

ISSN 1682-8356
ansinet.org/ijps



INTERNATIONAL JOURNAL OF
POULTRY SCIENCE

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Avian Influenza in Nigeria: Suggestions for Eradication

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Abstract: Avian Influenza is a disease caused by the highly pathogenic H5N1 virus. The disease has spread through Europe, Asia and has reached Nigeria-the first African country to record the disease in February, 2006. To date, only one human case has been reported in the country. However, the viral scare almost paralyzed the poultry industry in the country. The economic impact of the disease cannot be under-estimated and efforts should be geared towards curtailing the spread. Hence, this paper reviews and present updates on bird flu, its zoonotic impact and seeks to elucidate some of the best practices to help in the eradication of this pandemic disease.

Key words: Bird flu (H5N1), control measures, economic impact, zoonotic impact, Nigeria

Introduction

Avian influenza is an acute, highly fatal disease of chickens, turkeys, pheasants certain wild birds. Ducks, geese and water fowls are less susceptible but do contract the disease at times. (Hagan and Brunner, 1988). In addition, (Swayne and Halvorson, 2003) reported that the infection causes periodical epidemics in humans, horses, pigs, seals, whales and a variety of birds. Bird flu is also known as avian flu, avian influenza, bird influenza-they all mean the same thing.

Many people think avian influenza is a disease that is just coming into existence but that is not true. It was reported in Italy in 1880 and the virus was brought into the United State of America illegally in 1923 by a laboratory worker. In 1924, the virus escaped from the laboratory into the New York market, where it was estimated to have killed more than 500,000 birds. The disease was however stamped out within one year by strict quarantine method (Mohler, 1925 as cited by Hagan and Brunner, 1988). In 1978 to 1981 the disease occurred more frequently in turkeys than in chickens and caused considerable economic loss in North America and Europe.

The causative agent: Avian influenza viruses are members of the family *orthomyxoviridae*. Within the family are three types of influenza: A, B and C. Types B and C affect only humans while type A affects poultry species and there is evidence that the avian influenza viruses can naturally infect other mammals (Lu *et al.*, 1982). Influenza A viruses are divided on the bases of the antigenic relationships in the surface glycoproteins haemagglutinin (HA) and neuraminidase (NA) into subtypes. There are at present 16 H subtypes and 9 N subtypes. Currently, only viruses of H5 and H7 subtypes have been shown to cause the Highly Pathogenic Avian Influenza (HPAI) in susceptible species of poultry, but not all H5 and H7 viruses are virulent.

Transmission: Through direct contact with secretion and excretion of infected birds as well as contact with carrier migratory birds and indirectly through contaminated equipment, shoes, clothing, egg crates and vehicles. According to (Dochia, 2006b), there are some claims that bird flu did not reach Nigeria through migratory birds but through smuggled pets and birds.

Signs of avian influenza: The disease usually affects chicken and turkeys. The incubation period is 3-5 days in chicken and the signs are high temperature, loss of appetite, bird rapidly becomes lethargic, nasal discharge, oedema of the neck and head, hock may be swollen and discoloured. The course of the disease is very rapid with death occurring after the first signs. The mortality rate is close to 100%. (Hagan and Brunner, 1988).

Diagnosis: Based on the signs and symptoms, the use of enzyme-linked immunological assay (ELISA) for antibodies is an excellent diagnostic test whose sensitivity is greater than compliment fixation or hemagglutination-inhibition test, but the latter is the usual test of choice for diagnosis and research.

Incidence of avian influenza in Nigeria: The exotic disease that recently hit the country is avian influenza. This pandemic was reported in Nigeria by February 2006 causing panic and crisis in the poultry sector. (Dochia, 2006b) quoting the World Health Organization (WHO) for animal health reported that Northern Nigeria has seen Africa's first cases of bird flu. It was confirmed that it was the highly virulent H5N1 virus strain. (Anon, 2006), reported that the most lethal strain of bird flu has been detected in Taraba state, bringing to 15 the number of states, out of a total of 36 to be affected by the virus. So far, 20 farms in Nigeria have been infected and the cases have been taken over by the Federal Ministry

of Agriculture for containment and culling. The presence of H5N1 virus was confirmed by the National Institute of Veterinary Research, Vom, Jos. (Olanrewaju, 2006) reported that avian flu has in the last nine months spread from South East Asia to 40 other countries.

Importance of poultry products: To appreciate the grave danger posed by uncontrolled bird flu to the well-being of humans, it is pertinent to highlight the importance of poultry products before examining the impact of the pandemic. The contribution of poultry production (meat and egg) to total livestock output in Nigeria increased from 26% in 1995 to 27% in 1999 (Ojo, 2005). Poultry outnumber all other forms of livestock in Nigeria surprisingly are found throughout the country, wherever there is human settlement. Although pigeons, ducks, guinea fowl and some turkey (31.9 million) are also widely kept, chicken is by far the most common with an estimated population of 82.4 million Bourn *et al.*, 1992. The current estimate indicates that the daily animal protein consumption of Nigerians that is considered necessary for overall good health is far below the amount recommended by FAO. Gross animal protein malnutrition is the feature of the last millennium (20th century). The average Nigerian consumes only about 7 grams of animal protein a day as against the minimum of 28 grams/day. This represents a gross short fall of 75% (Onuekwusi, 2001). Since chicken population is the highest among the animals producing protein, then one of the quickest ways to attain the minimum protein requirement is to raise poultry, because of the short generation interval, fast growth rate and the efficiency in converting feed to meat and egg. Song and Kerver (2000) reported that egg contributed less than 10% of the daily intake of energy and vitamin B6, 10-20% of folate, saturated and polyunsaturated fat. Higher levels (20-30%) of the vitamin A, E and B12. The egg can be used in a variety of ways for cooking food. Egg emulsifies, thickens and binds other food materials together.

Economic impact of avian influenza: Indeed, the outbreak of bird flu has threatened to throw the poultry industry into a crisis. (Olanrewaju, 2006) reported that in Nigeria, the poultry farmers have been affected negatively by the outbreak of avian influenza. Many people refused to eat chicken and eggs to avoid being exposed to the risk of contracting the disease. In addition, many people will rather eat fish or beef causing the price of beef and other livestock to escalate (Personal observation, 2006). Moreover, the closure of affected farms has resulted to unemployment. (Akintunde, 2006) citing the Central Bank of Nigeria reported that Nigeria lost about 450,000 birds between February and March 2006 to the avian influenza H5N1 strain. Furthermore, (Olanrewaju, 2006) quoted the

World Bank as saying that a severe avian flu pandemic may cost the world a whopping \$1.25 trillion and may result in the death of about 70 million people. France's poultry sector, the biggest in Europe, is now losing 40 million euros (\$48 million) a month as bird flu hits sales at home and abroad. The Paris government said more than 40 countries have restricted imports from French poultry following the outbreak of H5N1 at a turkey farm in east of the country. The Germany's poultry industry has lost more than 140 million euros (\$ 168 million) since 2005 autumn (Dochia, 2006d). In South East Asia, (Verbiest and Castillo, 2004) separated the impact of HPAI into macro and micro economic impacts. The macro economic impact will be greater for poultry exporting countries while HPAI would have strong micro economic impact in regions where small holder farmers are dependent on poultry production due to difficulties in overcoming the costs of culling and restocking in the face of an outbreak. And the later is the case in Nigeria.

Zoonotic impact of avian influenza: When the deadly avian flu broke out among humans about two years ago in Asia, experts across the globe worried over the implications to human population if not curbed on time. However, a new dimension has been added to this fear which is that, the deadly H5N1 strain could exterminate a species of mammals and maybe other life forms and could even distort the ecosystem (www.independentngonline.com). It would be difficult for authorities to know whether any person has been infected with the virus as mortality rate in impoverished Nigeria are among the highest in the world and people are often buried without any formal autopsy (Dochia, 2006a). However, WHO count of human cases with avian influenza stood at 186 confirmed cases and 105 deaths as shown in Table 1 and most of them are from Asia. The number of human cases and countries increased in 2007, has shown in Table 2. And one case reported in Nigeria of a 22 years old female who died in Lagos on January 17, 2007.

The symptoms in affected humans include: keratoconjunctivitis, fever, rapid respiratory infection and death. Since 1997, when the human infections with H5N1 avian influenza virus were documented, the virus has undergone a number of changes. These changes have affected the patterns of virus transmission and spread among domestic and wild birds. They have not however, had any discernible impact on the disease in human including its mode of transmission (Dochia, 2006c).

Treatment and control: Studies to demonstrate the effectiveness of antiviral medication against human infection with H5N1 is on-going. The vaccine which the

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Table 1: Cumulative Number of Confirmed Human Cases of Avian Influenza A/(H5N1)

Country	2003		2004		2005		2006		Total	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
Azerbaijan	0	0	0	0	0	0	7	5	7	5
Cambodia	0	0	0	0	4	4	1	1	5	5
China	0	0	0	0	8	5	8	6	16	11
Indonesia	0	0	0	0	17	11	12	11	29	22
Iraq	0	0	0	0	0	0	2	2	2	2
Thailand	0	0	17	12	5	2	0	0	22	14
Turkey	0	0	0	0	0	0	12	4	12	4
Viet Nam	3	3	29	20	61	19	0	0	93	42
Total	3	3	46	32	95	41	42	29	186	105

Source: www.who.int/csr/disease/avian_influenza/country/cases_table_2006_03_24

Table 2: Cumulative Number of Confirmed Human Cases of Avian Influenza A/(H5N1)

Country	2003		2004		2005		2006		2007		Total	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
Azerbaijan	0	0	0	0	0	0	8	5	0	0	8	5
Cambodia	0	0	0	0	4	4	2	2	0	0	6	6
China	1	1	0	0	8	5	13	8	2	1	24	15
Djibouti	0	0	0	0	0	0	1	0	0	0	1	0
Egypt	0	0	0	0	0	0	18	10	11	3	29	13
Indonesia	0	0	0	0	20	13	55	45	6	5	81	63
Iraq	0	0	0	0	0	0	3	2	0	0	3	2
Lao PDR	0	0	0	0	0	0	0	0	2	2	2	2
Nigeria	0	0	0	0	0	0	0	0	1	1	1	1
Thailand	0	0	17	12	5	2	3	3	0	0	25	17
Turkey	0	0	0	0	0	0	12	4	0	0	12	4
Viet Nam	3	3	29	20	61	19	0	0	0	0	93	42
Total	4	4	46	32	98	43	115	79	22	12	285	170

Source: www.who.int/csr/disease/avian_influenza/country/cases_table_2007_03_29

United States already is stockpiling in the event of a bird flu pandemic is safe but not effective. However, the US Health Department had order millions of Tamiflu, which until the launch of Relenza was the only drug on the market with the capabilities to prevent influenza A and B and also be used as a treatment for people with the infection (Dochia, 2006f).

Why bird flu does not spread easily from person to person: Two research groups independently, presented results that help explain why H5N1 avian influenza virus is lethal to humans but so difficult to spread from human to human. Unlike human influenza viruses, the teams reported that H5N1 preferentially infects cells in the lower respiratory tract, residing deep in the airways. The virus is not easily expelled by coughing and sneezing, the usual route of spread. The result "explains a lot of mysteries" surrounding H5N1. Another group, tested various tissues of the human respiratory tract for receptors to which the virus can bind. Human flu viruses preferentially, bind to what are known as alpha 2,6 galactose receptors, which are present in the human respiratory tract from the nose to the lungs. While the avian viruses prefer alpha 2,3 galactose receptors, which are common in birds but were thought to be almost absent in humans. Using marker molecules that bind to one receptor or the other, the team found that

humans have alpha 2,3 galactose receptors, but only in and around the alveoli (Dochia, 2006e).

Some best practices to reduce exposure and prevention of H5N1: International Food Safety Authorities Network (INFOSAN, 2005), stated that the consumption of poultry products should not cause fear provided the food is properly cooked. INFOSAN further gave the recommended good hygienic practices to reduce exposure to the virus and its spread through food (adapted from the WHO 5 keys to safer food) as follows:

- (i) Separate raw meat from cooked or ready-to-eat foods to avoid contamination. Do not use the same chopping board or the same knife for raw meat and other foods.
- (ii) Keep clean and wash your hands. After handling frozen or thawed raw chicken or eggs, wash your hand thoroughly with soap. Wash and disinfect all surfaces and utensils that have been in contact with the raw meat.
- (iii) Cook thoroughly. Thorough cooking of poultry meat will inactivate the virus. Either ensure that the poultry meat reaches 70°C at the centre of the product or that the meat is not pink in any part. Egg yolk should not be runny or liquid.
- (iv) Do not eat raw poultry parts or raw eggs.

The control measures used in the five studied countries in Asia includes: disinfection, quarantine, import ban, screening, zoning compensation. (Rushton *et al.*, 2005). According to (Hafez, 2005) once a diagnosis of avian influenza has been officially confirmed, a competent authority shall establish a protection zone based on a minimum radius of three kilometres around the infected holding, itself contained in a surveillance zone based on a minimum radius of 10 kilometres. All poultry on the holding shall without delay be killed on the spot. Hatching eggs and table eggs laid during the presumed incubation period which have moved from the holding shall be traced and destroyed. No poultry shall be reintroduced to the holding until after 21 days. Furthermore, vaccination against avian influenza with vaccines authorized by the competent authority may only be used to supplement the control measures carried out when the disease appears in poultry.

Other suggested measures include: Prevent access to rodents and other wild birds, burn or bury dead birds, cases of rapid spread of infection should be reported to the veterinarian, workers should use hand glove and facemask, buy birds from known sources that are disease free, restriction in movement of visitors and materials to/in the farm, spraying of the premises with iodine and formalin, use of detergent containing disinfectant in the hatchery machines, trays, egg holding room etc, litter from poultry should be burnt or buried, old feed bags should be burnt or buried and not recycled, discourage staff from going to other farms and live bird markets and provide dipping vats with disinfectant for foot wears and vehicles.

Some measures aimed to curb the bird flu saga in Nigeria: The Minister of Agriculture Adamu Bello, said that authorities would kill all chicken suspected to be infected with bird flu and quarantine suspected farms. He stated that the government would budget N1.7 to 2.0 billion (\$13-15.5 million) for compensation of culled birds. The Federal Government paid N. 7 million to poultry farmers in Nasarawa State whose birds were culled during the bird flu epidemic. It will be recalled that the government had disbursed N107, 639, 886.00 as palliative to affected farmers with promise to pay N250 each for a culled chicken, N1,000 for duck or a goose and N2,500 for a turkey.

The government also, sought the cooperation of poultry raisers to report cases of birds with respiratory diseases and advised the public to cook their poultry products very well before eating. Some ministers from West Africa met and adopted a plan for fighting outbreaks of the deadly avian influenza in the region and preventing its spread to humans. The concerned Ministers are Agriculture, Health, Livestock, Environment and Integration in Economic Community of West African States.

The Nigerian National Petroleum Corporation (NNPC) Medical Services Division (2006) gave the following simple health advice to reduce to the barest minimum any chance of getting infected: minimize contact with all sick or dead poultry, wash hands after touching raw poultry meat, eggs or other food stuff, avoid eating "pink" chicken or cooked chicken that bleed when you cut the meat, cook chicken and other poultry properly, do not cross contaminate your food with raw poultry or other meat and do not panic.

Conclusion: The risk posed by bird flu is causing concern to all stakeholders-producers and consumers of poultry products the world over. International and collaborative researches into the deadly disease, vaccine development and access to data will greatly help in the current efforts to fight this pandemic. This disease which has now become a political as well as economic issue is capable of wiping out not only the poultry species but also humans.

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