# Chapter 1: Introduction

Poultry farming is now considered as a growing industry in Bangladesh. It is generally acknowledged as the most efficient and cost-effective way of increasing the availability of high protein food. Poultry sector now plays an important role in poverty alleviation and economic development of Bangladesh. Approximately 37% of total animal protein is now supplied by the poultry industry (Rahman, 1998). Among poultry, broiler rearing is particularly popular to the farmers for its short life span and comparatively low capital investment (Raha, 2007). Broiler farming has been playing a key role in providing meat containing high quality proteins and micronutrients, which has a tremendous impact on health and nutrition for the poor people in rural areas (Neumann *et al*., 2002; Barroetoa, 2007). However, infectious diseases are the major constraints for developing the poultry industry (Karim, 2003)**.** In recent years poultry farming has been hampered by the outbreak of fatal infectious diseases caused by bacterial (Samonellosis, Colibacillosis), viral (IBD, ND, Avian influenza), Mycoplasmal and other causative agents (Ahmed and Humid, 1991).Among these, Infectious bursal disease (IBD) in broiler is one of the most important. The disease is also known as Gumboro as it was first recognized in the Gumboro district of Delware, USA (Cosgrove, 1962). Since March 1992 IBD has been prevalent in Bangladesh with very high morbidity and mortality (Islam *et al*., 1994a;1994b; Rahman, 1994).IBD is a viral infection caused by IBD virus (IBDV), is a non-enveloped virus, belonging to the family Birnaviridae, with a bi-segmented double stranded RNA genome affecting the immune system of poultry (Eterradossi and Saif, 2008). The disease is highly contagious, affects young chickens and is characterized by the destruction of the lymphoid organs and in particular the bursa of Fabricious where B lymphocytes mature and differentiate. The virus targets the B lymphocyte in an immature stage and the infection when not fatal causes immunosuppression. Despite high importance, the grass-root farmers of Hathazari Upazilla are not well aware about the environmental load and prevalence of IBD. Therefore the study was conducted to estimate the prevalence of IBD in the small-scale commercial broiler farms of Hathazari upazila in Chittagong district.

Chapter 2: Materials and Methods

2.1 Study area:

The study was performed at Hathazari Upazilla, located at 22.5083°N 91.8083°E in Chittagong district. It has 52,594 households and a total area of 251.28 km² .
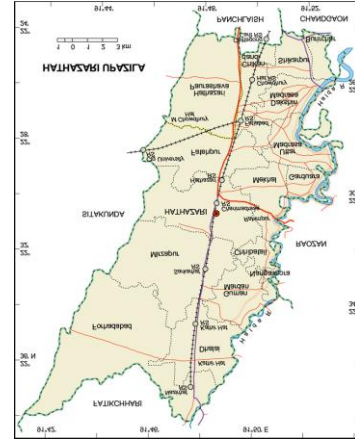
2.2 Study period:

This study was carried out during my clinical placement at Upazilla Veterinary Hospital (UVH) placement in Upazilla Veterinary Hospital, Hathazari during the period of 1st february to 29th of march 2018.

2.3 Study design:

A cross sectional study was performed where birds diagnosed with IBD infected based on both clinical and post-mortem examination by ULO of UVH were considered as case whereas birds were taken to the hospital by their owners. A total of 60 birds from sixty different farms were examined in the study period. The farms having about one hundred broiler birds were considered as study population.

2.4 Data collection:

A preplanned questionnaire was used to collect the data for this study(Annex 1). Information including date, name and address of owner, location of farm, number of flock size, age, strain of birds, rearing system, feeding system, bio-security, vaccination status, number of daily morbidity and mortality status, previous disease status by cross questioning to the farm owners along with post-mortem lesions for each bird were collected for the support of the diagnosis and recorded for future study.

Disease history including treatment for that disease, time of last vaccination, mortality rate in the flock, educational status of farmer, bio-security measures, hygienic management of farms, entry of wild birds and native poultry in the farm premises, feeding system and carcass disposal system, hygienic status of vaccine gun and man who administers vaccine to birds were taken by cross questioning to the farm owners during the study.

2.5 Statistical analysis:

The data obtained from this study were inputted in spreadsheet (Excel 2010) and then analyzed using STATA version 13. Significant difference among the variables was calculated using Pearson's Chi-square test. P value less than 0.05 were considered as significant.

2.6 Diagnosis of IBD by clinical and Post-mortem examination:

During this investigation each bird was examined systematically and gross pathological changes were observed and recorded carefully. Final tentative diagnosis of the disease was done based on clinical history, clinical signs and post-mortem findings. Clinical signs and post-mortem lesions that were considered to fix the diagnosis of IBD are mentioned below and figure-1.

Clinical signs (if the bird was live before post-mortem):

- Whitish and watery diarrhoea
- Soiled and wet vent
- Ruffled feathers and birds become dehydrated
- Anorexia, high fever

Post-mortem findings:

- Swollen and edematous bursa
- Bursa with necrotic foci, petechial or echymotic hemorrhage
- Hemorrhage in thigh and breast muscle
- Haemorrhage in the mucosa at the junction of proventriculus and gizzard

Chapter 3: Results

3.1 Diagnosis of IBD through necropsy:

The suspected broiler chickens from flocks with high morbidity and mortality were examined by necropsy and IBD was confirmed based on gross clinical findings(Fig 1-10). Haemorrhages were present on the pectoral, leg and thigh muscles in few cases, kidneys were swollen. The principal lesions were found in the bursa of Fabricious, it was swollen (inflamed); appeared edematous and hyperemic and has a gelatinous yellowish transudate.. In prolonged cases the bursa of Fabricious were atrophied as compared to hemorrhagic and normal bursa of Fabricious.

Figure-1: Clinical signs and Post-mortem lesions for IBD:

Figure 1(A): whitish and watery diarrhoea

Figure 1(B): swollen, gelatinous bursa

Figure 1(C): swollen, hemorrhagic bursa

Figure 1(D): swollen, hemorrhagic bursal fold

Figure 1(E): swollen kidney

Figure 1(F): duodenum full with mucus

3.2 *Overall prevalence of IBD in selected farm:*

Out of 60 samples 14 were positive out of 60 samples for IBD infection which sum up the overall prevalence of IBD infection in commercial broiler farms of Hathazari Upazilla in commercial broiler farm was 23.33%. (Table 1)

3.3 *Prevalence of IBD infection in different age group:*

The prevalence of IBD infection was also observed on the basis of different age groups. No cases were found in 0-9days aged birds, 15.79% in 10-19 days aged birds and 33.33% in 20-35 days aged birds (Table 2). The *P* value (0.048) was less than 0.05. So the prevalence were significant.

3.4 *Prevalence of IBD infection according to vaccination status:*

The prevalence of IBD in IBD vaccinated group was 4.44% and in non-vaccinated group it was 80% where P=0.000 (<0.05) which indicates very high significance between vaccination and IBD infection (Table 2).

3.5 *Prevalence of IBD infection according to bio-security status:*

Among the 14 IBD positive cases, bio-security was not followed properly in 12 farms where the prevalence was 34.29% .On the other hand, bio-security was followed strongly in rest 2 farms where the prevalence was 8% .It is clear that the prevalence was higher in those farms who did not follow bio-security strongly. Here the P value 0.018(<0.05) indicates that there is a high relationship between bio-security and IBD infection.(Table 3)
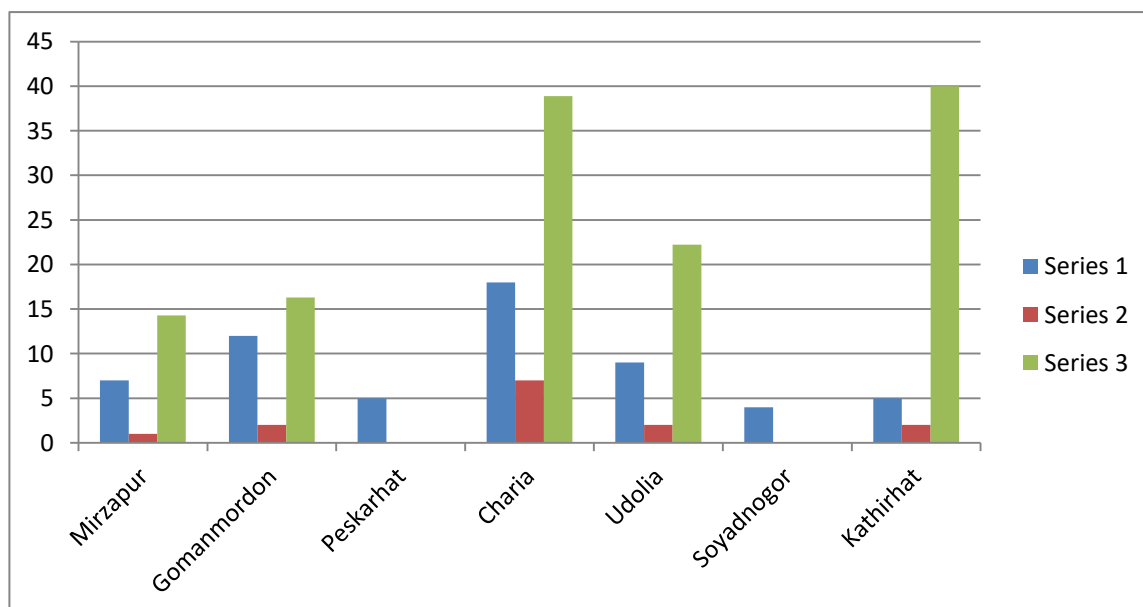
3.6 *Prevalence of IBD infection in relation to study areas:*

The study was conducted among 7 unions of Hathazari Upazilla. It was observed that the prevalence of IBD infection was 14.29% in Mirzapur, 16.29% in Gomanmordon, 0.00% in Peskarhat, 38.89% in Charia, 22.22% in Udolia, 0.00% in Soyadnogor and 40% in Kathirhat union respectively (Chart 2). The prevalence of IBD infection was highest in Kathirhat union however the variation was insignificant with IBD infection (P >0.05) .

Table 1: Overall prevalence of IBD infection in broiler in Hathazari Upazilla

Study area	No. of study sample	No. of IBD positive case	Prevalence %	P value
Hathazari Upazilla	60	14	23.33	0.02

Chart 1: Frequency and percentage of prevalence of IBD infection in broiler in different unions of Hathazari Upazilla

Here,

Series 1: No of samples;

Series 2 : no of cases;

Series 3: percentage of prevalence

Locations:

Indicated point in the map is the exact location

Table 2: Prevalence of IBD infection in broiler at Hathazari Upazilla for different variables

Variable	Category	No. of samples	No. of positive samples	Prevalence %	$\chi 2$ value	P value
Age	0 – 9 Days	8	0	0.00%		
	10 – 19 Days	19	3	15.79%	4.88	0.048
	20 – 35 Days	33	11	33.33%		
Vaccination	Yes	45	2	4.44%		
	No	15	12	80%	35.900	0.000
Status of bio-security	Poor	35	12	34.29%		
	Moderate	25	2	8%	5.6327	0.018
Total		60	14			

Annex1:

QUESTIONNAIRE

Date:

Sample no.:

1. Name of the owner :

   …………………………………………………………………..

2. Address of the farm

   :…………………………………………………………………..

3. Total no. of birds

   :…………………………………………………………………..

4. Total no. of affected birds

   :…………………………………………………………...

5. Total no. of dead birds

   :…………………………………………………………...

6. Age of birds

   :…………………………………………………………………..

7. Strain

   :……………………………………………………………………………

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8. Vaccination status : a)Yes   b) No

9. Bio-security: a) High   b) Moderate   c) Poor

10. Clinical signs

    :……………………………………………………………………

11. Post-mortem findings:

    Head……………………………………

    Trachea…………………………………

    Lungs……………………...........................

    Liver……………………………………

    Spleen…………………………………..

    Intestine……………….............................

    Proventriculus…………………………….

Gizzard…………………………………

Air sac………………………………….

Caecal tonsil…………………………….

Bursa……………………………………

Thigh muscle:……………………………..

Breast muscle:……………………………..

Others:……………………………………..

12. Tentative

diagnosis:………………………………………………………………

…………………………………………….

Signature of the interviewer

Chapter 4: Discussion

The present study was conducted to explore the current status of IBD in small-scale broiler farms in Hathazari Upazilla. IBD was diagnosed on the basis of clinical history and gross pathological lesions (Islam *et al*., *2016*). The gross pathological lesions observed during necropsy were dehydrated and darkened carcass in most of the cases and hemorrhages were present on pectoral, leg and thigh muscles in few cases. The kidneys were swollen. The principal lesion found on the bursa of Fabricious (Okoyo and Dzonkwu, 2005; Paul, 2004). Finding of the present study were in line with the previous records.

During this study the prevalence of IBD in broiler in Hathazari Upazilla was found 23.33% which is comparatively higher than the earliar studies of Dhaka (11.0%), Mymensingh (19.2%) but lower than that of Sylhet (24.3%) (Talha *et al*., 2001; Islam *et al.,* 2003). It might be due to small sample size or difference of managemental practices among the farmers of the following areas.

Age is the important issue for the prevalenceof IBD. Significant relationship (*P*=0.048) was found between age group and IBD infection in (Table 2). The prevalence of IBD infection was higher in age group of 20-35 days (33.33%) than the age group of 10-19 days(15.79%). Others studies have shown most of the birds get infection within the age group of 16-23 days. The chickens of 3 to 6 weeks of age group are most susceptible because maximum development of bursa of Fabricious take place at that time and the bursa follicles are filled up with immature lymphocytes (Shekaro *et al*., 2015). IBD virus replicates in and cytolytically affects the actively dividing B-lymphocytes in the bursa of Fabricius. IBD have also been recorded at 14-20 weeks in Nigeria (Abdu and Ibe, 2009). In this study the prevalence of IBD in between age 1-9days was 0.00% . (Rahman *et al*., 2010) did not find any IBD prevalence aging below 14 days. But in another study there was found IBD infection in broiler at 0-7 days old in Narshingdi (Uddin *et al*., 2010).

During this study the prevalence of IBD in broiler in vaccinated group(4.44%) was comparatively lower than that of non-vaccinated group(80%) and Vaccination is a crucial factor in prevalence of IBD.

The prevalence of IBD in farms with poor bio-security was recorded 34.29% whereas it was 8% in farms with moderate bio-security (Table 2). The highest prevalence was estimated in Kathirhat union(40%) and no cases were found in peskarhat and Mirzapur union. The test statistics was not significant ($P>0.05$) for location and IBD infection. This might reflect the limitation of the sampling since the study was only a month long.

Conclusion

This study reflected the prevalence of Infectious bursal disease (IBD) of broiler chickens in Hathazari Upazilla under Chittagong district of Bangladesh. The prevalence was 23.33% where the 20-35 days aged birds are most vulnerable. The study showed that vaccination and bio-security status has great effect on causing IBD. IBD causes great economical loss in poultry industry therefore. Proper vaccination and bio-security should be maintained strongly in this Upazilla for effective control of occurring IBD infection in broiler chickens.

Limitations and recommendations

The study would be more accurate if isolation , culture and identification of IBD virus would be possible through modern laboratory along with post-mortem examination .Shortage of study period was another constraint as the study had to be done during my internship placement in Upazilla veterinary hospital. The results would be more significant if the number of sample size would be more.

Acknowledgement

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Biography

This is MD. ABDUL KADER , son of MD. ABDUR RAHIM and JANNATUL FERDOUS. I am from Chittagong district. I completed S.S.C in 2010 and H.S.C in 2012 with GPA 5.00. I got admitted into Doctor of Veterinary Medicine(DVM) course under Chittagong Veterinary and Animal Sciences University in 2012- 2013 session. As an upcoming Veterinarian I would like to dedicate my rest of the life for the welfare of animals. I am keen to be a field veterinarian as well as a skilled poultry practitioner.