



ASSESSMENT OF KNOWLEDGE, ATTITUDE AND PRACTICES OF POULTRY FARMERS
TOWARD NEWCASTLE DISEASE MANAGEMENT IN BROILER CHICKENS IN KADUNA
METROPOLIS

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ABSTRACT

Newcastle disease is widely recognized as one of the most significant health challenges affecting chickens worldwide, often leading to substantial mortality and reduced productivity across various production systems. The prevention and control of this disease depends on awareness and protective behaviours of the general population. This study aims to assess the knowledge, attitudes, and practices of poultry farmers towards Newcastle diseases management in broiler chickens in poultry farmers within Kaduna metropolis, Kaduna state, Nigeria. The study was based on a cross-sectional designed structured questionnaire, administered by face-to-face interviews to 42 poultry farmers from the four local governments within the metropolis. The study revealed that the majority (80.5%) of the broiler farmers within Kaduna metropolis had a good knowledge of the infection, (95.1%) had a good attitude towards the infection and they utilised (65.9%) good practices to ward off the infections. Age emerged as the only demographic feature that is significantly ($P=0.001$); associated with knowledge levels, emphasizing the need for targeted education across age groups.

Keywords: Disease, Farmers, Management, Newcastle, Poultry

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INTRODUCTION

Newcastle disease is defined by the OIE as an infection of birds caused by a virus of avian paramyxovirus serotype 1 (APMV-1). [1] In Nigeria, it happens to be one of the most dreaded viral diseases of poultry causing illness, reduced egg production, immunosuppression, and often death, following infection with pathogenic strains. Despite efforts to prevent and control the disease, circulation of the causative viruses among free-roaming and wild birds has been reported as one of the factors responsible for the sporadic outbreaks of the infection among free-roaming village chickens and commercial poultry flocks [2].

In Nigeria, particularly in Kaduna State, chicken producers encounter numerous challenges ranging from inefficiency in production, low profitability, marketing, government policies, infrastructures decay, high cost of feed and other inputs used in the process of chicken production. Other problems include poor breed, decline in egg production and poor weight gain as a result of diseases and pest, poor feed quality feeds and inefficiency of management, lack of capital, risk and uncertainty of the business that arises from price fluctuations,

unexpected depreciation of investment and unstable supply of quality feeds [3].

Globally, respiratory diseases are unarguably the most important group of diseases in chickens, causing high mortality and production loss in different production systems, with multiple aetiology and complexity as characteristic features of respiratory disease in poultry. Among the major pathogens affecting the respiratory tract of chickens worldwide is Newcastle disease virus (NDV), Infectious laryngotracheitis virus (ILT), Infectious bronchitis virus (IBV), *Mycoplasma gallisepticum* (Mg), *Mycoplasma synoviae* (Ms), Avian metapneumovirus (aMPV), Avian influenza virus (AI), *Pasteurella multocida*, *Aspergillus fumigatus* and *Avibacterium paragallinarum* [4].

Apart from the high prevalence of the disease resulting in a wide range of mortality and morbidities which impact bird performance and the need for expensive treatments, Additionally, Newcastle disease has zoonotic significance, thereby posing a risk to the health of the public [1].

MATERIALS AND METHODS

Study area

The study was conducted in Kaduna metropolis, Kaduna State, Nigeria. The metropolis comprises of four Local Government Areas namely; Kaduna North, Kaduna South, Igabi and Chikun. Located between latitude 10°34'57.4" N and 10°22'56.6" N and longitude 7°38'12.2" E and 7°23'29.0"E. [5].

Socio-demographic information was collected for age, sex, marital status, level of education of respondents, farm location and L.G.A, source of birds, types of birds, average number of birds kept per production cycle, flock size, age of the birds. Closed-ended questions about knowledge, attitude and practices related to Newcastle disease in broiler chickens were also developed.

Sample size for the number of respondents

The sample size for number of respondents was based on the formula of [6] and 50% prevalence was used.

$$n = \frac{(Z_1 - \alpha/2 + Z_1 - \beta)^2}{ES}$$

Where: n = required sample size
 α = Selected level of significance

$$Z_1 - \alpha/2 = 1.96$$

$$Z_1 - \beta = 1.282$$

$$ES = \text{effective size (50\%)}$$

$$\text{Therefore } n = \frac{(1.96 + 1.282)^2}{0.5} = 42$$

Study design

A cross-sectional survey was conducted using a structured questionnaire to assess knowledge, attitude and practice of 42 broiler farmers in Kaduna metropolis, Kaduna State, Nigeria, over a period of 3 months (January, 2025 to March, 2025).

Study population

The study population included broiler farmers in Kaduna metropolis. The data were collected with the consent of both the broiler farmers and the farm managers.

Variables

The dependent variables of the study are knowledge, attitude and practice of broiler farmers in Kaduna metropolis, Kaduna state. While the independent variables are the respondents' age, sex, marital status, location of the farm, sources of the birds, population per cycle, bird age and size of the flock.

Inclusion and exclusion criteria

The inclusion criteria for this study were all broiler farmers in Kaduna metropolis and those who are accepted to participate in the study. Farmers who did not accept, non-clinical students were excluded from the study.

Data collection

A closed-ended questionnaire was designed in an electronic based form (Google Form). The questionnaire was developed in English and self-administered to the broiler Farmers. The questionnaire was pretested in 10 broiler farmers to ensure that it was comprehensible, for the content, design, and readability. The questionnaire had four sections consisting of socio-demographic information, knowledge, attitude and practice.

Measurement of knowledge, attitude and practice

A 10 item scale questions was used to score for the knowledge, attitude and practice and classified as high, moderate and low, with the overall score for each respondent >70% as high, 50-69% as moderate and less than 50% as low based on their respective scores for knowledge, attitude and practice [7].

Data analysis

Data obtained was inputted into excel sheet and was imported to SPSS version 20.0. The data was analysed through descriptive statistics. Knowledge, attitude and practice (KAP) of respondents were assessed and Chi-square was used to test for association where values of $P \leq 0.05$ were considered statistically significant [8].

In the respondent KAP scoring used, each correct answer attracted one point, while each wrong answer attracted zero point. The total score for each section. i.e., each respondent's KAP was divided by the total number of correct questions and multiplied by 100 to yield a percentage (%) score. Knowledge, attitude and practice % score was categorized into three (3);

Good: (60-100%)

Fair: (40-60 %)

Poor: (0-40 %).

The items in the domain of the questionnaire were scored by the method adopted from [7].

Ethical statement

All the participants consented to the study.

Data analysis

The collected data from the interviews were analyzed with the Statistical Package for Social Science (SPSS) version 20.0 (SPSS Inc, Chicago, USA), and the results were presented in tables and Chi-square was used to test for association and the p-value ≤ 0.05 was considered statistically significant.

RESULTS

Out of the 42 participants that were sampled to take part in this study, all (100%) questionnaires were successfully answered and data obtained were analyzed. A total of 42 broiler farmers comprising of 20 (48%) males and 22 (52%) females, consented to take part in the study. Of the respondent's, (55%) were aged between 25–35 years old, followed by

(36%) aged between 36–45 years old, (7%) >45 years old and (2%) <25 years old respectively. Based on educational status, (80%) had tertiary education, while 10% had secondary education and 10% had Quranic education. Based on geographic location, (38%) of the farms were distributed across Kaduna North, (33%) Kaduna South, (17%) Chikun, and (12%) Igabi local government areas. Data about sourcing birds indicated that (62%) of the farmers sourced their birds through middlemen,

38% through hatcheries. In terms of flock size per production cycle, 60% of farms kept less than 500 birds, 33% had between 500–5000 birds, and 7% kept over 5000 birds per production cycle. The age distribution of birds showed that 76% of farms had birds aged 3–6 weeks, 19% had birds older than 6 weeks, and 5% had 3-week-old birds. Regarding specific flock sizes, 64% of farms kept 0–500 birds, 17% had 501–1000 birds, and 10% each kept 1001–3000 or 3001–5000 birds.

Table 1: Demographic features of respondents and farms in Kaduna metropolis

Variable	Category	Frequency (n)	Percentage (%)
Sex	Male	20	48%
	Female	22	52%
Age group (years)	<25	1	2%
	25–35	23	55%
	36–45	15	36%
	>45	3	7%
Level of Education	Tertiary	34	80%
	Secondary	4	10%
	Quranic	4	10%
Farm Location	Kaduna North	16	38%
	Kaduna South	14	33%
	Chikun	7	17%
	Igabi	5	12%
Trainings	No	16	38%
	Yes	26	62%
Bird Population per Cycle	<500	25	60%
	500–5000	14	33%
	>5000	3	7%
Age of Birds	3 weeks	2	5%
	3–6 weeks	32	76%
	>6 weeks	8	19%
Flock Size	0–500	27	64%
	501–1000	7	17%
	1001–3000	4	10%
	3001–5000	4	10%

Table 2 presents respondents' knowledge of Newcastle disease in broilers. Of the 42 respondents 32 (76%) heard of Newcastle diseases in broiler chickens, while 21 (50%) knew its cause. Outbreak of Newcastle diseases were reported in only 15 (36%) of the farms, most of the respondents 38/42 (90%) believed Newcastle diseases result in economic losses

and cause symptoms such as swollen head, sneezing, and difficulty breathing. Half of the respondents 21/42 (50%) believed Newcastle diseases affects only broiler chickens. Additionally, 36 (86%) and 37 (88%) of the broiler farmers identified contact with sick birds and airborne transmission as means of spreading the disease.

Table 2: Responses to knowledge questions about Newcastle disease in broiler chickens

Knowledge items	Responses	Number	Frequency (%)
1. Have you ever heard of Newcastle diseases in broiler chickens before	Yes	32	76
	No	10	24
2. Do you know what causes Newcastle diseases in broiler chickens?	Yes	21	50
	No	21	50
3. Has there ever been an outbreak of Newcastle disease in the farm?	Yes	15	36
	No	27	64
4. Does Newcastle disease cause swollen head, sneezing and difficult breathing in birds?	Yes	37	88
	No	5	12
5. Does Newcastle disease cause the farmer economic losses?	Yes	38	90
	No	4	10
6. Does Newcastle disease affect only chickens?	Yes	21	50
	No	21	50
7. Does Air aid in the transmission of Newcastle disease?	Yes	37	88
	No	5	12
8. Newcastle disease is spread through direct contact between healthy birds and the bodily discharges of infected birds?	Yes	36	86
	No	6	14

Table 3 summarizes respondents' attitudes toward Newcastle diseases in broilers chickens. During outbreaks, 34 (81%) seek veterinary assistance, and 17 (41%) believe Newcastle diseases occur frequently. Most respondents 38 (91%) use antibiotics for treatment of Newcastle infections, while 31 (74%) reported recurrence of Newcastle infections after treatment. Only 2 (5%) of the respondents vaccinate

against specific Newcastle disease, even though 39 (93%) vaccinate against Newcastle disease. Disinfection of instruments used on sick birds is practiced by about 36 (86%) of the respondents. Regarding dead bird disposal, 22 (52%) of respondents discard carcasses with garbage, while 24 (57%) use incineration or burial. About 39 (93%) of the respondents disinfect their pen after disposal.

Table 3: Attitude of broiler farmers towards Newcastle disease

Attitude items	Responses	Number	Frequency (%)
1. Do you seek veterinary assistance during an outbreak?	Yes	34	81
	No	8	19
2. Does Newcastle disease occur frequently?	Yes	17	41

	No	25	59
3. Do you use antibiotics for the treatment of Newcastle infections?	Yes	38	91
	No	4	10
4. Does the infection re-occur after treatment?	Yes	38	91
	No	4	10
	Yes	2	5
5. Is Lasota vaccine effective protection against Newcastle disease?	No	40	95
6. Do you vaccinate against Newcastle disease (NCD)?	Yes	39	93
	No	3	14
7. Do you disinfect instruments used on sick birds?	Yes	36	86
	No	6	14
8. If there are mortalities, do you dispose your dead birds together with garbage on the farm?	Yes	22	52
	No	20	48
9. Do you incinerate or bury dead birds if there are mortalities?	Yes	24	57
	No	18	43
10. Do you disinfect pens after the birds have been disposed?	Yes	39	93
	No	3	7

As shown in Table 4. 25 (60%) respondents' rear birds of varying types and ages, while only 14 (33%) prevent access to rodents and other animals. Although 38 (90%) of the respondents fence their farms, only 31 (74%) and 20 (48%) allow wild birds and visitors respectively into their farms. Only 21% of the respondents restrict visitor's vehicle from entry into the farm. The biosecurity measure use of foot dips at farm and pen entries is practiced by 25 (60%) of the

respondents, while only 15 (36%) disinfect vehicles coming into the farm. Dedicated farm clothing and hand washing after bird handling are practiced by 28 (67%) and 38 (90%) of the respondents respectively. Equipment disinfection is a routine practice for 34 (81%) of the broiler farmers, while 32 (76%) of the respondents do not share farm equipment with others farms.

Table 4: Practice of broiler farmers towards Newcastle disease.

Practice items	Responses	Number	Frequency (%)
1. Are birds of different types and ages reared in your farm?	Yes	25	60
	No	17	40
2. Do you allow animals or rodents have access to the premises of the farm?	Yes	28	67
	No	14	33
3. Is the farm fenced?	Yes	38	91
	No	4	10
4. Are wild birds seen in the farm premises?	Yes	31	74
	No	11	26
5. Are visitors allowed entry into the farm?	Yes	22	52
	No	20	48
6. Are visitors' vehicles allowed into the farm premises?	Yes	33	79
	No	9	21
7. Are vehicles disinfected before entry into the farm?	Yes	15	36
	No	27	64

8. Are there dips at the entrance of the farm and pens?	Yes	25	60
	No	17	40
10. Do you use farm clothing while on the farm?	Yes	28	67
	No	14	33
10. Do you wash your hands before and after handling the birds?	Yes	38	91
	No	4	10
11. Are your farm equipment routinely washed and disinfected?	Yes	34	81
	No	8	19
12. Do you borrow any equipment for use in your farm?	Yes	10	24
	No	32	76

Tables 5, 6 and 7 Shows the analysis of KAP scores revealing gender-based differences, with females exhibiting slightly better knowledge (86% vs. 75%) and more consistent positive attitudes (100% vs. 90%) compared to males. However, the males showed slightly better practice scores (75% vs. 59%). Knowledge varied across age groups, with the highest scores among respondents >45 years (100%) and 25–35 years (83%). Attitude scores were high across all age groups but slightly lower in the 36–45 age group. Practice scores were generally consistent, though more variation was observed among middle-aged respondents. Based on their level of education, all respondents with Quranic and secondary education had good knowledge and attitude scores, whereas variability was observed among tertiary-educated respondents. Practice scores were highest among secondary school respondents (100%), followed by tertiary (65%) and Quranic (25%). Farm location analysis showed highest knowledge levels in Kaduna North (88%) and Chikun (86%), while attitudes were strong across all areas. Practice scores were highest in Igabi (100%) and Chikun (71%).

Table 5: Cross tabulations and association between respondent’s demographics to Respondent’s Knowledge

Characteristics	Knowledge			Chi Square <i>p</i> -Value	
	Good	Fair	Poor		
Sex	Female (22)	19 (86%)	2 (9%)	1 (5%)	0.546
	Male (20)	15 (75%)	4(20%)	1 (5%)	
	Total (42)				
Age	<25 (1)	0 (0%)	0(%)	1(100%)	0.001*
	26-35 (24)	20 (83%)	4(17%)	0(0%)	
	36-45 (14)	11 (79%)	2(14%)	1 (7%)	
	> 45 (3)	3 (100%)	0 (%)	0 (%)	
	Total (42)				
Level of Education	Quranic (4)	4 (100%)	0 (%)	0 (%)	0.661
	Secondary(4)	4 (100%)	0 (%)	0 (%)	
	Tertiary (34)	26 (77%)	6(18%)	2 (6%)	
	Total (42)				
Farm Location and L.G.A	Kaduna				0.508
	North (17)	15 (88%)	1 (6%)	1 (6%)	
	Kaduna				
	South (13)	10 (77%)	3(23%)	0 (%)	
	Chikun (7)	6 (86%)	1(14%)	0 (%)	
	Igabi (5)	3 (60%)	1(20%)	1 (20%)	
	Total (42)				

Pearson’s Chi-square test showed that only age had a statistically significant association with knowledge ($p = 0.001$), while sex, education, and location had no significant effect on KAP outcomes.

Table 6: Cross tabulations and association between respondents’ demographics and Attitude

Characteristics		Attitude			Chi Square p-Value
		Good	Fair	Poor	
Sex	Female (22)	22 (100%)	0(0%)	0 (0%)	0.669
	Male (20)	18 (90%)	1(5%)	1 (5%)	
	Total(42)				
Age	<25 (1)	1 (100%)	0 (0%)	0 (0%)	0.973
	26-35 (24)	24 (100%)	0 (0%)	0 (0%)	
	36-45 (14)	12 (86%)	1(7%)	1 (7%)	
	> 45 (3)	3 (100%)	0 (%)	0 (%)	
	Total (42)				
Level of Education	Quranic (4)	4 (100%)	0 (%)	0 (%)	0.709
	Secondary(4)	4 (100%)	0 (%)	0 (%)	
	Tertiary (34)	32 (94%)	1 (3%)	1 (3%)	
	Total(42)				
Farm Location and L.G.A	Kaduna North (17)	16 (94%)	0 (%)	1(6%)	
	Kaduna South (13)	12 (92%)	1 (8%)	0 (%)	
	Chikun (7)	7 (100%)	0 (%)	0 (%)	
	Igabi (5)	5 (100%)	0 (%)	0 (%)	
	Total(42)				

Table 7: Cross tabulations and association between respondent’s demographics to practices.

Characteristics		Good	Practice		Chi Square p-Value
			Fair	Poor	
Sex	Female (22)	13 (59%)	8(36%)	1(5%)	0.561
	Male (20)	15 (75%)	4 (20%)	1 (5%)	
	Total (42)				
Age	<25 (1)	1 (100)	0 (%)	0 (%)	0.990
	26-35 (24)	16 (67%)	7 (29%)	1(4%)	
	36-45 (14)	9 (64%)	4 (29%)	1 (7%)	
	> 45 (3)	2 (67%)	1 (33%)	0 (%)	
	Total (42)				
Level of Education	Quranic (4)	1 (25%)	3 (75%)	0 (%)	
	Secondary (4)	4 (100%)	0 (%)	0 (%)	
	Tertiary (34)	23(68%)	9(27%)	2 (6%)	
	Total (42)				
Farm location and L.G.A	Kaduna North(17)	10 (59%)	7 (41%)	0 (%)	0.336
	Kaduna South(13)	8 (62%)	4 (31%)	1(8%)	
	Chikun (7)	5 (72%)	1 (14%)	1(14%)	
	Igabi (5)	5 (100%)	0 (%)	0 (%)	
	Total (42)				

DISCUSSION

In this study, the sex distribution is almost similar, with 48% and 52% males and females respectively, which implies that both men and women are equally in charge of livestock activities, including chicken-raising activities. This is contrary to the study of Mera and Adenrele, [9] where majority (80%) of the farmers are males, and the study of Chilufya *et al.*, [9] in Lusaka West, Zambia, where majority (71.1%) of the respondents are also males. This is because most of the women in the study area engaged in rearing small ruminants, while males engaged in cattle and poultry production, contrary to this study where females are competing with males in poultry production due to economic hardship [9]. However, some reports showed that poultry industry in rural areas is largely controlled by women and children as they own or manage the rural poultry [11]. The present study found the mean age to be 35 years old. The implication is that people take up farming in their early 30s as a means of diversifying their sources of income [12].

This study revealed that (80%) of the respondent had tertiary education, which is an indication that farmers with higher education levels generally have greater awareness, better access to information, and use more scientific approach in farming, making them more likely to adopt vaccination practices [13]. In contrast, less educated farmers may face challenges related to limited knowledge, access to resources, and openness to new practices, which can affect their willingness and ability to vaccinate and manage their poultry. This finding is in line with previous studies in Ethiopia, Tanzania and Kenya and [13, 14, 15]. Thus, improving farmers' education levels can increase their understanding and adoption of vaccination practices, resulting in healthier poultry flocks and stable agricultural communities.

The present study revealed that more than half, 25 (62%) had training's related to poultry production which is contrary to the study of [10] who observed a limited access to training related to poultry production. Training focused on disease management, chicken health, and overall management practices, which are critical for enhancing chicken production. The availability of such training's often leads to the adoption of optimal practices, resulting in effective disease outbreaks containment.

Majority 32(76%) of the farmers in this study are aware of Newcastle disease. This observation points to the fact that Newcastle disease is indeed of great economic importance as it is said to be enzootic in Nigeria and also said to be a major disease problem of poultry in many other countries of the world, especially in Africa and Asia [15, 16]. In this study majority (86%) of the respondent knew that Newcastle disease is spread through direct contact between healthy birds and the bodily discharges of infected birds. This is similar to the study of Ashraf

[18] in Pakistan which found that the majority (78%) of the farmers were aware that Newcastle disease transmission was primarily through direct contact between healthy and infected birds, through droppings and secretions from the nose, mouth and eyes of infected birds.

In this study there was no association (p -value=0.973) between knowledge and attitudes, which is contrary to the study [10] which established a strong association between knowledge and attitudes, with a chi-square value of 23.496 and a p -value of 0.003. The result of this study revealed that 34(81%) of the farmers seek veterinary attention when the need arises which is similar to (73.8%) the study of Mera and Adenrele [9] in Sokoto- Nigeria, and higher than 8 (57.1%) the study of Okwara [19] where farmers affirmed to their frequent patronage of veterinary services. In this study majority (95%) of the farmers believe that LaSota vaccines are not effective in protection against Newcastle disease, which is contrary to the studies by Chilufa *et al.*, and Kiswaga [10, 20]; in Lusaka West, Zambia and Manyoni District, Tanzania, where (52%) and (81%) of the respondents respectively believe that LaSota vaccines are effective in protection against Newcastle disease. The finding of this study could be attributed to the levels of education of the poultry farmers and supported by a chi-square tabulation, which indicated that the p -value was 0.661 indicating a weak association between knowledge and experience, even though majority (80%) had tertiary level of education.

The present study revealed that (57%) of the farmers incinerate or bury dead birds which is consistent with a study conducted in Uganda, which found that nearly half (42%) of the respondents disposed of their dead birds by burning, as compared to the study conducted in Khartoum State, Sudan, which found that only 7% of the farmers disposed of their dead birds properly [21, 22]. This implies that good knowledge and attitude of the poultry farmers may influence certain practices regarding Newcastle disease prevention such as appropriate disposal of dead poultry.

The result of this study revealed that (60%) and (90%) of the farmers practice good biosecurity by putting dips at the entrance of the farm and pens and wash their hands before and after handling the birds respectively, which is similar to the study of [10] where the respondent implemented biosecurity measures, such as the provision of foot baths at the entrance of poultry farms, as well as, cleaning and disinfection of poultry houses. But majority (86%) of the respondent in this study failed to disinfected vehicles before entry into the farm, this poor biosecurity practice is in consistent with the findings of the study of Abdu and Assam, [17] in Benue State, Nigeria which revealed that poultry farmers' biosecurity practices were poor [22]. The disparity in the findings of these studies may suggest that the levels of knowledge on Newcastle disease

may be low in some regions due to a lack of training and awareness of poultry farmers on biosecurity practices, and the lack of enforcement and monitoring of these practices on the farms.

CONCLUSION

In conclusion, the study revealed that the majority (80.5%) of the broiler farmers within Kaduna metropolis had good knowledge of Newcastle disease infection, (95.1%) had a good attitude towards the infection, and (65.9%) utilized good practices to ward off the infection. The study recommends implementing comprehensive educational programs, promoting vaccination, enhancing biosecurity measures, and ensuring access to veterinary services. These interventions should focus on increasing awareness of Newcastle disease, its prevention through vaccination and biosecurity, and the importance of timely veterinary intervention.

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