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Community awareness of bird flu and the practice of backyard poultry in a North-Central State of Nigeria

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Key words

Bird flu • Avian influenza • Backyard poultry • Poultry practices

Summary

Introduction. *The practice of backyard poultry is a very common practice in many homes in Nigeria. Birds raised at home are usually free ranged, which increases close contact between man and birds, thus increasing the risk of transmission of avian influenza virus to man. This study investigated the awareness of bird flu infection and identifies risk factors associated with the practice of backyard/free ranged poultry among the residents of a state in Northern Nigeria.*

Methods. *This cross-sectional study was carried out in Kwara State using 130 wards selected through cluster sampling technique. Households in each ward were sampled through systematic random sampling technique using the primary health care house numbering register. Semi-structured questionnaire was used to generate relevant information through interview and 650 participants consented and were used for the study.*

Results. *Most of the respondents 604 (92.9%) kept birds in their homes and one-third 204 (33.8%) of this group knew that infection*

from birds can be transmitted to man. However, less than a third 186 (30.8%) of those who keep birds were aware of avian influenza (AI) infection. Out of the 186 respondents, 78 (41.9%) had experienced massive bird deaths in the preceding year prior to the interview. Less than half 81 (43.5%) were willing to report AI or massive deaths occurring in flocks of their birds to designated officers / authority. During outbreaks with massive deaths in birds some of the respondents sold infected live birds 45 (57.7%), few slaughtered and dressed the birds before sale 11 (14.1%), while some slaughtered and consumed the birds in their families 19 (24.4%).

Conclusion. *The practice of backyard poultry is very high with little knowledge and awareness of mechanism and risk of infection associated with it. This was also reflected in their attitude towards reporting of outbreaks in birds. Public awareness campaign and home visit by environmental and veterinary officers are important strategies that can prevent AI infection transmission among domestic birds and man.*

Introduction

Avian influenza, or “bird flu”, is a contagious disease of animals caused by viruses that normally infect only birds and, less commonly, pigs. Avian influenza viruses (AIVs) are highly species-specific, but have, on rare occasions, crossed the species barrier to infect humans [1]. In poultry, infection with AIVs causes two main forms of disease, distinguished by low and high extremes of virulence. The so-called “low pathogenic” form commonly causes mild symptoms (ruffled feathers, a drop in egg production) and may easily go undetected. The highly pathogenic form is far more dramatic. It spreads very rapidly through poultry flocks, causes disease affecting multiple internal organs, and has a mortality that can approach 100%, often within 48 hours [1, 2].

Bird flu is caused by 15 subtypes of the avian influenza A virus. Viruses of low pathogenicity can, after circulation for some time in a poultry population, mutate into highly pathogenic viruses. Current outbreaks of highly pathogenic form have been caused by influenza A/H5N1 virus [3]. The outbreak of highly pathogenic avian influenza (HPA1) H5N1 virus, which started in late 2003, has resulted in the death of over 140 million poultry, at least

92 human fatalities, and is estimated to have cost the Asian poultry industry about US \$10 billion [4, 5].

There is widespread concern that this virus could give rise to a global human pandemic. Wild birds are considered to be the natural reservoirs of AIV and the Anatidae (in particular ducks), many of which are long distance migrants, generally have a higher incidence of infection than other birds. There has been extensive speculation regarding the role of wild birds in the spread of H5N1 from the original source of infection (Southern China, and South East Asia across Eurasia) and into Africa [6]. The transportation of infected chickens across borders, both legally and illegally, as well as government inactivity despite mounting evidence of avian flu outbreaks are important factors that led to the widespread of the virus in developing countries [7, 8].

Sub-Saharan countries have weak public health and veterinary facilities and are ill-equipped to deal with any crisis involving bird flu [6]. This was confirmed by the late Director General of the World Health Organization (WHO), Lee Jong-Wook, who once said: “African health systems are still struggling to cope with children and adults suffering from HIV/AIDS, tuberculosis, malaria, respiratory infections and other infectious conditions;

human cases of H5N1 may be difficult to distinguish from other illnesses” [8]. Nigeria had first outbreak of AIV in Kaduna State in February 2006. After this, there were several reported outbreaks in 18 out of the 36 states of the federation and these outbreaks have resulted in deaths and destruction of hundreds of chickens in Nigeria [5, 7]. These have caused huge financial losses and economic hardship to owners of the poultry farms.

The scale of outbreak in birds in Nigeria is not fully known because most investigations have followed poultry deaths on large scale commercial farms, where outbreaks are highly visible. Little is known about the presence of the virus in small backyard flocks and small scale poultry marketers where the greatest risk of human exposures and infection resides. The continuous circulation of the virus in birds constitutes constant threat of sporadic human cases. Most human cases have occurred in rural and peri-urban areas where households keep small backyard flocks which allow close and continuing human exposure to virus from infected birds [9, 10].

The practice of backyard poultry is very common and most households raise different kinds of birds for economic and other purposes. Also, birds are raised at home as free rangers, which increase close contact with infected birds. All these increase the risk of transmission of the virus from birds to humans [7]. Many Africans are familiar with Newcastle disease, a poultry infection that has no effect on humans, but they are unaware of the risk of transmission from birds to humans of bird flu and therefore do not take precaution, nor use or adopt protective measures [5]. This study was conducted to determine the awareness of bird flu infection and identify risk factors associated with the practice of backyard/free range bird keeping practices among the residents of Kwara, a state in the northern central region of Nigeria.

Methodology

The study was carried out in Kwara state which has a land area of about 32,500km² and is located within the North central zone of Nigeria. The state is one the 19 states that constituted northern region of Nigeria where outbreaks of avian influenza (AI) infection in birds were detected. It has a long international border with the Republic of Benin along the north-western part of the state. The state has 16 local government areas (LGAs) with 193 wards and estimated total population of about 2,435,000. Cluster sampling technique was used to select two-thirds of the wards (130 wards) in the state. The total number of households in each ward was obtained from the Health Department of the LGAs while the primary health care (PHC) house numbering register was used to select studied households within the wards through a systematic random sampling technique. The LGA authorities gave letters introducing the research team to the head of selected wards and the ward focal health officers soliciting their cooperation and support. Community penetration/entry was done through ward health or development committees who had been thoroughly briefed of the objectives of the survey and the expected outcome. The research

team received the blessing of the ward heads who agreed to the conduct of the study within their territories.

Semi-structured and pre-tested questionnaires containing questions that elicited required information based on the study's objectives were administered by trained research assistants to any adult member (age 20 years and above) of the households that was seen or met in the selected households. Verbal informed consent was sought from each participant before the commencement of the interview and only those who consented were involved in the study. In all 720 respondents were contacted but only 650 consented and participated in the study. Completed questionnaires were validated manually for errors and then entered into a computer using EPI 2000 software package. Frequency distributions were generated for all important variables and data presented in tables.

Results

Six hundred and fifty (650) respondents were interviewed and their responses analyzed. The age of the respondents ranged between 21 and 67 years with a mean of 38.14 ± 4.21 years. Majority of the respondents were females [438 (67.4%)], married [462 (71.1%)] and had secondary school education [207 (31.8%)] (Tab. I). Most of the respondents [604 (92.9%)] keep birds in their homes and about half of them [308 (51%)] have been keeping birds for over 5 years. The number of birds owned or kept by the respondent ranged from 6-72 with a median number of birds kept been 26. The types of birds reared were chicken [512 (84.8%)], ducks [154 (25.5%)] and pigeon [85 (14.1%)] while the source of birds included friends/family members [114 (18.9%)], purchased locally within the state [138 (22.8%)] and hatched by existing older birds [212 (35.1%)] (Tab. II). Less than a quarter of the respondents [112 (18.5%)] allowed their birds to roam around their rooms and kitchen, [256 (42.4%)] allowed their children or wards to handle birds freely, while [164 (27.2%)] handled or cared for the birds as pets in their home. Two hundred and four (33.8%) of the respondents who keep birds, knew that infection from birds can be transmitted to man; and the mode of disease transmission from birds to man known to them were: eating of infected birds [96 (47.1%)], contact with infected birds or their droppings [71 (34.8%)] and inhalation of dust from the cage of the birds [54 (21.5%)]. The signs and symptoms of illness in birds known to the respondents and actions taken on birds and treatment given to sick birds are shown on Table III. Out of the 604 respondents keeping birds less than a third [186 (30.8%)] were aware of avian influenza infection, and the source of their awareness were radio [136 (73.1%)], television [84 (45.2%)] and health workers [34 (18.4%)]. Sign and symptoms of AI known to them are listed in Table IV. Out of the 186 respondents who knew about AI, [78 (41.9%)] had experienced massive bird deaths in the preceding year prior to the interview [22 (11.8%)], had had their birds culled while [18 (9.7%)] got compensated by the government (Tab. IV). One hundred and five respondent (56.5%) out of the 186

Tab. I. Socio demographic characteristic of respondents.

Age group (Years)	Frequency	Percent (%)
21-30	156	24.0
31-40	196	30.1
41-50	154	23.7
51-60	104	16.0
> 60	40	6.2
TOTAL	650	100.0
Marital status	Frequency	Percent (%)
Married	462	71.1
Single	84	12.9
Divorced	36	5.5
Widow	50	7.7
Separated	18	2.8
Total	650	100.0
Occupation	Frequency	Percent (%)
Unemployed	172	26.4
Trading	159	24.5
Artisans	202	31.1
Civil servants	117	18.0
Total	650	100.0
Educational status	Frequency	Percent (%)
None	162	24.9
Primary	180	27.7
Secondary	207	31.8
Post secondary	101	15.5
Total	650	100.0

respondents who had knowledge of AI were unwilling to make official reports of sudden and massive deaths or AI occurring in their birds to appropriate authority. This is because of fear of culling of birds without compensation [79 (75.2%)], believed that other birds will recover from the infection [66 (62.9%)] and lack of awareness of location of veterinary personnel or offices where official report can be made [47 (44.8%)]. However, respondents who were willing to make official reports would do so because they want their birds treated by government agency [22 (27.2%)], vaccination of unaffected birds [14 (17.3%)] and [21 (25.9%)] wanted birds culled and be compensated (Tab. IV).

The actions taken on the remaining birds by 78 respondents who had experienced sudden and massive deaths in their birds included: live sale of the birds [45 (57.7%)], slaughtering and dressing of birds for sale [11 (14.1%)], slaughtering and consuming the birds by their families [19 (24.4%)], while [21 (26.9%)] had to transfer the birds to other homes and places for safe keeping. Generally, all respondents keeping birds believed that AI infection in domestic birds can be prevented through public awareness campaign [246 (40.7%)], home visiting by environmental and veterinary officers [154 (25.5%)], free treatment for infected birds and incentive to encourage self reporting by people affected (Tab. V).

Tab. II. The practice of keeping birds among the respondents.

Duration of keeping birds (Years)	Frequency	Percent (%)
≤ 5	296	49.0
6-10	170	28.1
11-15	48	7.9
16-20	46	7.6
> 20	44	7.3
Total	604	100.0
Median duration of keeping birds = 6.2 years		
Average birds owned	Frequency	Percent (%)
≤ 20	231	38.2
21-30	118	19.5
31-40	105	17.4
41-50	62	10.3
51-60	53	8.8
> 60	35	5.8
TOTAL	604	100.0
Median number of birds owned or kept = 26		
**Types of birds kept	Frequency	Percent (%)
Chicken	512	84.8
Ducks	154	25.5
Pigeons	85	14.1
Turkey	51	8.4
**Sources of birds	Frequency	Percent (%)
Gift from Friends/Family	114	18.9
Hatched by existing older birds	212	35.1
Trapped as a stray bird	36	6.0
Purchased locally in the state	138	22.8
Purchased outside the state	72	11.9

**Multiple response (N=604)

Discussion

In January 2006, AI infection was reported in a northern state of Nigeria and this was confirmed on 7th February 2006 by the International Office of Epizootic (IOE) Reference Lab in Padova, Italy [7]. Since then several focal outbreaks in poultry farms have been recorded in 13 northern states of Nigeria including, the Federal Capital Territory. More than 2 million chickens were culled; poultry farms closed down and huge sums of money paid as compensation to poultry farmers [7]. Although only four (4) human morbidity cases and one death were recorded in the country, this figure probably represents a tip of the ice berg because of the prevailing poor reporting and incomplete data that characterized the disease surveillance and notification system in Nigeria and indeed other developing African countries [5, 7]. Rearing of birds at home is a common cultural or spiritual activity that is practiced by many communities in Nigeria and other African countries. The reasons for back-

Tab. III. Respondents knowledge of signs of disease and its management in birds.

Mode of transmission (multiple response; N = 204)	Frequency	Percent (%)
Eating infected diseased birds	96	47.1
Contact with infected bird and dropping	71	34.8
Eating improperly cooked diseased birds	58	28.4
Poor personal and environmental sanitation	60	29.4
Inhalation	54	26.5
Eating infected diseased birds	96	47.1
Signs and symptoms of illness in birds (multiple response; N = 604)	Frequency	Percent (%)
Excessive sleep	316	52.3
Dullness/ Inactive	328	54.3
Eye/Nasal discharges	196	32.5
Frequent watery stools /dropping	268	44.4
Poor feeding consumption	146	24.2
Poor egg dropping	96	15.9
Treatment of ill birds (multiple response; N = 604)	Frequency	Percent (%)
Give oral medications to birds	264	43.7
Give local concussion to birds	234	38.7
Provide warmth to birds	166	27.5
Administer injections to birds	62	10.3
Cleaning of birds cages	104	17.2
Call local vet officer for treatment	54	8.9
Do nothing	106	17.5
Actions taken on diseased birds	Frequency	Percent (%)
Sell birds immediately	116	19.2
Slaughter, dress and sell	132	21.9
Slaughter, and consume by the family	98	16.2
Slaughter and give to destitute / beggars	75	12.4
Treat and wait for improvement	121	20.0
Kill and bury	34	5.6
Allow to die naturally and then discard	28	4.6
Total	604	100

yard and free range domestic birds rearing ranged from ornamental, spiritual, economic and nutritional purposes. In this study, over 90% of the respondents rear birds in their homes and the type of birds reared were mostly chickens. This was not a surprise because this type of bird is easy to rear and the birds have adapted to human environment. Handling of bird as pet was seen in about one quarter of the subjects and this practice is a risk factor for transmission of zoonotic diseases of birds to man. The awareness of zoonotic bird disease affecting man was quite low judging by one third of the respondents who knew that such transmission can occur. Regarding the awareness of AI infection, less than one third were aware of the disease in the country, state or their locality. The source of awareness was mostly through the electronic media. The role of health workers and veterinary officers needs to be more prominent in creating awareness on the diseases.

About 42% of the total respondents have had an episode of bird death in the proceeding year before the survey. However, due to low awareness of AI infection and ignorance of actions to take, many of these sudden deaths in birds were not reported; hence not captured in the na-

tional data in monitoring the occurrence of the disease. The low prevalence of AI in the state and indeed Nigeria may not be a true reflection of the epidemiologic situation reported. This can be supported by poor reporting, and weak surveillance system in the country. Not until the outbreak of the disease in a large poultry farm was detected in the northern part of the country, there was no effective surveillance system in place for monitoring the disease.

More than half of the respondents were unwilling to report outbreaks because of several reasons including fear of culling of birds without compensation, lack of awareness on who to report to and the belief that sudden deaths in birds is a yearly phenomenon which no body can influence. It is therefore important that government policy on the control of the disease be widely disseminated to the grass root communities where more than 70% of birds in the country can be found. The practice of backyard poultry is an important predisposing factor to outbreak of AI in man because several birds of different types are reared together, which promote cross infection, genetic mutation and re-assortment of the virus from one bird type to another [7].

Tab. IV. Respondents' awareness, knowledge and attitude towards avian influenza in birds.

Source of awareness (multiple response; N = 186)	Frequency	Percent (%)
Radio	136	73.1
Television	84	45.2
Health workers	34	18.3
Friends/Neighbours	61	32.8
Print media	48	25.8
Vet office	21	11.3
Environmental sanitation officer	42	22.6
Signs and symptom of AI (multiple response; N = 186)	Frequency	Percent (%)
Excessive sleep/drowsiness	121	65.1
Poor bird activities	98	52.7
Frequent and Watery stools	93	50.0
Nasal /Eye discharges	72	38.7
Falling feathers	49	26.3
Unexplained deaths in birds	21	11.3
Knowledge and attitude towards AI (multiple response; N = 186)	Frequency	Percent (%)
Ever had massive bird deaths in the last 12 months	78	41.9
Willing to report suspected AI in birds or massive sudden bird deaths	81	43.5
Experienced culling of birds	22	11.8
House was visited by vet officers	38	20.4
Got compensation paid by government	18	9.7
Reasons for willing to report AI (multiple response; N = 81)	Frequency	Percent (%)
To get help and treatment from government	22	27.2
For vaccination or treatment of unaffected birds	14	17.3
To get birds examine/tested for segregation into infected and un-infected	32	39.5
For bird culling and compensation by Government	21	25.9
Reasons for not willing to report AI (multiple response; N = 105)	Frequency	Percent (%)
Fear of culling of birds without compensation	79	75.2
Don't know where and who to report to	47	44.8
Knows how to treat infected birds	51	48.6
Afraid of charges from vet officials for bird treatment	33	31.4
Afraid of been shown on TV/newspaper	29	27.6
May expose self to taxation	37	35.2
Believed bird will recover from infection naturally	66	62.9

Tab. V. Respondents action on living birds during massive bird deaths and suggestion to prevent AI among domestic birds.

What happened to remaining birds (multiple response; N = 78)	Frequency	Percent (%)
Sold at markets	45	57.7
Slaughter and dressed for sale	11	14.1
Slaughter and eat within the family	19	24.4
Treat the birds	44	56.4
Transfer to other houses /Places	21	26.9
Prevention of AI in domestic birds (multiple response; N = 604)	Frequency	Percent (%)
Increase public awareness on AI	246	40.7
Home visit by environmental and veterinary officers to inspect birds	154	25.5
Provide free treatment for infected birds	107	17.7
Incentive to encourage self reporting	118	19.5
Create community based local vet posts for AI reporting	81	13.4

The handling and management of live birds during out-break of disease is another peculiar observation in this study which is a source of concern. In many instances,

sick birds are quickly slaughtered and dressed and sold as a frozen chicken to unsuspecting customers who patronize retail outlets for frozen chicken. This practice is

a major risk factor for the spread of the infection from birds to man especially among frozen chicken consumers who may not take necessary preventive measures and those who eat improperly cooked and/or roasted chickens. About 25% of respondents who had episode of sudden and massive bird deaths slaughtered and consumed the birds within the household and family members. Transmissions of AI from birds to man through eating of infected birds are well documented [11-14]. It was reported by federal ministry of agriculture in Nigeria that many infected birds culled by the government agency found their ways into the market for sale and consumption. The reasons for this included corruption on the part of the government officials, persistent poverty and hunger in many households and communities in Nigeria [7]. Generally, the practice of backyard poultry was high but only few people were aware of the AI infection in birds. This low level of awareness among the respondents could be due to inadequate public awareness on the disease. The handling of backyard birds and the practices relating to rearing of birds are risk factors in the transmission of the zoonotic virus from birds to man and promote cross infection among the birds which may lead to emergence of HPAI through genetic mutation and re-assortment of the gene sequence of AI in the birds [15-17]. Willingness to report outbreak of disease in flocks of birds was generally low because of fear of culling of birds without compensation which some of the respondents had experienced or were victims in the recent past. Although, the results of this study cannot be generalized to the entire

country because of differences in socio-cultural practice and literacy level which is higher in the south than the northern part of the Nigeria. However, national Policy and programme on the prevention and control of the spread of AI in birds and man is urgently required to address fundamental problems that can result from widely practiced backyard poultry in the country. Immediate intervention activities should include creating public awareness on bird flu as it relates to backyard poultry using various channels of communications including electronic media, health talk at the community level and use of mobile public address system in rural settlements, market square and during congregation for festival.

Conclusions

The knowledge and awareness of bird flu and risk of infection associated with the disease was low despite high practice of backyard poultry. Poor handling and mixed rearing of birds are important risk factors associated with transmission of AI infection among domestic birds and to man. Creating public awareness, regular home visits by community health workers, sanitary and veterinary officers to support and supervise preventive practices relating to spread of bird flu and rearing of birds within human surrounding are important steps to address some of the problems; while strengthening surveillance network for the disease will provide adequate records and documentation of the magnitude of the disease.

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