**INTRODUCTION**

Poultry is one of the vibrant sub-sectors of agriculture that plays a significant role in the development of agro-based economy of Bangladesh. The poultry population in Bangladesh comprises of 160 million chickens and 38 million ducks (Das *et al*., 2008). The total number of commercial farms is about 150000 (Paul, 2008). Infectious diseases are one of the major constraints of poultry farming that hinder the development of poultry industry in Bangladesh.In every year 30% mortality of chicken occurs due to various infectious diseases (Ali, 1994). Among them infectious bursal disease (IBD) is one of the major viral diseases which cause 80% mortality in field outbreak (Chowdhury *et al*., 1996)

Infectious bursal disease also referred to as Gumboro disease is an acute disease of young chickens with high morbidity and mortality.The disease is caused by infectious bursal disease virus (IBDV), belong to the family Birna viridae. The disease is widely distributed and may cause considerable economic losses. The disease can infect chickens particularly with an age of 3 to 6 weeks, but subclinical infection can occur before 3 weeks of age. Infections caused by IBDV may exacerbate infections with other etiologic agents, and reduce the chickens ability to respond to vaccination. The economic impact of IBD is influenced by strain of virus, susceptibility and breed of flock, inter-current primary and secondary pathogens, environment and managemental factors.

The economic importance of this disease is manifested in two ways. The first is due to the clinical disease and mortality in chickens. The second and more important manifestation is a severe prolonged immune-suppression of chickens infected at early age. The disease is prevalent in the concentrated poultry producing areas and may account for considerable losses in individual flocks. Affected chickens have reduced antibody response to vaccinations, and increased susceptibility to secondary infections.For its proper control and management the status of this disease needs to be determined. Although the prevalence of IBDhas been reported from different parts of the country, very few information are available on the occurrence of this disease in Narsingdi district.

Therefore the objective of this study was to investigate the occurrence of infectious bursal disease in Narsingdi district of Bangladesh.

**REVIEW OF LITERATURE**

**Etiology**

Infectious bursal disease (IBD) is an acute highly contagious viral infection of young chickens. IBD is caused by double stranded RNA virus belonging to the family Birna viridae having a bi-segmented genome (MacDonald, 1980). The first report about the IBDV came from USA (Cosgrove, 1962). The virus is a single-shelled, nonenveloped virion with icosahedral symmetry (Nick *et al*., 1976 and Ozel and Gelderblom, 1985). There are two serotypes of infectious bursal disease virus (IBDV) (Mcferran *et al*., 1980). Serotype 1 is pathogenic while serotype 2 is also pathogenic for chicken (Saif, 1984). Practically there are 3 types of IBDV:

IBDV of classical virulence (sc IBDV), which do not cause mortality and indirectly induce economic loss, usually seen as sub-clinical form.

Very virulent IBDV (vv IBDV) is responsible for typical Gumboro Disease.

Variant IBDV (var IBDV) does not give rise to mortality but is capable of infecting chickens in the presence of MDA levels that are still protective against sc IBDV and vv IBDV (Segal, 2002)

**Incidence and distribution**

Infectious bursal disease (IBD) has worldwide distribution. It usually occurs in birds having the age group of 3-6 weeks. The disease was first reported by (Winterfield and Hitchner, 1962). The virus was first isolated in embryonating egg (Winterfield *et al*., 1962). Hitchner proposed the term infectious bursal disease as the name of the disease (Hitchner, 1970). The second serotype was reported in 1980 (McDonald, 1980).

The control of the disease has been complicated by the recognition of variant strains of serotype 1 IBDV in the Delmarva poultry producing area (Rosenberger *et al*., 1985). The presence of IBD was studied for the first time in Bangladesh during the period 1992-93. The work has carried out in CDIL, Dhaka and in the Laboratory of the Department of Microbiology and Hygiene, Bangladesh Agricultural University (BAU), Mymensingh (Rahman *et al*., 1996).

**Transmission of the disease**

Infectious bursal disease (IBD) is an acute highly contagious and the virus is persistent in the environment of poultry house. The water, feed and droppings of infected pens were infectious after 52 days of outbreak (Benton *et al*., 1967).IBDV is not transmitted through the egg and a true carrier state exists in recovered birds. Virus is resistant to heat and disinfectants sufficiently. So it survives in the environment between outbreaks (Calnek, 1997)

**Mortality and morbidity of the disease**

The morbidity following infection with classical strains of infectious bursal disease may be higher than 80% while mortality may be as low as5-12% (Mohanty *et al*., 1971) or may peak 25% in broilers (Lukert and Saif, 1997). However, infection with the newly emerged very virulent strain of infectious bursal disease may cause up to 100% morbidity and over 70% mortality (Brown *et al*., 1994).

The mortality of chickens in early age is high (1-40%) (Saif*et al.,* 2001). Concomitant infections with Ranikhet disease, infectious laryngotracheitis, infectious bronchitis, Marek’s disease, colibacillosis, salmonellosis, coccidiosis, anemia, gangrenous dermatitis, have been recorded by McNulty *et al*. (1979). The initial outbreaks of IBD were characterized by high morbidity (80%) and correspondingly significant mortality, attaining 25% in broilers (Chettle *et al.,* 1980). Broiler flocks often experience mortality rates of 20% to 30%.

**Diagnosis of infectious bursal disease**

In an acute outbreak in susceptible chicks, the short course bursal lesions are very suggestive of infectious bursal disease. Signs and lesions are often less apparent in subsequent outbreaks and in chicks with parental immunity.

**Clinical signs**

Rodriguez-Chavez *et al.* (2002) reported that the clinical signs of the infectious bursal disease include depression, reluctance to move, poor feed and water intake, watery diarrhea, ruffled feathers, reduced growth and prostration and dehydration in severely affected birds. Mortality is observed with a rapid increase at 3 days post infection and a sharp decrease at 5 days post infection. Dalgaard *et al*. (2002) observed that in the clinical disease, morbidity could be seen in nearly 100% of the flock and mortality could range from 0% to over 50% with some very virulent IBDV (vvIBDV) strains. Immuno-suppression is presumably transient in the clinical disease.

Butcher and Miles (2001) found IBD occurred in two forms - sub-clinical and clinical forms, depending on the age at which chickens are infected. The sub-clinical form occurs in chickens less than 3weeks of age. Chickens presented no clinical signs of disease, but experience permanent and severe immuno-suppression can occur due to damage of bursa of Fabricius. The clinical form of infectious bursal disease occurs in chickens from 3 to 6 weeks of age. The clinical disease had a sudden onset and the mortality rate in the flock increases rapidly. Clinical signs of disease include dehydration trembling, ruffled feathers, vent pecking and depression. Affected chickens experienced a transient immune-suppression.

Anku (2003) observed that the severity of signs was depended upon age, breed and maternal derived antibody level of the chicken as well as virulence of the virus and reported that the disease had a high morbidity and mortality of 30-35%. It had serious economic consequences to farmers, both directly (through mortalities) and indirectly, e.g. stunted growth, increased feed conversion ratio, high susceptibility to other infections and poor immune response to other vaccinations.

Cosgrove (1962) reported that one of the earliest signs of infection in a flock was the tendency for some birds to peck at their own vent.

**Postmortem findings**

Butcher and Miles (2001) observed that initially the bursa of Fabricius is swollen (inflamed); appears edematous and hyperemic, and had a gelatinous, yellowish transudate covering the serosal surface. Anku (2003) found that the carcasses of birds dying from this infection were dehydrated; there were petechial hemorrhages’ in the leg and thigh muscles, and occasionally on the mucosa of the proventriculus, and increased mucus in the intestine.Rodriguez-Chavez *et al*., (2002) reported that on necropsy, bursal lesions were characterized by occasional hemorrhage, pronounced enlargement of the organ; frequent accumulation of a yellowish exudates, and pronounced longitudinal striation. Atrophic bursa was clearly observed after 6 days post-infection.

Saif *et al*., (2001) said that gross lesions could be seen for the most part on the bursa of Fabricius. The bursa might be swollen or showed signs of hemorrhage. In some cases, however, no lesions were observed and the bursa shrinked in size.

Dybing *et al*., (1998) reported that on the 3rd day of post-infection, the bursa began to increase in size and weight due to edema and hyperemia. It was approximately double its normal weight by the 4th day and then began recede in size. By the 5th day it had returned to its normal weight, but the bursa then continued to atrophy rapidly, and from the 8th day onward it was approximately 1/3 of its original weight. By the 2nd or 3rd post infection day, bursa had a gelatinous, yellowish transudate covering the serosal surface.

**Prevention and control**

Huang *et al*., (2002) found that effective control of IBD in commercial broilers required that field virus exposure be reduced by proper clean-up and disinfections between flocks and that traffic (people, equipment and vehicles) into the farm be controlled. The development and enforcement of a comprehensive biosecurity program is the most important factor in limiting losses due to IBD. Phenolic and formaldehyde compounds had been shown to be effective for disinfection of contaminated premises.

Saif *et al*., (2001) reported a third factor to consider in the infectiousbursal disease prevention and control programme was vaccination of the broilers to prevent clinical infection.

Butcher and Miles (2001) described that the timing of broiler vaccination depended on the level of maternal antibody at the time of vaccination would neutralize the vaccine virus. Thus only a limited active immune response results and chickens would be susceptible to disease as maternal titers decrease. If low levels of maternal infectious bursal disease titers were present in the chicks, vaccination might not be effective on farms contaminated with virulent field virus.

Mandeville *et al*. (2000) said that approximately 10 to12 days were required after vaccination for chickens to develop minimal protective titers. During this “lag time”, chickens are susceptible to infectious bursal disease.

Jackwood *et al*. (1999) observed that if the maternal antibody titer was not uniform in the broiler flock, multiple costly vaccinations would be required.

**MATERIALS AND METHODS**

**Study area**

The study was carried outto determine the occurrence of infectious bursal disease inNarsingdi district during the period from 1st January to 31stJanuary 2013.A total of 64 dead broiler chickens were examined for *postmortem* examination during the study period. The age of the birds ranged from day-old to 6 weeks. Detail information concerning clinical history, flock size, mortality and vaccination history were collected from the farmers while submitting the chickens for examination.

**Criteria for diagnosis of the diseases**

The disease was diagnosed on the basis of clinical history, clinical signs and *postmortem* findings. *Post mortem* examinations of the dead birds were performed systematically following standard procedures.Diseases other than IBD were also recorded and diagnosed based on *post mortem* lesions.

The following criteria were considered for the diagnosis of IBD along with other diseases.

**Infectious bursal disease (IBD):** petechiae and ecchymotic hemorrhages in the thigh and breast muscle, swollen, hemorrhagic and edematousbursa of Fabricius, haemorrhage at the junction of proventiculas and gizzard

**Colibacillosis:**perihepatitis, pericarditis, airsacculitis, splenomegaly, enteritis and nephritis.

**Coccidiosis:** presence of hemorrhagic entreritis and clotted blood in the caecum

**RESULTS AND DISCUSSION**

Occurrence of infectious bursal disease in Narsingdi district is shown in Table 1. A total of 64 dead broiler chickens were analyzed.Of them,14 were found positive for infectious bursal disease accounting for 21.9% of all broiler chickens examined.This high prevalence is in accordance with the observation of Islam *et al*. (2003) who reported the proportion to be 24% in broiler chickens in Sylhet region. However there are reports in the other parts of the country which demonstrated the occurrence of this disease is lower than the present findings (Giasuddin *et al*. 2002;Talha *et al****.***2001**)**. Only small number of birds was investigated for *post mortem* examination and therefore the high occurrence of IBD in this study should be interpreted cautiously.

The results of the present study demonstrated other concurrent diseases along with infectious bursal disease including Newcastle disease, coccidiosis and colibacillosis. IBD along with chronic respiratory disease appeared to be higher (25%) than IBD with coccidiosis and IBD with colibacillosis. IBD along with colibacillosis was found 8% suggesting IBD might be a predisposing factor for secondary infection with *E. coli*. Newcastle disease was not found widespread among the dead chickens examined. Only 3% chickens were found dead due to mixed infection with IBD and Newcastle disease.

Out of 64 cases, 45 cases were found IBD affected (IBD alone or IBD with other infections) where 30 cases were vaccinated and rest 15 cases were not vaccinated. This finding indicates that,despite of application of vaccine, in most cases vaccination could not protect and presence of IBD indicates IBD infection in birds. IBD infection causes immunosuppression which results in vaccination failure with causing high mortality.

Distribution of infectious bursal disease (IBD) alone or IBD with other infections according to different age groups is summarized in Table 2. Occurrence of IBD alone or IBD with other infections was 21.88%, 54.69% and 23.43% in the age group of0 – 14 days,15 – 28 days and 29 – 42 days, respectively. These results indicate that the highest number of cases was recorded in the age group of 15 to 28 days. This observation is in consistent with the report ofTalha*et al.*, (2001). Fifteen or more days of age are more vulnerable to IBD than other age group.

**Table 1.**Occurrence of infectious bursal disease and others in broiler chickens in Narsingdi district, Bangladesh (n=64)

|  |  |
| --- | --- |
| **Name of the Diseases** | **Total no. of positive case (%)** |
| IBD | 14 (21.9) |
| IBD with ND | 2 (3.1) |
| IBD with coccidiosis | 8 (12.5) |
| IBD with colibacillosis | 5 (7.8) |
| IBD with CRD | 16 (25.0) |
| Others | 19 (29.7) |
| Total | 64 |

**Table 2.** Distribution of infectious bursal disease (IBD) alone or IBD with other infections according to different age groups in Narsingdi district, Bangladesh

|  |  |
| --- | --- |
| **Age group (days)** | **Total no. of positive cases (%)**  **N = 64** |
| 0-14 | 14 (21.9) |
| 15-28 | 35 (54.7) |
| 29-42 | 15 (23.4) |
| Total | 64 |

One of the limitations of the study is that during post mortem examination, 30% of chickens were not diagnosed properly based on necropsy findings and categorized as other diseases.

**CONCLUSION**

IBD is one of the highly prevalent diseases in commercial broiler farm. The prevalence of IBD was found 21.9% in Narsingdi district. Distribution of the disease varied according to different age groups with the highest proportion recorded in the age group of 15 – 28 days. Mixed infection with Newcastle disease, chronic respiratory disease, coccidiosis, *E. coli* infection increases the mortality rate. High prevalence of IBD in broiler chickens is a serious concern and urges the need for proper control measures to limit the spread of this disease.

**LIMITATION**

1. The duration of the study period was very short.
2. There were no facilities for histopathological examination for IBD infected samples and laboratory diagnostic techniques.
3. The disease was diagnosed by recording clinical signs and postmortem lesions which could be confused with other diseases

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