

Full Length Research Paper

# A serological survey for infectious bursal disease virus antibodies among village chickens in Yobe State Nigeria

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**A serological survey to detect the presence and prevalence of antibodies against infectious bursal disease virus among village chickens was conducted in 17 villages of Yobe State, Nigeria. Five chickens were randomly selected from up to 10 households in each of the 17 sampled villages and bled from their wing vein. Serum was extracted from clotted blood and screened for antibodies to infectious bursal disease virus using Agar gel precipitation method. The study was able to detect antibodies to infectious bursal disease virus among village chickens in Yobe state at a prevalence of 63%. The results could serve as a base line data for future studies.**

**Key words:** Nigeria, Seroprevalence, Village chickens, Infectious Bursal Disease, Nigeria

## INTRODUCTION

Infectious bursal disease is a viral disease regarded as the second most important diseases of village chickens in Zaria, Nigeria (Abdu et al., 1992) following Newcastle disease which is considered as the principal factor limiting village chicken production in Africa (Awan et al., 1994). Infectious bursal disease is an immunosuppressive disease associated with poor response to vaccination, increased susceptibility towards other pathogens and high mortality in a susceptible population (Bell, et al., 1990).

Knowledge of the occurrence and prevalence of any disease is important in the design and implementation of a suitable control program. Screening for antibodies to Infectious bursal disease virus among village chicken can give insight to the role of disease in chicken mortality that occurs annually in Yobe state- which has a chicken population of over 3 million. The mortality of these chickens affects the economy of the poor, especially, women who largely own these birds. It is for this reason that this study was designed to detect and establish the

prevalence of antibodies to infectious bursal disease virus using Agar gel precipitation test in village chickens.

## MATERIALS AND METHODS

### Study area

This study was conducted within 17 villages in Yobe State, Nigeria. The state lies within latitude 10°30' and 13°30'N, longitude 10°00' and 12°30'E. The state shares boundary with Borno, Gombe, Bauchi and Jigawa States and an international boundary with Niger republic. The state has a population of 2,321,339 people (National population commission, 2012) and an estimated chicken population of 3.0 million village poultry (Federal Livestock Department, 2006).

### Study design

A cross sectional study design was used in this study. Chickens were randomly and systematically selected within each household. Every 1<sup>st</sup> household was selected in each of the 4 quadrant of the village. The 5<sup>th</sup> household was selected from the centre of the village.

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### Sample size and distribution

A sample size of 384 calculated from a formula outlined by Joachin (1998) for a 50% prevalence was doubled to 768 with a 10% allowance to enable obtaining up to 50 samples from each of the 17 villages randomly selected from a shuffled list of 68 villages (drawn from four randomly selected villages in each of the 17 LGAs of Yobe State). About five adult or grower chickens were randomly caught and bled from each of the 10 households to be sampled per village. The number of households was calculated by dividing the maximum of 50 chickens to be sampled by the maximum of five chickens to be sampled per household.

A total of 652 serum samples of village chickens were obtained from 17 villages. All the serum samples were screened for antibodies to infectious bursal disease virus by agar gel precipitation test (Hirai et al., 1972). Antigen and positive antiserum for the test were obtained from National Veterinary Research Institute, Vom, Nigeria.

Excluded from the study were chicks and recently weaned chickens because the farmers considered them too young for bleeding.

### Collection of blood

1.5-2 ml of blood were obtained from the brachial vein of adult chickens using 2 ml syringe and a 23-gauge needle. The blood was transferred into 5 ml plastic test tube and left overnight at an average room temperature of about 30°C. Serum was extracted using a plastic micropipette and transferred into sample bottles and stored at -20°C until tested.

### Detection of antibodies to Infectious bursal disease virus

Agar gel precipitation test as described by Hirai et al. (1972) was used to detect the presence of antibodies to infectious bursal diseases virus. The appearance of precipitin lines between serum samples and positive antigen between a period of 24 to 48 hours was considered positive for that serum sample. Positive control serum was derived from hyper immunized chickens vaccinated with infectious bursal disease vaccine obtained from National veterinary research institute, Vom, Nigeria, while, negative control serum was obtained from unimmunized chickens reared separately.

### Data analysis

The prevalence of antibodies to Infectious bursal disease virus was calculated using the formula outlined by Bennette et al. (1991):

Prevalence (%) = number of serum positive/total number of serum examined x 100

## RESULTS

All the 17 villages sampled had chickens that were positive for antibodies to infectious bursal disease virus by Agar gel precipitation test (Table 1). A prevalence of 63% was obtained across the sampled villages. The highest prevalence of 99.5% was obtained from chickens sampled in Potiskum while the lowest prevalence of 25% was obtained from Geidam. The prevalence was 58.7 and 62.5 for adult and grower chickens (Table 2). Similarly, the prevalence was 57.7 and 63.7 in sampled males and female chickens (Table 3).

## DISCUSSION

The prevalence of antibodies to infectious bursal disease virus of 63% within 17 sampled villages indicates the presence and widespread distribution of Infectious bursal disease virus in Yobe State. The prevalence obtained from this study further supports the findings that infectious bursal disease is endemic in Nigeria (Onunkwo and Momoh 1981; Nawathe and Lamorde 1982). The prevalence of 63% was higher than 8% (Bukar-Kolo et al., 2007) and 48.2% (El Yuguda et al., 2009) in neighboring Gombe and Borno states. The prevalence was lower than 78.1% later obtained in Zaria (Umoh et al., 1982) and 68.0% in Ibadan (Adene et al., 1985). Since infectious bursal disease is immunosuppressive, most of these chickens might have been subjected to increased susceptibility to Newcastle disease and other disease agents.

The high prevalence obtained within chickens sampled in Potiskum (95.5%) and Buniyadi 88.2% were indicative of a high virus activity. Few samples were taken from Potiskum due to security problems encountered at the time of sampling. Conversely, the low prevalence in Kukar-gadu (35.6%) and Geidam (25.0%) were indicative of low virus activity. Since, infectious bursal disease can be transmitted through contact exposure (Okoye et al., 1999), it is probable that the high virus activity was due to horizontal transmission (Adene et al., 1985) that occurred around the many garbage's generated by the densely populated settlements of Potiskum and Buniyadi. The prevalence of 58.7 and 62.5 among sampled adults and growers is suggestive of horizontal transmission among the various age groups of chickens that are reared together. The rearing of village chickens of different age group together could make the infection within a given flock a permanent phenomenon as suggested by Nawathe and Lamorde (1982). The low prevalence obtained within Geidam and Kukargadu may be associated with the dispersed nature of their settlements.

**Table 1.** Distribution of infectious bursal disease virus antibodies among village chickens in Yobe State, Nigeria.

Villages	Total serum samples	Positive serum samples	Prevalence (%)
Badejo	39	23	58.9
Bombori	48	30	62.5
Buduwa	37	29	78.4
Buni-Yadi	34	30	88.2
Damagum	40	28	70.0
Damaturu	35	24	68.6
Dapchi	35	24	68.6
Daya	32	23	71.9
Degubi	45	24	53.3
Gadaka	48	19	39.6
Garin-maje	39	31	79.5
Gashua	36	22	61.1
Geidam	44	11	25.0
Janga-dole	37	15	40.5
Kukar –Gadu	45	16	35.6
Potiskum	22	21	95.5
Nguru	36	27	75.0
Total	652	397	63.0

**Table 2.** Distribution of antibodies to infectious bursal disease virus prevalence by age.

age	number	positive	Prevalence
adult	281	174	58.7
growers	371	232	62.5

The prevalence of 57.7 and 63.7 obtained among male and females shows that both males and females can be infected by this contagious virus which makes vaccination the only possible control measure.

The occurrence of antibodies to Infectious bursal virus in village chickens is suggestive of a high viral activity that may have a significant implication in the epidemiology of the disease in commercial poultry which are sometimes reared in close proximity to village chickens.

The authors recommend regular surveillance for infectious bursal disease antibodies as well as examination of the risk factors associated with the disease in village chickens to enable the institution of a

suitable control program. Also recommended is vaccination of village chickens to confer protection to susceptible birds.

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