Prevalence of Major Infectious Diseases of Commercial Chicken in Bangladesh: A Review

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List of Abbreviations

Abbreviation	Elaboration
IBD	Infectious Bursal Disease
ND	Newcastle Disease
IB	Infectious Bronchitis
FC	Fowl Cholera
NE	Necrotic Enteritis
DVM	Doctor of Veterinary Medicine

Abstract

A number of infectious diseases hindered the growth of poultry industry in Bangladesh. But information on the prevalence of infectious diseases are limitedly available. The study was to accumulate the reported data to provide a overview about the prevalence of infectious diseases. Relevant articles were searched using google scholar published in between 2001 and 2009. The articles that fulfilled the inclusion criterias were included in the study and other articles were excluded. Data was extracted and recorded in table. Proportionate prevalence was used for the comparison between bird type. In broiler chicken, the observed range of prevalence of IBD was (17-28%) followed by ND (8-10%), IB (0-15%), Salmonellosis (1-15%), Colibacillosis (3-12%), Mycoplasmosis (7-12%) and Coccidiosis (3-8%) in commercial farming. In commercial layer chicken the observed range of prevalence of IBD was (01-12%), ND (6-17%), IB (0-5%), Colibacillosis (3-15%), Salmonellosis (5-30%), Mycoplsmosis (9-15%) and Coccidiosis (5-12%). In this study, it was observed that there was a marked influence of different seasons on the occurrence of different diseases. Proper vaccination measures are recommended to control diversified diseases.

Keywords: Poultry industry, infectious diseases, prevalence, Bangladesh.

Chapter-1

Introduction

One of the sources for income generation is poultry farming practiced traditionally in rural area of Bangladesh especially by the landless and marginal farmers (Paul et al., 1990). Though the commercial poultry farming has started during 1980's, now it has turned out as an industry.

Poultry industry, a subsector of agriculture is a faster growing sector and plays important role in poverty alleviation as well as economy of Bangladesh (Paul et al., 1990). There is approximately 337.97 million poultry in Bangladesh where chicken comprises 282.15 million and duck comprises 55.85 million (DLS, 2017-18). About 20% people are directly and 45% people are partly associated with poultry farming. The contribution of livestock sector in the GDP is 1.54% (DLS, 2017-18).

Bangladesh has made considerable progress in reducing child stunning and lauded as a success story in global nutrition fora. Poultry industry contributes 1552.00 cores egg and 72.60 lakhs metric ton meat per year (DLS, 2017-18). The poultry sector provides 22-27% of the total human protein demand in Bangladesh (Hamid et al., 2017).
Though improvement many people remained undernourished where poultry industry can contribute as chicken meat is relatively cheap and affordable source of animal protein (Yami and Dessie, 1997).
Many diseases are the major constrains for this faster growing sector (Karim, 2003). About 30% mortality of chicken in Bangladesh is due to infectious diseases (Ali, 1994). Several factors such as geographical location, climate, farm hygiene and bio-security, production type, species, age, sex, immunization status and vaccine failure are responsible for the diseases (Chakma, 2015; Talukdar et al., 2017).

ND was the earliest economically important infectious diseases (Islam et al., 1998) whereas IBD was first reported in 1992 (Rahman et al., 1996). Salmonellosis causes more than 10% mortality as well as reduces egg production and hatchability upto 20-30% (Fehervari, 1994; Haque et al., 1997). The number of poultry farms had reduced to about 90,000 from 1.5 lakh due to 2007-08 outbreak of the bird flu scare (Daily star, 2011).

The commonly reported disease prevalence in chicken are IBD (19.2-25%), ND (8.9-34%), Salmonellosis (5.5-13.1%), Colibacillosis (0.8-5.1%) and Mycoplasmosis (10%) (Islam et al., 2014; Matin et al., 2017).

During last few years several diseases like aflatoxicosis, Chicken infectious anaemia, Egg drop syndrome and some unknown factors threat the poultry industry and caused huge damage. Some emerging diseases are also responsible for poultry mortality in Bangladesh.

Constrains in the poultry industry due to diseases also affect the public health as farmers use antibiotic unnecessarily without prescribed by a veterinarian. Diseases in broiler significantly affect the productivity and health status and many of them also have public health importance (Islam et al., 2007; Haider et al., 2008).

The poultry industry will be lying behind unless the practitioners know the cause of mortality. The epidemiological knowledge, pathogenesis and pathology of a particular disease is prerequisite in the proper diagnosis of the malady.

The aim of this study is to provide the field practitioners with an overview about the prevalence of major infectious diseases of chicken in Bangladesh.

Chapter 2

Methods

2.1 Search Strategy:

The articles were searched using Google Scholar sorted by relevancy about the prevalence of infectious disease in commercial chicken in Bangladesh published from 2001 to 2019. Three types of data were revealed: broiler chicken separately, layer chicken separately and broiler and layer chicken combinedly. The reference lists of retrieved articles were directly included in this article.

2.2 Inclusion and Exclusion Criteria:

Titles and abstracts of the searched studies were reviewed to identify relevant studies. The studies that met the inclusion criterias were included and other articles were excluded.

Any article to be included in the analysis had the following inclusion criterias; published between 2001 and 2019, related to commercial farming, studies performed within the boundary of Bangladesh, provided with prevalence of major infectious diseases of commercial chicken.

2.3 Data Extraction:

A pretested data extraction spreadsheet was developed and evaluated. The articles were reviewed and data were extracted on author and year, area, types of chicken, size of the sample, prevalence of different diseases.

2.4 Data analysis:

Proportionate prevalence of different diseases of commercial chicken were used for the comparison between bird type in this study.

Chapter 3

Results and Discussion:

A total of 22 articles were selected initially bases on relevancy. 10 articles were excluded that did not fulfill the inclusion criterias and other 12 articles were included in this analysis. Some other articles were also included for the reference related to this study.

Articles included in this study (n=12)

1. Hassan MK, Kabir MH, Al Hasan MA, Sultana S, Khokon MS, Kabir SL. Prevalence of poultry diseases in Gazipur district of Bangladesh. *Asian Journal of Medical and Biological Research. 2016 May 15;2(1):107-12.*
2. Giasuddin M, Sil BK, Alam J, Koike I, Islam MR, Rahman MM. Prevalence of poultry diseases in Bangladesh. *Journal of Biological Sciences. 2002;2(4):212-3.*
3. Al Mamun M, Islam KM, Rahman MM. Occurrence of poultry diseases at Kishoregonj district of Bangladesh. *MOJ Proteomics Bioinform. 2019;8(1):7-12*.
4. Uddin MB, Ahmed SS, Hassan MM, Khan SA, Mamun MA. Prevalence of poultry diseases at Narsingdi, Bangladesh. *International Journal of Biological Research. 2010;1(6):09-13.*
5. Ahmed MS, Sarker A, Rahman MM. Prevalence of infectious diseases of broiler chickens in Gazipur district. *Bangladesh Journal of Veterinary Medicine. 2009;7(2):326-31.*
6. Badruzzaman AT, Noor M, Mamun MA, Husna A, Islam KM, Alam KJ, Rahman MM. Prevalence of diseases in commercial chickens at Sylhet Division of Bangladesh. *International Clinical Pathology Journal. 2015;1(5):00023.*
7. Rahman MA, Rahman MM, Moonmoon M, Alam KJ, Islam MZ. Prevalence of common diseases of broiler and layer at Gazipur district in Bangladesh. *Asian Journal of Medical and Biological Research. 2017 Aug 29;3(2):290-3.*
8. Talha AF, Hossain MM, Chowdhury EH, Bari AS, Islam MR, Das PM. Poultry diseases occurring in Mymensingh district of Bangladesh. *The Bangladesh Veterinarian. 2001;18(1):20-3.*
9. Islam MR, Das BC, Hossain K, Lucky NS, Mostafa MG. A study on the occurrence of poultry diseases in Sylhet region of Bangladesh. *International Journal of Poultry Science. 2003;2(5):354-6.*
10. Rahman MA, Rahman MM, Abdullah MS, Sayeed MA, Rashid MH, Mahmud R, Belgrad JP, Hoque MA. Epidemiological assessment of clinical poultry cases

through the government veterinary hospital-based passive surveillance system in Bangladesh: a case study. *Tropical animal health and production. 2019 May 1;51(4):967-75.*

11. Rahman MA, Samad MA. Important viral diseases associated with mortality of layer chickens in commercial poultry farms in Bangladesh. *Bangladesh Journal of Veterinary Medicine. 2005;3(1):01-5.*
12. Rahman MA, Adhikary GN. POULTRY DISEASES IN SOME SELECTED AREAS IN SYLHET DISTRICT OF BANGLADESH.

The included studies represent data from 5 different districts whereas data were collected from over the country in 1 study. The highest number (4) of studies (n=12) were reported from Gazipur district, 3 studies were from sylhet district, 2 from Kishoregonj district, 1 from Mymensingh and 1 from Narsingdi.

Table 01: Prevalence of major viral diseases in commercial chicken.

Bird type	Study area	Sample size	Disease prevalence (%)			Author and year
			IBD	ND	IB	
Broiler Chicken	Gazipur	338	28.99	8.87	15.38	Hassan et al., (2016).
	Over the country	515	13.20	6.41	--	Giasuddin et al., (2002).
	Kishoregonj	1197	29.32	11.78	9.27	Mamun et al., (2019).
	Gazipur	199	11.06	--	--	Ahmed et al., (2009).
	Gazipur	189	15.3	9	--	Rahman et al., (2017).
	Kishoregonj	80	58.7	10	--	Rahman et al., (2018).
Layer Chicken	Gazipur	313	0.95	16.61	3.19	Hassan et al., (2016).
	Over the country	552	9.24	6.52	--	Giasuddin et al., (2002).
	Sylhet	513	9.16	17.54	4.09	Mamun et al., (2019).
	Gazipur	189	8.4	10.3	--	Rahman et al., (2017).
	Kishoregonj	87	6.9	32.1	1.1	Rahman et al., (2018).
	Gazipur	1751	11.20	10.34	0.63	Rahman and Samad (2005).
Broiler and Layer Chicken Combined	Narsingdi	1263	24.96	8.92	0.24	Uddin et al., (2010).
	Sylhet	2110	22	13.84	--	Badruzzaman et al., (2015).
	Mymensingh	381	19.16	10.24	--	Talha et al., (2001).
	Sylhet	1352	24.26	6.73	0.29	Islam et al., (2003).
	Sylhet	1494	16.27	10.78	--	Rahman and Adhikary (2016).

Table 02: Prevalence of major bacterial diseases in commercial chicken.

Bird type	Study area	Sample size	Disease prevalence (%)			Author and year
			Colibacillosis	Salmonellosis	FC	
Broiler Chicken	Gazipur	338	7.69	21.0	--	Hassan et al., (2016).
	Over the country	515	3.49	0.19	--	Giasuddin et al., (2002).
	Kishoregonj	1197	6.43	14.29	--	Mamun et al., (2019).
	Gazipur	199	52.26	1.01	--	Ahmed et al., (2009).
	Gazipur	189	33.4	--	--	Rahman et al., (2017).
	Kishoregonj	80	11.2	--	--	Rahman et al., (2018).
Layer Chicken	Gazipur	313	6.7	38.56	4.79	Hassan et al., (2016).
	Over the country	552	4.17	5.07	3.62	Giasuddin et al., (2002).
	Sylhet	513	7.01	30.60	5.26	Mamun et al., (2019).
	Gazipur	189	15.9	--	--	Rahman et al., (2017).
	Kishoregonj	87	3.4	9.2	6.9	Rahman et al., (2018).
	Gazipur	1751	--	--	--	Rahman and Samad (2005).

Table continued:

Broiler and Layer Chicken Combined	Narsingdi	1263	5.7	7.68	0.24	Uddin et al., (2010).
	Sylhet	2110	14.03	12.18	2.7	Badruzzaman et al., (2015).
	Mymensingh	381	5.51	13.12	3.15	Talha et al., (2001).
	Sylhet	1352	5.17	6.73	0.45	Islam et al., (2003).
	Sylhet	1494	13.12	6.63	2.81	Rahman and Adhikary (2016).

Table 03: Prevalence of Mycoplasmosis and Coccidiosis in commercial chicken.

Bird type	Study area	Sample size	Disease prevalence (%)		Author and year
			Mycoplasmosis	Coccidiosis	
Broiler Chicken	Gazipur	338	7.1	6.5	Hassan et al., (2016).
	Over the country	515	5.63	3.88	Giasuddin et al., (2002).
	Kishoregonj	1197	4.85	6.93	Mamun et al., (2019).
	Gazipur	199	12.56	4.52	Ahmed et al., (2009).
	Gazipur	189	--	5.8	Rahman et al., (2017).
	Kishoregonj	80	5.2	27.5	Rahman et al., (2018).
Layer Chicken	Gazipur	313	14.7	5.75	Hassan MK et al., (2016).
	Over the country	552	9.96	4.53	Giasuddin et al., (2002).
	Sylhet	513	--	9.16	Mamun et al., (2019).
	Gazipur	189	12.1	6.5	Rahman et al., (2017).
	Kishoregonj	87	6.9	18.3	Rahman et al., (2018).
	Gazipur	1751	--	--	Rahman and Samad (2005).

Table continued:

Broiler and Layer Chicken Combined	Narsingdi	1263	9.78	9.16	Uddin et al., (2010).
	Sylhet	2110	11.66	7.87	Badruzzaman et al., (2015).
	Mymensingh	381	--	5.51	Talha et al., (2001).
	Sylhet	1352	5.32	9.46	Islam et al., (2003).
	Sylhet	1494	4.08	6.96	Rahman and Adhikary (2016).

IBD and ND were the major, among the viral diseases for commercial chicken are shown in **Table 1**. The reported prevalence of IBD is 11-29% in broiler chicken 6-11% in layer chicken and 16-25% when broiler and layer chicken were studied combinedly.

ND was reported at the prevalence of 6-12%, 06-32% and 6-14% in broiler, layer and mixed birds respectively. IB was reported at the prevalence of 0-1% in commercial chicken, but the prevalence in broiler chicken was slightly higher, 9-15%.

The prevalence of salmonellosis in broiler, layer and mixed chicken were 1-25%, 5-38% and 6-14% respectively; colibacillosis were reported at the prevalence of 7-33%, 3-7%, 5-15%. The prevalence of fowl cholera in layer was 3-7% are shown in **Table 2**.

The prevalence of mycoplasmosis and coccidiosis were 4-13%, 8-15%, 4-12% and 4-7%, 4-10%, 5-10% in broiler,layer and mixed chicken respectively are shown in **Table 3**.

The prevalence of IBD in broiler was higher than in layer chicken. Islam et al., (2003) and Das et al., (2005) reported 19.16%, 24.26% and 21.1% IBD in commercial chicken agreed with the result. In layer chicken, the prevalence was 6-11% supported by Bhattacharjee et al., (1996). ND showed a higher prevalence in layer chicken than that of broiler chicken. In broiler chicken prevalence was 6-12%. The prevalence of ND was higher in Kishoregonj district 17.54% (Mamun et al., 2019) and 32.1% (Rahman et al., 2018), and it might be due to higher stocking density (Naik et al., 2005) and vaccination failure. The prevalence of IB in commercial chicken was 1-5% which was almost similar to 0.90% (Abbas et al., 2015). The prevalence of IB was lower in layer chicken that might be due to effective vaccination. The highest prevalence of salmonellosis was

reported 21.30% in broiler and 38.56% in layer chicken in Gazipur district. This might be due to inappropriate hygienic practices. Other data closely resembled to the findings of Islam et al., (2003) and Das et al., (2005) who reported 6.73%, 24.4% and 23.2% prevalence respectively. The prevalence of coccidiosis was 4-10% in commercial chicken supported by (Talha et al., 2001). Highest prevalence was recorded 27.5% in broiler chicken in Kishoregonj (Rahman et al., 2018). It might be due to mismanagement of litter. The prevalence of mycoplasmosis was 8-15% in commercial chicken which was lower than 18.3% and 27% reported by Saleque et al.,(2003) and Haque et al., (2005) respectively.

Limitations

1. All the studies were not conducted in the same season or same type of environment.
2. Data was not available from all the districts across the country.
3. No statistical software was used during the analysis of data.
4. In same studies sample size was comparatively smaller that might not be a representative of a large population.

Conclusion

Among the diseases, infections bursal disease, Newcastle disease, salmonellosis, colibacillosis, mycoplasmosis and coccidiosis attack the poultry industry more frequently and cause great damage. Steps should be taken immediately in order to ensure food security for the people of Bangladesh.

References

Ahmed S, Hamid MA. Status of poultry production and development strategy in Bangladesh. InWorkshop on Livestock Development in Bangladesh, Savar, Dhaka (Bangladesh), 16-18 Jul 1991 1991. BLRI.

Ali MJ. Current status of veterinary biologics production in Bangladesh and their quality control. In Proceedings of the BSVER symposium held on July 1994 (Vol. 28, No. 1994, pp. 4-7).

Bhattacharjee PS, Kundu RL, Biswas RK, Mazumder JU, Hossain E, Miah AH. A retrospective analysis of chicken diseases diagnosed at the Central Disease Investigation Laboratory, Dhaka. Bangladesh Veterinary Journal. 1996;30(3-4):105-13

Barua H, Biswas PK, Olsen KE, Christensen JP. Prevalence and characterization of motile Salmonella in commercial layer poultry farms in Bangladesh. PloS one. 2012 Apr 25;7(4):e35914.

Das PM, Rajib DM, Noor M, Islam MR. Antibody response to Newcastle disease vaccines in commercial layer chickens. The Bangladesh Veterinarian. 2005;23 (1):1-8.

DLS, 2018. Annual Report, Department of Livestock Services. Ministry of Fisheries and Livestock, Govt. Of People's Republic of Bangladesh.

Hoque MM, Biswas HR, Rahman L. Isolation, identification and production of Salmonella pullorum coloured antigen in Bangladesh for the rapid whole blood test. Asian-Australasian Journal of Animal Sciences. 1997 Feb 1;10(1):141-6.

Haque E, Uddin G. Prevalence of Mycoplasmosis of Chickens at Kotwali Thana in Chittagong, Bangladesh. Journal of Fisheries & Livestock Production. 2015 Oct 24:1-3.

Islam MR, MAHNA K, Das PM, Bari AS. Poultry diseases diagnosed at necropsy in 1997 and 1998 in the Department of Pathology of Bangladesh Agricultural University, Mymensingh. InProceedings of the 5th BSVER Annual Scientific Conference 1998 Dec 3.

Islam MR, Das BC, Hossain K, Lucky NS, Mostafa MG. A study on the occurrence of poultry diseases in Sylhet region of Bangladesh. International Journal of Poultry Science. 2003;2(5):354-6.

Islam MT, Islam MA, Samad MA. Immunosuppressive effect of infectious brusal disease virus and vaccine on humoral immune response of broiler chickens to Newcastle disease vaccination. Progressive Agriculture. 2005; 16:71-5.

Karim MJ. Current disease pattern in poultry with special emphasis on parasites and their methods of control. InProceeding of the 3rd International Poultry Show and Seminar of World Poultry Science Association-Bangladesh Branch 2003 Feb 28 (pp. 119-123).

Naik BC, Babu YH, Mamatha GS. The immunomodulatory role of calf thymus extract on humoral and cell mediated immune response in chicken vaccinated against New Castle Disease virus. International Journal of poultry science. 2005;4(8):580-3.

Paul DC, Haque MF, Abedin MZ, Akter MS. Participation of women in poultry husbandry in rural Bangladesh. In10th AFRSE symposium held at machining university, USA, during 1990 Oct (pp. 14-17).

Rahman MM, Rahman A, Islam AH, Miah AH, Mazumder JU, Bhattacharjee PS. Observation on out breaks and sub-sequent control of Infectious bursal disease in the central poultry farm in Bangladesh. Bangladesh Vet. J. 1996;30:13-7.

Sah RL, Kataria JM, Arya SC, Verma KC. Outbreaks of acute infectious bursal disease causing high mortality in chicken. Indian Journal of Comparative Microbiology Immunology and Infectious Diseases. 1995;16:7-13.

Sil GC, Das PM, Islam MR, Rahman MM. Management and disease problems of cockrels in some farms of Mymensingh, Bangladesh. International journal of poultry Science. 2002;1(4):102-5.

Saleque MA, Rahman MH, Hossain MI. A retrospective analysis of chicken diseases diagnosed at the BRAC Poultry Disease Diagnostic Centre of Gazipur. Bangladesh Journal of Veterinary Medicine. 2003;1(1):29-31.

Sharif M. Current status of chicken coccidiosis in Gazipur and coccidiosis control in semi scavenging layer pullets (Doctoral dissertation, MS Thesis, submitted the

Department of Parasitology, Faculty of Veterinary Science, Bangladesh Agricultural University, Mymensingh, Bangladesh).

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Biography

I am **Mohammad Anwer Sayed**, son of **Mohammad Rafiqul Islam** and **Taslima Akter**. I passed my Secondary School Certificate examination in 2012 (GPA 5.00). After that I Passed my Higher Secondary Certificate examination in 2014 (GPA 5.00). Now I am an intern veterinarian under the Faculty of Veterinary Medicine in Chattogram Veterinary and Animal Sciences University, Chattogram, Bangladesh. I would like to work as a veterinary practitioner and work for the improvement of animal status in Bangladesh in upcoming days.