



Retrospective Study of Selected Endemic Viral Diseases of Poultry Diagnosed in Maiduguri North-Eastern Nigeria

INNOCENT THLAMA MSHELIA¹, NAPHTALI NAYAMANDA ATSANDA¹, ASINAMAI ATHLIAMAI BITRUS^{2*}, BABAGANA MOHAMMED ADAM¹, IDRIS IBRAHIM FIKA³, STEPHEN BITRUS BALAMI¹, SOLOMON JAURO², SAMSON ANJIKWI MALGWI²

¹Department of Veterinary Public Health and Preventive Medicine, Faculty of Veterinary Medicine, University of Maiduguri, P.M.B 1069 Maiduguri, Borno State; ²Department of Veterinary Microbiology and Parasitology, Faculty of Veterinary Medicine, Nigeria University of Maiduguri, PMB 1069 Maiduguri, Borno State; ³Ministry of Agriculture and Natural Resources, Yobe State, Nigeria.

Abstract | Globally, poultry production contributes substantially to national economic development of many developing countries. The study to investigate the distribution of poultry viral diseases prevalent around Maiduguri metropolis was carried out using a total of n=1114 and n=21 hospital records obtained from Borno State Veterinary Hospital (BSVH) and the University of Maiduguri Veterinary Teaching Hospital (UMVTH) from 2005 to 2010. The proportion of endemic viral diseases were analysed using SPSS version 20.0. The distribution of poultry viral diseases diagnosed at BSVH revealed a high prevalence of Newcastle disease (ND) (58.17%) and Infectious Bursal Disease (IBD) (17.86%). While the prevalence of Fowl Pox and Infectious Laryngotracheitis were 8.26% and 0.81% respectively. However, low occurrence of Avian Influenza (0.36%), Infectious Bronchitis (IB) (0.27%), Lymphoid Leucosis (0.54%) and Marek's Disease (0.27%) were observed. In addition, 13.47% of all viral infections recorded were mixed infection. In UMVTH, the distribution of endemic poultry viral diseases diagnosed showed that the prevalence of Fowl Pox and ND was 47.62% and 42.86% while the prevalence of IBD observed was 9.52%. The overall viral poultry diseases diagnosed in Maiduguri metropolis during the period under investigation were ND (57.89%), IBD (17.71%) and Fowl Pox (8.99%) respectively. In addition, the prevalence of IB (0.26%), Infectious Laryngotracheitis (0.79%), Lymphoid Leucosis (0.53%), and Marek's Disease (0.26%) were observed to be relatively low. The result of this investigation demonstrated that the major viral poultry diseases affecting the progress of poultry production in Maiduguri are ND, IBD and fowl pox.

Keywords | Disease, Endemic, Maiduguri, Poultry, Retrospective, Viral

Editor | Asghar Ali Kamboh, Sindh Agriculture University, Tandojam, Pakistan.

Received | February 27, 2016; **Revised** | March 22, 2016; **Accepted** | March 24, 2016; **Published** | April 08, 2016

***Correspondence** | Asinamai Athliamai Bitrus, Department of Veterinary Microbiology and Parasitology, Faculty of Veterinary Medicine, Nigeria University of Maiduguri, PMB 1069 Maiduguri, Borno State, Nigeria; **Email:** abasinamai@gmail.com

Citation | Mshelia IT, Atsanda NN, Bitrus AA, Adam BM, Fika II, Balami SB, Jauro S, Malgwi SA (2016). Retrospective study of selected endemic viral diseases of poultry diagnosed in Maiduguri North-Eastern Nigeria. *J. Anim. Health Prod.* 4(2): 60-64

DOI | <http://dx.doi.org/10.14737/journal.jahp/2016/4.2.60.64>

ISSN | 2308-2801

Copyright © 2016 Mshelia et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

INTRODUCTION

Poultry production contributes substantially to socio-economic development of many developing countries of the world (Gambo et al., 2016; Henning et al., 2009). To many households, it serves as an important source of income and protein. However, the major setbacks associated with poultry production in many rural

and urban settlements is poor management and diseases such as Newcastle disease (Henning et al., 2009; Mapiye et al., 2008). In Nigeria, chickens are the most successfully developed poultry species that forms the bulk of the poultry industry. In addition, the management system of poultry production is intensive for exotic breeds and extensive for rural chickens (Adamu et al., 2009). The major limitations arising as a result of raising these chickens is the huge

economic losses due to disease and predation of which viral poultry diseases accounts for a substantial proportion of mortality (Abubakar et al., 2007).

Nigeria has the largest poultry population in Africa (Abubakar et al., 2007) with an estimated poultry population of about 130 – 150 million chickens (Gambo et al., 2016; Pagani et al., 2008). The high incidence of infectious diseases have impacted negatively on the growth of the poultry industry (Oladeebo and Ambe-Lamidi, 2007) resulting in a significant decrease in their performance and survival rate. Furthermore, viral diseases such as Newcastle disease (ND) and Infectious Bursal Disease (IBD) are recognized as two most important problems limiting the success of the poultry industry (Ambali, et al., 2003; Baba et al., 2004). To fully utilize and achieve the economic potentials of poultry production there is the need to implement measures that will ensure the prevention and control of the disease (Henning et al., 2009). In spite of the significant advances in poultry vaccine production, outbreaks of disease like ND and IBD continue to occur in many areas in both vaccinated and non-vaccinated flocks (Giambrore et al., 1977; Henning et al., 2009). Reliable and up to date information on poultry health and disease is fundamental to effective planning of disease prevention and control programme. Although studies on viral poultry disease in other parts of the country have been reported (Adamu et al., 2009). Insufficient data abounds on the accurate prevalence of viral poultry disease in Maiduguri. Therefore this study was designed to retrospectively investigate the distribution of some endemic viral poultry diseases in Maiduguri from 2005 to 2010 and to recommend measures for prevention and control.

MATERIALS AND METHODS

Data used in this study were obtained from 1135 recorded cases of viral poultry disease presented to the poultry and postmortem unit of the Borno State Veterinary Hospital (n_1114) and the University of Maiduguri Veterinary

Teaching Hospital (n_21) during the period from 2005 to 2010. Disease diagnosis were based on flock history, clinical and post mortem findings and data obtained from case books, files and post mortem records. The degree of variability or spread of the recorded viral diseases were carried out using SPSS version 20.0 (SPSS Chicago, USA). Descriptive statistics and frequency distribution were calculated and determined.

RESULTS

The result obtained from the investigation of poultry viral diseases diagnosed at Borno State Veterinary Hospital (BSVH) revealed that the prevalence of poultry viral disease was high in 2005 (261, 24.15%), 2009 (221, 19.84%) and 2010 (220, 19.75%) respectively (Table 1). In addition, high prevalence was also observed in 2007 (147, 13.20%) and 2008 (176, 15.80%), while low prevalence was recorded in 2006 (81, 7.27%). The distribution of poultry viral diseases diagnosed at BSVH Maiduguri also revealed a high occurrence rate of ND (58.17%) and IBD (17.86%). However, low occurrence of Fowl Pox (8.26%) and Infectious Laryngotracheitis (0.81%) were recorded. Low prevalence of Avian Influenza (0.36%), Infectious Bronchitis (0.27%), Lymphoid Leucosis (0.54%) and Marek's Disease (0.27%) were also observed with 13.47% mixed viral infections (Table 1).

Similarly, in University of Maiduguri Veterinary Teaching Hospital (UMVTH), a high prevalence of 66.67% was observed in 2006, while relatively very low prevalence was observed from 2007 to 2010 (4.76% -9.52%) (Table 2). A high prevalence of Fowl Pox (47.62%) and ND (42.86%) were observed; however, the prevalence of IBD (9.52%) was low. Furthermore, the overall viral poultry diseases diagnosed in Maiduguri Metropolis during the study period revealed that the most prevalent viral poultry diseases encountered were ND (57.89%), IBD (17.71%) and Fowl Pox (8.99%). While the prevalence of Infectious Bronchitis (0.26%), Infectious Laryngotracheitis (0.79%),

Table 1: Poultry viral diseases diagnosed at Borno State Veterinary Hospital (BSVH) from 2005 – 2010

Disease	2005	2006	2007	2008	2009	2010	Total
Avian Influenza	0	1 (0.09)	3 (0.27)	0	0	0	4 (0.36%)
Fowl Pox	45 (4.04)	5 (0.45)	22 (1.98)	20 (1.79)	0	0	92 (8.26%)
Infectious Bronchitis	1 (0.09)	1 (0.09)	0	0	0	1 (0.09)	3 (0.27%)
Infectious Bursal Disease	47 (4.22)	25 (2.24)	34 (3.05)	24 (2.15)	38 (3.41)	31 (2.78)	199 (17.86%)
Infectious Laryngotracheitis	1 (0.09)	1 (0.09)	4 (0.36)	2 (1.17)	1 (0.09)	0	9 (0.86)
Lymphoid Leucosis	1 (0.09)	0	0	1 (0.09)	2 (1.17)	2 (1.17)	6 (0.54%)
Marek's disease	1 (0.09)	0	1 (0.09)	1 (0.09)	0	0	3 (0.27%)
Mixed Infection	20 (1.80)	12 (1.08)	13 (1.17)	27 (2.42)	44 (3.95)	34 (3.05)	150 (13.46%)
Newcastle Disease	153 (13.73)	36 (3.23)	70 (6.28)	101 (9.07)	136 (12.21)	152 (13.65)	648 (58.17%)
Total	269 (24.15)	81 (7.27)	147 (13.20)	176 (15.80)	221 (19.84)	220 (19.75)	1114 (100)

Table 2: Poultry viral diseases diagnosed at University of Maiduguri Veterinary Teaching Hospital (UMVTH) from 2005 – 2010

Disease	2005	2006	2007	2008	2009	2010	Total
Fowl Pox	5 (23.81)	2 (9.52)	0	0	1 (4.76)	2 (9.52)	10 (47.62)
Infectious Bursal Disease	2 (9.52)	0	0	0	0	0	2 (9.52)
Newcastle Disease	7 (33.33)	0	1 (4.76)	1 (4.76)	0	0	9 (42.86)
Total	14 (66.67)	2 (9.52)	1 (4.76)	1 (4.76)	1(4.76)	2 (9.52)	21 (100)

Table 3: Total poultry viral diseases recorded in Maiduguri Metropolis for six (6) years (2005-2010)

Disease	2005	2006	2007	2008	2009	2010	Total	Prevalence
Avian Influenza	0	1 (0.09)	3 (0.26)	0	0	0	4	0.35%
Fowl Pox	50 (4.41)	7 (0.62)	22 (1.94)	20 (1.76)	1 (0.09)	2 (0.18)	102	8.99%
Infectious Bronchitis	1 (0.09)	1 (0.09)	0	0	0	1 (0.09)	3	0.26%
Infectious Bursal Disease	49 (4.32)	25 (2.20)	34 (3.00)	24 (2.12)	38 (3.35)	31 (2.73)	201	17.71%
Infectious Laryngotracheitis	1 (0.09)	1 (0.09)	4 (0.35)	2 (0.18)	1 (0.09)	0	9	0.78%
Lymphoid Leucosis	1 (0.09)	0	0	1 (0.09)	2 (0.18)	2 (0.18)	6	0.53%
Marek's disease	1 (0.09)	0	1 (0.09)	1 (0.09)	0	0	3	0.26%
Mixed Infection	20 (1.76)	12 (1.06)	13 (1.15)	27 (2.38)	44 (3.88)	34 (3.00)	150	13.22%
Newcastle Disease	160 (14.10)	36 (3.17)	71 (6.26)	102 (8.99)	136 (11.98)	152 (13.39)	657	57.89%
Total	283 (24.93)	83 (7.31)	148 (13.04)	177 (15.60)	222 (19.56)	222 (19.56)	1135	100%
Vaccination Request	131	53	12	5	4	2	207	-

Lymphoid Leucosis (0.53%), and Marek's Disease (0.26%) were found comparatively low (Table 3).

DISCUSSION

The findings of this study affirms the importance of some major viral diseases and their negative impact on the progress of poultry production in Maiduguri Metropolis and on the distribution pattern of poultry viral diseases prevalent around Maiduguri metropolis. The diseases are arranged in order of their endemicity, thus: Newcastle Disease (ND), Infectious Bursal Disease (IBD), Mixed Infection (MI), Fowl Pox, Infectious Laryngotracheitis (ILT), and Lymphoid Leucosis (LL), Avian Influenza (AI), Infectious Bronchitis (IB) and Marek's Disease. Of the 1135 hospital records sampled in this study, the result obtained revealed ND as the most prevalent viral disease followed by IBD and fowl pox while Marek's disease, IB and AI were the least recorded viral poultry disease in the period under investigation (Table 1). The total prevalence of ND recorded during the six year period was 57.89%. High prevalence of Newcastle disease virus in rural chicken was also reported by Njagi et al. (2010) The disease was observed to have increased from 3.17% in 2006 to 13.39% in 2010; however, marked increase in the prevalence of the disease was observed in 2005, 2010 and 2009 respectively with the least rate of occurrence observed in 2006. Similarly, the occurrence of IBD was also observed to have increased from 3.23% in 2006 to 13.63% in 2010. In addition, peak result was however observed in 2005 while low

occurrence rate was observed in 2008. These findings are in agreement with the work of Adamu et al. (2009) where researchers recorded a 128 (12.4%) and 337 (32.9%) prevalence of Newcastle disease and infectious bursal disease. Newcastle disease and infectious bursal disease are considered as one of the most common problem hindering the growth of poultry industry (Henning et al., 2009). To this end, it can be inferred that ND and IBD are the most common problem associated with poultry production in Maiduguri metropolis. Furthermore, it was also observed that peak prevalence of ND and IBD were recorded from the month of December to March. In the tropics, the months of December and March is characterized by extreme cold and dust which facilitates the spread of disease. Thus, the reason for the high prevalence of ND and IBD recorded during the period under study. In addition, high prevalence of the diseases might be attributed to use of modern and more sophisticated diagnostic aids which gives better precision in the diagnosis of poultry diseases. Furthermore, the prevalence of viral poultry disease in the two hospitals sampled showed that the occurrence rate of the disease was high in the BSVH than the UMVTH, even though the number of recorded cases sampled were high. This could be due to the fact that the number of cases attended on daily basis was higher compared to the UMVTH which was located in the outskirts of Maiduguri town. Moreover, records obtained from UMVTH showed high frequency of vaccination request by poultry farmers. This finding could explain the reason as to why the prevalence of poultry viral disease in UMVTH was lower compared to that obtained

at BSVH. Furthermore, it was observed that in UMVTH, the prevalence of ND, IBD and fowl pox was very low from 2006 to 2010. This was due to the outbreak of the avian influenza virus which severely affected the poultry industry in Nigeria. In addition, mixed infection which could be of either two different viral diseases or a combination of viral and bacterial disease was also recorded. For the purpose of this study, only mixed infection of different viral diseases were considered. It was observed that the occurrence of mixed infection recorded ranges from 1.06% to 3.88%. However, the overall prevalence of mixed infection was 13.22%.

In this study, the total prevalence of fowl pox observed was 8.99%. Peak prevalence was however observed in 2005 (4.41%) and least prevalence of 0.09% in 2009 (Table 3). This finding was however almost similar to that obtained by Adamu et al. (2009) where they observed a prevalence of 9.9% after sampling hospital records from 2004 to 2008 in sokoto north-western Nigeria. The slight difference observed in the prevalence of fowl pox observed in the two studies could arise due to difference in sample size, period of study and geographical location. However, comparing the two hospitals sampled, 47.62% of all recorded cases of viral poultry diseases reported at the UMVTH was Fowl Pox. Furthermore, the number of recorded cases of Fowl Pox was observed to have reduction from 24.93% in 2005 to 7.31% in 2006. In addition, a steady increase in the number of reported cases of fowl pox was observed until it reached 19.56% in 2010. The increase in the number of recorded viral infection observed was due to lack of vaccination. This is evident, since vaccination history observed revealed that 201 out of the 207 vaccination records in UMVTH showed that the poultry owners had requested for vaccination as compared to the vaccination records sampled at BSVH. The difference in vaccination request can be attributed to poor knowledge of the importance vaccination in disease control and prevention or lack of access to such services. Furthermore, the occurrence of ND virus, IBD and fowl fox was more pronounced during the month of January to the month of May. This might be due to the fact that during those periods, the weather condition changes from extremely cold and dusty in the months of January to a relatively hot and dry conditions in the months of May. In addition, it was observed that most poultry farmers restock their farm during those periods.

In conclusion, this study reported the prevalence of endemic viral poultry disease in Maiduguri metropolis. The findings of this report indicated that the major set-back of the poultry industry in Maiduguri were diseases such as ND, IBD and Fowl pox. It is therefore pertinent to encourage the use of vaccine and the practice of safe hygiene and biosecurity in order to guard against occurrence of disease and mortality.

The authors wish to thank all the management staff of Maiduguri Veterinary Hospital and University of Maiduguri Veterinary Teaching Hospital for their kind cooperation throughout the course of the research study.

CONFLICT OF INTEREST

There is no any conflicting interest.

AUTHORS' CONTRIBUTION

The design, critical analysis and review of the manuscript is a collective effort of all the authors.

REFERENCE

- Abubakar MB, Ambali AG, Tamjdo T (2007). Rural chicken production: Effects of gender on ownership, and management responsibilities in some parts of Nigeria and Cameroon. *Intl. J. Poult. Sci.* 6(6): 413-416. <http://dx.doi.org/10.3923/ijps.2007.413.416>
- Adamu AY, Ahmed AB, Abubakar MB, Lawal MD (2009). A retrospective study (2004-2008) of poultry diseases diagnosed in Veterinary Teaching Hospital (VTH), Usmanu Danfodiyo University Sokoto (Udus) and Sokoto Veterinary Centre (Svc), Sokoto State, Nigeria. *Intl. J. Animal Vet. Adv.* 1(1): 15-17.
- Ambali AG, Abubakar M, James TE (2003). Assessment of Poultry Health Problems in Maiduguri Borno State Nigeria. *Trop. Vet.* 21(3): 138-145.
- Baba SS, Iheanacho CC, Idris JM, El-Yuguda AD (2006). Food-based Newcastle disease V4 vaccine in guinea fowl (*Numida meleagris galeata pallas*) in Nigeria. *Trop. Vet.* 22(3): 37-45.
- Gambo HI, Bitrus AA, Adam BM, Goni DM, Kwoji ID, Thliza SJ, Mshelia PA (2016). Survey of hepatic lesions and incriminating pathogens in rural scavenger chickens in Maiduguri, North-Eastern Nigeria. *Adv. Anim. Vet. Sci.* 4(4): 174-177. <http://dx.doi.org/10.14737/journal.aavs/2016/4.4.174.177>
- Giambrone JJ, Closser J (1990b) Efficacy of live vaccine against serologic subtypes of infectious bursal disease virus. *Avi. Dis.* 37: 7-11. <http://dx.doi.org/10.2307/1591328>
- Henning J, Morton J, Pym R, Hla T, Meers J (2009). Evaluation of strategies to improve village chicken production-controlled field trials to assess effects of Newcastle disease vaccination and altered chick rearing in Myanmar. *Prevent. Vet. Med.* 90(1): 17-30. <http://dx.doi.org/10.1016/j.pvetmed.2009.04.007>
- Mapiye C, Mwale M, Mupangwa JF, Chimonyo M, Foti R, Mutenje MJ (2008). A research review of village chicken production constraints and opportunities in Zimbabwe. *Asian-Australian J. Anim. Sci.* 21(11): 1680-1688.
- Njagi LW, Nyaga PN, Mbuthia PG, Bebora LC, Michieka JN, Kibe JK, Minga UM (2010). Prevalence of Newcastle disease virus in village indigenous chickens in varied agro-ecological zones in Kenya. *Livestock Res. Rural Dev.* 22(95).
- Oladeebo JO, Ambe-Lamidi AI (2007). Profitability, input elasticities and economic efficiency of poultry production

among youth farmers in Osun State, Nigeria. Intl. J. Poultry Sci. 6(12): 994-998. <http://dx.doi.org/10.3923/ijps.2007.994.998>

•Pagani P, Abimiku Y, Emeka-Okolie W (2008). Assessment of

the Nigerian poultry market chain to improve biosecurity. FAO (Nigeria, Consultative Mission on Poultry) Study. Pp. 1-65.