

## Clinical and Serological Observation of the Newcastle Disease on Commercial Meat Chicken Flocks in Basrah Province, South of Iraq

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**ABSTRACT:** The current study was conducting to observed Newcastle Disease (ND) in Basrah and evaluated the competence of vaccination schedules used in commercial meat chicken farms. **Published Online: July 22, 2024**

Monitoring of ND was dependent on 20 poultry houses located in Al Zubair, Al Mudaina, Al Qurnah, Garmat Ali Safwan, and Aluhais. The Incidence was recorded based on the clinical history of the disease in the poultry house, clinical signs, and post-mortem findings. ELISA test was estimated to detect Ab titer against ND, including maternal immunity and immune state after vaccination. The results indicated that the Incidence of ND was 80%. ND was not recorded in 20% of poultry houses. Results of the ELISA test showed differences of Ab against ND at different ages of birds, especially at a late stage. Ab titers were very low. The mean of maternal-derived antibodies was 6000 in Belgian, 308 Rose and 2000 for Iranian 501 coop. On the other hand, ND vaccines, available in local markets, showed a good quality (Ma5 + Clone 30) compared with different types, especially ( lasota + IB) Henkar.

**KEYWORDS:** Clinical , serological , observation, ND, chicken

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### INTRODUCTION

Newcastle disease (ND) is regarded as a worldwide disease and one of the critical virulence diseases of poultry (1). The high mortality rates of bird flocks caused by ND Virus (NDV) infections result in destruction and economic consequences such as trading restrictions and embargoes imposed on affected areas and nations (2). Due to the severe nature of the disease and its resulting repercussions, ND is classified as a List A disease by the Office Internationale des Epizooties (OIE) (3). As a result, most nations, including all European Union countries, implement mandatory control measures in the event of disease outbreaks (4). However, Newcastle Disease (ND) is endemic in some areas of the world and continues to pose a persistent risk to most domestically raised birds (5). Since its recognition in 1926, Vaccination against ND has been practised in almost all countries producing commercial poultry. A widely accepted practice is vaccination with attenuated strains of NDV. As the live attenuated virus in the vaccine is infectious, the vaccine itself may be a source of infection in unimmunized chicks.

Moreover, vaccination with a live virus has specific side- -effects, such as adverse reactions that can be avoided using an inactivated vaccine.

Further, inactivated virus vaccines stimulate high levels of long-duration immunity (6). The poultry business in Iraq has a substantial economic impact and encompasses many species of chickens. The disease continues to be a persistent issue in chicken farms. Therefore, this study aimed to monitor the ND incidence to determine the types of vaccines and vaccination schedules used in Basra poultry houses.

### MATERIALS AND METHODS

#### Study area and clinical monitoring

This study was carried out in Basrah province, located in south Iraq. The study duration was eight weeks, starting 1 Juli 2023 and continuing until Aug 30 2023. A total of 20 poultry houses were visited, located in al Zubair, al Mudaina, al Qurnah, Garmat Ali, Safwan and aluhais. The monitoring depended on many parameters, including the clinical history of the disease that was received by conducting direct interviews with farmers, in which we recorded answers to our questions. The questions were about

## Karrar Haider Abedali et al, Clinical and Serological Observation of the Newcastle Disease on Commercial Meat Chicken Flocks in Basrah Province, South of Iraq

previous infection, current infection, age and type of birds, vaccine type and vaccination age. We also recorded the clinical signs, and a mortem examination was performed. The clinical signs and post-mortem findings are based on (7). The Incidence (%) of ND in poultry houses was calculated.

### Serological test (ELISA )

The blood samples, which were collected from five chicks for each origin of chicks on the first day of age in the local market, were killed to collect blood after decapitation to determine maternal antibodies against The blood samples obtained from the birds were promptly placed into a sterile test tube and allowed to clot at room temperature to extract the serum using a centrifuge unit. Subsequently, the samples were subjected to freezing at 20 degrees Celsius until the serological test was conducted. An ELISA kit from SYNBIOTICS CORPORATION, Canada, was used to measure antibody levels against the Newcastle Disease (ND) vaccine, following the manufacturer's instructions. Different types of vaccines available in the local markets of Basra province were used in the study for titration. Titration was done with an ELISA kit (NEWCASTLE DISEASE VIRUS ANTIGENE TEST KIT, Zhenrui, China).

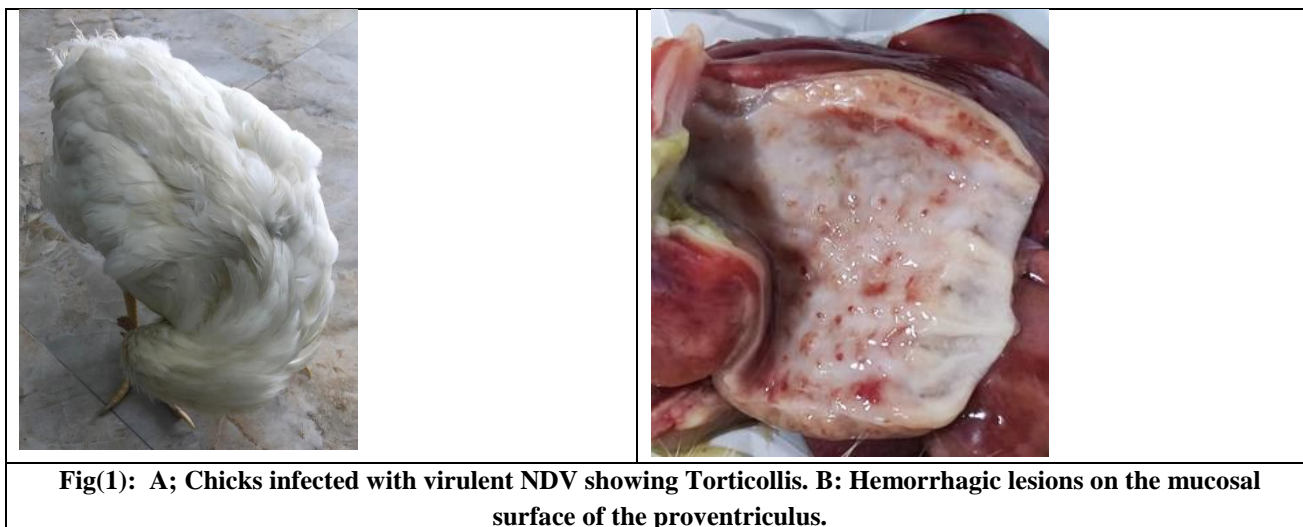
### RESULTS

The current study covered most of Basra's poultry houses in different locations to monitor the occurrence of ND.

**Table (1) Clinical Incidence of ND in 20 poultry houses in Basrah**

No	Location	Type of bird	age	Number of birds	Mortality rate %	Previous infection	Current infection%	non-infected
1	Al-Zubaer	Belgian	35	14000	2%	Yes	no	
2	Al-Mudaina	Belgian	27	10000	8%	Yes	Yes	
3	Al-Qaranah	Turkish	31	10000	10%	Yes	Yes	
4	Al-Qaranah	Belgian	20	12000	38%	no	Yes	
5	Al-Qaranah	Turkish	29	9000	5%	Yes	Yes	
6	Al-Mudaina	Belgian	21	14000	16%	Yes	Yes	
7	Al-Zubaer	Belgian	24	12000	12%	Yes	Yes	
8	Al-Zubaer	Belgian	21	10000	8%	Yes	Yes	
9	University of Garma ali	Belgian	18	6000	9%	Yes	Yes	
10	University of Garma ali	Belgian	30	10000	12%	Yes	Yes	
11	Al-Qurnah	Belgian	25	7000	5%	Yes	Yes	
12	Al-Qurnah	Belgian	27	6000	13%	Yes	Yes	
13	Al-Zubair	Belgian	40	14000	4%	Yes	Yes	
14	Al-Mudaina	Turkish	40	10000	3%	Yes	no	
15	Al-Qurnah	Belgian	28	12000	5%	Yes	Yes	
16	Al-Qurnah	Belgian	30	12000	14%	Yes	Yes	
17	Al-Qurnah	Belgian	24	9000	13%	Yes	Yes	
18	Al-Mudaina	Turkish	31	14000	17%	Yes	Yes	
19	safwan	Turkish	34	10000	7%	yes	no	
20	Aluhais	Belgian	29	14000	1%	no	no	
	<b>Total</b>						<b>80%</b>	<b>20%</b>

Table (1) displays the outcomes of the clinical surveillance of hens throughout the study time, exhibiting all the infected types of birds at different ages and locations in Basra, which were 20 visited farms [16 infected farms (80%) / four non-infected farms (20%)]. The data revealed that the Incidence of disease was 89% in infection farms. The parameters considered in the diagnosis are clinical signs and pathological changes. Common clinical manifestations include respiratory symptoms (gasping, coughing), neurological symptoms (depression, loss of appetite, drooping wings, Torticollis), enlargement of the tissues surrounding the eyes, and greenish diarrhea Only the significant lesion of ND, which is present on the carcass as Petechial in the proventriculus and on the submucosal of the gizzard, is typical; there is also severe enteritis of the duodenum.



The results of monitoring are represented in table (2). Data from the table revealed that the maximum Ab titer in poultry house No.4 was (1200) at 20 days of age. In contrast, the second titer was 900 at all 30 days of age in poultry house No.10. These titers were more significant than other results despite the difference in vaccines and vaccination methods. Other poultry houses show low Ab titers against ND, especially at the late stages of life.

**Table (2) Vaccination schedules, method of vaccination and ELISA Antibody titer against different types of ND vaccine**

No.	Form of ND	vaccine type	Vaccination schedule	Age of vaccination	Time of blood collection	Ab Twitter
1	Visceral	Lasota+influenza+IBD	Injection+	3	35	300
		French (B1+ IB)	drinking water	15		
2	Visceral& respiratory	German Lasota	drinking water	3 and 21	27	700
3	Visceral& respiratory	Lasota+ influenza	Injection	5	31	600
4	Visceral, Nervous & Respiratory	German Lasota	Injection	3	20	1200
		Ma5+ Clone 30	drinking water	12		
5	Respiratory	Henkari (last +IB)	Injection	3	29	300
		Ma5+ Clone 30	drinking water	9		
6	Visceral, Nervous & Respiratory	Fatro Italy(influenza +lasota)	Injection	3	21	600
		Ma5+ Clone 30	drinking water	17		
7	Visceral & respiratory	Canadian Iraqi Lasota	Injection	3	24	600
		Ma5+ Clone 30	drinking water	15		
8	Respiratory	German Lasota	drinking water	3 and 15	21	400
9	Respiratory	Canadian Iraqi Lasota	drinking water	3 and 18	22	600
10	Nervous	Canadian Iraqi Lasota	drinking water	7 and 17	30	600

**Karrar Haider Abedali et al, Clinical and Serological Observation of the Newcastle Disease on Commercial Meat Chicken Flocks in Basrah Province, South of Iraq**

11	Visceral	German Lasota	Injection	3	25	500
		Ma5+Clone 30	drinking water	17		
12	Nervous	Hungarian (last +IB)	Injection	5	27	800
		Ma5+Clone 30	drinking water	15		
13	Respiratory	(Lasota+influenza +IBD)	Injection	3	40	0
		French (B1+ IB)	drinking water	15		
14	Respiratory	German Lasota	drinking water	3 and 21	38	300
15	Respiratory	Lasota+ influenza	Injection	5	28	200
		French (B1+ IB)	drinking water	12		
16	Visceral	Canadian Iraqi Lasota	Injection	3	30	600
		Ma5+ Clone 30	drinking water	12		
17	Nervous	Ma5+Clone30	Injection	3	24	600
		Henkari (last +IB)	drinking water	9		
18	Visceral & respiratory	German Lasota	Injection	3	31	500
		Ma5+ Clone30	drinking water	17		
19	Nervous	German Lasota	Injection	10	25	400
20	Respiratory	Lasota+ influenza	Injection	6	21	500

**Table (3) Maternal Derived Antibodies (MDA) at first day of age for different types of chicks in Basrah (mean ± SD )**

Chick type	Ab titer ± SD
Portuguese 308	3109 ± 1519.575
Turkish 308 Rose	3202 ± 1519.575
Iranian 501 coop	1915 ± 1519.575
Belgian 308 Rose	5957 ± 1519.575
Hungarian 308 Rose	4211 ± 1519.575

The mean (MDA) of 5 birds for each chick type tested at the first day of age by ELISA and shown in table (3) indicated that the highest titration was in Belgian 308 Rose and lesser in Iranian 501 coop.

**Table (4) Titration of ND vaccines in the local market in Basra**

Vaccine	Titer
Lasota Germani	95775
(B1 + IB) French	32237
(Lasota + IB) Hungarian	8781
(Ma5+Clone 30) Dutch	98755
Lasota Canadian Iraqi	96705

Table (4) revealed that the (Ma5+Clone 30) showed the highest titration of vaccine (98755) compared with other types of vaccines, especially (Hungarian lasota +IB) was lower (8781). These results indicate that there was a difference in the potency of the virus vaccine.

**DISCUSSION**

Newcastle disease is a highly infectious viral disease affecting any bird species. The disease is extremely contagious and significantly affects the chicken sector. The Newcastle Disease, with its tendency to spread rapidly among animals, has resulted in significant financial damage to the global poultry sector since the 1920s (5). Vaccines are crucial for managing Newcastle disease.

## **Karrar Haider Abedali et al, Clinical and Serological Observation of the Newcastle Disease on Commercial Meat Chicken Flocks in Basrah Province, South of Iraq**

Both live attenuated and inactivated vaccinations are commonly administered to chickens throughout their lifespan to protect against Newcastle Disease (ND). Signs characterize the disease, which varies with the pathotypes involved in particular outbreaks (8).

The results of the present clinical monitoring study for poultry houses in Basra province, shown in Table (2), revealed the Incidence of ND was (89%). These findings were consistent with previous reports indicating that infected chickens' morbidity and mortality rates can range from 1% to 100%. Also, the results of our study showed that poultry houses that recorded previous infections with ND are still available. ND at some poultry houses may be due to bad management, false vaccine programs and the type of vaccine used.

These findings were consistent with previous studies that have observed variations in vaccination programmes and procedures across countries and even within farms within the same country. Local factors, such as the specific circumstances of each study, have influenced the use of different vaccination programmes in commercial chicken flocks to provide adequate protection against NDV.

The clinical signs of ND included respiratory symptoms (gasping, coughing), neurological symptoms (depression, decreased appetite, drooping wings, Torticollis), swelling of the tissues around the eyes, and greenish diarrhoea. A study found similar symptoms, including depression, diarrhoea, weakness, swelling of the head and wattles, neurological symptoms like paralysis and Torticollis, and respiratory symptoms. Results of Ab titer, which ELISA tested for poultry houses of Basrah province, have been recorded to vary from (1200 - 0). This difference in Ab titers may be due to type, administration route and vaccination age. This finding is in agreement with the finding of (13), who discussed that vaccination of chicks with live B1 strain by eye drop route in one day old will lead to the production of a higher level of antibodies (IgA, IgG and IgM) in comparison with other vaccination routes.

MDA results, which ELISA tested, shown in table (4), revealed a high Ab in (Belgian 308 Rose) and a low level of Ab titer in (Iranian 501 coop). The results disagreed with those reported by (14), who reported that there were chicks from vaccinated parent stock containing a high level of MDA at day old, which then declined gradually within 15-20 days after hatching. (15) reported that the MDA level declined to zero on day 25 and also reported a high maternal antibody level in day-old chicks.

The variance in antibody titers observed in different immunological responses may be attributed to variations in passive immunity in chicks or varying levels of vulnerability to immune mechanisms. (17) proposed that the variance in antibody titer could be attributed to the genetic inability of certain birds to generate any response to NDV, and the genetic makeup of the birds may have a substantial impact on their reaction to vaccination. Results of the study vaccine quality that were used in the fields of Basrah province, which ELISA tested revealed that the (Ma5+Clone 30) was higher (100000) compared with other types of vaccine, especially (Hungarian lasota +IB) was recorded lower (10000). These results have indicated that there was a difference in virus vaccine potency. This leads to a different immunity against the disease. These results were in agreement with those reported by (18). The recommended dosage for live lentogenic vaccines is between 106.5 and 107.0 EID<sub>50</sub> per bird, while the optimal dosage for mesogenic vaccines is approximately 105.0 EID<sub>50</sub> per bird when delivered by parenteral means.

### **CONCLUSIONS**

From this study, it is concluded that ND is endemic in Basrah province. Mismanagement in poultry houses and vaccination programs is not enough to prevent infection, which is different from one field to another and is not based on international standards, causing failure in the route of vaccine administration. Finally, it indicated weakness in maternal immunity of some types of chicks.

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**Karrar Haider Abedali et al, Clinical and Serological Observation of the Newcastle Disease on Commercial Meat Chicken Flocks in Basrah Province, South of Iraq**

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