INCIDENCE OF INFECTIOUS BURSAL DISEASE AMONG BIRDS SUBMITTED TO A DIAGNOSTIC LABORATORY IN NWFP, PAKISTAN

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ABSTRACT

Incidence of infectious bursal disease (IBD) in poultry birds amongst the cases submitted to Divisional Diagnostic Laboratory, Dhodial, Mansehra, NWFP, Pakistan during the years 1994 through 1996 was investigated. Overall incidence of IBD was 3.05±0.04%. Flock size, bird type and vaccination had a significant effect (P<0.01) on the incidence of IBD. Disease incidence was higher (P<0.05) in farms (6.53±0.008%) maintaining flock size of less than one thousand birds. Incidence of IBD was higher (P<0.05) in broilers (5.13±0.002) than in breeders (2.93±0.01) and layers (1.08±0.01%). Difference in incidence of IBD between breeders and layers was non-significant. Incidence of IBD was higher (P<0.05; around 5%) in those flocks which received irregular vaccination or were vaccinated once than in non-vaccinated flocks (1.74±0.005) or properly vaccinated flocks (0.91±0.002%). Season had no significant effect on incidence of IBD. Age wise incidence or mortality caused by IBD indicated comparatively higher losses (3.93±0.009 to 4.90±0.034%) between the ages of 23 and 34 days. It was concluded that severe losses occurred in flocks maintained under irregular vaccination programe.

Keywords: Incidence, infectious bursal disease, poultry birds

INTRODUCTION

Infectious bursal disease (IBD) is an economically important disease of poultry causing considerable losses (Tsai and Lu, 1993; Anjum *et al.*, 1993). IBD is a wide spread disease and can occur at any stage of life, however, most prevalent upto 12 weeks of age. According to Anjum *et al.* (1993), 4-6 weeks old birds are more susceptible to IBD, mortality being high (32-76%) in 4 weeks old pullets (Philip and Moitra, 1993). IBD was reported to be the most prevalent disease at the age of 19-20 days and 29-30 days in broilers resulting severe mortality (9.20%) in later stages of life (29-30 days; Braunius *et al.*, 1990). Singh *et al.* (1994) reported higher incidence of IBD in 6-11 weeks old birds than in 18-22 weeks old birds. Rao *et al.* (1990) also reported 20% mortality in white leghorn birds at the age of 12 weeks.

Because of its infectious nature, IBD can affect all types of birds. Singh *et al.* (1994) reported higher incidence of IBD in broiler (46.2%) than in laying birds (14.2%). On the contrary, Anjum *et al.* (1993) reported laying birds to be more affected by IBD than broilers and breeders. IBD can be effectively controlled through appropriate vaccination. Any variation in vaccination schedule can lead to severe economic losses. Birds vaccinated beyond 10 days of age were found less infected by IBD than those vaccinated at an earlier age (Anjum *et al.*, 1993). Kouwenhoven *et al.* (1994) suggested that broilers vaccinated at the age of 14-21 days partially controlled the problem of IBD. The present study was an effort to investigate the incidence of IBD among birds submitted to a diagnostic laboratory.

MATERIALS AND METHODS

Data on more than 500 cases submitted to Divisional Diagnostic Laboratory, Dhodial, Mansehra from 1994 to 1996 were utilized to investigate IBD. Information on flock size, type of bird, number of dead, and sick birds, vaccination schedule, age of the flock and season of occurrence were extracted from the records maintained at the laboratory. The following statistical model was constructed to investigated the effect of flock size, season, type of bird, vaccination and age of the bird on incidence of IBD.

$$Y_{ijklmn} = \mu + \alpha_i + \beta_j + \gamma_k + \lambda_l + \tau_m + e_{ijklmn}$$

where

Y = the nth observation on incidence of IBD in flock of i^{th} size in the j^{th} season among birds of k^{th} type and m^{th} age under l^{th} vaccination programme

μ = population constant to all observations

α_i = the effect of i^{th} flock size; i = $\leq$ 1000, > 1000 $\leq$2000, > 2000 $\leq$ 4000 and 4000,

β_j = the effect of jth season; j = spring (March through April), summer (May through August), fall (September through October) and winter (November through February)

γ_k = the effect of k^{th} type of bird; k + broiler, layer, breeder

λ_l = the effect of i^{th} vaccination schedule; L irregular vaccination, vaccination only once no vaccination, appropriate vaccination schedule

τ_m = the effect of m^{th} age group; m = 11-114, 15-18, 19-22, 23-26, 27-30, 31-34, 35-38, 39-42, 43-46,

e_{ijklmn} = random residual term, assumed to be NIID with mean zero and unit variance.

RESULTS AND DISCUSSION

Overall incidence of Infectious Bursal Disease (IBD) was 3.05±0.04% in the cases submitted (Table 3). Various survey studies reported higher incidence of IBD (Sulochana and Lalithankunjamna, 1991, 9%; Anjum *et al.*, 1993, 26.83% and Singh *et al.*, 1994, 36.65%). The incidence of IBD reported in the present study was among the birds submitted to the laboratory for treatment or necropsies. Not necessarily all sick or dead birds would have been presented. The present estimates would therefore, be considered most conservative. The results may, however, also suggest that the farmers efficiently followed the immunization program. Generally, farmers temporarily stop broiler farming during harsh months of the year, which might have lead to lower incidence of IBD on overall basis.

Type of bird had a significant (P<0.01) effect on incidence of IBD (Table 1). Incidence was significantly higher (P<0.05) in broilers (5.13±0.002%) than in breeders (2.35±0.01%) and layers (1.08±0.01%). Differences in incidence of IBD between breeders and layers were non significant. Singh *et al.* (1994) also reported higher losses (46.2%) in broilers than in layers (14.2%). Conversely, Anjum *et al.* (1993) stated layers to be more affected by IBD than broilers and breeders. The higher losses in broilers could be attributed to poor vaccination practice. The study indicated the layers were less susceptible to IBD than broilers.

Vaccination practice had a significant effect (P<0.01) on incidence of IBD (Table 1). Disease incidence was significantly higher (P<0.05) in those birds which were irregularly vaccinated (4.6±0.005%) or those vaccinated once (4.19±0.004%) than in birds maintained under scheduled vaccination program (0.91±0.005%; Table 2). Mortality due to IBD was around 2% in birds which were not vaccinated. Hahnewald *et al.* (1990) also reported that pullets vaccinated once at the age of 3 weeks produced better immunity against IBD till the age of 100 days than boosting vaccination at the age of 25 days. IBD was more severe in non-vaccinated flocks than in vaccinated flocks (Anjum *et al.*, 1993). Findings of the present study suggested that incidence of IBD was less in properly vaccinated flocks indicating that the vaccinated birds developed better immunity than non vaccinated ones. Birds receiving improper or irregular vaccination were more prone to IBD than properly vaccinated birds or those which received no vaccination. The comparatively higher incidence of IBD in irregularly vaccinated than in vaccinated flocks could be attributed to stressful conditions the chicks were exposed to, which could have lowered resistance of the birds. In addition, the irregular and premature vaccination (Vaccination before the age of 10 days) might have led to immuno-suppression.

Age had no significant effect on the incidence of IBD (Table 1). Although not significant, disease incidence was found to be maximum in birds aged 23-26 irrespective of the bird type (Table 3). Anjum *et al.* (1993) reported that birds at the age of 4-8 weeks were more susceptible to IBD than at other stages of life. Braunius *et al.* (1990) reported higher incidence of the disease at the age of 19-20 days with higher losses being inflicted at the age of 29-33 days (9.2%) in broilers. Findings of the present study suggested that incidence of IBD was higher up to the age of 35 days. A decline in incidence was observed beyond 35 days. The severe losses at earlier age could be attributed to poor immunity of the chicken against infectious disease than in later stages of life. Hahnewald *et al.* (1990) also reported that vaccination at the age of 3 weeks produced antibody titre capable of protecting birds against IBD upto 100 days of age.

Season had no significant effect on IBD (Table 1). Although not significant, disease incidence was maximum in fall (4.60±0.006%) and minimum in winter season (3.57±0.002%). Disease incidence was around 3% in spring and summer seasons. The minimum incidence of IBD during winter season could be attributed to depopulation of most of the sheds in Mansehra district because of severe winter conditions. It is always difficult for the small farm owners to maintain proper temperature inside the house during severe winter season. Such farmers usually stop poultry production activity during this period.

Flock size had a significant effect (P<0.01) on the incidence of IBD (Table 1). Incidence of the disease was significantly higher (P<0.05) in flocks comprising less than 1000 birds (6.53±0.008%) than in birds maintaining birds of 4000 or above (1.14±0.002%; Table 2). The findings suggested a decreasing trend in incidence of IBD with increase in flock size. Larger flocks were probably better managed and received better care and immunization than smaller flocks.

Table 1: Analysis of variance of per cent mortality caused by IBD amongst the submitted cases at Divisional Diagnostic Laboratory, Dhodial, Mansehra, NWFP.

Source	DF	MS	p
Flock size	3	0.0392	0.0001
Season	3	0.0036	0.1909
Type of bird	2	0.0279	0.0001
Vaccination	3	0.0158	0.0001
Age group	8	0.0028	0.1318
Residuals	627	0.0023	
Total	646		

Table 2: Mean comparisons of per cent mortality caused by IBD amongst the submitted poultry birds at Divisional Diagnostic Laboratory, Dhodial, Mansehra, NWFP.

	Type of bird		Vaccination		Season		Flock size
1	5.13±a0.002 a	1	1.74±0.005 b	1	3.57±0.002	1	6.53±0.008 a
2	1.08±0.01 b	2	4.19±0.004 a	2	3.59±0.005	2	4.13±0.002 b
3	2.35±0.01 b	3	4.61±0.005 a	3	4.06±0.003	3	3.32±0.003 c
		4	0.91±0.002 b	4	4.60±0.006	4	1.14±0.002 d

Means with different letters in each column differ significantly (P=0.05).

Type of birds	Vaccination	Season	Flock size
1 = broilers	1 = No vaccination	1 = Winter	1 = ≤ 1000
2 = Layers	2 = vaccinated only once	2 = Spring	2 = > 1000≤ 2000
3 = Breeders	3 = Partial vaccination	3 = Summer	3 = > 2000 ≤ 4000
	4 = Standard vaccination	4 = Fall	4 = > 4000

Table 3: Comparison of per cent mortality according to age of the birds caused by IBD amongst the submitted cases at Divisional Diagnostic Laboratory, Dhodial, Mansehra, NWFP.

Age in days	Range		Mean ± SE (%)	CV (%)
	Minimum	Maximum		
11-14	1.33	10.37	3.11±0.014 b	59.22
15-18	0.14	12.45	3.22±0.011 b	99.45
19-22	0.04	4.87	2.24±0.004 b	88.75
23-26	0.15	14.35	4.90±0.034 ab	131.85
27-30	1.23	9.33	4.10±0.007 ab	91.95
31-34	0.98	7.37	3.93±0.009 ab	95.53
35-38	0.72	6.46	3.04±0.008 b	111.66
39-42	0.25	5.83	2.89±0.012 b	97.90
43-46	0.08	1.77	0.45±0.003 c	55.00
Overall mortality	0.08	14.35	3.05±0.04	72.37

Means with different letters in a column differed significantly (P=0.005).

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