

# Zoonotic Diseases of Poultry: A Threat to Profitable Poultry Production. A Review

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## 1. Introduction

Zoonosis is defined as diseases and/or infections which are transmitted naturally between vertebrate animals and man (Gillian *et al* 2008; WHO 2010). Zoonotic diseases associated with poultry include; Avian influenza, Avian tuberculosis, Salmonellosis, Ornithosis, Cryptosporidiosis and Campylobacteriosis. Birds infected with these diseases may have diarrhoea and discoloured dropping, but some birds may show no symptom of disease. Free-range animals are more likely to carry these infections than those raised and housed in a laboratory setting.

Zoonotic diseases are heterogeneous group of infections with varied epidemiology, clinical features and control measures. The causative organism may be viral, bacterial, fungal, protozoan parasites or unconventional agents (WHO 2010). Any disease or infection that is naturally transmissible from vertebrate animal to human and vice-versa is classified as zoonosis (Taria *et al* 2004; WHO 2010).

Over 200 zoonoses have been described and they have been known for centuries. Transmission may occur in number of settings, ranging from indirect contact through food or drinking water contaminated by microbes, (*e.g.* campylobacteriosis and salmonellosis) or indirectly via vector such as mosquitoes or tick and contaminated inanimate objects, oral ingestion or inhalation of aerosolized materials to direct-contact through occupational exposure on farm, during leisure or from pet(s).

### 1.1. The Importance of Zoonotic Diseases to Man

The issue of health and diseases in animals is of great importance owing to the following factors.

Man's dependence on animal for food and such other health or pleasure derivable to man from animals as burden-bearing, transportation, usage in warfare and sports, (*e.g.* horse).

Population of human-beings is increasing daily, as such there is rise in food demand, hence the need to open new areas for food production, such as domestication and/or farming of some game-animals like deer, antelopes, grass-cutters, ; non-poultry birds like pheasants, cockericks, bush-fowls and micro-stocks like snails, to augment.

Both humans and their domestic animals are more frequently exposed to diseases as a result of encounter with wild animals, thus increasing exposure to once rare zoonotic infections (Seimenis 1998). Increasing interactions between humans and animals contribute to the spread of zoonosis, Rapid development, urbanization and faster means of transport such as air-travels are triggering the spread of zoonotic diseases in a particular area and also across the globe. (Siemens 1998).

#### 1.1.1 Importance of Zoonotic Diseases to Animal Health.

A healthy animal reduces or prevents the escalation of its cost of production as well as the infection of the human handler(s), which would have otherwise reduced the effectiveness or availability of the production labour.

A healthy animal is an additional source of health to man especially in terms of zoonosis and as well as a safe source of food to man.

#### 1.1.2 Importance of Zoonotic Diseases in Animal Production

The presence of zoonosis such as avian influenza, will adversely affect the productivity of infected-birds as it would cause significant drop in egg production as well as saleability of those eggs thereby causing loss of profit to the farmer or the farm with such infections.

Brucellosis on the other hand is also known to be responsible for significant drop in milk production both in terms of quality and quantity as well as the saleability of such milk if and when a cattle in a dairy farm are known to be infected with brucellosis as the human who knows that brucellosis is zoonotic would avoid products from such farms.

A poultry farm in which the birds have been diagnosed to have avian tuberculosis will also suffer from production losses as birds should be destroyed or if not destroyed the farm will suffer from poor or no patronage leading to loss of investment and profits.

The recent outbreak of avian influenza in some nations of the world is a very good example of how zoonotic diseases can adversely affect animal production. For example among the nations where the outbreak was

recorded, virtually all the birds present in the farms diagnosed to have this disease were destroyed by the government authority of such countries with little or below commensurate compensation paid to such farms or farmers.

Apart from the foregoing production losses, in a country like Nigeria even farms that were not affected suffered serious production losses as there was significant drop in patronage owing to the threat of a disease to human health.

### **1.2. Occurrence and Significance of Zoonotic Diseases in Poultry Globally**

The 2006 annual community summary report from European Food-safety Authority and European Centre for Disease Prevention and Control indicated that worldwide, bacterial food-borne zoonotic infections are most commonly causes of human intestinal diseases with *Salmonella* specie and *Campylobacter* species accounting for over 90% of all cases of bacteria-related food poisonings. The above report estimated also that one-third of populations residing in developed countries worldwide are affected by food-borne diseases every year and the majority of these are thought to be caused by zoonotic agents. The same report also predicted that about 1% of inhabitants of Europe will be infected with campylobacter every year.

*Salmonella* was most commonly found in poultry meat and egg where 5.6% and 1.0% respectively and *Salmonella* outbreaks were associated with egg as concluded in the report referenced above.

### **1.3 Statistics of Zoonotic Diseases Globally**

Delia (2012) reported that 12% of animals have brucellosis reducing production by 8%. 10% of livestock in Africa have Human African Trypanosomiasis (H.A.T.), reducing their production by 15%. 7% of livestock have tuberculosis reducing their production by 6% and 3-10% of human Tuberculosis(TB) cases may be caused by zoonotic TB; 17% of small holder of pig have cysticercosis reducing their value and creating enormous burden of human cysticercosis; 27% of livestock have bacterial food-borne disease as a major source of food contaminant and illness in people; 25% of livestock have Q- fever and are a major source of infection of farmers and consumers. Furthermore Delia (2012) reported that salmonellosis was recorded as zoonosis accounting for 151,995 confirmed human cases.

## **2.0 Results**

From available records, a number of zoonotic-diseases occur in poultry-production world-wide. These include avian-influenza, avian-tuberculosis, salmonellosis, cryptosporidiosis and ornithosis. The causative agents are varied and cut across virtually all groups of micro-organisms with varied epidemiology. Zoonotic diseases of poultry have also been reported to occur across the world including developed, developing and underdeveloped nations. This invariably makes zoonotic diseases a global phenomenon, problems and threat. It is on record that in poultry, salmonella is the most commonly found in poultry meat with 5.6% occurrence and 1.0% in their eggs. Generally speaking 12% of animals (poultry exclusive) have brucellosis reducing their production by 8%, 10% of livestock (including poultry) have HAT reducing their productivity by 15%, 7% of livestock including poultry have tuberculosis reducing their production by 6%, 27% of livestock including poultry have bacteria food-borne contamination causing an illness in people. All these affirm the occurrence of zoonosis in poultry production.

## **3.0 Discussion**

No doubts, zoonosis occur in poultry and invariably in its production. These range from those that affect the poultry birds themselves, such as avian-influenza, avian-tuberculosis, salmonellosis etc. and those that contaminate poultry-products like meat and the eggs in the course of production activities and processing of the products (which include *Campylobacter* and *Salmonella*, etc.). The effects of these on poultry production and profitability cannot be over emphasized and should not be under estimated. This is because those that affect the poultry birds themselves are known to cause significant reduction in their productivity such as reduced meat quality and quantity. This leads to production loss which adversely affect profitability as reduction in quality and quantity could cause reduction in market value and expected income from such. Those that affect the product become sources of infections to human and are serious threats to human health (Kaingu *et al* 2010).

Those that cause threat to human health could also affect productivity if the affected humans are the poultry farmers themselves as they would be rendered incapacitated to effectively carry out expected activities in poultry production business. While those that contaminate poultry products will constitute a threat to human that feed or interact with such product and will become an avenue whereby those that have been infected will be scared-off

from coming in contact with let alone feeding on such or any related poultry product. The case at hand is that of the recent Avian influenza epidemic. That became a pandemic leading to huge loss in poultry products. A massive reduction in much needed animal protein and huge financial losses were experienced by the poultry farmers and the nations affected as the infected birds were destroyed by the government in an attempt to arrest or curb the menace. In majority of the cases, inadequate or no financial compensation were made to affected farmers.

#### **4. Conclusion.**

Zoonotic diseases are given little, inadequate or no attention commensurate to the enormity of losses and dangers associated with zoonosis generally and those that occur in poultry production most particularly. It is on record that zoonosis or zoonotic diseases occur in poultry production. The danger, threat and losses from zoonosis have adverse effects on human health, public health, the economy. As a consequence, there are financial losses, production losses, increase in the cost of production and loss of much needed animal-protein. The effects are felt more by individuals in developing and under-developed nations of the world such as Nigeria and other third-world countries. For this reason, zoonotic diseases should no longer be toyed with as humans appear to be the final recipients of the adversities of zoonosis as we all in one way or the other depend on, or at least interact with poultry birds.

#### **5. Recommendations:**

Poultry diseases generally and the zoonotic ones invariably affect humans directly or indirectly. Man's dependence on and/or interaction with poultry is in no doubt and cannot be denied. Therefore, much attention should be given to efforts aimed at proper understanding of zoonotic diseases of chickens and possible solutions. As such:

- Concrete, constant and consistent efforts and actions should be carried out by human beings against poultry-diseases and to ensure the health and productivity of poultry birds.
- Poultry production has been established to have or be associated with some zoonosis, so more humans should be trained or educated on zoonotic diseases of poultry, their causes and ways of reducing if not eradicating them.
- More funds, policy and effective support through the provision and maintenance of the necessary materials, personnel by government and other agencies should be put in place. This will encourage and ensure further research, finding and enforcement of necessary solutions that will ensure the reduction or elimination of zoonosis in general and in poultry production in particular. With better health and production for these very important sources of animal protein, human safety and wellbeing along that line are ensured

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