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Serological study of Newcastle disease in local chickens in the federal capital territory, Abuja, Nigeria

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ABSTRACT

Newcastle Disease (ND) has been recognized for a long time as one of the major production and health constraints to rural poultry. There have been increasing reports by private veterinarians of ND outbreaks in commercial farms in the Federal Capital Territory (FCT), Nigeria but the epidemiological status of the disease in local chickens is unknown and outbreaks are usually not reported. A serological survey was conducted to determine the prevalence of antibodies to Newcastle disease virus (NDV) in local chickens in four area councils of the FCT. An overall prevalence of 57% was obtained from the 400 samples collected from apparently healthy birds and tested using haemagglutination inhibition (HI) test. This study shows that NDV is circulating in the study area and may pose a serious threat to the commercial poultry industry in the study area; therefore, local chicken in the study area should be vaccinated against ND.

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1. Introduction

Newcastle Disease (ND) is worldwide and is regarded as one of the most economically important diseases of chickens and other birds. The first documented, reported outbreak of ND in Nigeria occurred between December, 1952 and February, 1953 in and around Ibadan (Hill et al., 1953).

Studies carried out in rural chickens in Nigeria by Ezeokoli et al., (1984) showed 73% prevalence of antibodies against NDV in traditionally managed backyard flocks in Zaria, 63% seroprevalence was reported by Orajaka et al., (1999) in south eastern Nigeria, 38% seroprevalence was reported by Oyewole et al., (1996) in south western Nigeria around Ibadan and Musa et al., (2009) reported a prevalence of 51.9% in Plateau State.

Vaccination has been reported as the only safeguard against endemic ND (Orajaka et al., 1999). In order to formulate appropriate vaccination schedule and control measures, the serological status of NDV among chickens in the study area need to be elucidated due to high demand of poultry and poultry products.

2. Materials and Methods

2.1. Study area

This study was carried out in four Area Councils (Abuja Municipal, Kuje, Gwagwalada, Kwali) of Federal Capital Territory (FCT), Abuja-Nigeria. FCT made up of 6 Area Council, out of which 4 are selected for the study. FCT is located in North Central Nigeria (Northern Guinea Savannah zone) and lies between Latitude 8 25' and 9 20'N, and Longitude 6 45' and 7 39'E. It has an approximate land mass of 7,315km² with a population of 1,405,201 people (according to 2006 National Population Census). According to the records of the Nigerian poultry population (FDLPCS, 2003), there is a total of 508,305 poultry in FCT, out of which 84% (3,465,000) are local and 16% (347,288) are exotic. It has moderate climatic conditions and experiences three weather conditions annually. This includes a warm humid rainy season and a blistering dry season; in between the two seasons is a brief interlude of harmattan occasioned by the North East Trade Wind, with the main feature of dust haze, intensified coldness and dryness. The rainy season begins from April and ends in October, when daytime temperatures reach 28-30oC and night time lows hover around 22-23oC. In the dry season, daytime temperatures can dip to 12oC, resulting in chilly evenings. Even the chilliest nights can be followed by daytime temperatures well above 30oC. The predominant occupation of the rural populace is crop farming supplemented with livestock rearing.

2.2. Study design

This study is a cross sectional type, and was carried out in 40 villages of four area councils (Municipal, Kuje, Gwagwalada, Kwali) of FCT. These villages were purposively selected due to the presence of poultry and livestock population and market.

2.3. Study population

According to the records of the Nigerian poultry population (FDLPCS, 2003), there is a total of 508,305 poultry in FCT, out of which 84% (3,465,000) are local and 16% (347,288) are exotic. The local chickens are extensively managed (free range) and usually come in contact with other birds and animals.

2.4. Serological analysis

The sera samples collected from 400 apparently healthy unvaccinated local chickens were tested for NDV specific antibody using Haemagglutination Inhibition test (HI). The samples showing peculiar central button shaped settling of red blood cells (RBCs) were recorded as positive and maximum dilution of each sample causing haemagglutination inhibition was considered as the end point, which was used to estimate the haemagglutination inhibition (HI) titer. The HI titer of each serum sample was expressed as reciprocal of the serum dilution, and once the dilution is $\geq 1:16$ it is consider as positive sample.

3. Results and discussion

Antibodies to Newcastle disease was detected is sera samples collected from unvaccinated local chickens in all the four Area Councils of FCT using haemagglutinating inhibition (HI), with the overall seroprevalence of 57%.

The prevalence in each of the four area councils are: Municipal (37%), Kuje (44%), Gwagwalada (79%) and Kwali (68%).

Table

Showing average ND titre values in the four Area Councils of the Federal Capital Territory, Nigeria.

Area council	Titre value	
	Negative (<1:16%)	Positive (\geq 1:16%)
Gwagwalada	21 (21)	79 (79)
Municipal	63 (63)	37 (37)
Kwali	32(32)	68 (68)
Kuje	56 (56)	44 (44)
Total	172 (42)	224 (57)

($P>0.5$).

Statistically there was no any significant difference ($P>0.5$) in the antibodies titre of the unvaccinated local chicken in the four Area council of the FCT.

From the above result it shows that ND is circulating among the local chicken in the study area and it may save as a threat to poultry industry in the study Area. The detection of antibodies in unvaccinated local chickens in the four Area council show that the birds are expose to Newcastle diseases either through the outbreak of the disease in the study area. Those chickens that are test positive to Newcastle disease may be those that survive the outbreak in the study area or those that are purchase from other area that had the outbreak order than the study area. The presence of antibodies to ND shows that the virus is circulating in the study area and it will serve as a threat to poultry industry. Once there is an outbreak of ND in the study Area, with the extensive system of rearing these local chickens in the study it possible to experience high morbidity and mortality rate. It is therefore advisable to vaccinate all birds in the study area yearly to prevent outbreak of Newcastle disease.

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