

CHAPTER-1

INTRODUCTION

Bangladesh is a land of agriculture where over 80% of the country's 160 million people live in rural areas and are highly depended on agriculture. There are approximately 153.6 million chickens (Bangladesh economic review, 2013) and 34.1 million ducks in the total population of Bangladesh (Banglapedia, 2012) and indigenous chickens constitute nearly 50% of the chicken population (DLS, 2008). In Bangladesh around 8% of total animal protein for human consumption comes from livestock (BBS, 2009). Meat and eggs are the two major source of animal protein, at present chicken contributes 51% of total meat production of the country though the share of broiler is not separated. Per capital annual consumption of meat in the country is 5.9 kg which is only 7.38 kg of universal standard (MoFL, 2006). The consumption of eggs annually per head in the country is against the maximum requirement of 104 eggs (DAS *et al.*, 2008). This sector employs about 5 million people of the country and has experienced a long – term growth rate of about 4.5%, which is one of the highest in the economy and is believed to have accomplished a silent revolution in Bangladesh (BLRI, 2008). For the improvement of national health status and the socio economic condition of the people of our country, establishment of broiler and layer poultry farms should be increased. One of the major constrains of the poultry farming is the outbreaks of several devastating diseases (like newcastle disease and infectious bursal disease) causing economic loss and discouraging poultry rearing.

ND is caused by avian paramyxovirus serotype-1 viruses under the genus Rubella virus and family pararrryxoviridae (Rima *et al.* 1995). Introduction of feed of diseased tissues, contamination of food and water, clothing, foot gear, trucks help to introduce the ND virus. The use of vaccines as spray and dust and water vaccine act as a transmitter of ND virus. Liberation of virus from the respiratory tract spread the ND virus in the flock (Beard and Hanson,1994). ND virus can be transmitted from hen through egg to hatchling. ND virus has been isolated from eggs laid by diseased hens. Embryonic death occurs during the first 4-5 days of incubation. In some instances, vaccine may serve to introduce the virus into the flocks or into regions, because it was not completely inactivated or contained the active virus as a contaminant (Beard and Hanson, 1994). ND can be diagnosed by observing signs and

postmortem findings. Serological test like ELISA, viral neutralization test can be used for diagnosis (Beard and Hanson, 1994). ND may cause mortality from 5 to 50% in adult and 90% in young chicks and morbidity may reach up to 100%. The greatest loss among laying bird's results from reduced egg production and impaired egg shell and albumen quality (A-1. Sreenivasu, 2002).

Gumboro Disease or Infectious bursal disease (IBD) is a chicken disease targeting the Bursa of Fabricius, an important organ in the young chicken's developing immune system. The causative agent, a Birna virus, destroys immature B-lymphocytes in the Bursa of Fabricius resulting in immunosuppression. Very virulent strains of IBDV can result in mortality of up to 40%. Control is best achieved by improved biosecurity and vaccination. (www.gumboro.com) Positive cases recorded were 195 (82.25%) in embryo inoculation and (79.16%) in agar gel precipitation test. Rahman *et al.* (1996). The occurrence of IBD was first studied for the first time in Bangladesh during period 1992-93, the work was carried out in CDIL, Dhaka and in the laboratory of department of microbiology and Hygiene, BAU (Rahman et al 1996). Butchers and miles observed that initially the bursa was swollen hyperemic, five days after infection. Anku found that the carcass were dehydrated, petechial hemorrhage in leg, thigh muscle, (2003).

The occurrence of diseases varies depending on the Geo climate condition, season, breed and age of the bird. Again the occurrence of particular disease in an area sometimes may be negligible and at other time it may cause havoc. In prevention and controlled strategies of a disease, the epidemiological knowledge and knowledge about the pathogenesis and pathology of particular disease is prerequisite in the proper diagnosis of the malady is very necessary. Among the various diagnosis procedures necropsy remains in key point. Considering the above mentioned facts the diagnostic investigation on the poultry diseases in Kishoreganj District Veterinary Hospital, Kishoreganj was undertaken in order to achieve the following objectives:

1. To observe the occurrence of new ND and IBD according to different strain, age, flock size, vaccination status etc.
2. To observe the frequent post mortem findings found in case of ND and IBD.

CHAPTER-2

MATERIALS AND METHODS

2.1. Study area:

This study was conducted in Kishoreganj District of Bangladesh.

2.2. Study time:

From 1st March, 2017 to 6th April, 2017 and from 5th July, 2017 to 4th August, 2017.

2.3. Study population:

A total of 180 commercial broiler, 120 layer farms were observed. Among them 16 broiler farms, 31 layer farms were recorded as Newcastle disease infection and 87 broiler farms, 15 layer farms were recorded as Infectious bursal disease infected were brought into District Veterinary Hospital, Kishoreganj.

2.4. Procedure of postmortem examination:

Post mortem examination of the sampled birds was done following standard procedure. The following materials and methods were used during the procedure:

2.4.1. Tools used in postmortem examination:

- Postmortem tray
- Scissors
- Simple forceps
- Gloves
- Masks

2.4.2. Steps followed during postmortem examination:

- At first general inspection was done on dead birds for detecting any defects or abnormalities that were present externally.
- After that a close inspection was done regarding the state of eye, presence or absence of litter materials in the beak.
- Then the birds were sprinkled with water for preventing any dust.
- Then the abdominal cavity was opened & inspection of visceral organs was done. Then the inspection of proventriculus, gizzard, liver and

intestine were done both internally & externally for detecting any sorts of lesions.

- The caecal tonsil & bursa were also inspected.
- Overall the internal organs were viewed at a glance.

2.4.3. Measures taken after postmortem examination:

- The birds were properly disposed by burial.
- The lesions on different organs were noted down in the questionnaire.
- Tentative diagnosis was done in relation to lesions.

2.5. Data collection:

Data were collected by questionnaire. The questionnaire was developed after reviewing several published paper to gather knowledge about ND and IBD at national level. The questionnaire was administered following a ‘face to face’ method. Farm owners/managers who brought the birds at the hospital were interviewed to collect data at bird, flock and farm level. The questionnaire is shown in appendix.



Figure 01



Figure 02



Figure 03



Figure 04

Figure 01-04: Collecting data from some poultry farm owner



Figure 05



Figure 06

Figure 05-06: Visiting different poultry farms for collecting data.

2.6. Diagnosis of diseases:

The birds were examined systematically and the postmortem changes were listed in the questionnaire during necropsy. Before postmortem examination the farm owner was interviewed to collect information about the history, i.e. the time of death, the time when illness started etc.



Figure 07



Figure 08

Figure 07-08: Performing post mortem of poultry

2.6.1. Case definition of ND:

1. Dehydrated and dull birds with some neurological signs.
2. Pin point hemorrhage in tip of glands of proventriculus, haemorrhagic tracheitis
3. Cecal tonsil haemorrhage.
4. In case of velogenic form: haemorrhagic plaque on intestine.



Figure 09



Figure 10

Figure-09-10: Pin point haemorrhage on tip of gland of proventriculus.



Figure-11: Haemorrhage on caecal tonsil

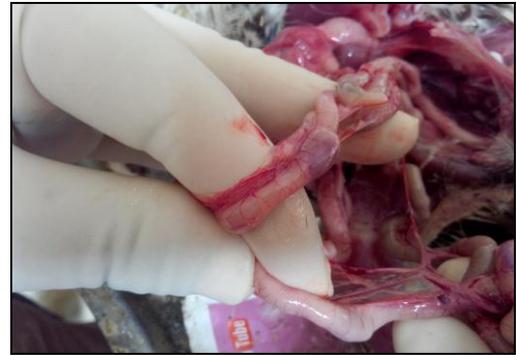


Figure-12: Velogenic form of ND

2.6.2. Case definition of IBD:

1. Enlarged and necrosed bursa of fabricious.
2. Yellowish gelatinous membrane over the swollen bursa.
3. Haemorrhage on bursa.
4. Pin point haemorrhage on breast and thigh muscle.
5. Mucous containing droppings in the ascending part of small intestine.



Figure-13: Haemorrhage on breast and thigh muscle.



Figure-14: Haemorrhage on bursa



Figure-15: Haemorrhage in the lining of proventriculus and gizzard in Infectious bursal disease



Figure-16: Pus in bursa in Infectious bursal disease

CHAPTER-3

RESULTS

The present pathological investigation detected that new castle disease and infectious bursal diseases are mainly responsible for the morbidity and mortality of chickens in Kishoreganj Sadar area. Birds were examined for diagnosis of diseases on the basis of history, clinical signs and post-mortem findings. The occurrence of new castle disease and infectious bursal disease in case of broiler and layer is presented in Table 1 where higher occurrence was recorded in case of IBD (34%) prior to ND (17.67%). In Table 2 this occurrence was categorized according to strain where the occurrence of ND and IBD was more in case of layer birds(30.8%) and broiler birds (48.3%) respectively. The frequency distribution of ND in case of broiler is showed in Table 3 where broiler birds from day 30 to the selling day is more susceptible (43.8%).In Table 4 it is clear that layer birds age range from 41 days to 252 days is very much susceptible (54.1%) for ND. The frequency distribution of IBD in case of broiler is showed on Table 5 where broiler birds from day 19th to day 26th are more susceptible (50.5%). In TABLE 6 it may be noted that layer birds age more than 26 are very much susceptible (66.6%)for having IBD.

Among 300 farms total 53 and 102 farms were recorded for ND and IBD respectively.

Table 01:Overall occurrence of occurrence of new castle disease and infectious bursal disease

Total Farms (N)	ND				IBD			
	Broiler (n)	Layer (n)	Total (n)	Percentage (%)	Broiler (n)	Layer (n)	Total (n)	Percentage (%)
300	16	37	53	17.67%	87	15	102	34%

Among 180 broiler farms 16 and 87 farms were recorded for ND and IBD respectively. For 120 layer farms 37and 15 farms were recorded for ND and IBD respectively.

Table 02: Overall occurrence of occurrence of new castle disease and infectious bursal disease according to strain:

Strain	Number of Farms(n)	Number affected		ND	IBD
		ND	IBD		
Broiler	180	ND	IBD	8.9%	48.3%
		16	87		
Layer	120	37	15	30.8%	12.5%

Table 03: Frequency distribution of ND in case of broiler (n=16):

Variable	Category	Frequency(n)	Percentage (%)
Age (days)	0-15	5	31.2
	16-30	4	25
	More than 30	7	43.8
Hatchery	Aftab	1	6.2
	Index	1	6.2
	Kazi	3	18.7
	Local	7	43.7
	Nourish	3	18.7
	Provita	1	6.2
Vaccination	Yes	5	31.2
	No	11	68.7
Flock	1	5	31.2
	2	8	50
	3	2	12.5
	5	1	6.2
Feed	CP	1	6.2
	Fast hope	3	18.7
	Kazi	2	12.5
	New hope	2	12.5
	Nourish	2	12.5
	Provita	3	18.7
	Quality	3	18.7
Flock size (n)	0-1134	5	31.2
	1135-2400	10	62.5
	More than 2400	1	6.2
Mortality (n)	0-19	4	25
	20-32	6	37.5
	More than 32	6	37.5
Mortality Rate (%)	0-2	9	56.2
	More than 2	7	43.7
Previous exposure	Yes	6	37.5
	No	10	62.5
Appeared to be diseased (n)	0-100	6	37.5
	More than 100	10	62.5
Affected days	1	3	18.7
	2	6	37.5
	3	3	18.7
	4	4	25

Table 04: Frequency distribution of Newcastle disease (ND) in case of layer (n=37):

Variable	Category	Frequency(n)	Percentage (%)
Age (days)	0-40	4	10.8
	41-252	20	54.1
	More than 252	13	35.1
Hatchery	Aftab	2	5.4
	Agro Bangla	4	10.8
	CP	7	18.9
	Goalondo	3	8.1
	Kazi	12	32.4
	Nahar	1	2.7
	Paragon	3	8.1
	Provita	5	13.5
Vaccination	Yes	34	91.8
	No	3	8.2
Flock	1	11	29.7
	2	13	35.1
	3	8	21.6
	4	3	8.1
	5	2	5.4
Feed	CP	5	13.5
	Kazi	10	27
	New hope	5	13.5
	Nourish	2	5.4
	Paragon	2	5.4
	Provita	9	24.3
	Quality	4	10.8
Flock size (n)	0-1134	9	24.3
	1135-2400	17	45.9
	More than 2400	11	29.7
Mortality (n)	0-19	12	32.4
	20-32	19	51.3
	More than 32	6	16.2
Mortality Rate (%)	0-2	30	81.1
	More than 2	7	18.9
Previous exposure	Yes	32	86.5
	No	5	13.5
Appeared to be diseased (n)	0-40	15	40.5
	41-100	18	48.6
	More than 100	4	10.8
Affected days	1	17	45.9
	2	16	43.2
	3	4	10.8

Table 05: Frequency distribution of Infectious bursal Disease (IBD) in case of broiler (n=87):

Variable	Category	Frequency(n)	Percentage (%)
Age (days)	0-18	29	33.3
	19-26	44	50.5
	More than 26	14	16.1
Hatchery	Aftab	11	12.6
	Index	8	9.2
	Kazi	23	26.4
	Local	13	14.9
	Nourish	8	9.2
	Paragon	10	11.4
	Pocha	4	4.6
	Provita	10	11.4
Vaccination	Yes	75	86.2
	No	12	13.7
Flock	1	10	11.4
	2	19	21.8
	3	17	19.5
	4	9	10.3
	5	15	17.2
	6	5	5.7
	7	10	11.4
	8	1	1.1
	11	1	1.1
Feed	Agata	6	6.9
	Agrotech	1	1.1
	CP	10	11.4
	Fast hope	3	3.4
	Kazi	18	20.6
	Nahar	1	1.1
	New hope	4	4.6
	Nourish	7	8
	Paragon	12	13.7
	Provita	14	16
	Quality	9	10.3
	RRP	2	2.3
Flock size (n)	0-1500	27	31
	1501-3000	54	62
	More than 3000	6	6.9
Mortality (n)	0-15	26	32.1
	16-30	34	41.3

	More than 30	23	26.4
Mortality Rate (%)	0-1	30	34.4
	1.1-2	41	47.1
	More than 2	16	18.3
Previous exposure	Yes	69	79.3
	No	18	20.6
Appeared to be diseased (n)	30-50	27	31
	51-120	36	41.3
	More than 120	24	27.5
Affected days	1	29	33.3
	2	46	52.8
	3	11	12.6
	4	1	1.1

Table 06: Frequency distribution of Infectious Bursal Disease (IBD) in case of layer (n=15)

Variable	Category	Frequency(n)	Percentage (%)
Age (days)	0-18	1	6.6
	19-26	4	26.6
	More than 26	10	66.6
Hatchery	Agro Bangla	2	13.3
	CP	5	33.3
	Goalondo	2	13.3
	Index	1	6.6
	Kazi	1	6.6
	Nahar	2	13.3
	Nourish	1	6.6
	Paragon	1	6.6
Vaccination	Yes	15	100
	No	0	0
Batch	1	2	13.3
	2	5	33.3
	3	6	40
	4	1	6.6
	5	1	6.6
Feed	Aci	1	6.6
	CP	5	33.3
	Kazi	1	6.6
	Nahar	2	13.3
	Paragon	1	6.6
	Provita	1	6.6
	Quality	4	26.6
Flock size (n)	0-1500	2	13.3
	1501-3000	10	66.6
	More than 3000	3	20

Mortality (n)	0-15	6	40
	16-30	8	53.3
	More than 30	1	6.6
Mortality Rate (%)	0-1	8	53.3
	1.1-2	6	40
	More than 2	1	6.6
Previous exposure	Yes	10	66.6
	No	5	33.3
Appeared to be diseased (n)	30-50	9	60
	51-120	6	40
Affected days	1	5	33.3
	2	8	53.3
	3	2	13.3

CHAPTER-4

DISCUSSION

4.1. Occurrence of ND and IBD:

This disease was recorded 17.67% in the study population. In case of broiler and layer it was 8.9% and 30.8%, respectively which is shown in table 1 and table 2. The pathological investigation and prevalence of diseases and the postmortem lesions are similar to Charlton (2000).

IBD was recorded in 34% (n=102) farms of the study population. In case of broiler and layer it was 48.3% and 12.5%, respectively. Pathological investigation and prevalence of IBD was reported by Anjum (1990) and Kim *et al.* (1996) as 3.1% and 27.3%, respectively

4.2. Frequency distribution of ND in case of broiler:

The occurrence of ND in case of broiler is 8.9% (n=16). Among the ND affected broilers 43.8% were more than 30 days old. 68% broiler birds were not vaccinated in the study population. 62% birds were from medium sized farms (1135-2400 birds). 56% farms of the study area were having less than 2% mortality rate. The birds age beyond 30 are more susceptible for having Newcastle disease up to the selling. Highest occurrence found in case of birds from local hatchery 47.3% (n=7) it includes mainly Sonali. The occurrence of ND in broiler estimated by Islam *et al.*, (2005) and Das *et al.*, (2005) who recorded 6.73%, 7.9% which is slightly lower from my study value. This might be due to higher stocking density, oftenly getting contact with local and migratory birds, not maintaining cool chain in case of vaccination of birds.

4.3. Frequency distribution of ND in case of layer:

The occurrence of ND in case of layer is 30.8% (n=87). We observed that highest mortality in the study area among layers due to ND were at the age between 41 to 252 days (54.1%) which is more than reported by Rahman *et al.* (2003). Only 3% of this study population was not vaccinated. The mortality rate was highest in layer farms affected with ND from Kazi farms 32.4% (n=12). In Kishoreganj maximum of the layer farms affected with ND contained 1135 to 2400 birds (45.9%). In maximum case mortality rate was less than 2%. Previously studied the occurrence of ND in case of layer by Giasuddin *et al.*, (2002) ; Islam *et al.* (2003) was 7.50% and 6.73% respectively which is lower than my study value (30.8%). This may be due

to not maintaining cool chain in vaccination of birds, improper dose of vaccine and faulty management system, uneven level of maternal antibody etc.

4.4. Frequency distribution of IBD in case of broiler:

The occurrence of IBD in case of broiler is 48.3% (n=87). We noted highest mortality due to IBD among the study population (broilers) at the age between 19 to 26 days 50.5% (44) and 13.7% of this population (broilers with IBD) was not vaccinated. Highest mortality rate were observed at broiler farms affected with IBD were from Kazi farms 26.4% (n=23). In kishoreganj maximum of broiler farms affected with IBD contained 1501 to 3000 birds (62%). The occurrence was approximately higher to some of the previous reports evidenced by Islam *et al.*, (2003) (24.26%), Talha *et al.*, (2001) (19.16%). The occurrence estimated by Ahmed *et al.*, (2009) (11.06%) and Giasuddin *et al.*, (2002) (11.80%) which was less than to my study value. This might be due to not maintaining proper cool chain, uneven level of maternal antibody, inexperience vaccinator, improper dose and faulty management system.

The occurrence of Newcastle Disease in layer (30.8%) was higher in layer in comparison to broiler (8.9%).

4.5. Frequency distribution of IBD in case of layer:

The occurrence of IBD in case of layer is 12.5% (n=15). Layer birds affected with IBD were majorly belonged to the age group of more than 26 days (66.6%). Only 13.7% of these birds were vaccinated against IBD. Majority of the layer birds affected with IBD were from Kazi farms 33.3% (n=5). Maximum number of layer birds affected with IBD was from farms contained 1501 to 3000 birds (66.6%). In maximum case mortality rate at layer farms having IBD outbreak was less than 2%. The occurrence of IBD in layer was recorded 4.32% which was lower than Talha *et al.*, (2001) (19.16%), Ahmed *et al.*, (2009) (11.06%) and Giasuddin *et al.*, (2002) (11.80%). Most of the IBD infected farms in the study area were vaccinated against IBDV. Findings of the study indicated that in most cases vaccination could not protect the birds. This might be due to not maintaining proper cool chain, uneven level of maternal antibody, inexperience vaccinator, improper dose and faulty management system.

The occurrence of Infectious Bursal Disease (48.3%) was higher in broiler in comparison to layer (12.5%).

CHAPTER-5

LIMITATIONS AND RECOMMENDATIONS

5.1. Limitations:

- Shortage of time was the main constraint, because it reduced case number of the study.
- It was not possible to perform more sophisticated confirmatory methods of diagnosis, e.g. isolation and identification of the causative organism.
- All of the poultry farm owners are not co-operative about sharing the information of their farm.

5.2. Recommendations:

- An ideal well equipped laboratory should be established in upazila level for proper diagnosis and treatment of a particular disease.
- Strict, continued surveillance system should be developed for preventing sudden outbreak of any kind of disease.

CHAPTER-6

CONCLUSION

In Kishoreganj district overall occurrence of ND and IBD is 17.67% (n=53) and 34% (n=102) respectively. The occurrence of ND in case of broiler and layer is 8.9% (n=16) and 30.8% (n=37) respectively. The occurrence of IBD in case of broiler and layer is 48.3% (n=87) and 12.5% (n=15) respectively. Here total 180 broiler farms and 120 broiler farms were observed as they were recorded in District Veterinary Hospital, Kishoreganj.

In summary, it can be stated that in Kishoreganj district Newcastle disease are more common in case of layer birds specially in between 41 to 252 days and Infectious Bursal Disease are more common in case of broiler specially in between 19 to 26 days. It has potential of hindering the economy of the poultry industry at Kishoreganj District. So we have to pay much attention about this problem. To reduce the occurrence of Newcastle disease and infectious bursal disease firstly we should restrict the birds with the contact of other animals specially the local birds and migratory birds, selecting a good hatchery and following proper immunization process specially maintaining the cool chain in case of vaccination and testing specific antibody titer level at particular period of time interval. Finally strict bio- security and continued surveillance of poultry is required to minimize the outbreak of those diseases.

CHAPTER-7

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ACKNOWLEDGEMENT

At first I am really thankful to almighty GOD who has given me strength and opportunity to complete the report – Occurrence of ND and IBD and observing post mortem lesions in Kishoreganj district of Bangladesh.

Completion of any work or responsibility gives nice feelings but the accomplishment of this work as the partial fulfillment of the requirements for the degree of Doctor of Veterinary Medicine(DVM) in (CVASU), not only has given me the pleasure but also given me the confidence to move ahead and showed me a new opening to knowledge. Standing at this opening, it is an honor to revoke the names of the person and the organization I am grateful to.

I would like to extend my gratitude to my supervisor Prof. Dr. Sharmin Chowdhury, Department of Pathology and Parasitology, CVASU. My heartfelt thanks to her for her support and creative directions. I had autonomy to decide my ways with the progress under his persistent feedback.

Special thanks to Dr. Mohammad Ali, District Livestock Officer, Kishoreganj and Dr. Bahadur Ali, Veterinary Surgeon, District Veterinary Hospital, Kishoreganj for their cordial cooperation at the time of conducting the research work.

The author highly expresses his sincere gratitude and gratefulness to DR. A.K.M. Saifuddin, Director of External Affairs, CVASU

Finally the author expresses his good wishes and warmest sense of gratitude to all his friends and families.

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The Author

Appendix

QUESTIONNAIRE

Diseases diagnosed in broiler chickens by postmortem examination

Date:

Sample No.:

1. Name of the owner & address:.....
2. Total no. of birds:.....
3. Total death to date:.....
4. Age of the birds:.....
5. Type of feed: a) mash b) pellet
6. Strain:.....
7. When the bird was died:.....
8. Clinical signs described by the owners:.....
9. Postmortem findings:

Head.....	Spleen.....
Trachea.....	Proventriculus.....
Lung	Gizzard.....
Liver	Air sac.....
Intestine	Caecal tonsil
Bursa	Yolk sac
others.....	
10. Vaccination history:.....
11. Tentative diagnosis based on post mortem examinations:
12. Treatment given: Rx.....

.....

Signature of the interviewer

Biography

Myself AUMIT DAS, the author of this report would like to introduce as Intern DR of CHITTAGONG VETERINARY and ANIMAL SCIENCES UNIVERSITY (CVASU) have passed four years academic career in faculty of veterinary medicine and attended several meetings related with veterinary medicine in Bangladesh and India. I have passed my Secondary School Certificate (SSC) from Dhaka Board in 2008 (G.P.A-5.00) and Higher Secondary Certificate (HSC) also from Dhaka Board in 2010 (G.P.A-5.00). As a student of veterinary medicine, the main mission and vision of my life is to do something better like a creative job or any other research work by dint of my academic knowledge and experience for the development of livestock as well as the development of the economic condition of our country. I strongly assure that I have done all the works furnished here in this report and I hold the entire responsibility of the information given here which are collected from different books, journals and websites.