Current Research in
Poultry Science

ISSN 2152-2111

Academic
Journals Inc.

www.academicjournals.com

Current Research in Poultry Science 3 (1): 12-17, 2013
ISSN 2152-2111 / DOI: 10.3923/crpsaj.2013.12.17

A Retrospective (2007-2011) Analysis of Newcastle Disease Diagnosed at Avian Clinic of Veterinary Teaching Hospital, Usmanu Danfodiyo University Sokoto, Nigeria

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ABSTRACT

Newcastle Disease (ND) is a highly contagious viral disease of almost all species of domestic and wild birds. This disease is caused by a virus of genus *Avulovirus*, subfamily Paramyxovirinae of the family Paramyxoviridae. A five-year study (Jan, 2007-Dec, 2011) of case reports on ND and other poultry diseases diagnosed at the Avian Clinic of Veterinary Teaching Hospital, Usmanu Danfodiyo University, Sokoto (VTH-UDUS) was conducted. A total of 2,624 individual cases were documented with a prevalence of 80.9% (2,123 cases) diagnosed as ND. The result showed that there were incremental fluctuations in the prevalence of ND from 2007 to 2011. There were also variations in monthly and bird-type distribution of ND in Sokoto, with highest number of cases in March and October accounting for 88.4 and 94.4%, respectively. Layers had the highest prevalence (89.0%), followed by cockerels and pigeons (66.7%). Also intensive system of management had the highest disease occurrence of 84.7%. Poor management, improper vaccine handling and self medication practiced by the poultry farmers coupled with harsh weather conditions and inadequate diagnostic facilities may be responsible for the distribution pattern recorded. It is therefore imperative for poultry farmers to institute and intensify appropriate biosecurity measures on how to minimize horizontal transmission of the disease. Regular surveillance for ND virus should be routinely carried out.

Key words: Newcastle disease, layers, outbreaks, Sokoto

INTRODUCTION

In Nigeria poultry industry offered fastest supply of animal protein to man and provide comparatively quickest rate of returns on investment than livestock, hence, the increased attention being given to the health care of poultry by farmers (Molokwu *et al*., 1988). Disease is a hindrance to livestock production (Lamorode, 1996). The major disease problems of poultry are Newcastle disease, avian influenza, pox, bursal disease, colisepticeamia, coccidiosis and worm infestation.

Newcastle disease is an acute, highly contagious rapidly spreading viral disease affecting birds of all ages (Abdu, 2005); with many breeds of domesticated and wild bird's susceptible (Wernery *et al*., 1992). It is characterized by high morbidity and mortality rates, with respiratory and nervous signs. Also, there is swollen of tissues around the eyes and neck coupled with greenish-watery diarrhea, abnormal eggs, reduced egg production and/or complete cessation of egg

production (Alexander, 2001). It is caused by a virus of genus *Avulovirus*, subfamily Paramyxovirinae, family Paramyxoviridae (Al-Garib *et al.*, 2003). The disease is transmitted mainly through newly introduced birds, selling or giving away sick and carrier birds (Tu *et al.*, 1998). However, suitable climatic factors and high poultry farm concentrations favours air transmission (Alexander, 2001). The windy harmattan also encourages the spread of the virus (Musa *et al.*, 2009). Saidu *et al.* (2006) reported that cold weather induces stress on chickens and subsequently lowers their immunity to ND. Throughout the world, off all poultry diseases, Newcastle disease is generally considered the most important (Herenda and Franco, 1996). A previous survey study revealed that about 60% respondents listed Newcastle disease as the main disease in their birds (FAO, 2008). In some parts of Nigeria, Newcastle disease has been rated one of the major constraints to the development of the village poultry production (Adene, 2000).

ND is of public health significance and in human; it may produce inflammation of the conjunctiva. Infection in humans is an occupational disease limited to workers handling infected birds (Brook *et al.*, 2007). In Nigeria, ND outbreaks have shown a continuous presence of the ND virus in poultry populations since it was first reported (Saidu *et al.*, 2006). There have been outbreaks of ND in vaccinated flocks (Abdu *et al.*, 2005; Musa *et al.*, 2010) with its attendant public health significance. It was against this background that this study was conducted in order to provide a base line data on the ND status of various avian species in Sokoto and to determine the population of poultry at risk, with a view to proffering solutions to the problem.

MATERIALS AND METHODS

The study was conducted by collating information (poultry breed, management practice, months and yearly distribution) on cases of poultry diseases presented to the avian clinic of Veterinary Teaching Hospital, Usmanu Danfodiyo University Sokoto (VTH-UDUS) from Jan, 2007 to Dec, 2011. Clinical data of outbreaks in poultry as recorded in the case file were collected; they were grouped into New castle disease (ND) and others (non-ND). Diagnosis was based on flock history, clinical signs, post-mortem and laboratory findings. Information obtained were analyzed demographically using descriptive statistics such as percentages and frequency (Gomez and Gomez, 1984). The specific rate for each of the factor was determined.

RESULTS

A total of 2,624 cases of poultry diseases were recorded with 2,123 (80.9%) of the cases diagnosed as ND. On yearly distribution, there were incremental changes in the incidence rate of ND. The highest prevalence rate of ND was observed in 2011 with a year-specific rate of 86.7% and the least rate of 2.7% was recorded in 2010 (Table 1). As shown in Table 2, the monthly distribution showed the highest prevalence of ND over other poultry diseases in the months of March and October with specific rates of 88.4 and 94.4%, respectively and zero prevalence in January, August and December. From this study, ND and Non-ND outbreaks observed in various types of poultry showed that layers had the highest specific morbidity rate (89.0%); followed by cockerels and pigeons each with specific rate of 66.7%. Morbidity was low in broilers (5.7%) and turkey (6.3%), while ducks, parrot, guinea fowl and peacock had the lowest morbidity rates (0.0%) (Table 3). The distribution according to management system indicates that ND outbreaks were greater among intensively reared birds than those under extensive system which in turn had higher ND outbreaks than birds managed semi intensively (Table 4).

Table 1: Annual distribution of ND and Non-ND outbreaks in Sokoto (2007-2011)

	Years					
Outbreaks	2007	2008	2009	2010	2011	Total
ND	9	4	101	1	2008	2123 (80.9%)
Non-ND	10	65	83	36	307	501 (19.1%)
Total	19	69	184	37	2315	2624
Year specific rates (%)	47.4	5.8	54.9	2.7	86.7	

Table 2: Monthly distribution of ND and Non-ND outbreaks in Sokoto (2007-2011)

	Months												
Outbreaks	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
ND	0	1	2009	3	1	2	3	0	1	101	2	0	2123
Non-ND	15	29	263	10	16	11	69	12	40	6	15	15	501
Total	15	30	2272	13	17	13	72	12	41	107	17	15	2624
Monthly specific rates (%)	0.0	3.3	88.4	23.1	5.9	15.4	4.2	0.0	2.4	94.4	11.8	0.0	

Table 3: Distribution of ND and Non-ND outbreaks in Sokoto, according to type of birds (2007-2011)

	Outbreaks			
Bird type	ND cases	Non-ND cases	Total	Bird specific rates (%)
Broiler	5	82	87	5.7
Layers	2102	259	2361	89.0
Cockerels	4	2	6	66.7
Turkey	8	118	126	6.3
Ducks	0	5	5	0.0
Pigeons	4	2	6	66.7
Parrots	0	11	11	0.0
Guinea fowl	0	20	20	0.0
Peacock	0	2	2	0.0
Total	2123	501	2624	

Table 4: Distribution of ND and Non-ND outbreaks in Sokoto, according to management systems (2007-2011)

	Management systems			
Outbreaks	Intensive	Semi-intensive	Extensive	Total
ND	2110	9	4	2123
Non-ND	382	113	6	501
Total	2492	122	10	2624
Management specific rates (%)	84.7	7.4	40.0	

DISCUSSION

The prevalence of ND in this study was 80.9%. this is higher than the reports of Ezeokoli *et al.* (1984) in Zaria, Baba *et al.* (1998) in Maiduguri, Orajaka *et al.* (1999) in the south eastern Nigeria, Nwanta (2003) in Kaduna, Musa *et al.* (2010) in Plateau State and Oyewola *et al.* (1996) and Ohore *et al.* (2002) in Ibadan. The difference in prevalence could be due to the fact that the present study included more species of birds both local and exotic breeds, while those studies were restricted to only local or village chickens except Musa *et al.* (2010) who worked on broiler chickens only.

The annual distribution of ND outbreaks moved in a zigzag pattern in recent times with the highest prevalence in the year 2011. This could be due to the inability of poultry farmers to consistently maintain standard biosecurity and hygienic condition of farms. It may also be as a result of increase in number of poultry farmers, engaging in backyard poultry farms in Sokoto state (Adamu *et al.*, 2009) as well as increased sensitization of poultry farmers to report any clinical cases of poultry diseases to nearest Veterinary clinic. Also, inadequate periodic monitoring of antibody levels against ND as well as lack of well equipped veterinary laboratories could have contributed to this increase prevalence. The highest occurrence was observed in the months of March and October. This is in agreement with the reports of Abdu *et al.* (2005), Adamu *et al.* (2009) and Sonaiya (2009), suggesting high risks at this periods. The extreme hot weather in Sokoto around these months may be another factor which induces stress on the birds thereby suppressing their immunity. Besides, the control of the disease by vaccination may be ineffective due to the heat labile nature of the ND vaccine (Spradbrow, 2001). The low outbreaks recorded from of May to September agrees with the report of Sadiq *et al.* (2011) in Maiduguri as well as earlier reports about the disease in Sokoto (Adamu *et al.*, 2009). This suggests the ideal time to raise birds in the hot zones of Nigeria. Layers were seen to be more prone to ND in this study. This might be attributed to the fact that layers are kept for a longer period and a wider age range are susceptible. Apart from this, layers are more commonly kept in Sokoto, probably due to their higher economic value. ND was common among chickens raised under intensive system of management in this study and this agrees with the findings of Hofacre (1986). This might be due to the fact that ND spreads rapidly among birds kept in confinement, such as commercially raised chickens, in which most of the birds are overcrowded, coupled with lack of adequate biosecurity measures which might increase the rate of direct contact between healthy birds and infected birds. The practices and conditions of intensive poultry production are considered to be optimal for disease outbreaks (Hafez, 2003). These factors may have promoted the spread of the disease among birds kept under intensive management.

CONCLUSION

This study provides background information on current distribution status of Newcastle disease in Sokoto metropolis, north-western Nigeria and the results indicate that ND is enzootic among poultry populations in Sokoto. This explicitly revealed the potential of ND in lowering poultry productivity in the area, thereby highlighting the need for effective preventive health programmes to boost poultry production.

Therefore, farmers should be properly educated on appropriate periods to stock their farms as well as appropriate ways of handling vaccines and vaccinations. Periodic monitoring of antibody levels against the disease in poultry and performance of serologic profiling of day-old chicks in order to determine optimal schedule for batch vaccination should be performed. There should be laboratory capacity building in Veterinary faculties in Sokoto to enhance comprehensive monitoring of field and vaccine strains of ND to ensure effective surveillance to mitigate pandemic emergence from Nigeria. There should be adequate support for quality vaccines to farmers as well as need for effective extension services to farmers on ND biosecurity measures in Sokoto and its environs for team work in efforts to minimize horizontal transmission of the disease.

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