IAA Journal of Biological Sciences 10(2):15-21, 2023. ISSN: 2636-7254

Seroprevalence of Infectious Bursal Disease Virus and Newcastle Disease Virus in Local Adult Chickens in Eke Onu-Nwa, Ama-Hausa, Afor-Umuaka, Eke-Eziachi and Orie-Umuna market in Owerri, Imo State, Nigeria.

Abraham, O.J.[1]*, Onwuatuegwu, J.T.C.[2], Sulaiman, L.K.[3], Ahmed, S.J[3]. and Ewurum, A[1].

[1]Dept of Science Laboratory Technology, Federal Polytechnic Idah, Kogi State, Nigeria.
[2]Dept of Microbiology, Tansian University Umunya, Anambra State, Nigeria.
[3]Regional Laboratory for Avian Influenza and other Transboundary Avian Diseases, National Veterinary Research Institute, Vom, Plateau State, Nigeria.
*Correspondence: josephoyiguh@yahoo.com ; Phone: 08062908906

ABSTRACT

Seroprevalence of infectious Bursal Disease Virus and Newcastle Disease Virus in Local Adult Chickens in Eke Onu-Nwa, Ama-Hausa, Afor-Umuaka, Eke-Eziachi and Orie-Umuna market in Owerri, Imo Stat, Nigeria were analysed. Samples were collected at sales point in the markets mentioned above in Owerri Imo State, Nigeria. The results obtained from IBDV in chicken from 5 different markets in Owerri Imo State have the prevalence rate of 15.5% (43/250) obtained from NDV. People in Owerri should vaccinate their chickens and should not eat dead chicken. Every dead chicken should be buried. Government should also pay more attention to poultry farming especially in Eastern part of the country or in Nigeria at large in order to curb this diseases.
Keywords: Seroprevalence, Infectious, Virus and Newcastle Disease.

INTRODUCTION

Infectious Bursa Disease Virus (also known as IBDV) (Gambaro Disease Infectious Bursitis and infections Avian Nephrosis) is a highly contagious disease of young chickens caused by infections bursa disease virus (IBDV) which is characterized by immuno-suppression and morality at 3 to 6 weeks of age [1]. It is economically important to the poultry industry worldwide due to increased susceptibility to other disease and negative interference with effective vaccination [2]. Very virulent strains of IBDV causing severe mortality in chicken have emerged reentering Europe, Latin America, South East [3]. Infection is through the room-fecal route, with affected birds excreting high levels of virus for up to two weeks after infection [4].

Virus classification
Group: Group III (ds RNA)
Family: *Birnaviridae*
Genus: *Avibrinavirus*
Species: Infection bursa disease

Infectious bursal disease virus (IBDV) causes an acute and contagious disease in young chicken from 3-6weeks of age. Two serotypes of the virus are recognized of which serotype one viruses are pathogenic to chickens and are classified into classic, viariant and serotype 2 virus and non-pathogenic [5] the disease is controlled by vaccination [6].

EPIDERMOLOGY OF NEWCASTLE DISEASE

Newcastle disease (ND) is a viral disease of birds caused by a filterable virus Newcastle Disease virus (NDV) which belongs to the family of *paramyxoviridae* [7] it is a per acute, acute and sometime sub-clinical

disease contagious disease of poultry [8] ND is considered among the most important disease of poultry and out breaks with mortality up to 100% are common [9] ND infection takes place through virus inhalation or ingestion and its spread from one bird to another depends on the availability of the virus in its virulent infectious form [10] and its short incubation period of 5-6 days [11]. The disease usually affect the respiratory, gastro intestinal and nervous systems with common signs of listlessness increased respiratory rate, yellowish to greenish diarrhea and weakness followed. Later by prostration and death [12]. The virus has been isolated from domestic ducks by inoculating tissue homogenates into 9 to 11 day old embryonated Muscovy duck eggs [13]. NDV is spread by direct contract between healthy birds and the bodily discharge of infected birds. The disease is transmitted through infected birds dropping and secretions from the nose, mouth and eyes. NDV spreads rapidly among birds kept in it confinement, such as commercially raised chickens [14]. It can also spread by mechanical means on shoes and clothing and carried from an infected flock to a healthy one [15]. NDV can survive for several weeks in a warm and humid environment on birds feathers, manure and other materials [16]. However, dehydration can destroy the various rapidly and by the ultra violet rays in sunlight. [17]

AIMS AND OBJECTIVE

This project is designed to determine the Seroprevalence of infection bursa disease virus (IBDV) and Newcastle disease virus in local Adult chickens from Eke Onu-Nwa, Ama-Hausa, Eke Eziachi and Afor Umuaka market in Owerri Imo state and to generate data for policy formulation and control.

MATERIALS AND METHODS

SAMPLE COLLECTION

250 samples of blood was collected from Eke Onu-Nwa, Ama-Hausa,,Afor Umuaka,Orie Umuna and Eke Eziachi markets in Owerri, Imo State. This was done by venal puncture

ii. The wings was held back to expose the brachial vein of the chicken.
iii. Few feathers were removed to aid visibility.
iv. The exposed skin area was disinfected using alcohol.
v. Sterile needle was inserted into the muscle around the vein and gently man curve into brachial vein.
vi. 4 ml of blood was collected into ACD to make a total of 5 ml.
vii. The needle and syringe was gently removed and the punctured area clean up.

AREA OF STUDY

The study was carried out in Eke Onu-Nwa, Ama-Hausa and Eke-Eziachi, Afor Umuaka and Orie Umuna Markets in Owerri, Imo State.

PERIOD OF STUDY

The practical was carried out between November 2011 to November 2012

STUDY POPULATION

Samples were collected at Sales point in the markets mentioned above in Owerri Imo State

SAMPLE SIZE

Samples collected were 250 serums of local chickens.

MATERIAL

i. Phosphate buffered saline (PBS), sterile.
ii. Syringe & needle.
iii. Sodium chloride.
iv. A arose.

v. Weighing balance.
vi. Vacuum pump
vii. Test sample (Sera).
Vi. Centrifuge.

PREPARATION OF AGAR (100ML)

i. 1g of A arose and 8g of sodium chloride was weighed.
ii. The salt was poured in to sterile Durham bottle (500ml.)
iii. 100ml of PBS was added
Vi The mixture was heated until it dissolves completely.
V 15ml of melted agar was dispensing into 100x 15ml sterile Petri dishes
Vi These Petri dishes was lift open until agar is set.
Vii The plate was then covers and stored at +4c

PROCEDURE FOR AGAR GEL IMMUNO DIFFUSSION (AGID) TEST

i. wells was cut in set agar using a tubular cutter.
ii. The agar was then removed from the walls using suction pump.
iii. The test sera was dispense in to the wells.
Iv. The standard antigen was dispensing into the central well.
V. The standard positive antiserum was dispense in the peripheral well opposite the standard antigen
vi. Standard negative antiserum was dispensed in the well opposite the standard positive antiserum.
vii. The plates was incubated at 37oC for 24-48 hours in a humid chamber
viii. The plates was examined in dark ground with oblique light source to identify line between positive antiserum and standard antigen

PROCEDURE FOR HEAMAGGLUTINATION (HA) TEST

- ✓ 0.025ml of PBS was dispense into each well of a plastic micro titre plate (v bottomed wells)
- ✓ 0.025ml of virus suspension was placed in the first well
- ✓ Two- fold dilutions (from 1:2 to 1:4096) of virus was done across the plate
- ✓ 0.025ml of PBS was further dispense to each well
- ✓ 0.025ml of 1% of serum was added to each well
- ✓ The mixture is then mixed by tapping gentle and place at 20^{o}C for 30 minute
- ✓ Plates was read after 30 minutes to observed the presence or absence of tear-shaped streaming of the serum

PROCEDURE FOR HAEMAGGLUTINATION INHIBITION (HI) TEST

- ✓ 0.025ml of PBS was dispense into all wells of a plastic micro-titre plate (with V-bottomed wells)
- ✓ 0.025ml of the serum was placed into first wells of micro plate
- ✓ Two fold dilution of 0.025ml volumes of the serum was made across the plate
- ✓ 4 HAU virus/antigen in 0.025ml was added to each well and the plate was left for a minimum of 30 minutes at room temperature
- ✓ 0.025ml of 1% (v/v) chicken RBC was added to each well and was gently mixed
- ✓ Plates was read after 30-40 minutes

RESULTS

HI Titre in local chicken sold at Eke Onu nwa market. Here, the total number of 50 samples were collected, 46 were negative while 4 were positive (table1)

HI Titer in local chicken sold at eke onu-uwa market

Table 1

Titre value	2^0	2^1	2^2	2^3	2^4	2^5	2^6	2^7	2^8
Number of sample	12	16	11	7	1	3	0	0	0

HI Titre in local chicken at Ama-Hause market. The total number of 50 samples were collected, 41 were negative while 9 were positive. (Table II). HI Titre in local chicken sold at Ama-Hausa market.

Table 2

Titre value	2^0	2^1	2^2	2^3	2^4	2^5	2^6	2^7		2^8
Number of sample	14	15	6	6	3	2	2	2		0

HI Titre in local chicken sold at Eke-Ezeachi market. Total numbers of 50 samples were collected, 34 were negative while 16 were positive (table III). HI Titre in local chicken sold at Eke-Eziachi market

Table 3

Titre value	2^0	2^1		2^2	2^3	2^4	2^5	2^6	2^7	2^8
Number of sample	9	11		7	7	6	5	3	2	0

HI Titre in local chicken sold at Afor Umuaka market

Total numbers of 50 samples were collected and 44 were negative while 6 were positive

Table 4

Titre value	2^0	2^1	2^2	2^3	2^4	2^5	2^6	2^7	2^8	2^9
Number of sample	11	19	7	7	3	3	0	0	0	1

HI Titre in local chicken sold at Orie Umuna market

Here, 41 samples were negative while 9 were positive

Table 5

Titre value	2^0	2^1	2^2	2^3	2^4	2^5	2^6	2^7	2^8	2^9
Number of sample	13	13	7	8	1	5	2	0	0	1

Table 6. Seroprevalence of NDV in Owerri.

S/No	Collection point	No. of Samples	No. of Positive	Seroprevalence
1	Eke Onu-Nwa	50	4	0.08
2.	Ama-Hausa	50	9	0.18
3.	Eke Ezi Achi	50	16	0.32
4.	Afor Umuakah	50	6	0.12
5.	Orie Umuna	50	8	0.16

Table 7. Seroprevalence of IBDV in Owerri.

S/No	Collection point	No. of Samples	No. of Positive	Seroprevalence
1	Eke Onu-Nwa	50	24	0.48
2.	Ama-Hausa	50	33	0.66
3.	Eke Ezi Achi	50	21	0.42
4.	Afor Umuakah	50	17	0.34
5.	Orie Umuna	50	23	0.46

DISCUSSION

In table I the study of this project revealed the occurrence of NDV antibodies and IBDV antibodies by HI and AGID on chicken sold in 5 markets in Owerri Imo State. The prevalence rate 8% (4/50) obtained for NDV in local chicken from Eke Onu –Nwa is very significant (P≤ 0.05) and therefore high. A similar findings was reported by [18]. His result was 49% (10/50) samples. Chickens are susceptible to NDV due to local practices. In table 2 the prevalence rate of 20% (9/50) obtained for NDV in chicken from Ama Hausa Market is Significant (P ≤ 0.05) and therefore high. Similar research work was carried out by [19] where 50% (20/50) tested positive. In table 3, the prevalence rate of 35% (16/50) obtained for NDV in chickens from Eke Ezichi Market is very significant (P≤ 0.05). This work is comparable to the result obtained in a similar research by Zamarin *et al* (2009) in Zambia whose result was 20% (10/30) positive samples. In table 4 the prevalence rate of 10% (6/50) obtained for NDV in chicken from Afor Umuakah Market is significant (P≤ 0.05) and therefore high. A similar finding was reported by Alexander in Britain whose finding was 29% (2001) positive samples. In Table 4, the prevalence rate 12% (8/50), this is also comparable to the result obtained in a similar work carried out by [5] in Zaria, whose finding was 35% (25/50) positive samples.

CONCLUSION

From the findings of this study, it can be said that the prevalence rate of 50.9% (118/250) obtained from IBDV in chicken from 5 different markets in Owerri Imo State have the prevalence rate of 15.5% (43/250) obtained from NDV. People in Owerri should vaccinate their chickens and people should not eat any dead chicken and dead chicken should be buried. Government should pay more attention to poultry farming especially in Eastern part of the country or in Nigeria at large.

REFERENCES

1. Caston (2008) infectious Bursal disease virus (IBDV) segmented double stranded RNA viruses; structure and molecular biology.CaisterAcademic press ISBN 978-1-90445521-9
2. Lukert P.D. Saif 7m (1957), Infectious Bursal disease in; USA, Calnek, B.W. Barnus, H.J. Beend C.W. Reid. W.M and Yolder, H.W (edn) Disease of poultry 9th Edition. Jowa state University press PP. 648-663
3. Barbezange C. and Jestin V (2002) Development of a RT-nested PCR test detecting pigeon paramyxovirus-1 directly from organs of infected animals. J. Virol methods 106, 197-207
4. Kitalyi Aj (1997) Village chicken production systems in developing countries world Anim Rev. 89; 48-53
5. Mazengia A, Bekele ST, Nagash T. (2010) (MD)

and infectious Burial disease and threats to village chicken production in two districts of Amhara National Regional state, Northwest Ethiopia, IUPD. Life Science 4, (2): 62-72.

6. Gohm D.S. Thur B. and Hofmamn M. A (2000) detection of (NDV) in organs and facecus of experimentally infected chickens using RT-PCR, Avian Pathol, 29, 131-142
7. Alexander DJ and Allan W.H. (1999) Newcastle disease virus pathotypes Avian Pathor, 3, 269-278
8. Hailemariam T. Legesse D. Alemu Y, Nigussie D (2006) Adopting Poultry breeds in the hands of Ethiopia, Addis Ababa, Ethiopia. Pres. Rep. pp. 65-70
9. Al-Garib(2003). Newcastle disease virus: Immune reactivity and pathogenesis. PhD thesis, Utrechit University, Faculty of veterinary medicine the Netherlands pp 1-123.
10. Baxendale W. (2002) Birnaviridae. In Jordan, F. Pattsion, M. Alexander D and Faragher, T. (edn) Poultry disease, 5th Edition W.B, Saunder. London, pp 320-324.
11. Chuahan HV, Roy 57 (1998) Poultry Disease Diagnosis, Prevention and control, 7th Edition W.B. Saunder, India, pp 58-429
12. Alexander DJ, Bell DJ and Alders RG (2004). A Technology Review: Newcastle disease with special emphasis on its effect on village chickens. FOA animal production and Health paper 161. food and Agriculture org. of the United Nation Rome, Italy.
13. Mazengia H; Bekele ST, Nagash T (2009) incidence of infectious bursal disease in village chicken in two districts of Amhara Region, Northwest Ethiopia j. Livest Res. Rural development 21:12
14. Fabian Z, Csatany C.M, Szeterenyi, J and L.K Csatery (2007) p53 Independent endoplasmic 81(6); 2817-2830
15. Mase M, Imai K, Samada Y, Sanada N, Yuasa N., Imada T. Tsukamoto K and Yamaquchi 5(2002) phylogenetic analysis of (NDV) genotypes isolated in Japan J. Clin Microbiology 40, 3826-3830
16. Falcon M. Exotic Newcastle disease. Semin Avian and Exot pet Med 2004; 13 79-85
17. Halima H, Nesser FWC, Van Marlekoster E, De Kock A (2007), village based indigenous chicken production system in north west Ethiopia trop. Anim. Health prod. 39; 189-197
18. Murphy F.A, Gibbs EPJ, Hozinek MC, Studdert MJ (1999) veterinary virology, 3rd edition London; academic press pp. 405-409.
19. Newcastle disease outbreak in South Africa one (viib) of which reached Southern Europe. Arch Virol 144, 2087-2099

Abraham, O.J., Onwuatuegwu, J.T.C., Sulaiman, L.K., Ahmed, S.J. and Ewurum, A. (2023). Seroprevalence of Infectious Bursal Disease Virus and Newcastle Disease Virus in Local Adult Chickens in Eke Onu-Nwa, Ama-Hausa, Afor-Umuaka, Eke-Eziachi and Orie-Umuna market in Owerri, Imo State, Nigeria. *IAA Journal of Biological Sciences* 10(2):15-21.