) and rainy season (2.78%).For aspergillosis, highest prevalence (3.71%) was recorded in winter followed by 1.16% and 0.81% in rainy and summer season respectively.Coccidiosisis prevalent almost all the year round but more prevalent in winter (3.48%) than summer (2.67%) and rainy (1.39%) season(shown in Table 3).

Table 3.Prevalence of the diseases in commercial chickens in relation to seasons

Comment [21051182G13]: Please add year of duration or month of data collection.

Name of the diseases	Identified cases (n)	Summer		Winter		Rainy	
		No. of cases (n)	Prevalence (%)	No. of cases (n)	Prevalence (%)	No. of cases (n)	Prevalence (%)
Colibacillosis	89	47	5.45	25	2.90	17	1.97
Omphalitis	22	10	1.16	05	0.58	07	0.81
Salmonellosis	133	43	4.98	33	3.82	57	6.60
Fowl Cholera	21	12	1.39	04	0.46	05	0.58
Infectious Coryza	18	00	0.00	10	1.16	08	0.93
Necrotic Enteritis	10	05	0.58	03	0.35	02	0.23
Infectious Bursal Disease	156	73	8.46	49	5.68	34	3.94
Infectious Bronchitis	62	14	1.62	30	3.48	18	2.09
Newcastle Disease	115	55	6.37	17	1.97	43	4.98
Fowl Pox	13	08	0.93	02	0.23	03	0.35
Marek's Disease	04	03	0.35	00	0.00	01	0.12
Mycoplasmosis	106	43	4.98	39	4.52	24	2.78
Aspergillosis	49	07	0.81	32	3.71	10	1.16
Coccidiosis	65	23	2.67	30	3.48	12	1.39
Total	**863**	**343**	**39.75**	**279**	**32.33**	**241**	**27.93**

4. Discussion

In this study, the overall prevalence of IBD was recorded 18.08% in Barishal district. This result was higher than 11.80% and 16.9% reported respectively by Giasuddin et al. [9] and Islam et al. [10]. Previously, it was recorded as 19.16% and 22.00% of IBD reported by Talha et al. [11] and Badruzzaman et al.[12], respectively which was higher from the present study. In this investigation, the prevalence of IBD was found 27.87%, 20.42% and 10.10% in broiler, sonali and layer chickens respectively. Rahmanet al.[13] reported highest prevalence

of IBD (15.3%) in broiler than layer and sonalichikens.These findings support the results of our study. On the contrary, sonali chickens were found to be the highest prevalent for IBD reported by Islam et al.[14] where they reported 39% prevalence of IBD in sonali chickens. Most of the flocks where IBD were recorded are vaccinated. Findings indicated that in most cases vaccination could not protect the birds due to faulty method of vaccination or breaks of vaccine. According to Godwin [15], there are several factors that are involved in vaccine breaks. These are (a) vaccine type, storage and handling, or (b) condition of the birds including the level of maternal antibody or (c) administration of vaccine. According to the findings of our study, IBD is prevalent almost all the year round but mostly prevalent in summer (8.46%) followed by winter (5.68%) and rainy season (3.94%). These observations are similar with the findings of Badruzzamanet al.[12] where they recorded the prevalence of IBD 8.81%, 7.25% and 5.92% respectively in summer, winter and rainy season. This variation may be due to geographic variation.

In the present study 13.33% of cases of ND was reported which is higher than 8.92% and 10.24% recorded respectively by Uddin et al. [16] and Talha et al. [11]. On the contrary, the study more or less supports the findings of Badruzzamanet al.[12] who reported 13.84% of ND prevalence. At the same time, Islam et al. [10] recorded 14.1% cases of ND in commercial chickens which are higher from the present study. Highest prevalence of ND (22.54%) was found in sonali followed by 14.42% and 7.54% respectively in layer and broiler chickens. Al Mamunet al. [17] reported 19.56%, 17.54%, and 11.78% prevalence of ND respectively in sonali, layer and broiler chicken; this findings are in support of our study. In our investigation, highest prevalence of ND found in summer season (6.37%) followed by rainy (4.98%) and winter season (1.97%). These findings are in agreement with the findings of Islam et al. [14] who showed the higher prevalence of ND in summer season (3.48%) than rainy (2.36%) and winter season (0.88%). Our findings indicated that ND in commercial chickens especially in sonali chickens was still a threat to the poultry which might be due to several factors that might trigger the disease frequency like geographical variation, genetic variation of the species, dense poultry population, types and methods of vaccination, presence of maternal antibody, faulty storage and handling of vaccine, administration of vaccine, and environment also.

In the present investigation, 15.41% of salmonellosis cases were recorded but a higher 28.56% incidence of the disease was reported by Hassan et al. [18]. On the contrary, Uddinet al. [16] and Islam et al. [10] described 7.68% and 14.6 % prevalence of salmonellosis, respectively. Islam et al. [14] described highest prevalence of salmonellosis in layer (18.3%) followed by sonali (7.6%) and broiler chickens (6.6%). These findings are support in our study. In our investigations, rainy season (6.60%) was found to be the most prevalent for salmonellosis followed by 4.98% and 3.82% respectively in summer and winter season. These findings are in agreement with Uddinet al. [16] who reported 3.70%, 2.32% and 1.66% prevalence of salmonellosis in rainy, summer and winter season respectively.

Hassan et al. [18] recorded 8.3% cases of colibacillosis. In the present study, colibacillosis constituted 10.31% of the total cases. Whereas Islam et al.[19] found 10.5% prevalence of colibacillosis which is higher from the present study. Layer chicken (12.98%) is found to be the highest prevalent forcolibacillosis followed by 9.86% and 6.89% subsequently in sonali and broiler chickens. Similarly, Islam et al.[14] described highest prevalence of colibacillosis in layer 24.2% followed by 15.4% and 13.6% respectively in broiler and sonali chickens. These findings are more or less similar to our study. In the present study, 5.45%, 2.90% and 1.97% prevalence of colibacillosis is found respectively in summer, winter and rainy season. These findings are in similar with Al Mamunet al.[17] who reported 8.60%, 6.51% and 5.33% prevalence in summer, winter and rainy season respectively. This higher incidence of

sallmonellosis and colibacillosis in these areas might be due to unhygienic management of the farm, supply of contaminated water and feed that has become a widespread problem.

In Barishal district, the prevalence of CRD is recorded as 12.28% which is slightly higher from the findings of Hassan et al. [18], Talhaet al.[11] where they recorded 10.89% and 11.55% respectively. In contrast, Haque et al. [20] reported a higher 15.38% prevalence of CRDin commercial chickens.Highest prevalence of CRD (15.41%) was found in broiler followed by 11.30% and 8.45% respectively in layer and sonali chickens. Our study is in agreement with Islam et al. [14] who reported 22.5%, 9.1% and 6% prevalence in broiler, layer and sonali chicken respectively. According to the findings of our study, CRD is prevalent almost all the year round but summer (4.98%) is found to be the most prevalent followed by winter (4.52%) and rainy season (2.78%). But,Uddinet al. [16]showed that the highest prevalence of CRD in rainy (5.37%) followed bywinter (3.70%) and summer season (0.80%) which is different from the findings of our study.

Infectious bronchitis was found 7.18% in commercial chicken. These findings are in agreement with the findings of Al Mamunet al.[17] who reported 7.12% prevalence of infectious bronchitis. In other ways, Bhuiyan et al. [21]found 17.52% positive cases which are higher from the present study. From the present investigation, infectious bronchitis is found to be the most prevalent in broiler (12.46%) followed by layer (5.77%) and sonali (0%) chickens. Hassan et al. [18]also reported the highest prevalence of infectious bronchitis in broiler (15.38%) followed by 3.19% and 0% subsequently in layer and sonali chickens. These findings are similar to the present study. In this study, 3.48%, 2.09% and 1.62% prevalence of infectious bronchitis was found respectively in winter, rainy and summer season. These findings are similar with the study of Bhuiyan et al. [21]who recorded highest prevalence in winter (22.67%) followed by rainy (15.87%) and summer season (11.58%). Here, we observed infectious bronchitis was more prevalent in broiler than layer and sonali chickens. This variation may be due to breed variation or problems in vaccination.

In this investigation, the prevalence of coccidiosis was recorded 7.53% which was less than previous study, reported by Islam et al.[22] and Islam et al. [10] where they showed the prevalence 9.46% and 9.9%, respectively. On the other hand, the study supports the findings of Uddinet al. [16] who reported 7.32% prevalence of coccidiosis. In this study, higher prevalence of coccidiosis is found in the case of sonali (18.31%), followed by growing layer (7.45%) and broiler chickens (2.62%). This study supports the findings of Al Mamunet al. [17] who reported 10.70%, 9.16%, and 6.93% prevalence of coccidiosis subsequently in sonali, layer and broiler birds. But, Islam et al. [10] described highest prevalence in broiler (15.39%) followed by 7.5% and 5.56% respectively in sonali and layer birds. Here, we observed that coccidiosis was more prevalent in winter (3.48%) than summer (2.67%) and rainy (1.39%) season. Similarly, Uddinet al. [16] found highest prevalence in winter (2.94%) followed by 2.46% and 1.92% respectively in rainy and summer season. These findings are in agreement with our study. This variation might be due to species variation and use of anticoccidial drug in case of broiler feed.

In our investigation, the prevalence of fowl cholera was found 2.43% in Barishaldistrict which is more or less similar to the findings of Hassan et al. [18] who reported 2.2% prevalence. On the contrary, Raji et al. [23]reported 4.7% which is higher from the present study. Fowl cholera was found to be the most prevalent in layer chickens (5.05%). These findings are in similar with Islam et al. [14]and Islam et al. [19]who also reported the highest prevalence in layer (4.4% and 7.2%) followed by sonali (0.9% and 3.9%) and broiler chickens(0.6% and 0%) respectively. These reports are in agreement with the findings of our study. Highest prevalence (1.39%) was recorded in summer followed by 0.58% and 0.46% in rainy and winter season respectively from the present study. Previous reporter, Al Mamunet al. [17]

showed that the prevalence of fowl cholera in summer is 2.41% followed by 1.99% and 1.06% respectively in rainy and winter season which is similar to the present study.

The prevalence of aspergillosis was found 5.68% which is differentiated to the earlier reporterBadruzzaman et al. [12] who reported 7.2% in commercial chickens. But, Talha et al. [11] recorded 4.20% aspergillosis which is lower from the present study. 8.20%, 4.93% and 4.09% prevalence was recorded in broiler, sonali and layer chickens in this study. But, Sultana et al. [24]recorded the incidence of aspergillosis was 6.14% in commercial broiler chickens. For aspergillosis, highest prevalence (3.71%) was recorded in winter followed by 1.16% and 0.81% in rainy and summer season respectively.This findings support the study of Uddinet al. [16] who recorded 3.95%, 3.31% and 0.72% prevalence respectively in winter, rainy and summer season. On the other hand, Islam et al. [22]and Sultana et al. [24]described highest prevalence of aspergillosis in rainy (11.68% and 8.22%) followed by summer (5.33% and5.16%) and winter season(0.52% and 3.16%).

In the present findings, 2.09% prevalence of infectious coryza was found but, Talhaet al. [11] recorded 0.52% of positive cases. 4.33% prevalence of infectious coryza was recorded only in layer chickens. ButAbbas et al. [25] recorded 2.50% and 2.52% prevalence in broiler and layer chickens, respectively. Seasonal prevalence was found more in winter (1.16%) than rainy season (0.93%). Similarly, Al Mamun et al. [17] reported higher prevalence in winter (0.76%) than rainy season (0.15%).

The prevalence of fowl pox was noted 1.51% in this investigation which is more or less similar to the findings of Islam et al. [10] who showed 1.4% of positive cases. Conversely, Islam et al. [19] described a relatively higher prevalence of fowl pox 2.3% in chickens. Highest prevalence (3.13%) in layer chickens was recorded in the present study. These findings support Islam et al. [19]who described 3.6%, 2.6% and 0.5% prevalence of fowl pox respectively in layer,sonali and broiler chickens. Summer (0.93%) was found highly prevalent season for fowl pox followed by rainy (0.35%) and winter season (0.23%).

Islam et al. [22] noted 2.81% positive cases of omphalitis. These findings support the present study where prevalence was recorded 2.55% in commercial chickens. From this investigation, 1.16%, 0.81% and 0.58% prevalence of omphalitis was found subsequently in summer, rainy and winter season. This findings support the study of Badruzzamanet al. [12] who reported the highest prevalence in summer (2.701%) followed by rainy (1.659%) and winter season (0.948%) respectively.

The present study showed 1.16% of necrotic enteritis in Barishal district that is higher than the study of Hassan et al.[18] where it was described as 0.74% positive cases. From the present study, a relatively higher incidence was found by Islamet al. [19]who reported 2.9% cases of necrotic enteritis. In our study, necrotic enteritis was found to be the highest in broiler (1.64%). These findings are in agreement with the investigation of Islam et al.[10]who also reported the highest prevalence in broiler (2.89%). On the other hand, Islamet al. [19] recorded highest prevalence of necrotic enteritis in layer (3.6%) followed by sonali (2.6%) and broiler chickens (2%). According to the findings of our study, necrotic enteritis is prevalent almost all the year round but mostly prevalent in summer (0.58%) followed by winter (0.35%) and rainy season (0.23%). At the same time, Al Mamunet al. [17] described 3.32% (summer), 2.59% (rainy), and 0.30% (winter) prevalence of necrotic enteritis in commercial chickens. These findings are more or less similar to the findings of our study.

In accordance with the findings of the study, marek's disease was found 0.46% in commercial chickens. In layer, the prevalence was recorded 0.96% which is higher from the findings of Islam et al. [14] who described 0.4% prevalence in layer chickens. Marek's

disease was highly prevalent in summer (0.35%) followed by rainy (0.12%) and winter season (0%). However, there is a variation among the previous report and the present research findings; this variation on findings may due to variation in farm managements, variation in region and climate, sample size, diagnostic procedure, geographic location, exposure of causal agents.

5. CONCLUSION

In accordance with the findings of this investigation, IBD was found to be the highest (18.08%) followed by salmonellosis (15.41%), ND (13.33%), CRD (12.28%), colibacillosis (10.31%), coccidiosis (7.53%), infectious bronchitis (7.18%), aspergillosis (5.68%), omphalitis (2.55%), fowl cholera (2.43%), infectious coryza (2.09%), fowl pox (1.51%), necrotic enteritis (1.16%), and marek's disease (0.46%). Most of the diseases occurred in the summer (39.75%) followed by (32.33%) and (27.93%) in winter and rainy season respectively.The results of the current study provide an overall layout of disease prevalence in commercial chickens in the Barishal district of Bangladesh. Importance should be given to proper immunization processes, high degree of biosecurity, and good management practices for effective prevention and control of diseases to establish profitable and sustainable poultry farms in these areas.

REFERENCES

1. Islam MA, Nishibori M. Indigenous naked neck chicken: a valuable genetic resource for Bangladesh. World's Poult. Sci. J. 2009;65(1):125-138.

2. Prabakaran R. Good practices in planning and management of integrated commercial poultry production in South Asia. FAO Animal Production and Health Paper 159, Food and Agriculture Organization of the United Nations, Rome, Italy; 2003.

3. Da Silva CA, Rankin M. Contract farming for inclusive market access. Food and Agriculture Organization of the United Nations, Rome, Italy; 2014. pp. 227.

4. Banerjee GC. Poultry. 3rd ed. Oxford & ONH Publishing Co. Pvt. Ltd: New Delhi; 2004.

5. Islam MT, Samad MA. Mortality in chicks associated with economic impact and prospect of layer chick rearer package programme of the participatory livestock development project in Bangladesh. Int. J. Poult. Sci. 2004;3(2):119-123.

6. Meseret S. A review of poultry welfare in conventional production system. Livest. Res. Rural Dev. 2016;28:12.

7. Carrique-Mas J, et al. Mortality, disease and associated antimicrobial use in commercial small-scale chicken flocks in the mekong delta of Vietnam. Prevent. Vet. Med. 2019;165:15-22.

8. Yunus AW, Nasir MK, Aziz T. Prevalence of poultry diseases in district Chakwal and their interaction with mycotoxicosis: Effects of season and feed. J. Anim. Plant Sci. 2009;19(1):1-5.

9. Giasuddin M, Sil BK, Alam J, Koike I, Islam MR, Rahman MM. Prevalence of poultry diseases in Bangladesh. Online J. Biol. Sci. 2002;2(4):212-213.

10. Islam SS, Islam MS, Siddiqe MZF, Shawon RH, Hanif SM, Rahman MA, 2014. Diseases of birds and their responses to treatment in different regions of Bangladesh. Int. J. Nat. Soc. Sci. 2014;1(2):31-36.

11. Talha AFSM, Hossain MM, Chowdhury EH, Bari ASM, Islam MR, Das PM. Poultry diseases occurring in Mymensingh district of Bangladesh. Bangladesh Vet. 2001;18(1): 20-23.

12. Badruzzaman ATM, Noor M, Mamun MAL, Rahman M, Husna A, Islam KM. Prevalence of diseases in commercial chickens at Sylhet division of Bangladesh. Int. Clin. Pathol. J. 2015;1(5):104-108.

13. Rahman MA, Rahman MM, Moonmoon M, Alam KJ, Islam MZ. Prevalence of common diseases of broiler and layer at Gazipur district in Bangladesh. Asian J. Med. Biol. Res. 2017;3(2):290-293.

14. Islam M, et al. Common chicken diseases in Kishoreganj, Bangladesh: estimation through the veterinary hospital-based passive surveillance system. Adv. Anim. Vet. Sci. 2021;9(11):1951-1958.

15. Godwin AL. Common causes of vaccine failure in developing countries with special reference to Srilanka. Proceeding of the 2nd International Poultry Show and Seminar of World Poultry Association, Dhaka, Bangladesh; 2001. pp: 101-104.

16. Uddin MB, Ahmed SSU, Hassan MM, Khan SA, Mamun MA. Prevalence of poultry diseases at Narsingdi, Bangladesh. Int. J. Bio. Res. 2010;1(6):09-13.

17. Al Mamun M, Islam KM, Rahman MM. Occurrence of poultry diseases at Kishoregonj district of Bangladesh. MOJ Proteom. Bioinform. 2019;8(1):7-12.

18. Hassan MK, Kabir MH, Hasan MAA, Sultana S, Khokon MSI, Kabir SML. Prevalence of poultry diseases in Gazipur district of Bangladesh. Asian J. Med. Biol. Res. 2016;2(1):107-112.

19. Islam MT, et al. A retrospective study of common poultry diseases at Gazipur district of Bangladesh. Bangladesh J. Ecol. 2020;2(2):113-120.

20. Haque E, Uddin G, Akter S. Prevalence of Mycoplasmosis of Chickens at Kotwali Thana in Chittagong, Bangladesh. J. Fisheries Livest. Prod. 2015;3:151.

21. Bhuiyan ZA, Ali MZ, Moula MM, Giasuddin M, Khan ZUM. Prevalence and molecular characterization of infectious bronchitis virus isolated from chicken in Bangladesh. Vet. World. 2019;12(6):909-915.

22. Islam MR, Das BC, Hossain K, Lucky NS, Mostafa MG. A study on the occurrence of poultry diseases in Sylhet region of Bangladesh. Int. J. Poult. Sci. 2003;2(5):354-356.

23. Raji MA, Ahmed JS, Saidu L, Ameh JA. Retrospective studies on the Prevalence of Fowl Cholera in Zaria, Kaduna State, Nigeria. Sokoto J. Vet. Sci.2010;8(1&2):9-11.

24. Sultana S, Harun-ur-Rashid SM, Islam MN, Ali MZ. Pathological investigation of avian Aspergillosis in commercial broiler chicken at Chittagong district. Int. J. Adv. Res. Biol. Sci. 2014;1(8):74–85.

25. Abbas G, Khan SH, Hassan M, Mahmood S, Naz S, Gilani SS. Incidence of poultry diseases in different seasons in Khushab district, Pakistan. J. Adv. Vet. Anim. Res. 2015;2(2):141-145.