Acta Scientific Veterinary Sciences (ISSN: 2582-3183)

Volume 5 Issue 6 June 2023

Research Article

Error Induced ND-Lasota Vaccination Haematological Changes and Performance in Three (3) Genotypes of Exotic Chickens

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Received: April 10, 2023

Published: May 03, 2023

Abstract

The experiment aim to evaluate error induced ND-Lasota vaccination haematological changes and performance in three (3) genotypes of exotic chickens. The experiment which lasted for four (8) weeks was carried out at the teaching and research farm of Niger Delta University Wilberforce Island Bayelsa State. A total of seventy five (75) unsexed day-old exotic chicks were purchased from Federal University of Agriculture Abeokuta (FUNAAB), Ogun State. The experimental birds were randomly picked and segregated into three (3) groups (T1broiler birds, T2Isa brown and T3Noiler birds) which had a control each according to their genotypes with each group housing twenty (20) birds in a Completely Randomized Block Design (CRBD). Each control group housed five (5). Experimental birds were fed starter mash from day old to fourth (4th) week of age and Growers mash from 5th week to 8th week. Feed and water were supplied ad-libitum to birds throughout the experimental phase. ND-Lasota Vaccine was orally administered to birds in each group excluding the controls in each group beginning at the 5th week and ended at the 8th week. Blood samples were collected from experimental birds with 2ml syringe and transferred into non-vacuum tubes on the Day 0, 7th, 14th, and 21st of pre-infection and post infection for determination of haematological parameters. Data obtained were subjected to one-way ANOVA using MINITAB version 16 software and the means were separated using Turkey Test at ($P < 0.05$). At the end of the experiment statistical analysis showed significant difference ($P < 0.05$) for performance parameters from Day 0 to 21st of experiment, the best performance in terms of Average final weight was recorded in T3NB 525.0 ± 29.5a and the least was recorded in C-IB 347.0 ± 18.5a although, T1BB and C-BB had no data recorded. However, WBC was slightly high at the end of the experiment with C-NB 3.600 ± 0.766a been the highest and T2IB 2.500 ± 0.764a recorded the least. In conclusion, ND-Lasota vaccination error induced haematological changes and performance in three (3) Genotypes of exotic chickens has proven to adversely affect the performance of bird as their growth were impaired, mortality recorded as their immune system were compromised. I recommend that farmers adhere to the right stocking density in poultry farming so as to cub disease outbreak in farms. I also recommend proper handling of birds and elimination of wrong vaccination among the poultry industry as it tends to pose deleterious effect on birds performance.

Keywords: ND-Lasota Vaccine; Exotic Chickens; Performance and Haematology

Introduction

Exotic chicken production system is characterized by intensive management with adequate provision of feed resulting to high production of number of eggs and meat than the indigenous chicken breeds but not generally adapted to adverse environmental conditions compared to that of indigenous chicken [7]. Exotic chicken is characterized by high mortality rate due to disease, poor management and coupled with nutrition amongst them [16]. Thus, infectious diseases are one of the major factors constraining the sector.

Newcastle diseases according to [3] is a viral disease of birds which belongs to paramyxovirus type I (APMV-I) serotype of the genus *Avulavirus* and the subfamily Paramyxovirinae and family Paramyxoviridae known for causing Newcastle disease virus (NDV). Newcastle disease (ND) is regarded as a very highly contagious viral infection of birds which remains a serious health issue with significant economic loss due to high mortality and costs of disease control [5]. This disease is recognized as one of the most important limiting factor in chicken farming making it a serious threat to

intensively reared chickens [6]. Newcastle disease has been recognized globally as one of the most economically important disease of chicken and other birds due to the fact that it is easily transmitted through direct contact of healthy birds with their droplets and body fluids from infected birds and also through contact with contaminated feed, water and equipment [13]. Newcastle strain can lead to high mortality rate of chicken without showing any clinical signs prior to it. [9] also posited Newcastle disease (ND) as an infectious and one of the most devastating diseases which can lead to huge productivity losses in poultry.

Haematological observation provides valuable information about health of human and animals. According to [2] changes in haematological parameters are often used to determine health status of the body and to know the degree of environmental, nutritional and pathological stresses.

Newcastle disease impact is most notable in domestic poultry due to the fact that this disease is of serious economic threat to the poultry industry resulting in increased morbidity and mortality rates and loss of eggs for both breeding and human consumption (Alexander, 2003).

Exotic birds are routinely vaccinated against prevailing disease and prominent among this disease is the Newcastle Disease which has been regarded and viewed as one of the most serious fatal poultry disease of economic importance [5]. The attack of this disease has led to hindrance to asses' cheap source of protein and provision of income in poultry production. [1] posited that this disease is endemic in nature due to economic loses to farmers coupled with hampering the growth of poultry industries that has been recorded due to their attack. The continuous reoccurrence of Newcastle disease even in vaccinated flock's haematology have been reported.

Newcastle disease vaccine has been developed for local or regional production and use in controlling Newcastle disease in village chickens [15]. There are three main goals when using vaccination to help control Newcastle Disease: to decrease or eliminate clinical disease, to decrease the amount of virulent virus shed and to increase the infectious dose of the challenge virus [13]. Biosecurity is a critical component of keeping the challenge away from the flock before they achieve a protective level of immunity [3].

Newcastle disease vaccine is more robust and is known as thermo stable vaccines which require long-term storage in the refrigerator and thus, Evaporative cooling provided by wrapping the vaccine in a damp cloth will be adequate for maintaining the viability of the vaccine during transportation to remote villages [15]. However if it is stored in direct sunlight or allowed to reach high temperatures (above 37°C) for more than a few hours it too will deteriorate and be unsuitable for use as a vaccine [15].

Materials and Methods

Description of the study area

The experiment was carried out at the Teaching and Research Farm of Niger Delta University Wilberforce Island, Bayelsa State. Niger Delta University is located in the heart of the rainforest zone with latitude of 4˚.51'' North and 5˚.23 south of the equator and longitude 5˚.22 West and 6˚.45 East of the Greenwich meridian. It exhibits a humid equatorial climate with an average annual rainfall of 2000mm- 4000mm with a maximum mean temperature record of maximum mean range of 29˚C- 31˚C and with a relative humidity ranging between 55-90%.

Experimental Animal and management

The study was conducted with 75 unvaccinated healthy chickens purchased from a reputable hatchery. The chickens were raised together according to strains during brooding until grouping for the experiment was made after the acclimatization period. After the brooding phase, Chickens were separated into appropriate experimental groups and then housed in separate pens. Feed and water supply was ad-*libitum* throughout the experiment in all treatments and control respectively. The control group was also gathered around the same vicinity maintaining a good distance from the vaccinated experimental birds.

Feeding

Birds were fed with a starter mash from day old to fourth (4^{th}) week of age. Growers were also used to feed them from 5^{th} week to 8^{th} week of age. The feeding and water supply to this bird were given at *ad libitum* for both experimental and control.

Experimental birds grouping

A total of 75 day-old exotic chicks that were immunologically naïve to Newcastle disease were randomly selected and then placed into three groups based on their genotypes. A total of 25 chicks were used for each treatment which represented the different genotypes i.e. Broiler, Isa brown and Noiler, with each treatment having a control group containing five (5) chicks each. The experimental birds were raised under the same environment and management practice.

Blood samples

Blood samples were collected from the jugular vein with the aid of 2ml syringe and then transferred into EDTA bottles. Sample collection commenced on the 5^{th} week and was then terminated at the 8^{th} week. 1-2ml of blood was collected randomly from 3 birds each from individual treatments and controls in a weekly basis and was labeled accordingly.

Haematology test

Blood samples for hematology were collected into bottles containing Ethylene Diamine Tetra Acetic acid (EDTA). Parameters collected for the blood samples was evaluated and include: Packed cell volume (PCV), red blood count (RBC), white blood cell count (WBC), haemoglobin concentration, eosinophil, monocyte, lymphocyte, heterophil, heterophil –lymphocyte ratio and mean corpuscular hemoglobin (MCH) and mean corpuscular volume (MCV) were carefully calculated using PCV, RBC and Hb values.

Statistical analysis

All data obtained were subjected to one-way analysis of variance(ANOVA) in a Completely Randomized Block Design (CRBD) using MINITAB version 16 software and the means were separated using Turkey Test at ($P < 0.05$) and differences among the vaccinated groups were determined [12].

Results

The results of performance of day 0 pre-vaccination in three genotypes of exotic chickens are shown in Table 1, the parameters analysed include Average initial weight, Average final weight, Average weight gain, Average daily weight, Average Feed Intake, FCR, FER and Mortality.

Parameters (g)	T_1BB	C-BB	T_2IB	C-IB	T_3NB	C-NB
Average initial weight	178.67 ± 8.09^{a}	167.3 ± 17.0^{a}	78.33 ± 6.36^{b}	63.67 ± 4.48^{b}	131.7 ± 12.4^{ab}	162.3 ± 26.1^{a}
Average final weight	225.0 ± 12.6^{a}	218.3 ± 14.1^{a}	140.67 ± 5.21^{b}	152.0 ± 15.0^{b}	235.3 ± 17.3^{a}	196.33 ± 3.28^{ab}
Average weight gain	46.33 ± 5.81^{ab}	51.0 ± 14.0^{ab}	62.3 ± 10.3^{ab}	88.3 ± 19.0^{ab}	103.67 ± 6.17^{a}	34.0 ± 22.8^{b}
Average daily weight	6.620 ± 0.83^{ab}	7.29 ± 2.01^{ab}	8.91 ± 1.48^{ab}	12.62 ± 2.71^{ab}	14.81 ± 0.88^{a}	4.86 ± 3.26^{b}
Average Feed Intake	366.7 ± 17.6^{a}	361.7 ± 19.2^{a}	443.0 ± 64.0^{a}	439.3 ± 19.7^{a}	504.7 ± 31.3^{a}	513.3 ± 25.1^{a}
FCR	8.26 ± 1.41^{a}	8.74 ± 3.02^{a}	7.16 ± 0.21^{a}	5.44 ± 1.09^{a}	4.87 ± 0.04^{a}	43.3 ± 25.7^{a}
FER (%)	12.84 ± 2.17^{ab}	13.92 ± 3.61^{ab}	14.00 ± 0.40^{ab}	19.81 ± 3.62^{ab}	20.55 ± 0.18^{a}	6.43 ± 4.29^{b}
Mortality (%)	0.00 ± 0.00^{a}	0.00 ± 0.00^{a}	0.00 ± 0.00^{a}	0.00 ± 0.00^{a}	0.00 ± 0.00^{a}	0.00 ± 0.00^{a}

Table 1: Showing the Performance Characteristics of Day 0 Pre-Vaccination in three Genotypes of Exotic Chickens and Control.

Turkey test: Means that do not share a letter are significantly different.

Key: T_1 = Treatment 1…Broiler birds. T_2 = Treatment 2…Isa brown. T_3 = Treatment 3…Noiler birds.

CBB = Control Broiler birds. CIB = Control Isa brown. CNB = Control Noiler birds.

FCR = Feed conversion ratio.

FER = Feed efficiency ratio.

The results obtained on Average initial weight showed significant difference ($P < 0.05$) among treatments. T_1BB 178.67 ± 8.09^{a}g, C-BB 167.3 ± 17.0^{a}g, T_3NB 131.7 ± 12.4^{ab}g and C-NB 162.3 ± 26.1^{a}g were statistically synonymous ($P > 0.05$) but completely different ($P < 0.05$) from T_2IB 78.33 ± 6.36^{b}g, C-IB 63.67 ± 4.48^{b}grespectively except T_3NB 131.7 ± 12.4^{ab}g. Average final weight recorded significant difference ($P < 0.05$) among treatments. T_1BB 225.0 ± 12.6^{a}g, C-BB 218.3 ± 14.1^{a}g, T_3NB 235.3 ± 17.3^{a}g, and C-NB 196.33 ± 3.28^{ab}g had no significant difference ($P > 0.05$) but T_2IB 140.67 ± 5.21^{b}g, and C-IB 152.0 ± 15.0^{b}g were significantly different ($P < 0.05$) from all other treatments except C-NB 196.33 ± 3.28^{ab} ($P > 0.05$). Average weight gain and Average daily weight recorded no significant difference ($P > 0.05$) across treatment T_1BB46.33 ± 5.81^{ab}, 6.620 ± 0.83^{ab}, C-BB51.0 ± 14.0^{ab}, 7.29 ± 2.01^{ab}g, T_2IB62.3 ± 10.3^{ab}g, 8.91 ± 1.48^{ab}g, C-IB88.3 ± 19.0^{ab}g, 12.62 ± 2.71^{ab}g, and T_3NB 103.67 ± 6.17^{a}g, 14.81 ± 0.88^{a}g respectively. However, T_3NB 103.67 ± 6.17^{a}g, 14.81 ± 0.88^{a} was significantly different ($P < 0.05$) from C-NB 34.0 ± 22.8^{b}g, 4.86 ± 3.26^{b}g. There was no statistical difference ($P > 0.05$) across treatment for FCR but numerically, C-NB recorded the highest value of 43.3 ± 25.7^{a}g and the least was recorded in T_3NB as 4.87 ± 0.04^{a}g.

The results of performance of day 7 Post-Vaccination in three genotypes of exotic chickens are shown in Table 4.2. Result for Average initial weight shows significant difference ($P < 0.05$) among treatments. T_1BB 225.0 ± 12.6^{a}g, C-BB 218.3 ± 14.1^{a}g, and T_3NB 235.3 ± 17.3^{a}g had no significant difference ($P > 0.05$) but T_2IB 140.67 ± 5.21^{b}g, and C-IB 152.0 ± 15.0^{b}g, and significantly different from T_3NB 235.3 ± 17.3^{a}. There was no significant difference ($P > 0.05$) across treatments T_1BB, C-BB, T_2IB, and C-IB for Average final weight, Average weight gain and Average daily weight. Although, T_3NB 342.0 ± 24.6^{a}g, 106.67 ± 7.26^{a}, 15.24 ± 1.04^{a}g, and C-NB 215.3 ± 22.6^{b}g, 19.0 ± 25.8^{b}g, 2.71 ± 3.69^{b}gwere significantly different ($P < 0.05$). FCR and FER had no significant difference ($P > 0.05$) across treatments. However, the highest value for FCR was recorded in T_1BB 10.06 ± 0.84^{a}, and the least was recorded in T_3NB

Parameters (g)	T_1BB	C-BB	T_2IB	C-IB	T_3NB	C-NB
Average initial weight	225.0 ± 12.6^a	218.3 ± 14.1^a	140.67 ± 5.21^b	152.0 ± 15.0^b	235.3 ± 17.3^a	196.33 ± 3.28^{ab}
Average final weight	269.3 ± 11.9^{ab}	260.0 ±17.2^{ab}	201.0 ± 18.3^b	230.0 ± 37.5^b	342.0 ± 24.6^a	215.3 ± 22.6^b
Average weight gain	44.33 ± 2.40^{ab}	41.7 ± 15.3^{ab}	60.3 ± 13.4^{ab}	78.0 ± 23.4^{ab}	106.67 ± 7.26^a	19.0 ± 25.8^b
Average daily weight	6.333 ± 0.343^{ab}	5.95 ± 2.19^{ab}	8.62 ± 1.91^{ab}	11.14 ± 3.35^{ab}	15.24 ± 1.04^a	2.71 ± 3.69^b
Average Feed Intake	445.3 ± 40.2^a	433.3 ± 64.0^a	487.0 ± 59.5^a	563.3 ± 103^a	563.3 ± 3.84^a	539.3 ± 33.7^a
FCR	10.06 ± 0.84^a	14.00 ± 4.92^a	8.66 ± 1.82^a	9.54 ± 4.45^a	5.33 ± 0.37^a	6.3 ± 16.8^a
FER (%)	10.09 ± 0.87^a	9.64 ± 3.79^a	12.51 ± 2.30^a	15.67 ± 5.98^a	18.94 ± 1.31^a	3.34 ± 4.44^a
Mortality (%)	21.67 ± 4.41^{ab}	18.33 ± 6.01^{ab}	0.00 ± 0.00^b	19.33 ± 5.21^{ab}	21.67 ± 6.01^{ab}	34.67 ± 8.37^a

Table 2: Showing Performance Characteristics of Day 7 Post Vaccination of three Genotypes of Exotic Chickens and Control following Error Induced Vaccination.

Turkey test: Means that do not share a letter are significantly different.

Key: T_1 = Treatment 1…Broiler birds. T_2 = Treatment 2…Isa brown. T_3 = Treatment 3…Noiler birds.

CBB = Control Broiler birds. CIB = Control Isa brown. CNB = Control Noiler birds.

FCR = Feed conversion ratio.

FER = Feed efficiency ratio.

5.33 ± 0.37^{a}g while for FER, the highest value was recorded in T_3NB 18.94 ± 1.31^{a}g and the least in C-NB 3.34 ± 4.44^{a}g. There was no significant difference (P > 0.05) recorded in mortality except for T2IB 0.00 ± 0.00^{b}which was statistically different (P < 0.05) from all the treatments, but numerically, C-NB 34.67 ± 8.37^{a}g had the highest and the least was recorded in T_2IB 0.00 ± 0.00^{b}g.

The results of performance characteristics of day 14 post vaccination are presented in table 3. Average initial weight had no significant difference (P > 0.05) across treatment except T_3 NB 342.0 ± 24.6^{a}g which was significantly different (P < 0.05) from T_2IB 201.0 ± 18.3^{b}g, C-IB 230.0± 37.5^{b}g and C-NB 215.3± 22.6^{b}grespectively. Result for Average final weight also had no statistical difference across treatment excepting C-BB 414.0 ± 19.1^{a}g which happens to be statistically different (P < 0.05) from T_2IB 207.0± 15.3^{b}g and T_3NB 220.0 ±37.0^{b}g respectively. Result for Average weight gain and Average daily weight showed no significant difference (P > 0.05) across treatments except for C-BB 154.0 ± 28.1^{a}g, 22.00±4.01^{a}g and C-NB 72.7 + 35.4^{a}g, 10.38 + 5.05^{a}g which was grossly significant (P < 0.05) from T_3NB -122.0±25.3^{b}g, -17.43 ± 3.62^{b}grespectively. Results for Average feed intake, FCR, FER and Mortality had no significant difference (P > 0.05) across treatment. However, T_3NB 850.3± 25.32.8^{a}g was numerically the highest in Average feed intake while the least was recorded against T_1BB 612.0 + 6.80^{a}g.

Parameters (g)	T_1BB	C-BB	T_2IB	C-IB	T_3NB	C-NB
Average initial weight	269.3 ± 11.9^{ab}	260.0 ± 17.2^{ab}	201.0 ± 18.3^b	230.0 ± 37.5^b	342.0 ± 24.6^a	215.3 ± 22.6^b
Average final weight	312.0 ± 49.3^{ab}	414.0 ± 19.1^a	207.0 ± 15.3^b	261.00 ± 8.50^{ab}	220.0 ± 37.0^b	288.0 ± 42.4^{ab}
Average weight gain	42.7 ± 47.6^{ab}	154.0 ± 28.1^a	6.0 ± 23.8^{ab}	31.0 ± 45.2^{ab}	-122.0 ± 25.3^b	72.7 ± 35.4^a
Average daily weight	6.09 ± 6.80^{ab}	22.00 ± 4.01^a	0.86 ± 3.40^{ab}	4.43 ± 6.46^{ab}	-17.43 ± 3.62^b	10.38 ± 5.05^a
Average Feed Intake	612.0 ± 28.4^a	759.67 ± 4.26^a	674.0 ± 63.3^a	739.7 ± 41.4^a	850.3 ± 32.8^a	718 ± 119^a
FCR	1.09 ± 7.91^a	5.36 ± 1.17^a	-23.9 ± 19.0^a	8.5 ± 14.2^a	-7.92 ± 2.29^a	86.2 ± 78.4^a
FER (%)	1.82 ± 4.56^a	13.77 ± 5.75^a	-15.6 ± 18.3^a	0.69 ± 8.64^a	-9.76 ± 3.30^a	7.62 ± 3.97^a
Mortality (%)	48.67 ± 4.67^a	56.00 ± 6.35^a	41.67 ± 7.17^a	55.00 ± 6.08^a	59.00 ± 7.00^a	45.00 ± 6.35^a

Table 3: Showing Performance Characteristics of Day 14 Post Vaccination of three Genotypes of Exotic Chickens and Control following Error Induced Vaccination.

Turkey test: Means that do not share a letter are significantly different.

Key: T_1 = Treatment 1…Broiler birds. T_2 = Treatment 2…Isa brown. T_3 = Treatment 3…Noiler birds.

CBB = Control Broiler birds. CIB = Control Isa brown. CNB = Control Noiler birds.

FCR = Feed conversion ratio. FER = Feed efficiency ratio.

Parameters (g)	T_1BB	C-BB	T_2IB	C-IB	T_3NB	C-NB
Average initial weight	312.0 ± 49.3^{ab}	414.0 ± 19.1^{a}	207.0 ± 15.3^{b}	261.0 ± 8.50^{a}	220.0 ± 37.0^{b}	288.0 ± 42.4^{ab}
Average final weight	0.00 ± 0.00^{c}	0.00 ± 0.00^{c}	396.0 ± 19.5^{b}	347.0 ± 18.5^{b}	525.0 ± 29.5^{a}	369.0 ± 5.29^{b}
Average weight gain	0.00 ± 0.00^{c}	0.00 ± 0.00^{c}	189.0 ± 30.8^{ab}	86.0 ± 25.9^{b}	305.0 ± 28.0^{a}	81.0 ± 39.1^{b}
Average daily weight	0.00 ± 0.00^{c}	0.00 ± 0.00^{c}	27.00 ± 4.40^{ab}	12.29 ± 3.70^{bc}	43.57 ± 4.00^{a}	11.57 ± 5.59^{bc}
Average Feed Intake	0.00 ± 0.00^{c}	0.00 ± 0.00^{c}	1,285 ± 9.29^{a}	681.0 ± 11.4^{b}	1294.0 ± 35.3^{a}	685.0 ± 13.2^{b}
FCR	0.00 ± 0.00^{a}	0.00 ± 0.00^{a}	7.15.00 ± 1.08^{a}	10.17 ± 3.86^{a}	4.30 ± 0.32^{a}	27.1 ± 21.0^{a}
FER (%)	0.00 ± 0.00^{b}	0.00 ± 0.00^{b}	14.74 ± 2.50^{a}	12.57 ± 3.68^{ab}	23.50 ± 1.66^{a}	11.78 ± 5.57^{ab}
Mortality (%)	100.00 ± 0.00^{a}	100.00 ± 0.00^{a}	15.00 ± 2.89^{c}	20.00 ± 5.77^{bc}	30.00 ± 5.77^{bc}	40.00 ± 5.77^{b}

Table 4: Showing Performance Characteristics of Day 21 Post Vaccination of three Genotypes of Exotic Chickens and Control following Error Induced Vaccination.

Turkey test: Means that do not share a letter are significantly different.

Key: T_1 = Treatment 1…Broiler birds. T_2 = Treatment 2…Isa brown. T_3 = Treatment 3…Noiler birds.

CBB = Control Broiler birds. CIB = Control Isa brown. CNB = Control Noiler birds.

FCR = Feed conversion ratio.

FER = Feed efficiency ratio.

The results of performance of day 21 Post-Vaccination in three genotypes exotic chickens are shown in table 4. Result for Average initial weight showed significant difference ($P < 0.05$) among treatments, C-BB 414.0 ± 19.1^{a}g significantly differ ($P < 0.05$) from T_2IB 207.0 ± 15.3^{b}g and T_3NB 220.0 ± 37.0^{b}g respectively. Average final weight had significantly different ($P < 0.05$) between T_2IB 396.0 ± 19.5^{b}g and T_3NB 525.0 ± 29.5^{a}g but there were no significant difference ($P > 0.05$) between T_2IB 396.0 ± 19.5^{b}g, C-IB347.0 ± 18.5^{b}g and C-NB369.0 ± 5.29^{b}g respectively. Result for Average weight gain was significantly different ($P < 0.05$). T_3NB 305.0 ± 28.0^{a}g had the highest record while T_1BB 0.00 ± 0.00^{c}g and C-BB 0.00 ± 0.00^{c}g had the least record. Result for Average daily weight and Average feed intake also had significant difference ($P < 0.05$) as opposed to FCR, FER and Mortality which were all insignificant ($P > 0.05$) across treatments.

Parameters	T_1BB	C-BB	T_2IB	C-IB	T_3NB	C-NB
HB (g/dl)	10.000 ± 2.08^{a}	10.000 ± 2.52^{a}	10.600 ± 1.30^{a}	10.300 ± 1.78^{a}	10.000 ± 1.15^{a}	10.000 ± 2.08^{a}
PCV (%)	30.000 ± 3.61^{a}	30.000 ± 1.53^{a}	32.000 ± 1.53^{a}	31.000 ± 2.00^{a}	30.000 ± 1.15^{a}	30.000 ± 1.53^{a}
RBC X10^12/L	3.000 ± 0.577^{a}	3.000 ± 0.577^{a}	3.100 ± 0.666^{a}	3.000 ± 0.577^{a}	3.000 ± 0.577^{a}	3.000 ± 0.153^{a}
WBC X10^9/L	3.200 ± 0.416^{a}	2.500± 0.764^{a}	2.500 ± 0.764^{a}	2.700± 0.850^{a}	3.500 ± 0.289^{a}	3.600 ± 0.755^{a}
NEUT (%)	60.00 ± 8.39^{a}	56.00 ± 7.00^{a}	56.00 ± 4.04^{a}	44.00 ± 3.06^{ab}	56.00 ± 4.04^{a}	28.00 ± 2.08^{b}
LYM (%)	30.00 ± 3.00^{b}	34.00 ±9.07^{b}	36.00 ± 5.13^{b}	48.00 ± 3.21^{ab}	32.667 ± 0.88^{b}	62.667 ± 0.88^{a}
MONO (%)	5.00 ± 1.53^{a}	4.00 ± 0.577^{a}	4.00 ± 1.15^{a}	2.00 ± 0.00^{a}	2.00 ± 0.00^{a}	4.00 ± 0.577^{a}
EOSI (%)	2.00 ± 0.00^{b}	2.00 ± 0.00^{b}	2.00 ± 0.577^{b}	2.00 ± 0.00^{b}	5.00 ±0.577^{a}	2.00 ± 0.00^{b}
BASO (%)	3.667 ± 0.882^{a}	4.00 ± 0.577^{a}	2.00 ± 0.00^{a}	4.00 ± 0.577^{a}	3.00 ± 0.577^{a}	2.00 ± 0.00^{a}

Table 5: Showing the Response of Haematological Parameters of Day 0 Pre-Vaccination of three Genotypes of Exotic Chickens and Control.

Turkey test: Means that do not share a letter are significantly different.

Key: HB = Hemoglobin, PCV = Parked Cell Volume, RBC = Red Blood Cell, WBC = White Blood Cell, NEUT = Neutrophil, LYM = Lymphocyte, MONO = Monocytes, ESOI = Ecosinocyte, BASO = Basinophil.

The result of haematological analysis recorded for day 0 pre-vaccination of three genotype exotic chickens are presented in table 5. There was no significant difference (P > 0.05) across treatment for HB, PCV, RBC, WBC, MONO, EOSI and BASO. However, result for NEUT and LYM showed significant difference (P < 0.05) among treatment. For NEUT, C-NB 28.00 ± 2.08^{b} was significantly different (P < 0.05) from all other treatments within the group except C-IB 44.00 ± 3.21^{b} (P > 0.05). LYM had no significant difference (P > 0.05) across treatment groups except for C-NB 62.667 ± 0.88^{a} which was significantly different (P < 0.05) from TBB 30.00 ± 3.00^{b}, C-BB 34.00 ± 9.07^{b}, T_2IB 36.00 ± 5.13^{b} and T_3NB 32.667 ± 0.88^{b} respectively.

Parameters	T_1BB	C-BB	T_2IB	C-IB	T_3NB	C-NB
HB (g/dl)	6.600 ± 0.40^{b}	8.300 ± 0.265^{a}	7.600 ± 0.46^{ab}	8.600 ± 0.321^{a}	8.300 ± 0.153^{a}	7.300 ± 0.15^{ab}
PCV (%)	20.00 ± 2.08^{a}	25.00 ± 1.53^{a}	23.00 ± 1.53^{a}	26.00 ± 1.53^{a}	25.00 ± 2.52^{a}	22.00 ± 3.06^{a}
RBC X10^12/L	2.00 ± 0.577^{a}	2.700 ± 0.557^{a}	2.600 ± 0.153^{a}	2.800 ± 0.557^{a}	2.700 ± 0.436^{a}	2.500 ± 0.231^{a}
WBC X10^9/L	3.00 ± 0.577^{a}	3.00 ± 0.00^{a}	3.00 ± 1.15^{a}	4.500 ± 0.289^{a}	3.400 ± 0.173^{a}	4.200 ± 0.306^{a}
NEUT (%)	50.00 ± 1.00^{a}	48.00 ± 5.13^{a}	56.00 ± 2.65^{a}	56.00 ± 2.52^{a}	58.00 ± 3.79^{a}	60.00 ± 5.03^{a}
LYM (%)	47.00 ± 3.06^{a}	48.00 ± 5.13^{a}	41.00 ± 3.06^{a}	46.00 ± 1.53^{a}	34.00 ± 2.65^{a}	37.00 ± 2.52^{a}
MONO (%)	1.00 ± 0.00^{b}	2.00 ± 0.00^{a}	1.00 ± 0.00^{b}	1.00 ± 0.00^{b}	2.00 ± 0.00^{a}	1.00 ± 0.00^{b}
EOSI (%)	1.00 ± 0.00^{b}	1.00 ± 0.00^{b}	1.00 ± 0.00^{b}	1.00 ± 0.00^{b}	4.00 ± 1.53^{a}	1.00 ± 0.00^{b}
BASO (%)	1.00 ± 0.00^{b}	1.00 ± 0.00^{b}	1.00 ± 0.00^{b}	1.00 ± 0.00^{b}	2.00 ± 0.00^{a}	1.00 ± 0.00^{b}

Table 6: Showing the Response of Haematological Parameters of Day 7 Post Vaccination following Error Induced Vaccination in three Genotypes of Exotic Chickens and Control.

Turkey test: Means that do not share a letter are significantly different.

Key: HB = Hemoglobin, PCV = Parked Cell Volume, RBC = Red Blood Cell, WBC = White Blood Cell, NEUT = Neutrophil, LYM = Lymphocyte, MONO = Monocytes, ESOI = Ecosinocyte, BASO = Basinophil.

The result of haematological analysis recorded for day 7 post-vaccination of three genotype exotic chickens are presented in table 6. Result for HB showed no significant difference (P > 0.05) across treatment groups except T_1BB 6.600 ± 0.40b which significantly differed (P < 0.05) from C-BB 8.300 ± 0.265^{a}, C-IB 8.600 ± 0.321^{a} and T_3NB 8.300 ± 0.153^{a} respectively. Result for PCV, RBC, WBC, NEUT and LYM were statistically insignificant (P > 0.05) across treatments. MONO had significant difference (P < 0.05) between treatments. C-BB 2.00 ± 0.00^{a} and T_3FF 2.00 ± 0.00^{a} had no significant difference (P > 0.05) but were significantly different (P < 0.05) from every other treatments across the group. Result for EOSI and BASO were not significantly different (P > 0.05) across treatments except for T_3NB 4.00 ± 1.53^{a}, 2.00 ± 0.00^{a} which was unquivocally different (P < 0.05) from every there treatments in the group.

Parameters	T_1BB	C-BB	T_2IB	C-IB	T_3NB	C-NB
HB (g/dl)	7.600 ± 0.46^{b}	8.00 ± 0.289^{b}	9.00 ± 0.751^{ab}	8.300 ± 0.15^{b}	10.600 ± 0.61^{a}	7.600 ± 0.35^{b}
PCV (%)	23.00 ± 3.06^{a}	24.00 ± 3.06^{a}	27.00 ± 1.00^{a}	25.00 ± 2.65^{a}	32.00 ± 3.51^{a}	23.00 ± 3.06^{a}
RBC 10^12/L	2.00 ± 0.058^{a}	2.20 ± 0.100^{a}	2.20 ± 0.416^{a}	3.00 ± 0.577^{a}	3.100 ± 0.100^{a}	2.00 ± 0.00^{a}
WBC X10^9/L	2.00 ± 0.00^{a}	2.20 ± 0.200^{a}	2.30± 0.351^{a}	2.00 ± 0.577^{a}	2.500 ± 0.265^{a}	3.00 ± 0.577^{a}
NEUT (%)	50.00 ± 7.02^{a}	48.00 ± 1.53^{a}	50.00 ± 7.09^{a}	49.00 ± 4.51^{a}	47.00 ± 5.51^{a}	58.00 ± 2.65^{a}
LYM (%)	47.00 ± 3.06^{a}	48.00 ± 1.53^{a}	48.00 ± 1.15^{a}	48.00 ± 7.51^{a}	50.00 ± 5.51^{a}	39.00 ± 5.03^{a}
MONO(%)	1.00 ± 0.00^{a}	2.00 ± 0.577^{a}	1.00 ± 0.00^{a}	1.00 ± 0.00^{a}	1.00 ± 0.00^{a}	1.00 ± 0.00^{a}
EOSI (%)	1.00 ± 0.00^{a}	1.00 ± 0.00^{a}	1.00 ± 0.00^{a}	1.00 ± 0.00^{a}	1.00 ± 0.00^{a}	1.00 ± 0.00^{a}
BASO (%)	1.00 ± 0.00^{a}	1.00 ± 0.00^{a}	1.00 ± 0.00^{a}	1.00 ± 0.00^{a}	1.00 ± 0.00^{a}	1.00 ± 0.00^{a}

Table 7: Showing the Response of Haematological Parameters of Day 14 Post Vaccination following Error Induced Vaccination in three Genotypes of Nigerian Indigenous Chicken and Control.

Turkey test: Means that do not share a letter are significantly different.

Key: HB = Hemoglobin, PCV = Parked Cell Volume, RBC = Red Blood Cell, WBC = White Blood Cell, NEUT = Neutrophil, LYM = Lymphocyte, MONO = Monocytes, ESOI = Ecosinocyte, BASO = Basinophil.

The result of haematological analysis recorded for day 14 post-vaccination of three genotype exotic chickens are presented in table 7. Result for HB was statistically insignificant (P > 0.05) all other treatments except T3FF 10.600 ± 0.61[a] which varied significantly (P < 0.05) from T_1BB7.600 ± 0.46[b], C-BB 8.00 ± 0.289[b], C-IB 8.300 ± 0.15[b] and C-NB 7.600 ± 0.35[b] respectively. Result for PCV, RBC, WBC, NEUT, LYM, MONO, EOSI and BASO were not significantly different (P > 0.05) across treatment.

Parameters	T_1BB	C-BB	T_2IB	C-IB	T_3NB	C-NB
HB (g/dl)	9.00 ± 1.62[a]	8.00 ± 1.00[a]	8.60 ± 1.48[a]	8.30 ± 1.80[a]	8.00 ± 2.52[a]	7.600 ± 0.351[a]
PCV (%)	27.00 ± 5.03[a]	24.00 ± 3.51[a]	26.00 ± 5.03[a]	25.00 ± 5.03[a]	24.00 ± 8.50[a]	23.00 ± 9.50[a]
RBC X10^12/L	2.200 ± 0.21[a]	2.400 ± 0.55[a]	2.600 ± 0.31[a]	2.500 ± 0.29[a]	2.400 ± 0.50[a]	2.300 ± 0.47[a]
WBC X10^9/L	2.200 ± 0.21[a]	2.100 ± 0.90[a]	2.200 ± 0.42[a]	3.100 ± 0.67[a]	2.500 ± 0.65[a]	2.40 ± 1.10[a]
NEUT (%)	47.00 ± 3.79[a]	50.00 ± 12.5[a]	49.00 ± 6.56[a]	50.00 ± 10.5[a]	48.00 ± 8.02[a]	58.00 ± 7.02[a]
LYM (%)	50.00 ± 6.03[a]	47.00 ± 4.16[a]	48.00 ± 7.00[a]	48.00 ± 9.07[a]	48.00 ± 11.5[a]	38.00 ± 5.13[a]
MONO (%)	1.00 ± 0.00[a]	1.00 ± 0.00[a]	1.00 ± 0.00[a]	1.00 ± 0.00[a]	2.00 ± 0.577[a]	1.00 ± 0.00[a]
EOSI (%)	1.00 ± 0.00[a]	1.00 ± 0.00[a]	1.00 ± 0.00[a]	1.00 ± 0.00[a]	1.00 ± 0.00[a]	1.00 ± 0.00[a]
BASO (%)	1.00 ± 0.00[a]	1.00 ± 0.00[a]	1.00 ± 0.00[a]	1.00 ± 0.00[a]	1.00 ± 0.00[a]	1.00 ± 0.00[a]

Table 8: Showing the Response of Haematological Parameters of Day 21 Post Vaccination following Error Induced Vaccination in three Genotypes of Exotic Chicken and Control.

Turkey test: Means that do not share a letter are significantly different.

Key: HB = Hemoglobin, PCV = Parked Cell Volume, RBC = Red Blood Cell, WBC = White Blood Cell, NEUT = Neutrophil, LYM = Lymphocyte, MONO = Monocytes, ESOI = Ecosinocyte, BASO = Basinophil.

The result of haematological analysis recorded for day 21 post-vaccination of three genotype exotic chickens are presented in table 8. The parameters analysed were HB, PCV, RBC, WBC, NEUT, LYM, MONO, EOSI and BASO. There was no significant difference (P > 0.05) across treatment for haematological parameters recorded in day 21 of post vaccination following error induced vaccination in three genotype exotic chickens and control.

Discussion

Newcastle disease remains an important issue for poultry production worldwide. Currently, vaccines are still the most accepted and effective way to prevent and control the occurrence of ND [4,8]. Controlling of NDV through vaccination is commonly and routinely applied by the majority of poultry production companies to supply an immunological response against the disease [3].

The result of Effect of ND-Lasota Day 0 Pre-Vaccination on Performance of three (3) Genotypes of Exotic Chicken shown in Table 1 reveals that there was significant difference (P < 0.05) in all the performance parameters across the treatment groups except for FCR and FER which had no significant difference (P > 0.05). The results of the various parameters for day 0 on performance followed a symmetric order of great increase and a massive decrease across treatment groups. This could be as a result of difference in genotype as well as feeding pattern or environment. It could also be as a result of the erroneous induced Nd-Lasota Vaccination. The result connotes that Treatment 3 (Noiler Breed) had the highest significant effect in Average final weight (235.3 ± 17.3[a]), Average weight gain (103.67 ± 6.17[a]), and the least FER (4.87 ± 0.04[a]). Subsequent findings of this study revealed an increase in Average Final weight as the experiment began. In Day 7 of the experiment, the highest Average Final weight was seen in Treatment 3 (Noiler Breed) (342.0 ± 24.6[a]) with a fairly high mortality rate of 21.67 ± 6.01[ab]. At the Day 14[th] of the experiment there was a major decline in Average final weight cross treatments as Treatment 1 (Broiler bird) 312.0 ± 49.3[ab] had the highest Average final weight. The mortality rate seems to increase incredibly across treatment with Treatment 3 (Noiler Breed) 59.00 ± 7.00 ranking the highest in the group. At Day 21[st] of the experiment which happens to be the end of the experiment, 100% mortality was recorded in Treatment 1 (Broiler bird) and its Control (Broiler bird). However, other treatment group performances were seen to have been better. This finding therefore connotes that the Error Induced Nd-Lasota Vaccination had the highest significant effect on the Performance of Treatment 3 Noiler Breed which was followed by Treatment 2 Isa Brown. The result reveals that C_1 (Broiler) and T_1 (Broiler) had the

least significant effect in all the performance parameter recording 100% mortality. The results correlates with the report of [11] who revealed that vaccinated birds infected with Newcastle disease virus recorded 100 % mortality by day 5 for both vaccinated and unvaccinated infected cockerels respectively. Also ND-infected non-vaccinated broilers showed high mortalities with cyanosis, nasal discharge, and edema of eyelid, white pasty diarrhea and nervous manifestations [14]. The least significant effect which was found in the C_1 (Broiler) and T_1 (Broiler) was due to their high mortality rate. This results correlates with the report of [17] who stated that NDV challenge reduced growth performance of broilers in earlier period after the first immunization.

The findings also suggest that the various treatment groups in the Three (3) Genotypes of Exotic Chicken had better growth performance in compared to the different control groups. This is supported by the findings of [17] who stated that appropriate lower doses of NDV inoculation increase feed efficiency of broiler chickens. The findings from this result also correlates with the report of [5] who revealed that FCR increased ($P < 0.0001$) from days 0 to 7 post vaccination in all the vaccinated groups compared to the controls.

The effects of vaccination on the haematological responses to velogenic NDV infection had been reported in broilers by [10]. The haematological response in the three strains of exotic chickens revealed no significant effect ($P > 0.05$) in almost all haematological parameters across the different treatment groups from Day 0 pre-vaccination to Day 21st post vaccination except for LYM in day 0, HB, MONO, EOSI and BASO in day 7, and HB in day 14 which had significant difference ($P < 0.05$). This result is in agreement with [14] who revealed that ND-infected non-vaccinated broilers showed a significant ($P < 0.05$) decrease in the values of RBC, Hb, PCV, MCHC with significant increase in MCV showing features of macrocytic hypochromic anaemia.

The haematological response in the three strains of exotic chickens revealed significant increase in HB, PCV, RBC, Neutrophil, Monocytes and MCV in the ND-Lasota Vaccination Error Induced chickens in the three different treatments groups when compared with the controls, while there was a significant decrease in WBC and lymphocytes in the different treatment groups when compared to their control groups indicating macrocytic hypochromic anaemia [10]. The results recorded for total WBC and lymphocytes counts were in agreement with the reports of [9,18] and However, the significant increase in the WBC and lymphocytes count in the various control groups could be due to the early response of animals to infectious agents and leucocytosis that follows inflammatory reactions [12]. While the significant reduction in the total WBC count of the various treatment group when compared with the control may be due to the reductions in the lymphocyte counts [18].

Conclusion and Recommendation

Conclusion

The aim of this study, error induced ND-Lasota vaccination haematological changes and performance in three (3) genotypes of exotic chickens is seen to have deleterious effect on the performance of bird as their growth were impaired, mortality recorded as their immune system were compromised. A well designed, well timed and soundly executed vaccination Programme followed with proper management, nutrition and biosecurity will lower the probability of disease palaver and increase the chances of the flock performing better to its genetic ability. Vaccines may not play its role if they do not get into the chicken. Error induced vaccine administration is the most common cause of vaccine failure in poultry. The result of a good vaccination Programme will help improve disease control and performance of poultry birds. When a vaccine fails, the natural tendency is to blame the vaccine. Farmers must put into cognizance that, several factors (spacing, temperature, environment etc.) must be considered to determine the cause of the vaccine failure as animals tend to respond to the environment they find their selves in.

Recommendation

Diseases are ubiquitous and where there are increased number of commercial birds, their impact can be devastating thus, I recommend that farmers adhere to the right stocking density in poultry farming so as to cub disease outbreak in farms.

I also recommend proper handling of birds and elimination of wrong vaccination Programme practiced among the poultry industry as it tends to pose deleterious effect on birds performance.

Therefore, a recommended and tested Vaccination Programme should be used to eliminate the spread of the virus.

Bibliography

1. Abraham-Oyiguh J., *et al*. "Prevalence of Newcastle Disease Antibodies in Local Chicken in Federal. Capital Territory, Abuja, Nigeria". *International Scholarly Research Notices* (2014).

2. Alexander DJ. "Newcastle disease, other avian paramyxoviruses and pneumovirus infections: Newcastle disease". in Diseases of Poultry, Y. M. Saif, Ed., pp. 64-87, Iowa State University Press, Ames, Iowa, USA (2003).

3. Boven VM., *et al*. "Herd immunity to Newcastle disease virus in poultry by vaccination". *Avian Pathology* 37 (2008): 1-5.

4. Cornax I., *et al*. "Characterization of live LaSota vaccine strain-induced protection in chickens upon early challenge with a virulent Newcastle disease virus of heterologous genotype". *Avian Diseases* 56.3 (2012): 464-470.

5. Cveti CZ., *et al*. "Immunogenicity of Newcastle disease virus strain ZG1999HDS applied occasionally or by means of nebulization to day-old chicks". *Poultry Science* (2021).

6. Echeonwu GO N., *et al*. "Survival of Newcastle disease virus (NDV) strain V4- UPM coated on three grains offal and exposed to room temperature". *African Journal of Biotechnology* 15 (2008a): 2688-2692.

7. Fisseha M. "Studies on production and marketing system of local chicken ecotypes in Bure Wereda, North West Amhara". M.Sc. Thesis, Hawassa University, Ethiopia (2009).

8. Gonmei G., *et al*. "Studies on immune response to Newcastle disease virus in broiler chickens fed with Lactobacillus reuteri PIA16 isolated from the gut of indigenous chicken of Assam, India". *Veterinary World* 12.8 (2019): 1251-1255.

9. Igwe AO., *et al*. "Comparative study on the haematology and persistence of velogenic Newcastle disease virus in chickens and guinea fowls". *Research Opinions in Animal and Veterinary Sciences* 3.5 (2013): 136-142.

10. Ismail H T H. "Biochemical and haematological studies on the effect of neem (*Azadirachta indica*) leaves aqueous extract on Newcastle disease vaccine and infection in broiler chickens". *International Journal of Recent Scientific Research* 8.3 (2017): 15876-15884.

11. Okorie KO., *et al*. "Effects of vaccination on the haematological parameters of cockerels and ducks infected with a Velogenic Newcastle Disease Virus". *Animal Research International* 15.1 (2018): 2926-2936.

12. Okoroafor O., *et al*. "Immunologic and haematologic effects of methanolic stem bark extract of *Azadihiracta indica* on chickens experimentally infected with velogenic newcastle disease virus (kudu 113) strain". *Animal Research International* 12.3 (2015): 2274-2283.

13. Olabode AO., *et al*. "Antibody levels against NDV in rural chickens at slaughter point in Kubwa Village. Abuja, Nigeria". *Journal of Life Environmental Science* 8.1 (2006): 449-454.

14. Shefaa A M El-Mandrawy and Shimaa A A Ismail. *Selective Hematological, Biochemical and Pathological Alterations of Newcastle Virus in Naturally Infected and Vaccinated Broilers in Damietta Governorate of Egypt Bulletin UASVM Veterinary Medicine 74.2 (2017).

15. Spradbrow PB. "Newcastle disease vaccines" (1987).

16. Tadesse S. "Prevalence of avian tuberculosis in three selected agro-climatic zones of Central Ethiopia". PhD Thesis, Addis Ababa University, Debre Zeit, Ethiopia (2000).

17. Xiaofei W., *et al*. "Effect of difference doses of Newcastle disease vaccine immunization on growth performance, plasma variables and immune response of broilers". *Journal of Animal Science and Biotechnology* 6 (2015): 20.