



A retrospective study on the prevalence and monthly distribution of Newcastle disease in poultry in Bauchi State, Nigeria

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Abstract

Newcastle disease (ND) is a major constraint to poultry production in Africa. A retrospective study was conducted to determine the prevalence of ND and its distribution by months in poultry from the records of monthly disease reports (MDRs) submitted by eight (8) of the twenty (20) Area Veterinary Offices (AVOs) in Bauchi State. Cases of ND in proportion to the total poultry cases for the period of 60 months (June 2010-May 2015) were used to determine the prevalence of ND, while, the average number of cases per month was used to create a bar chart to illustrate the monthly pattern of distribution of ND. The prevalence of reported cases of ND in poultry was 11.6% (26166/225891x100). The highest number of cases (>500) was frequently reported between October and January; and in May. The results highlight the need to monitor the occurrence of ND and to apply strategic vaccination as a control measure for the disease before the month of October and May in all the communities.

Keywords: Area Veterinary Office, Bauchi State, Monthly disease report, Newcastle disease, Prevalence, Nigeria

Introduction

Newcastle disease is an OIE listed disease and is the second most important trans-boundary animal disease that has affected twenty seven of the forty-one African Union member countries (PAAR, 2013). The disease had accounted for 9% of the total outbreaks of diseases in the African continent in 2013 and was responsible for the highest number of outbreaks, death, emergency slaughter and destruction in the avian specie in Africa in the year, 2013 (PAAR, 2013). The disease in Nigeria is considered endemic and causes high chicken mortality (Abdu *et al.*, 1992) and increase in the slaughter of chickens as a result of panic sales in

anticipation of yearly epidemics (Nwanta *et al.*, 2008).

Newcastle disease virus (NDV) belongs to the genus *Avulavirus*, subfamily *Paramyxovirinae*, family *Paramyxoviridae* and order *Mononegavirales* (Lamb & Parks, 2007). Chickens are the most susceptible among the over 200 specie of birds that can be infected by velogenic NDV (Kaleta & Baldauf, 1988). Even though Bauchi State, Nigeria has an estimated population of over 5 million chickens (Adene & Oguntade, 2006), reports on ND are scanty (Nwakiti *et al.*, 2010; Musa *et al.*, 2013) especially, with regards to distribution and prevalence of the disease across the State.

The aim of the work was to determine the prevalence and monthly distribution of ND from the records of monthly disease reports (MDRs) in the office of the Director Veterinary Services (DVS), Bauchi State.

Materials and Methods

Study area

This study was carried out in Bauchi State, Nigeria (Figure 1). Bauchi State occupies a land mass of 48,382 sq km that is located within latitudes 7° 52'N and 8° 56'N and longitudes 7° 25'E and 9° 37'E. The State lies on the Bauchi plateau with a dry and a wet season and a vegetation regarded as Savannah woodland. The State has river Hadejia in its northern

part and River Gongola in its southern part. The State shares boundary with Kaduna, Yobe, Gombe, Plateau, Taraba, Kano and Jigawa States (INEC, 2008). The State has twenty Local Government Areas (LGAs), a human population of 5,515,300 (INEC, 2008) that belong to many ethnic groups whose occupation is mainly farming and a village poultry population of about 5,832,750 (Adene & Oguntade, 2006).

Data collection

Information on reported cases of ND was extracted from MDRs (June, 2010-May, 2015) submitted by Area Veterinary Offices (AVOs) to the office of the

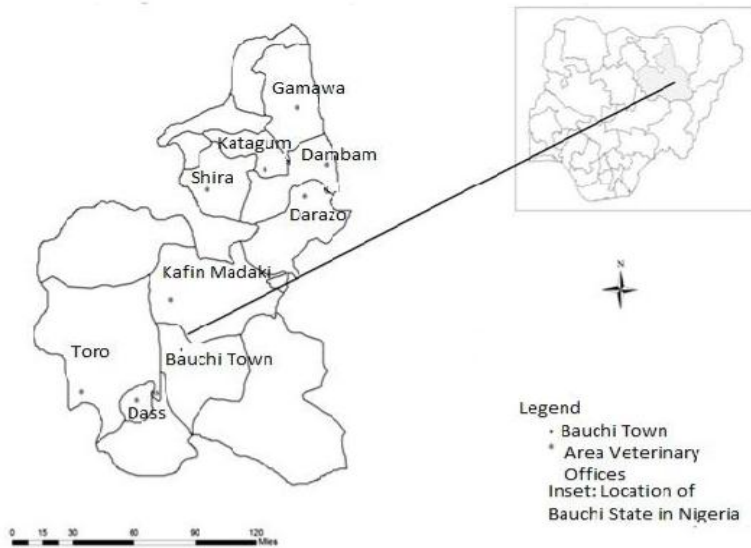


Figure 1: Map of Bauchi State showing communities that contained the Area Veterinary Offices which provided the monthly disease reports (June, 2010-May, 2015) for this study

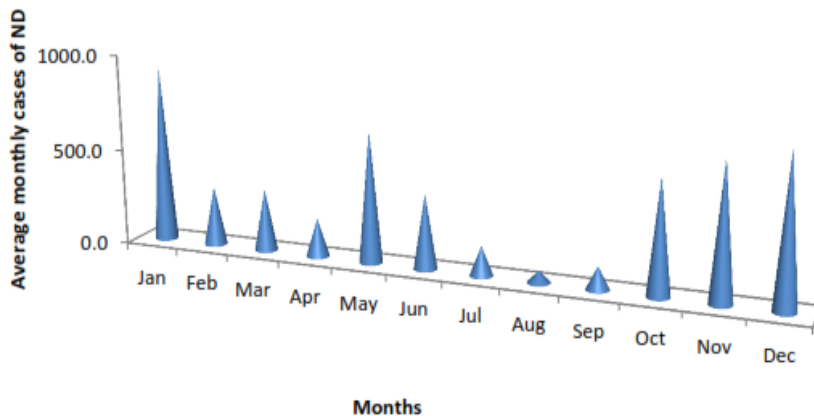


Figure 2: Average monthly cases of Newcastle disease in poultry in Bauchi State, Nigeria (June 2010-2015)

DVS, Bauchi State. Number of cases of ND was calculated as proportion of the total number of all poultry cases reported during the study period to determine the prevalence of ND. Average monthly distribution of cases of ND was computed from all the MDRs for construction of bar chart to illustrate seasonal occurrence of ND. Diagnoses of ND was based on history, clinical signs and postmortem examination.

Data obtained were analyzed using SPSS version 20.0. Prevalence for cases of ND was calculated following the formula outlined by Bennette *et al.* (1991): Where prevalence = $\frac{\text{Number of ND cases reported} \times 100}{\text{Total number of poultry disease cases reported}}$.

Odds ratio to determine association between cases of ND and total number of poultry cases reported during the study period in each AVO were calculated. values of $P < 0.05$ were considered significant.

Average monthly distribution of cases of ND was calculated from the average of all the monthly distribution of ND cases reported during the study period. A bar chart (Figure 2) was used to illustrate monthly distribution of ND cases.

Results and Discussion

An overall prevalence of ND cases reported was 11.6% (26166/22589) (Table 1). The highest ND prevalence of 13.1% (13325/101591x100) with an OR of 1.29 (1.249-1.335) was reported from Toro AVO. The lowest prevalence of zero per cent was obtained from Ganjuwa and Dass AVOs where no ND case was reported (Table 1). The average monthly cases were highest (>595) between the months of October to January ; and in May.

The results show that cases of ND were part of the MDRs submitted from six of the eight AVOs to the office of the DVS, Bauchi State. The prevalence of cases of ND was 11.6%. The highest prevalence of ND cases reported from Toro 13.1% appears to indicate a high activity of virulent strain of NDV that may be associated with high commercial activity taking place in Toro.

The lack of inclusion of ND in the MDRs from Ganjuwa and Dass could either suggest that poultry farmers are likely not presenting or reporting cases of ND to the veterinary clinics within the AVOs perhaps because of the futility of treating ND, or the reports were emanating mostly from commercial farmers who routinely vaccinate their chickens against ND. Other possible reasons for lack of report on ND cases could be that farmers may be subscribing to private community animal health workers who may not find it obligatory to report cases of ND to the nearest AVO.

The failure to report cases where disease is presumed to be endemic could lead to underreporting of a disease situation. Underreporting of diseases had been previously observed by Gashash (2009) in all the states of Nigeria.

The 11.6% prevalence of ND cases obtained for Bauchi State was lower than 52.23% in Maiduguri (Saddiq *et al.*, 2011) and 55.5% in Gombe (Lawal *et al.*, 2015). The low prevalence of ND obtained in this study may be due to eight communities covered in this study in contrast to specific towns mentioned in the previous studies or perhaps due to under reporting of ND cases much similar to the observation by Nwanta *et al.* (2008) and Gashash (2009).

Even though, the prevalence of ND from MDR was low, the occurrence of ND in all the months appears to suggest endemicity of ND (Figure 2). The average monthly distribution of ND cases (Figure 2) appears to show some seasonality in the occurrence of cases of ND. Newcastle disease was most likely to occur between the months of October and January which coincides with cold season and in May which coincides the hot season and beginning of rainy season. Increase in the prevalence of ND during these periods had also been observed in other states of Nigeria and had been associated with cold stress and dry harmattan winds (Nwanta *et al.*, 2005; Sa'idu *et al.*, 2006; Okwor & Eze, 2011; Saddiq *et al.*, 2011).

A second high peak prevalence of ND reported in May may be due to heat stress that depresses the immunity of chickens making them susceptible to diseases as suggested by Saddiq *et al.* (2011), and Okwor & Eze (2011).

Conversely, average cases of ND were lowest in August possibly because farmers had sold off their excess chickens and had left only the breeders to breed chicks in the case of village chickens or are raising another batch of chickens in the case of

Table 1: Distribution of Newcastle disease cases as reported by Area Veterinary Officers in Bauchi State, Nigeria

Area Veterinary Office	Total number of poultry cases reported	Number of cases of Newcastle disease reported	Prevalence of cases of Newcastle disease (%)	Odds ratio	CI at 95%
Azare	53,949	5,647	10.5	Reference	
Dambam	11,515	856	7.4	0.6869	0.6373-0.7403
Darazo	27,372	2,137	7.8	0.7244	0.6876-0.7631
Dass	2,405	0	0.0	0.002	0.0001-0.0285
Gamawa	20,978	900	4.29	0.3834	0.3567-0.4121
Ganjuwa	11	0	0.0	0.3719	0.02190-6.316
Shira	8,070	900	11.2	1.074	0.9965 - 1.157
Toro	101,591	13,325	13.1	1.291	1.249 - 1.335
Total	225,891	26,166	11.6		

$$X^2 = 21.65 \quad P < 0.001$$

commercial poultry.

A strategic vaccination campaign against ND could be undertaken in August, when cases of ND was lowest and before October to January when cases of ND was at its peak; and before the second peak of cases of ND in May.

In conclusion, the prevalence of 11.6% obtained in this study demonstrates that ND is an existing threat to poultry farmers in Bauchi State. The study recommends that the Department of Veterinary Services, Bauchi State create and embark on vaccination campaign against ND in poultry, especially, before the cold season when outbreaks were at their peak.

References

- Abdu PA, Mera UM & Sa'idu L (1992). A study on chicken mortality in Zaria, Nigeria. *Research National Workshop on Livestock and Veterinary Institute, Vom, Nigeria*. Pp 51-55.
- Adene DF & Oguntade AE (2006). *Structure and Importance of the Commercial and Village Based Poultry Industry in Nigeria*, Food and Agricultural Organization, Rome, Italy. Pp 1-109.
- Bennette S, Woods T, Liyanage WM & Smith DL (1991). A simplified general method for cluster-sample surveys of health in developing countries. *World Health Statistics Quarterly*, **44**(3): 98-106.
- Gashash IA (2009). *Annual Assessment of Disease Reporting Performance of State*. Epidemiology Unit, Federal Department of Livestock, Nigeria.
- Independent National Electoral Commission (INEC) (2008). Bauchi State In: *Nigeria Atlas of Electoral Constituencies*. Independent National Electoral Commission, Garki, Abuja, Nigeria. Pp 42-50.
- Kaleta EF & Baldauf C (1988). Newcastle disease in free living and pet birds. In: *Newcastle Disease* (DJ Alexander, editor). Kluwer Academic Publishers, Boston, MA. Pp 197-246.
- Lamb RA & Parks GD (2007). Paramyxoviridae In: *Fields Virology* (DM Knipe, PM Howley, editors), *fifth Edition*. Lippincot, Williams and Wilkins, Philadelphia. Pp 1450-1496.
- Lawal JR, Jajere SM, Mustapha M, Bello AM, Wakil Y, Geidam YA & Ibrahim UI (2015). Prevalence of Newcastle disease in Gombe. Northeastern Nigeria: A ten-year retrospective study (2004 – 2013), *British Microbiology Journal*, **6**(6): 367-375.
- Musa IW, Abdu PA, Sackey AKB, Oladele SB (2013). Survey for highly pathogenic avian influenza from poultry in two Northeastern States, Nigeria. *Veterinary Medicine International* doi: 10.1155/2013/531491.
- Nwakiti OO, Ejekwolu AJ, Ibrahim I, Ndako JA & Echenwo GON (2010). Detection of serum antibody levels against Newcastle disease in local chickens in Bauchi metropolis, Bauchi State, Nigeria. *African Journal of Clinical Experimental Microbiology*, **11**(2): 96-101.
- Nwanta JA, Abdu PA & Ezema WS (2008). Epidemiology, challenges and prospects for control of Newcastle disease in village poultry, Nigeria. *World's Poultry Science Journal*, **64** (1): 119-127.
- Nwanta JA, Umoh JU, Abdu PA, Ajogi I & Egege SC (2005). Comparison of the cost of unvaccinated and oral vaccinated local chickens with a Malaysian thermostable Newcastle disease vaccine (NDV4HR) in Kaduna State, Nigeria. *Bulletin of Animal Health and Production in Africa*, **53** (3): 202-210.
- Okwor EC & Eze DC (2011). Epizootic Newcastle disease in local chickens reared in South East savannah zone of Nigeria. *International Journal of Poultry Science*, **10**(3): 212-215.
- PAAR (2013). Pan African Animal Resource, AU-IBAR Year Book, African Union Commission (September 2013). Page viii.
- Saddiq MA, Nwanta JA, Okolocha EC & Tijjani AM (2011) Retrospective (2000-2009) studies of Newcastle disease (ND) cases in avian species in Maiduguri, Borno State, North Eastern Nigeria. *International Journal of Poultry Science*, **109**(1): 76-81.
- Sa'idu L, Abdu PA, Tedek LB, Umoh JU, Usman M & Oladele SB (2006). Newcastle disease in Nigeria. *Nigerian Veterinary Journal*, **27**(2): 23-32.