



Knowledge and attitude of poultry farmers towards biosecurity against zoonotic avian influenza H5N1 in Kaduna state, Nigeria

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ABSTRACT

The reported outbreak of Avian Influenza (H5N1) in August through September, 2015 prompted this cross-sectional study carried out between February and April, 2016. The study sought to appraise the knowledge and attitude of poultry farmers in Kaduna State, Nigeria, regarding biosecurity against Avian Influenza. A total of 112 poultry farmers randomly selected from two of the three sensational zones in the state were interviewed using a pre-tested structured questionnaire. Primary data generated were analyzed using both descriptive and inferential statistics. The socio-economic characteristics of the respondents revealed a mean age of 39.5 years, predominance of male farmers and a reasonably high level of educational attainment. Majority of the respondents (58.0%) were small scale operators; 30.4% medium scale and 11.6% large scale. The level of awareness of disease was found to be high (86.6%), while only 38.4% had knowledge of the cause and nature (clinical signs) of infection. Results also revealed poor observance of biosecurity measures (BSMs) among the respondents. The regression analysis of socio-economic variables showed that only educational status and flock size significantly influenced adoption of BSMs. Constraints limiting strict compliance with BSMs were identified, and recommendations aimed at enhancing biosecurity against H5N1 were proffered.

Contribution/ Originality

This article contributes to (a) ascertaining the level of awareness of Biosecurity measures (BSMs), (b) identifying socio-economic factors that significantly influence the adoption of BSMs and (c) proffering vistas for increasing awareness and knowledge of BSMs.

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1. INTRODUCTION

There is no gainsaying the fact that Nigeria with a population of about 165 million (NPC, 2006) is grossly undersupplied with essential food components, notably animal protein. According to Odedire and Abegunle (2015), low supply and high cost of animal protein such as beef, pork, mutton, chevon, poultry, eggs and milk have brought about an acute shortage of animal protein in the diet of most Nigerians. Many have argued that the poultry industry holds the key to bridging the supply gap in high quality animal protein intake.

No doubt, the Nigerian poultry industry has come of age and commands recognition as a viable sub-sector of the agricultural economy in Nigeria. Invariably, poultry farming is the most popular livestock enterprise adopted by small and medium scale farmers in both rural and urban areas of Nigeria (Idowu *et al.*, 2005; Afolayan *et al.*, 2014). According to Ozoedu *et al.* (2015), poultry production represents the fastest means of correcting the shortage of animal protein intake, because poultry has the best efficiency of nutrient transformation into high quality animal protein.

However, sight must not be lost of the fact that the poultry industry, promising as it seems, has been bedevilled with a myriad of daunting challenges with mitigating consequences. Notable among these challenges is the Avian Influenza H5N1 popularly known as Bird Flu which was first reported in Kaduna in 2006.

The Highly Pathogenic Avian Influenza (HPAI) is a devastating virus infection of the strain H5N1 usually associated with high mortality rates which may lead to disruptions in production and trade. The disease, being zoonotic, may be transmitted from birds to humans and is a potential source of future human influenza epidemic (Thamawat *et al.*, 2004; Wakawa *et al.*, 2015). From 2003 to date, a total of 228 persons were reported to have died out of 362 persons that were infected with confirmed HPAI H5N1 worldwide (WHO, 2008). One human dead due to the disease was reported in Nigeria in January, 2007 (WHO, 2008).

As already mentioned, bird flu is very lethal, highly pathogenic and usually results in massive depopulation of poultry stocks any time there is an outbreak. The outbreaks reported in 2006 and 2007, firstly in Kaduna and subsequently in other parts of the country, took a massive toll in its wake. Saidu *et al.* (2008) estimated that over 480,000 birds were lost in four states of Kano, Kaduna, Katsina and Jigawa following the outbreak. As the poultry industry was recuperating from this onslaught after its containment in 2008, fresh outbreaks were reported in August/September, 2015. More recently in January 2016, more outbreaks have been reported in about six state including Kuje and Gwagwalada area councils in the Federal Capital Territory (FCT).

Highly pathogenic and devastating as bird flu is, it is gratifying to note that the disease is preventable and can be controlled and contained. According to FAO (2008), the HPAI, like any disease that spreads primarily through human activities, is susceptible to biosecurity measures (BSM) along the production and marketing chain. It is this that makes biosecurity an important tool for the control and eradication of H5N1 HPAI. In fact, regarding the 2015 outbreaks, the Poultry Site News Desk of August 19, 2015 had this to say: “The disease report to the World Organization of Animal Health (OIE) commented that the one farm and three backyard operations involved displayed poor biosecurity”.

Given that the 2006/2007 outbreaks of bird flu took everybody off guard, being the first time, why are we having resurgent outbreaks in recent months? Are Nigerian poultry farmers aware and knowledgeable of biosecurity measures (BSMs) that must be put in place to keep the disease in check? These questions coupled with the apparent dearth of information on the subject have made this study an imperative. The specific objectives of the study are to:

- i. Describe the socio-economic characteristics of poultry farmers in the area of study
- ii. Ascertain the level of awareness and knowledge capacity of the respondent about bird flu.
- iii. Determine the factors that influence the adoption of biosecurity measures by the farmers.
- iv. Identify the constraints that mitigate the adoption of biosecurity measures by the farmers.

1.1. Sampling procedure and data collection

The study was carried out in Kaduna State in the North western geopolitical zone of Nigeria. The state has 23 Local Government Areas with Kaduna as the State capital. With a population of over 9 million people (NPC, 2006). Kaduna State is bordered to the North by Katsina State, to the east by Kano State and Niger State to the South (figure, 1).

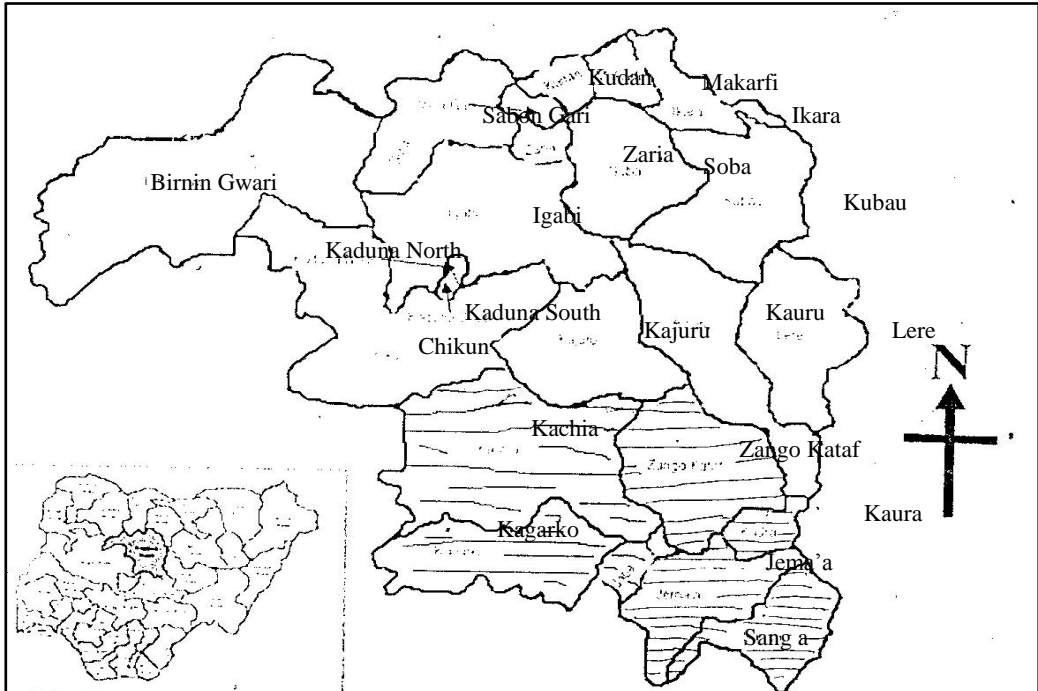


Figure 1: Map of Nigeria showing Kaduna State and the area of study (unmarked)

A cross-sectional survey of small, medium and large scale poultry farmers in Kaduna North and Kaduna Central Senatorial districts of the state was carried out using a structured questionnaire and involving 120 randomly selected farmers. At the end of the exercise 112 questionnaire were duly completed and constituted the sample size for the study. Data generated were analyzed using descriptive statistics and linear regression analysis. A 4-point Likert-type scale was used to appraise the attitude and compliance with BSMs. The scales are: strongly agree and strictly observed (SASO =4), Agree and Observed (AO=3), Disagree but observed sometimes (DOS=2) and strongly disagree and not observed (SDNO=1).

2. RESULTS AND DISCUSSION

Results of the study are discussed under the following sub-headings:

2.1. Socio-economic characteristics of poultry farmers

Socio-economic characteristics of the poultry farmers examined include age, gender, education status, farming experience, farm/flock size and extension/veterinary contact.

Table 1: Distribution of poultry farmers based on socio-economic characteristics

Characteristics	Frequency (n=112)	Percentage
Age		
15-24 years	7	6.3
25-34 years	26	23.2
35-44 years	48	42.8
45-54 years	22	19.6
55-64 years	9	8
Mean	39.5 years	
Gender		
Female	50	44.6
Male	62	55.4
Educational status		
Primary education	17	15.2
Secondary education	32	28.6
OND/NCE	35	31.3
HND/B.Sc./PGD/M.Sc. Ph.D	21	18.8
Farming Experience		
<5 years	12	10.7
6-10 years	27	24
11-15 years	44	39.3
>16 years	29	36

Source: Field survey (2015)

Result in table 1 showed that the mean age of the respondents was 39.5 years, with over 65% of them aged between 25 and 44 years. There were more males (55.4%) than females (44.6%) in the sample and the educational attainment of the respondents could be adjudged as reasonably high. Over 63% of the poultry farmers had put in between 5 and 15 years in the business of keeping poultry. Based on the farm/flock size, the distribution of the respondents is as shown in table 2.

Table 2: Distribution of respondents based on flock size

Category/flock size	Frequency	Percentage
SS:<1000 birds	65	58.0
MS 1000-2500 birds	34	30.4
LS>2500 birds	13	11.6
Total	112	100

Source: Field survey (2015)

Note: SS = Small scale MS= Medium scale LS = Large Scale

Majority (50%) of the poultry farmers in the sample were small scale operators, 30.4% were medium scale while only 11.6% fell into the large scale category. Contact with extension/veterinary agent was recorded as generally poor because only 17.8% of the farmers claimed to have contact quarterly, 22.3% once in six months and 49.1% once a year. Zero scores were recorded for 'once a month' and 'twice a month' while 10.7% indicated they hardly made any contacts. These observations were consistent with the findings of [Ezeh et al. \(2015\)](#) on information seeking behavior of poultry farmers where the number of those who sought veterinary advice was dismal.

2.2. Awareness and knowledge of Bird flu by Respondents

The study sought to ascertain the level of awareness and knowledge of cause and nature of disease among the farmers.

Table 3: Distribution of poultry farmers based on level of awareness and knowledge of bird flu

Response	Awareness of bird flu (H5N1) Disease	Knowledge of cause and nature (clinical signs) of disease
Yes	97 (86.6)*	43 (38.4)*
No	15 (13.4)*	69 (61.6)
Total	112 (100)	112 (100)

Source: Field survey (2015)

Note: * figures in parenthesis represent percentage

The responses in table 3 indicated that a high percentage of the farmers (86.6%) were aware of the disease while only 13.4% were not. With respect to the knowledge of cause and clinical signs of bird flu, 38.4% had knowledge while 61.6% admitted not having knowledge of the cause and clinical signs of avian influenza. Apparently, poultry farmers are yet to fully understand the nature of the disease since the first outbreak in 2006. As reported by *Saidu et al. (2008)*, “the absence of H5N1 in Nigeria prior to the outbreak of January 2006 made the diagnosis difficult for both veterinarians and poultry farmers regarding the sources of information on Avian Influenza, the farmers responded as shown in table 4.

Table 4: Distribution of poultry farmers based on sources of information on avian influenza H5N1

Source of Information	Frequency	Percentage	Rank
Newspaper	41	19.7	2 nd
Extension/vet agent	22	10.6	5 th
Television (news)	57	27.4	1 st
Radio	32	15.4	3 rd
Neighbours/friends	7	3.4	7 th
Farmers/poultry association	15	7.2	6 th
Subscribed newsletter/journals	6	2.8	8 th
Internet	28	13.5	4 th
Total	208*	100	-

Source: Field survey (2015)

Note: * multiple responses

Results in table 4 indicate that television was the most popular source of information on HPAI among the respondents followed by newspapers and radio in that order. Internet, extension/vet agent ranked 4th and 5th respectively. Only 3.4% and 2.8% of the respondents got their information through neighbours/friends and subscribed newsletters/journals respectively. Evidently, the importance of television, newspapers, radio and internet as information sources relate to the literacy status of most of the poultry farmers in the sample. It is also evident that if these sources were pivotal to creating awareness, they do not seem to have done much in enhancing knowledge about the cause and nature of the disease.

2.3. Attitude and observance of biosecurity measures (BSMs)

The attitude of the poultry farmers and their strict observance of key biosecurity measures against bird flu (*FAO, 2008; Gov. UK, 2014*) were appraised as shown in table 5 using the 4-point Likert-type scale already explained in the methodology.

Table 5: Attitude and observance of biosecurity measures by poultry farmers

S/N	Biosecurity Item	SASO F (%)	AO F (%)	DSO F (%)	SDNO F (%)	Σx	\bar{x}
1	Always remain vigilant for signs of disease	29 (25.9)	34(30.4)	27(24.1)	22(19.6)	294	2.62**
2	Register poultry farm with a Vet clinic	21 (18.8)	31(27.7)	35(31.3)	25 (22.3)	272	3.43
3	Seek prompt attention of a Vet when there are concerns	27 (24.1)	31(27.5)	28(25.0)	26(23.2)	283	2.53**
4	Cleansing and disinfecting protective clothes footwear, vehicles, equipment before and after contact with poultry	15 (13.4)	29(25.9)	34(30.4)	34(30.4)	249	2.22
5	Reduce movement of people, vehicles and equipment from and into areas where birds are	31 (27.7)	39(34.8)	25(22.3)	17(15.2)	304	2.75**
6	Thoroughly cleansing and disinfecting housing at the end of a cycle	47 (42.0)	36(32.1)	23(20.5)	6 (5.4)	348	3.11**
7	Avoiding contact between poultry and wild birds	21 (18.8)	26(23.2)	36(32.1)	29(25.9)	263	2.3
8	Always maintaining clean surroundings around poultry pens	30 (26.8)	36(32.1)	24(21.4)	22(19.6)	298	2.66**
9	Not recycling egg trays from and into poultry farms	11(9.8)	20(17.9)	32(28.6)	49 (43.8)	217	1.94
10	Do not introduce old birds from other farms e.g. at point- of- lay	25 (22.3)	31(27.7)	31(27.7)	27 (24.1)	278	2.48

Source: Field survey (2015)

Note: * figures in parenthesis represent percentages **mean (\bar{x}) ≥ 2.5

Results shown in table 5 indicate that only five of the key biosecurity measures examined had means of 2.5 and above implying reasonable observance of biosecurity measures. These biosecurity items with positive compliance had means ranging from 2.53 for item (3) to 3.11 for item (6). A look at the poorly observed BSMs indicated poor compliance with critical issues which are key to preventing and controlling bird flu e.g. items 7, 9 and 10. While wild birds are known as the primary carriers of the bird flu virus (FAO, 2008), the recycling of egg trays from and into poultry farms portends great danger. The markets where the eggs/trays are carried to are same markets where already infected birds are sold to minimize losses. With respect to the introduction of old birds (item 10), Wakawa *et al.*, (2008) reported that the introduction of new birds (without history of health status) into an already existing flock was probably responsible for the outbreaks in two of the cases reviewed in Zaria. Also, Saidu *et al.* (2008) reported that the farm from which bird flu was first suspected and later diagnosed in Kaduna State had purchased some point- of- lay pullets from several farms in Kano prior to the outbreak of AI in the farm.

2.4. Socio-economic factors influencing observance of biosecurity measures

Linear regression was run against the socio-economic characteristics examined in the study to determine those that influenced the adoption of biosecurity measures by the poultry farmers.

Table 6: Regression coefficients of socio-economic characteristics influencing the adoption of biosecurity measures

Socio economic variable	Coefficient	t-value	Remarks
Age	-077	-636	NS
Gender	-010	-115	NS
Educational status	0.217	2.018	*
Farming experience	0.011	-142	NS
Farm/flock size	119	1.120	*
Extension/vet contact	-0.192	-2.394	NS

Source: Field survey (2015)

Note: * significant at $P < 0.05$

NS not significant

The regression analysis results showed that only two variables education status ($r = 0.217$) and flock size ($r = 0.119$) were statistically significant at $P < 0.05$ level. Age, gender, farming experience and extension/vet contact did not significantly influence the observance of biosecurity measures by the respondents.

2.5. Constraints limiting the observance of biosecurity measures

Table 7: Constraints limiting the strict observance of biosecurity measures

Constraints	Frequency	Percentage	Ranking
1. Poor knowledge of biosecurity measures	65	15	2 nd
2. Measures are laborious and time consuming	57	13.1	5 th
3. Difficult to access/contact Vet in the area	54	12.4	6 th
4. High cost implications	78	18	1 st
5. Few hands/labourers on the farm	63	14.5	3 rd
6. Technical nature of biosecurity measures	28	6.4	8 th
7. Nonchalant attitude/carelessness	32	7.4	7 th
8. Poor/advocacy/sensitization on bird flu	58	13.3	4 th
Total	435*	100	-

Source: Field survey (2015)

Note: *Multiple responses

Result in table 7 indicates that major constraints identified in order of ranking, include high cost implications, poor knowledge of BSM, and few hands on the farm. Poor advocacy/sensitization on disease and the laborious/time consuming nature of BSM ranked 4th and 5th respectively. Apparently, accessing a Vet, technical nature of BSM and careless attitude (6th, 7th and 8th) did not seem to bother the farmers much. It is important to relate the low ranking of accessing a vet to the poor perception of the respondents regarding the place of Vet. In the effective observance of biosecurity measures. Again, this corroborates the findings of [Ezeh et al. \(2015\)](#) in their study on the information seeking behaviour of poultry farmers in Zaria and environs.

3. CONCLUSION AND RECOMMENDATIONS

Highly pathogenic and devastating as avian influenza is, it is gratifying that the disease can be prevented and controlled. The findings here indicate that while majority of poultry farmers

(86.6%) were aware of the disease, knowledge of the clinical signs as well as biosecurity measure were found to be generally poor ‘Knowledge is power’ and in this matter is very crucial to helping the farmers save the huge investments they have made in the business. The following recommendations are proffered with a view to enhancing knowledge and forestalling further outbreaks of HPAI.

- i. Being pro-active and embarking on a sustained surveillance to help nip outbreaks in the bud.
- ii. More diagnostic centers are required for rapid diagnosis of suspected cases and necessary action. The national Veterinary Research Institute (NVRI), Vom and few Veterinary Teaching Hospitals that are capable are far flung from most poultry farms in Nigeria,
- iii. Stronger synergies between agencies and stakeholders for impactful intervention.
- iv. More advocacy and sensitization is required to enhance knowledge of both clinical signs of disease (H5N1) and Biosecurity Measures.

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References

- Afolayan, M., Bawa, G. S., Sekoni, A. A., Abeke, F. O., & Daramola, S. T. (2014). Effect of inclusion level of African Locust Bean (*Parkia biglobosa*) pulp in growth parameters of Egg type chicken. (0-20 weeks) *Nig. J. of An. Sc.*, 16(1), 51-60. [view at Google scholar](#)
- Ezeh, C. C., Nalado, A. M., & Ezeh, O. H. (2015). *Information seeking behavior of poultry farmers in Zaria and environs*. Proceedings of the 40th Annual Conference of NSAP, Zaria. Pp. 233-236.
- FAO (2008). *Biosecurity for highly pathogenic avian influenza: Issues and options*. FAO Animal and Animal Production and Health Paper No. 165. [HHP/www.fao.org/docrep/011/.../i035e00.ht](http://www.fao.org/docrep/011/.../i035e00.ht).
- Gov. UK. (2014). *Avian influenza (Bird flu): Biosecurity guidance*. In notifiable diseases in animal and animal and plant health [from <http://www.gov.uk/.../avian-influenza-biosecurity>].
- Idowu, O. M., Bamgbose, A. M., Jeseke, A. U., Suce, A., & Erubetine, D. (2005). *Effect of sievette on performance and quality characteristics of laying hens*. Proc. of 8th Annual Conf. of Animal Science Association of Nigerian (ASAN) Pp. 12-15.
- NPC-National Population Commission (2006). *Populations Census of the Federal Republic of Nigeria*. Census Report, Abuja, Nigeria.
- Odedire, J. A., & Abegunde, J. O. (2015). Exploitation of unconventional protein sources in the feed of weaner Rabbits (*Oryctolagus cuniculus* Linn). *Nigerian Journal of Animal Production*, 42(1), 93-99. [view at Google scholar](#)
- Ozoedu, E, Eseonu, B. O., & Emanalom, O. O. (2015). Performance of starting broiler chicks on Sandbox (*Hura crepitans*). Seed meal. *Nig. J. of An. Prod.* 42(1), 79-84. [view at Google scholar](#)
- Poultry Site News Desk (2015). *Four more outbreaks of HPAI in Nigeria*. Wed. 19th August, 2015. [from <http://www.sm.thepoultrysite.com/news/356297>].
- Saidu, L., Wakawa, A. M., Abdu, P. A., Adene, D. F. Kazeem, H. M, Ladan, K., Abdu, M., Miko, R. B., Fatihu, M. Y., Adamu, J., & Mamman, P. H. (2008). Impact of Avian Influenza in some States of Nigeria. *Int. J. of Poultry Sc.*, 9, 913-916. [view at Google scholar](#)
- Thamawat, I., Prasit, J., Thaweesak, S. A., Arunee, C., Worongorong, H., Mirayan, N., & Arjan, B. (2004). Highly pathogenic avian influenza H5N1, Thailand, 2004. *Emerging Infectious Diseases*, 1(1), 1664-1800. [view at Google scholar](#)

- Wakawa, A. M., Saidu, L., Abdu, P. A., & Joannis, T. M. (2008). Review of highly pathogenic avian influenza outbreaks in poultry in Zaria, Nigeria. *Sokoto J. of Vet. Sc.*, 7(1), 1-4. [view at Google scholar](#)
- WHO Commission on Social Determinants of Health, & World Health Organization. (2008). *Closing the gap in a generation: health equity through action on the social determinants of health: Commission on Social Determinants of Health final report*. World Health Organization. [view at Google scholar](#) / [view at publisher](#)