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ARTICLE

A Sero-Epidemiological Survey of Infectious Bursal Disease in Scavenging Village Chickens in Enugu State, Nigeria

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SUMMARY

A serological survey was conducted to determine the prevalence of antibodies to Infectious Bursal Disease (IBD) virus using the Agar Gel Precipitin Test (AGPT) in unvaccinated scavenging adult village chickens in Nsukka Local Government Area (L.G.A.) in South Eastern Nigeria. Of the 800 sera samples tested, 328 (41%) were positive for IBD virus antibodies. There was no significant difference (P>0.05) in seasonal distribution, being 43% in the wet and 39% in the dry seasons; and gender being 41.1% and 41% for cocks and hens respectively. The study thus confirmed the endemicity of IBD in local chickens. A national IBD control programme is recommended.

KEY WORDS: Antibodies, Infectious Bursal Disease, village chickens, Nigeria

INTRODUCTION

Infectious bursal disease (IBD) is an acute, highly contagious viral infection of young chickens that has lymphoid tissues as its primary target with a special predilection for the bursa of fabricius (Sonaiya *et al.*, 1999). It was first reported in Nigeria by Ojo *et al.* (1973) and confirmed by Onunkwo (1975). Subsequent studies showed that the disease has acquired an endemic status among the Nigerian poultry population (Abdu *et al.,* 2001, El-Yuguda and Baba, 2004; Mai *et al*, 2004; Oluwayelu *et al.* 2007; Usman and Diarra, 2008). Antibodies to IBD virus have been detected in the sera of exotic (Abdu *et al.,* 2001; El-Yuguda and Baba, 2004; Usman and Diarra, 2008) and village indigenous chickens (Abdu *et al*, 2001; Permin and Bisgard, 1999). Village poultry accounts for about 90% of the total poultry population in Nigeria (Sonaiya *et al.,* 1999) and is an important source of high quality animal protein and income for rural dwellers (Permin and Bisgard, 1999). These local birds are hardy and have adapted to the prevailing tropical environmental conditions of high temperature and high humidity (Baba *et al.*, 2004). Previous studies have shown that experimental IBD is more severe in village chickens than in pullets and broilers of exotic breeds (Okoye and Aba-Adulugba, 1996; M-El-Elahi *et al.*, 2001). In view of this situation and the absence of epidemiological information on IBD in the South Eastern region of Nigeria a cross- sectional survey was initiated in Nsukka L.G.A., southeastern Nigeria, with the objectives of establishing the prevalence of antibodies against IBD virus at different seasons of the year and determining if sex has an effect on the susceptibility of local chickens to IBD virus infection.

MATERIALS AND METHODS

The study area

The study was carried out in Nsukka Local Government Area (L.G.A.) which comprises of 14 towns located within the tropical, humid and derived savannah zone situated between 4^0.21'and $7^0$5' N and 6^0 and 10^0 E. The temperature varies usually from 27^0C to 35^0C. The hottest months are February to April, while the coldest period is between December and January during the Harmattan. Rainfall is seasonal, the wet season seen from April to October and dry season from late October to early April.

Sampling procedure

Ten of the 14 towns within Nsukka L.G.A. were randomly selected. In each town 20 households were randomly selected and 4 chickens per household sampled. The study covered part of the wet season (June-July 2008) and part of the dry season (January-February 2009).

Blood sample collection and storage

A total of 800 blood samples were collected by

jugular vein puncture, 400 in the wet and 400 in the dry season. The blood samples were allowed to clot; sera were separated and frozen at -15^{0}C until use.

Agar Gel Precipitin Test

Serum samples were tested for IBD virus precipitins using the Agar Gel Precipitin Test (AGPT) as described by Hirai *et al*. (1972). Briefly, 5mm wells were made in 1% agar gels (Oxoid) in 5cm diameter Petri dishes. A 1:3(w/v) suspension of the tissue homogenate prepared in phosphate buffered saline in a manual tissue homogenizer using bursa of fabricius from confirmed field outbreak of IBD and centrifuged at 2,000 revolutions per minute for 10 min, served as the source of IBD antigen. The positive control serum was a known IBD antiserum derived from chickens that had been hyper immunized with successive intramuscular doses of IBD vaccine virus while the negative control serum was from unimmunized chickens reared separately, which were negative for IBD virus antibodies. Test results were read after 18-24hr and finally read by 72hrs.

Data Analysis

Data generated were analyzed using descriptive statistics with emphasis in absolute distribution and percentages. The prevalence of IBD among the different towns; sexes and seasons were calculated. Seroprevalence of IBD between sexes and the two seasons (dry and wet) were compared using Chi-square test.

RESULTS

A total of 800 sera samples comprising 380 and 420 from cocks and hens respectively were tested. IBD seroprevalences in the different towns are as shown in Table I. Of the 800 birds (hens and cocks) 328 (41%) were found to be seropositive for IBD. No individual town or household was free from IBD virus antibodies. The seroprevalence of the different towns ranged from 26.3% - 58.8%. Highest prevalence occurred in Obukpa (58.8%) and the lowest in Opi (26.3%).

Table II shows the seasonal (wet and dry season) distribution of IBD seroprevalence. The seroprevalence was 43% for the wet season and 39% for the dry season. The difference in seroprevalence between wet and dry season was not statistically significant (P > 0.05). However, peak prevalence was recorded in Obukpa (62.5%) during the dry season and the lowest recorded in both Opi (25%) in the dry season and Okpuje (25%) in the wet season, respectively.

Table III shows the sex distribution of IBD seroprevalence. A prevalence rate of 41.1% and 41% were noted among the males and females respectively. There was no statistically significant difference (P > 0.05) in the IBD seroprevalence between the sexes (cocks and hens).

TABLE I: Total seropervalence of IBD in village chickens in Nsukka L.G.A., Nigeria

Towns	No. Samples tested	No positive	Prevalence (%)
Obukpa	80	47	58.8
Alor Uno	80	27	33.8
Ibagwa Ani	80	36	45
Okutu	80	36	45
Nsukka	80	40	50
Okpuje	80	24	30
Ehalumona	80	29	36.3
Lejja	80	41	51.3
Opi	80	21	26.3
Ede Oballa	80	27	33.8
Total	**800**	**328**	**41**

TABLE II: Seroprevalence of IBD in village chickens according to season

Towns	Wet Season			Dry season		
	No. tested	No. positive	Prev. (%)	No. tested	No. positive	Prev[a] (%)
Obukpa	40	22	55	40	25	62.5
Alor Uno	40	12	30	40	15	37.5
Ibagwa Ani	40	20	50	40	16	40
Okutu	40	24	60	40	12	30
Nsukka	40	18	45	40	22	55
Okpuje	40	14	35	40	10	25
Ehalumona	40	16	40	40	13	32.5
Lejja	40	22	55	40	19	47.5
Opi	40	10	25	40	11	27.5
Ede Oballa	40	14	35	40	13	32.5
Total	**400**	**172**	**43**	**400**	**156**	**39**

[a]Prev = Prevalence

TABLE III: Seroprevalence of IBD in village chickens according to sex

Towns	Cocks			Hens		
	No. tested	No. positive	Prev. (%)	No. tested	No. positive	Prev[a] (%)
Obukpa	37	21	56.8	43	26	60.5
Alor Uno	30	11	36.7	40	16	32
Ibagwa Ani	40	21	52.5	40	15	37.5
Okutu	39	18	46.2	41	18	43.9
Nsukka	43	20	46.5	37	20	54.1
Okpuje	46	16	34.8	34	8	23.5
Ehalumona	32	11	34.4	48	18	37.5
Lejja	33	17	51.5	47	24	51.1
Opi	41	11	26.8	39	10	52.6
Ede Oballa	39	10	25.6	41	17	41.5
Total	**380**	**156**	**41.1**	**420**	**172**	**41.0**

[a]Prev = Prevalence

DISCUSSION

Infectious bursal disease seroprevalence in village chickens has not been determined hitherto in any area of South Eastern Nigeria. The total seroprevalence of IBD in Nsukka local government area was 41% which was higher than 38% refered by Oyewola *et al*. (1996) in village chickens in Ibadan in South Western Nigeria but lower than 45.7% reported in Northern Nigeria (El-Yuguda and Baba, 2002). The IBD antibodies detected in this study could only have been acquired from natural infection since there was no history of vaccination among the village chickens and all the birds were adult birds, thereby ruling out the presence of maternal antibodies. In Mauritania, Bell *et al*. (1990) found that 46.2% of birds had antibodies against IBD while in a similar study by Permin and Bisgard (1999) a prevalence of 42.3% was obtained. These regional similarities in IBD seroprevalence suggest ecological similarities in IBD virus activity and may perhaps be a reflection of the absence of environmental impact on the viability and spread of IBD virus. IBD virus is hardy and capable of withstanding wide variations in environmental conditions (Lukert and Saif, 2003).

The results indicated widespread prevalence of IBD antibodies among all birds sampled with no significant differences between seasons and gender.

CONCLUSION

The results of this study have further confirmed the enzootic and carrier status of village chickens for IBD. In view of the socio-economic importance of IBD to the commercial poultry industry and of village chickens to rural dwellers in Nigeria, there is a need to embark on a National control programme which will take into consideration the role of the village chicken in the epizootiology of IBD in Nigeria.

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