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EFFECTIVENESS OF BIOSECURITY MEASURES IN SOME SELECTED FARMS IN KWARA STATE, NIGERIA

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ABSTRACT

Biosecurity in poultry farm is a set of practices designed to prevent the entry and spread of infectious diseases into and from a poultry farm. It is one of the most economical and effective methods of disease prevention and control in the poultry industry. A semi-structured questionnaire was employed to capture data on biosecurity practices observed by some registered poultry farms randomly selected in Kwara State from March 2016 to December 2016. Data generated under a focused group discussion covered information on farm environment and hygiene, risk factors, disease management, control and regulations. Epi Info software package version 6.04 was used for data analysis. The relationships between the dependent and independent variables were compared using the χ^2 tests. A P-value of <0.05 indicated a statistically significant difference that biosecurity measure is of great relevance in the poultry industry. The study revealed that the management practices and hygiene methods employed in the farms investigated were not in tandem with standard biosecurity measures and practices (SD≤0.5), standard methods and their implication of non-compliance were also not well understood. We recommend 'all-in and all-out' management system of practice and further research on biosecurity measures for human and animal health and protection.

Keywords; Biosecurity measures, poultry farms, Kwara State.

INTRODUCTION

Over the last few decades the poultry industry supported by technological advances in genetic selection, feed quality, growing methods, processing and marketing has outstripped all other agricultural commodities in both developed and developing countries. This is mainly due to poultry being the most efficient protein-producing (meat and eggs) domestic species with the lowest feed conversion ratio (Adene and Oguntade, 2006).

In the last decade, the commercial poultry sector has encountered considerable and multiple challenges such as environmental pollution, rising cost of feed and increasing demand for higher welfare standards. All these contribute in putting pressure on the poultry industry. However the continuous threats of infectious diseases severely affecting poultry, including Newcastle Disease (ND), Infectious Bursal Disease (IBD), campylobacteriosis, salmonellosis, and in some cases diseases that affect humans, such as H5N1 Avian Influenza (HPAI) are of serious biosecurity concern and pose significant economic threat to the industry (Fasina *et al*., 2012).

Biosecurity requires the adoption of a set of attitudes and behaviors by people, to reduce risk in activities involving poultry production and marketing (Nyaga, 2007; Sharma, 2010). Biosecurity is the first line of defense against the introduction of any poultry disease and probably the only defense as long as prophylactic vaccination of flocks at risk is excluded. Biosecurity is defined as all hygiene efforts designed to reduce the risk of introduction and dissemination of infectious agents in a population or facility. Animal facility that must be considered when developing biosecurity plans range from backyard animal operations to large

intensive livestock operations (Otte *et al*, 2007; Haifa, 2008).

Biosecurity is the intentional avoidance of disease through a planned program of risk reduction. It is a program that uses a combination of physical barriers and directed actions in a specific way to prevent the introduction of, or limit the spread of infectious disease causing agents to a group of susceptible individual. It embodies all of the measures that can or should be taken to prevent viruses, bacteria, fungi, protozoa, parasites, insects, rodents, and wild birds, from entering or surviving and infecting or endangering the well-being of the poultry flock (Otte *et al*, 2007). This involves identifying and eliminating all possible routes by which a disease could be accidentally introduced into a flock. Biosecurity also involves all necessary management procedure to prevent the spread of existing disease outbreak in poultry industry thereby reducing lateral spread between units (Sonaiya, 1990; Pagani, *et al*, 2008).
The objective of biosecurity is to ensure improved management practices, good sanitation and animal husbandry practices from farm to the market, for wholesome quality produce and maximum profit margin. This study therefore sought to access data on biosecurity in randomly selected farms in Kwara State, Nigeria using structured questionnaires and focused group discussion so as to better understand and improve biosecurity measures in poultry farms.

MATERIALS AND METHODS

Study area

Kwara State located in North-central Nigeria lies between Longitude 8°05′ and 10°15′ N; and Latitude 2°73′ and 6°13′ E. It has a total area of about 34,500 square kilometres comprising rainforest in the South and wooded savannah in the larger part of the North. It has 16 Local Government Areas divided into 5 agro-ecological zones (Figure 1). Rainfall has an annual range of 1,000 - 1,500mm and average maximum temperature between 30ºC and 35°C Kwara State is bound in the North by Niger and Sokoto State, Oyo, Ondo States and Benin Republic in the South and in the East by Benue, Plateau and the Federal Capital Territory, while it maintains international boundary with the Republic of Benin to the West. Kwara State is divided into 5 agro-ecological zones. The humid; sub-humid Babana-New Bussa-Kaiama plain mixed with humid zones; the sub-humid Central Niger-Benue trough in combination with humid zones, sub-humid zone and very humid latitude 2°73′ and 6°13′E (Aiyedun, 2015).

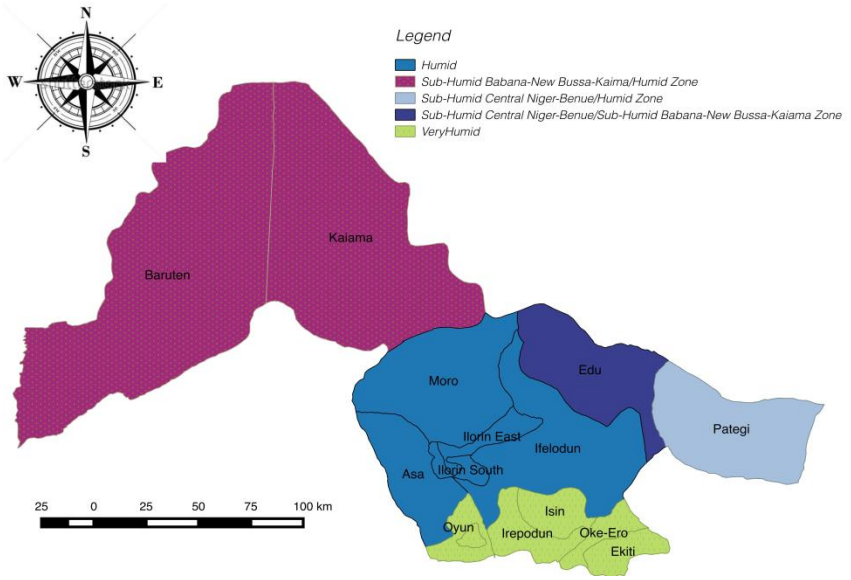

Figure 1: Kwara State and its Local Government Areas

Kwara State is close to the confluence of the rivers Niger and Benue, the two rivers that demarcate the Northern and Southern region of Nigeria (Olorunfemi and Odita, 1998) with a population of 0.85million (NPC, 2007). It is strategically located as the gateway between the Southern and Northern areas of the

country which makes it easily accessible to all parts of the country by air, road and rail transport (Aiyedun, 2011).

Experimental Design

A structured questionnaire was developed to assess the biosecurity practices used in 215 registered poultry farms randomly selected in Kwara State, North-Central Nigeria. Farm biosecurity assessment form was used to record information on farm environment, characteristics, hygiene, management and regulations in a focused group discussion setting. A multistage sampling technique was adopted for data collection for the study.

Data Collection

A questionnaire was administered to each of the farm and filled by either the manager, supervisor or any other designated staff, while discussions involved as many staff as were available at the time of the exercise and the appropriate answers entered into the form.

Data Analysis

The data collected on the questionnaires and from the focus group discussion and analyzed using version 6.04 of the Epi Info software package (Centers for Disease Control and Prevention, Atlanta, GA). The relationships between dependent and independent variables were compared and analyzed using χ^2 test.

RESULTS

Figures 2 and 3 show 115 (53.5%) and 145 (68.4%) farms respectively keep birds of different species and different ages together. New birds from other sources were added to 6 (2.8%) of the farms investigated while 119 (55.3%) and 115 (62.8%) have their farms fenced and installed warning sign posts controlling movement respectively (Figures 4, 5 and 8). One hundred and forty five (67.4%) and 119 (55.3%) dispose dead birds in shallow open ditches and open ditches respectively while 97 (45.1%) farms do not dispose dead birds daily (Figures 5, 6 and 10). One hundred and eighty-eight (87.4%) farms do not have their poultry feed accessible to wild birds and rodents while 116 (54%) indicated they have no issue with wetness and moldiness of poultry feed in their store rooms (Figures 9 and 10). A high percentage of investigated farms 211 (98.1%) do not have their staff living on the farm; do not practice hand washing with soap before and after handling birds, eggs and poultry feed 207 (96.3%) and do not have farm clothe and foot wears 189 (87.9%) (Figures 16, 13 and 12). Some of the respondents however indicated that their workers do not have personal poultry or pet birds at home 59 (27.4%) and do not visit live bird markets 77 (35.8%). The analyses of the relationship between variables resulted in P values <0.05 which is statically significant.

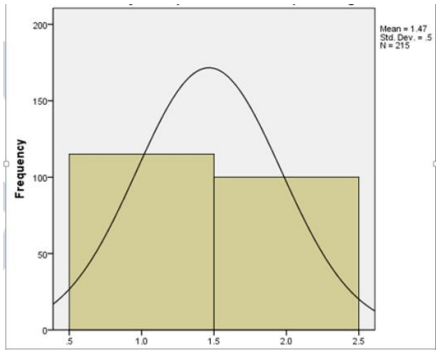

Figure 2: Do you keep birds of various spp together?

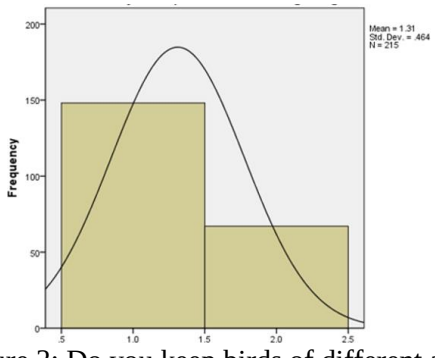

Figure 3: Do you keep birds of different ages together?

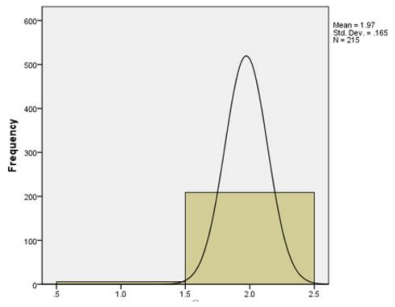

Figure 4: Do you add new birds from other sources to your stock?

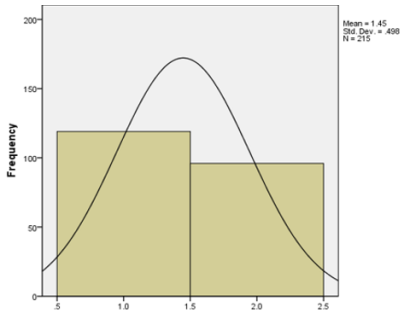

Figure 5: Is your farm fenced?

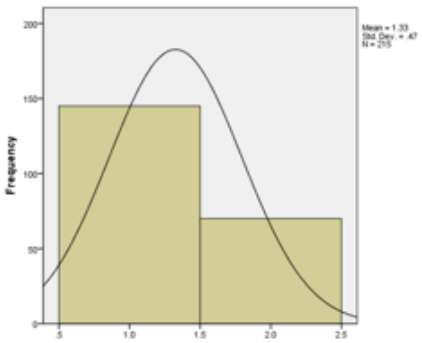

Figure 6: Do you dispose dead birds into shallow open ditches?

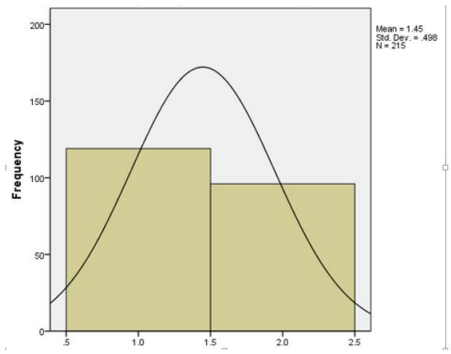

Figure 7: Do you dispose dead birds in open ditches?

Figure 8: Do you have warning sign posts to control movements in to the farm?

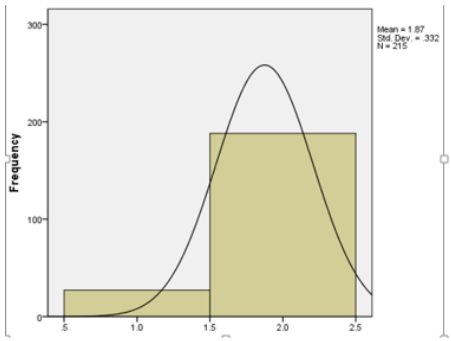

Figure 9: Are the bird food accessible to rodents and wild birds?

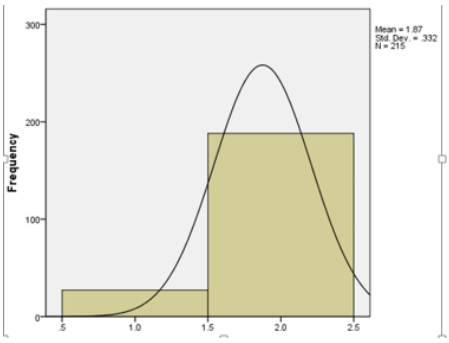

Figure 10: Do the bird food get wet or mouldy in the storage room?

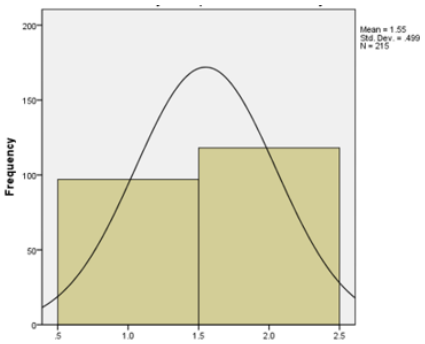

Figure 11: Do you dispose dead birds daily?

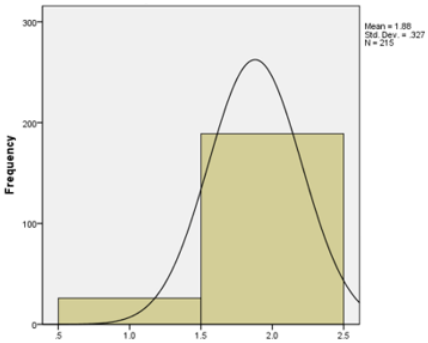

Figure 12:Do you have farm clothe and footware?

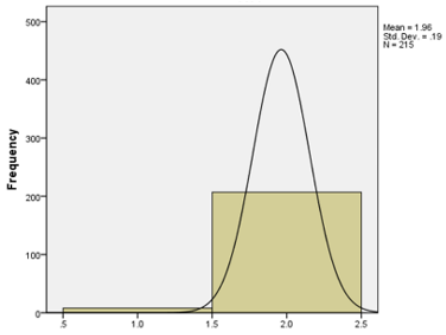

Figure 13: Do you do hand washing with soap before and after handling birds, eggs, feed etc?

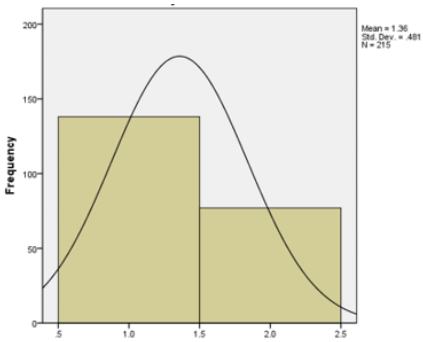

Figure 14: Do you visit live bird market?

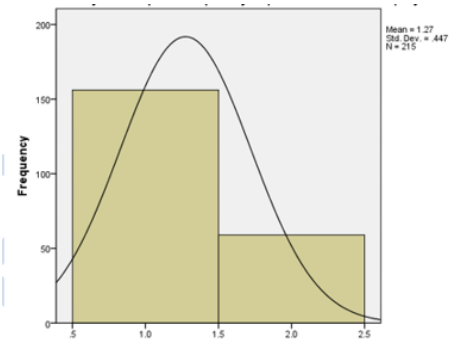

Figure 15: Do you own personal poultry or pet bird as a farm employer?

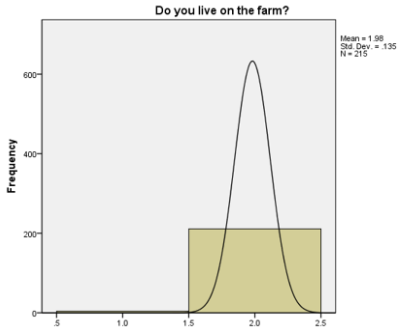

Figure 16: Do you live on the farm?

Frequency = No of farms
1.0=Yes
2.0=No

DISCUSSION

Keeping and mixing birds of different species, ages and sources together could encourage cross- infection between species and different age groups resulting in biosecurity risk (Pagani and Kilany, 2007). These were the general practice in most of the farms investigated. The presence of fence and warning/directional sign-posts around farms limited access to the farms by unwanted visitors and guided human activities for effective biosecurity (Fasina *et al*., 2011). Most of the farms investigated employed these biosecurity measures. Disposal of dead birds in shallow open ditches and open ditches including non-disposal of dead birds daily are of great concern. These may be due to the ignorance of the farm managers on the potential risks posed by the decomposition and possible transmission of diseases from infected dead birds to both humans and other birds. The absence of

functional incinerators in most of these farms could also be the reason for not promptly disposing dead carcasses. Wild birds and rodents, moldy feeds visiting live bird markets and members of staff raising personal birds that are possibly infected could be biosecurity risk. All these may transmit diseases some of which could be of zoonotic importance (Wilson, 2010). Personal hygiene which include hand washing with disinfectants soap and flowing water before and after handling birds and the use of protective clothing on the farm by farm workers are biosecurity measures that could reduce the horizontal transmission of diseases (Guerne *et al*., 2009). Non-usage of these measures as reported in this study could be as a result of the unavailability of the equipment in the farms and ignorance of most of the farm workers usually due to their level of education and exposure. Low compliance to standard biosecurity protocols may result in economic losses in the poultry industry due to disease outbreaks (Fasina *et al*., 2012).

CONCLUSION

Biosecurity is considered as an indispensable tool to mitigate against the spread of infectious diseases in poultry farms.

The results obtained in this study suggests that most farms in Kwara State do not observe basic biosecurity protocols in terms of farm environment, hygiene and management practices. This may however, have grave consequences on the health of the birds and handlers.

RECOMMENDATIONS

All workers or visitors must wash hands and feet with soap before entering the poultry house. Workers or visitors must change or cover their clothes and footwear with those provided before entering the chicken house (wear farm's clothes). Prevent contact of birds inside the poultry house with wild and domestic animals and birds from the outside. There is need to prevent unauthorized people from entering into the chicken houses. Birds of different species should not be kept together in the same pen. Farms should be fenced with gate and warning signs to control the movement of people and vehicles in and out of the farm. All-in all-out management system should be practiced by all poultry farmers.

There is therefore, the need to ensure that new birds are not added to the stock in the farm indiscriminately and birds of different ages are not mixed together. A quarantine area should be established to ensure new set of birds are not housed with poultry already on the farm. These housing areas should be separated from each other as much as possible. Also, separate workers should handle different poultry units. Strategies to separate wildlife from poultry production farms should be put in place. Rodents should be prevented from accessing poultry pens and poultry feed (Ohore *et al.*, 2002; Gueye, 2005).

Biosecurity plans are not one-size-fit-all but include the evaluation of hazards on an individual local basis and the development of appropriate prevention protocols (Pagani and Kilani, 2007). An optimal biosecurity plan should effectively address animal contact patterns and associated activities, hygiene, surveillance and awareness programmes (Badubi *et al*, 2004; Saidu *et al*, 2006).

Poultry producers worldwide should now seriously consider taking steps to institute effective biosecurity programmes to exclude disease carrying vectors from entering the farm environment (Loth, *et al.*, 2011; Aiyedun *et al.*, 2015).

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