



**Original Article**

## **Health and Disease Management of Indigenous Ducks (*Anas Plathrynychus*) in the Tamale Metropolis, Northern Region**

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### **ABSTRACT**

A survey was conducted in 23 selected communities in the Tamale metropolis to identify various health and disease management practices employed by local duck farmers. Snowball sampling technique was used to select the various communities while purposive sampling technique was used to identify duck farmers within the communities. Primary data was obtained using semi-structured questionnaires administered to 91 duck farmers and was analyzed using SPSS version 20. Results of the survey showed that majority (69.2%) of the farmers adopted biosecurity measures while 30.8% adopted no biosecurity measures. The majority of the farmers (64.8%) practiced a semi-intensive management system. In terms of various biosecurity measures carried out by farmers, 9.5% ensured good hygiene whereas 17.5% practiced culling and slaughtering of sick ducks to avert possible transmission of infections. Additionally, 28.6% of the farmers provided water and fed regularly to their ducks. Some farmers (11.1%) protected their ducks from predator's while control of ticks was carried out by 3.2%. Few farmers (9.5%) provided shelter to ducklings while 20.6% provided prophylactic treatment to ducks. Few farmers (4.4%) follow vaccination schedules while 95.6% do not. Modern treatment was practiced by 31.9% while 1.1% use ethno-veterinary medicine. The majority of the farmers (76.7%) used Amoxicillin antibiotics while 6.7% and 13.3% use Sulfa and Flagyl (metronidazole) drugs. The medicaments identified were used in treating symptoms and ailments such as anorexia, paresis, fowl cholera, and paralysis. Avian botulism was the prevalent

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disease in the study area. In terms of action on sick ducks, 24.2% of the farmers slaughtered and consumed sick ducks while 33% treated their sick ducks. From the study disease management of ducks in the metropolis has not been given much attention by farmers however, with much extension education on these the farmers would obtain many benefits from their production.

**Keywords:** Disease, *Anas Plathrynychus*, Biosecurity, Vaccination

## INTRODUCTION

### Background of Study

Ducks are water birds with webbed feet, short legs, and a broad, flat beak belonging to the same family - waterfowl- as geese and swans (Stick and Foote (2006). Most domestic ducks originate from Mallard, belonging to the family *Anatidae*, order *Anseriformes*, and are classified as *Anas Plathrynychus* (Esse, 2021). Ducks are known to live on all continents except Antarctica, and they inhabit most of the world's islands. Most ducks dwell near ponds, rivers, wetlands, or places with freshwater. According to the VSD (2010), total duck population is 330,045 which accounts for 0.91% of ducks in the country. Poultry production has over the years contributed significantly to the nutrient requirement of many consumers. Ducks can be reared for eggs and meat, including products such as down, feathers, and fattened livers for sale (Meulen and Dikken, 2004). Ducks are noted to be high in nutritional quality and thus can supplement the nutritional requirement of consumers. This receives corroboration from the fact that; duck meat and eggs are a rich source of protein and iron (Adzitey, 2012). It is well known that ducks can produce quite a substantial number of eggs comparable to chicken which is of high protein quality. Ducks are noted to be hardier and resistant to common prevalent diseases affecting other species of poultry (Wakenell, 2016). Duck production can be seen as an enterprise that can aid in the fight against poverty alleviation due to its cost-effectiveness and high potential. Poultry and livestock collectively contribute hugely to households and farm enterprises in Northern Ghana (Karbo *et al.*, 2003).

To assist small-holder farmers to exploit the full potential of duck production to increase the existing low number of ducks in the country, there must be a good health and disease management system to promote the health of ducks and also help in the prevention and treatment of diseases. Diseases lead to high mortality, a decline in growth rate, and low egg production in flocks. This affects the economic livelihood of farmers especially small-holder farmers in rural areas. Diseases lead to low productivity and a reduction in quality of meat. For duck health management to be effective, the main objectives should be preventing the onset of disease or parasites, recognizing at an early stage the presence of diseases or parasites, and treating all ducks suffering from disease or parasite infestation. It encompasses control, prevention, and treatment of diseases.

Effective disease management is a pivotal factor in profitable duck production. Controlling diseases by putting in place biosecurity measures will help limit any possible transfer of infection. As reported by Halifa (2008), biosecurity entails all management practices targeted at excluding or reducing the potency for the transmission and spread of diseases to animals and humans from infectious agents. Vaccination and medications as part of prevention and treatment of duck diseases help in boosting the health of ducks. Health and disease management of ducks is highly relevant since ducks are known to be carriers of common prevalent diseases of other domestic birds. In effect, managing or controlling diseases of other domestic birds that are in the same environment as ducks must first start with disease management of ducks to prevent any untoward transmission of infectious agents to other birds. The highly pathogenic avian influenza virus (HPAI H5N1) which poses serious health challenge to the poultry sector and human health manifests mildly in ducks and tends to be carriers of the disease capable of infecting other poultry species and posing serious health concern to humans. Outbreaks of HPAI H5N1 in poultry populations are concomitant with high mortality. In contrast, HPAI H5N1 is mildly pathogenic in ducks (Pabilonia, 2007).

It is therefore very justifiable, that much attention is paid to managing diseases of ducks. Unfortunately, literature covering health and disease management of indigenous ducks in Ghana is lacking and virtually little if any. Information availability on management practices aimed at controlling and preventing diseases of ducks is very paramount. It is against this background, that a study should be carried out to bridge the gap. This study, therefore, sought to identify the various health and disease management practices implemented by small-holder farmers aimed at promoting the health of ducks. This would much inform authorities of the need for a possible formulation of a policy towards disease management of ducks to exploit the full potential of ducks.

### **General Objective**

To identify various health and disease management practices employed by duck farmers to promote production

## **MATERIALS AND METHODS**

### **Study Area**

The study was carried out in the Tamale Metropolis in the Northern Region. The metropolis is located in the central part of the region and shares boundaries with the Sagnarigu district to the west and north, Mion district to the east, East Gonja to the south, and Central Gonja to the south-west. The Metropolis has a total estimated land size of about 646.90780sq km (GSS, 2010). Geographically, the metropolis lies between latitude 9°16 and 9°34 north and longitudes 0°36 and 0°57 west and has one

rainfall season (GSS, 2010). The metropolis is within the savannah woodland zone of Ghana. There are 115 communities in the metropolis and the trees in this zone are short scattered wood lots.

### **Data Collection**

Primary data was collected from 91 duck farmers using semi-structured questionnaires. Secondary data was also sourced from veterinary technicians concerning communities noted for duck production. Data was collected from 23 communities within the metropolis. These were Nyohini, Sagnerigu, Shishegu, Zogbeli, Choggu, Kulnyevila, Lamashegu, Kaselgu, Chogu-Yapalsi, Kpalsi, Jisonayilli, Zakaliyilli, Gurugu, Gunnayilli, Gumani, Banvim, Choggu-Manayilli, Kuku, Tutingli, Zagyuri, Chengli, Kakpayili and Zagyuri. Data collection was performed using purposive and snowball sampling methods. Snowball sampling technique was used in the selection of communities noted for duck farming and purposive sampling technique was employed to access duck farmers within the communities.

The questionnaires administered entail information such as demographic characteristics of farmers, flock size, system of production, treatment regime employed, any available veterinary assistance, any available vaccination schedules, and various management practices. However, because of the possibility of some farmers not being capable of reading and writing in the English Language, interpretation of questions was made by a translator employed as a field assistant.

### **Statistical Analysis**

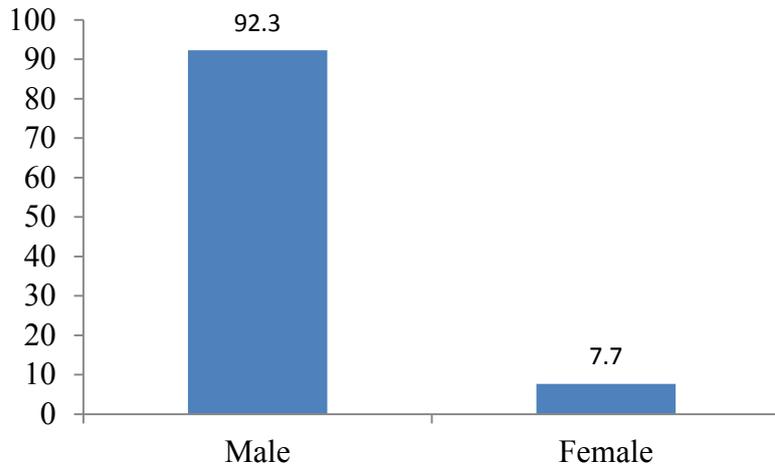
Data were analyzed using simple descriptive statistics such as percentages and frequencies using the Statistical Package for Social Sciences (SPSS) version 20 and the results were presented in the form of a table and pie chart.

## **RESULTS AND DISCUSSION**

### **Demographic Characteristics**

#### **Sex**

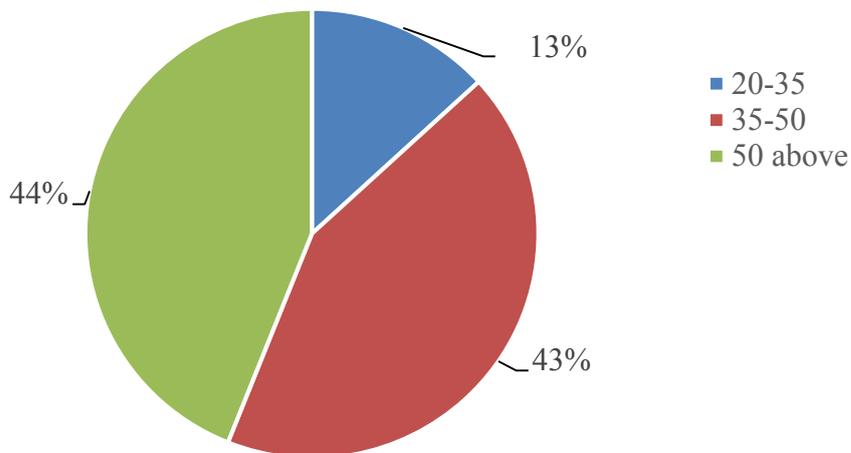
The results in figure 1 show that more males are involved in the production of ducks than females. This portrayed a high level of gender imbalance in terms of duck rearing in the metropolis. This could be attributed to the fact that males are traditionally noted to be livestock or poultry raisers in developing countries. This finding agrees with the report by FAO (2013) that indicated gender disparities in roles and activities which arise principally from customary rules tend to consider certain tasks or activities as "male" or "female". To increase the income of households engaged in livestock production, women need to be given a level ground in terms of duck farming in the metropolis as reported by FAO (2013).



**Figure 1: Sex Distribution of Farmers**

**AGE**

Figure 2 shows that majority of the farmers are within twenty to fifty years. This implies that farmers who are in their active ages are more involved in the production of ducks than the aged in the metropolis. This indicates that the industry has the potential to develop since there is a huge potential of labor availability needed to increase production. This finding agrees with the report by Dei *et al.* (2014) who indicated that majority of the farmers are in their active economic age group in their assessment of rural poultry production in Northern Ghana.



**Figure 2: Age Distribution of Farmers**

## Production Characteristics

### Flock Size

The results in figure 3 show that majority of the farmers have their flock size from 1 to 10. Few farmers have their flock sizes between the ranges of 11-30 and 31-50. The results indicate that majority of farmers are into small-scale production of ducks in the metropolis (flock sizes of between 1 to 10). This corroborates the small-scale production of traditional poultry in developing countries as mentioned in the report by IV WWFC (2009). The small flock size could also be attributed to the low demand for ducks and their products which might have discouraged many duck farmers to expand their flock size. This finding agrees with previous work by Oguntunji and Ayorinde (2015) who indicated that farmers tend to channel limited resources to areas of high demand due to low demand for ducks and their products. Farmers also revealed that ducks are reared for family consumption in most cases which serves as a pointer to the small flock size kept. This agrees with findings of Gueye (2009) who reported that family poultry is considered as an appropriate venture for providing rich quality protein to the fast-growing human population.

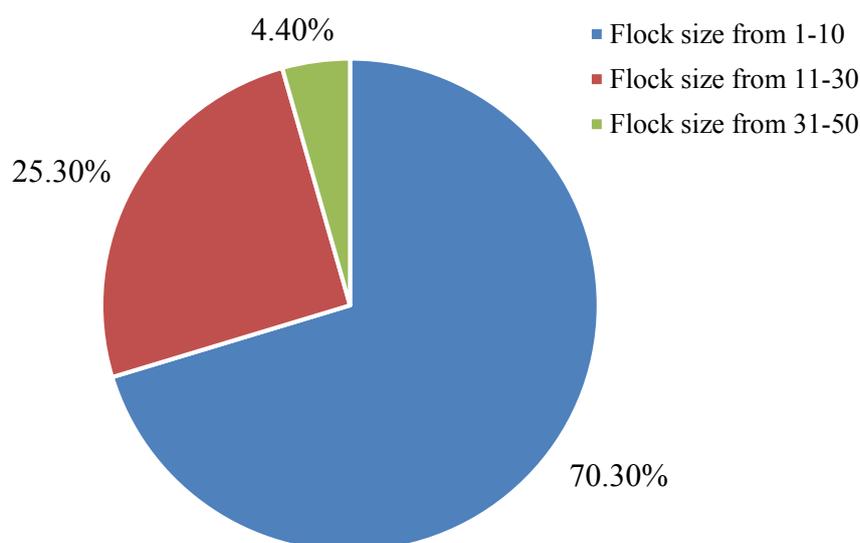


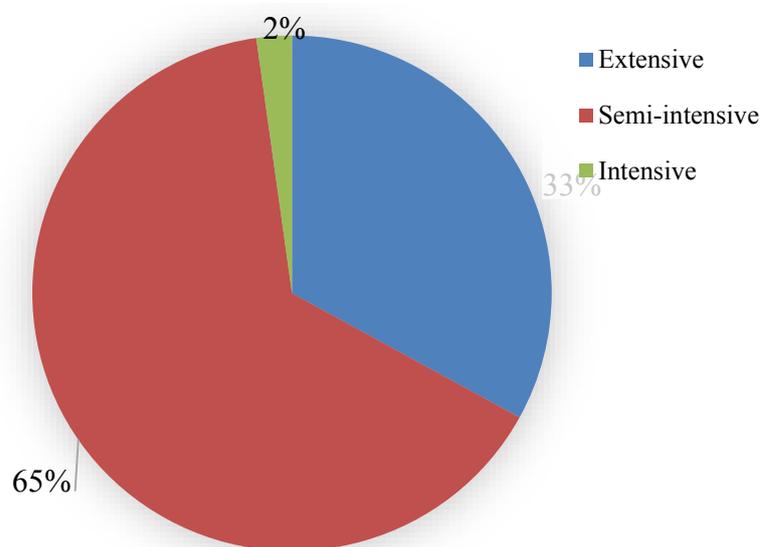
Figure 3 Response on flock size

### Management System

In terms of management systems, figure 4 shows that the semi-intensive management system is mostly practiced. Very few farmers adopted the intensive management system with the extensive system being the second highly practiced management system.

This finding agrees with previous work by Dei *et al.*, (2014) who indicated that a semi-intensive system of production is mainly practiced in the three regions of

Northern Ghana. Farmers stated that ducks feed a lot hence, the need to keep them on the semi-intensive system to enable them to scavenge for additional feed materials to supplement their requirement nutritionally. Owing to the expensive nature of the intensive system of duck production, majority of the farmers did not give it a priority. Quite a substantial number of the farmers (33%) kept their ducks extensively to provide ducks the opportunity to utilize cheap natural feed resources by scavenging. This finding agrees with the report by IV WWFC (2009) which indicated that the extensive waterfowl production in small-scale farms plays a huge role in rural areas in Asian countries for utilization of feed resources such as insects. Farmers who kept their ducks on intensive systems attributed it to the perceived dirty nature of ducks by some community members hence, they resorted to keeping them using this system to prevent possible attacks on their ducks.



**Figure 4: Response on management system**

### Healthy Measures and Medicaments Used for Treating Ducks

#### Action On Sick Ducks

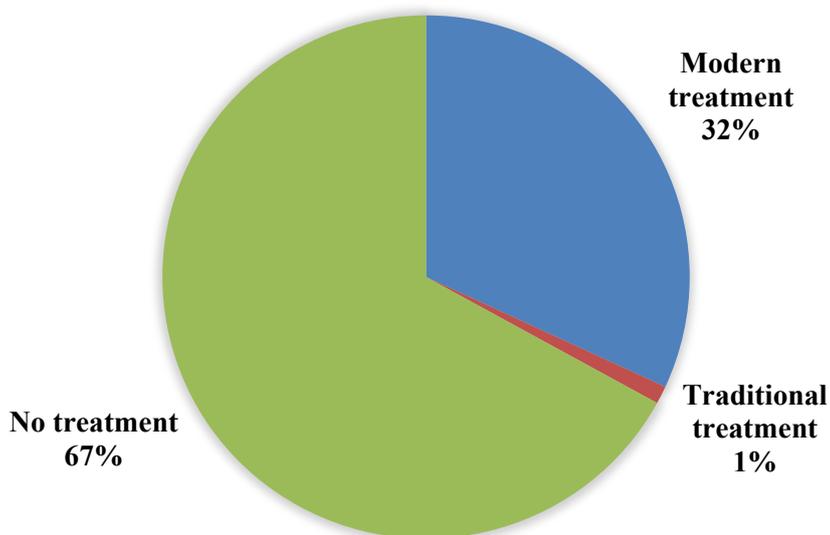
Table 1 shows that an appreciable number of farmers offered treatment to their sick ducks and majority of the farmers did not offer treatment owing to unnoticed deaths, slaughtering and consuming sick ducks, and no sick ducks recorded by farmers.

**Table 1: Response on action on sick ducks**

Action on sick ducks	Frequency	Percentage (%)
Sick ducks slaughtered and consumed	22	24.2
Sick ducks treated	30	33
Unnoticed death of sick ducks	11	12.1
No sick ducks	28	31
Total	91	100

### Treatment

In terms of treatment choice, figure 5 shows that the considerable number of farmers offered modern treatment. Traditional treatment method was given a low priority by farmers and majority of the farmers claimed not to have been offered any form of treatment.

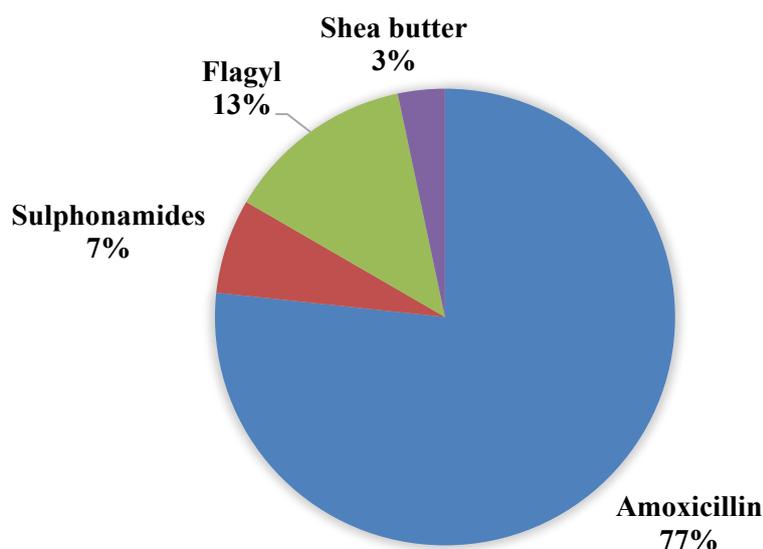


**Figure 5: Response on Treatment choice**

Action taken on sick ducks is important to avoid transmission of infectious agents to healthy ducks and also to pre-empt any possible deaths. From the survey conducted, quite a substantial number (33%) of farmers did offer treatment to their sick birds. Modern treatment was the preferred choice by most farmers in the metropolis. This finding is contrary to the high patronage of ethno-veterinary medicine in the treatment of sick ducks in certain states of Nigeria as reported by Oguntunji and Ayorinde (2015). The patronage of modern treatment could be attributed to access to veterinary services and availability of drugs. Modern treatment works effectively when the correct dosage of conventional drugs is administered over the correct time through water medication since sick ducks are more likely to drink than eat (Jacob and Pescatore, 2012).

### Medicaments Used for Treatment

In terms of medicaments used, figure 6 shows that Amoxicillin antibiotic is the highly used medicament in treating sick ducks. It is used in the treatment of symptoms and ailments such as lethargy, anorexia, paresis, diarrhea, fowl cholera, and paralysis.



**Figure 6: Response on medicaments used by some farmers**

Amoxicillin is a broad-spectrum antibiotic effective against gram-positive and gram-negative bacteria. The sole reason for its usage is attributed to its availability and affordability. It could be inferred from this reason that farmers resorted to the use of the drug without much knowledge about the proper diagnosis of an infection to prescribe the correct dosage of the antibiotic. This finding agrees with previous work by Dei *et al.* (2014) that majority of farmers use medicaments at a dosage only decided by them. Sulfa drugs and Flagyl (metronidazole) were also used by a few farmers. There is a slight difference in terms of usage of Flagyl and Sulfa medicaments and this could be due to cost factors and availability. These were prescribed by vets in treating diarrhea and coccidiosis in some cases. Sulfa drugs and metronidazole are noted to be effective against protozoan infections. The use of shea butter in traditional treatment was given a low priority. This is mostly used in treating leg paralysis. The use of shea butter was employed as an alternative means of treatment due to unavailability of modern medicaments and also due to inability to access veterinary agents mostly in remote areas within the metropolis. Majority of the farmers (67%) did not offer any treatment owing to unnoticed deaths as farmers were not able to monitor fully the health status of their birds due to the extensive system practiced. Moreover, inadequate knowledge on disease management and unavailability of veterinary agents prompted farmers to slaughter and consume sick ducks in most remote areas with the sole reason of avoiding loss. This finding agrees with previous work by Oguntunji and Ayorinde (2015) who reported that farmers resort to the slaughter and consumption of sick ducks to prevent total loss of their investment. In addition, most farmers stated they have not offered any treatment since they have not recorded sick ducks due to the care provided to the ducks. Disease control is a corporate shared obligation between the government and the private sector (Turkson and Okike, 2016). There is a need for workers from government and private

sectors belonging to the veterinary service to consider it a responsibility to extend services to rural areas.

### Vaccination

Vaccination has been major neglect in the metropolis possibly due to lack of awareness of the deleterious effects of not vaccinating their ducks and possibly the cost involved in vaccination. Figure 7 shows that vaccination was given a low priority in the metropolis as only a few farmers did administer the vaccination to their ducks and majority of the farmers had no vaccination schedule.

In terms of cost as a challenge, the finding in this study agrees with the report by Dei *et al.* (2014) who indicated that the vaccination fees charged were considered to be exorbitant by some farmers. From the survey conducted, more than half of the farmers interviewed had no vaccination schedule. Vaccination is a tool to prevent infectious diseases which are difficult to eliminate by biosecurity alone. This is in line with the assertion made by Capua and Marangon (2006) who reported that although biosecurity is considered an excellent means of forestalling infection, the biosecurity standards necessary to prevent infections are difficult to sustain in certain situations. Vaccination against *Salmonella enteritidis* and *Salmonella typhimurium* may be administered as part of a *Salmonella* control strategy, despite *Salmonella typhimurium* being considered a duck pathogen in its own right (Jacob and Pescatore, 2012). These zoonotic diseases pose a health concern to humans if sick ducks without any history of vaccination are consumed.

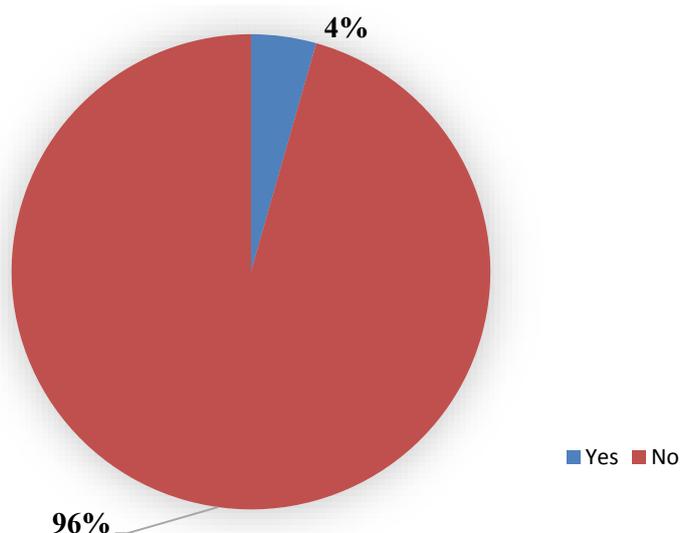
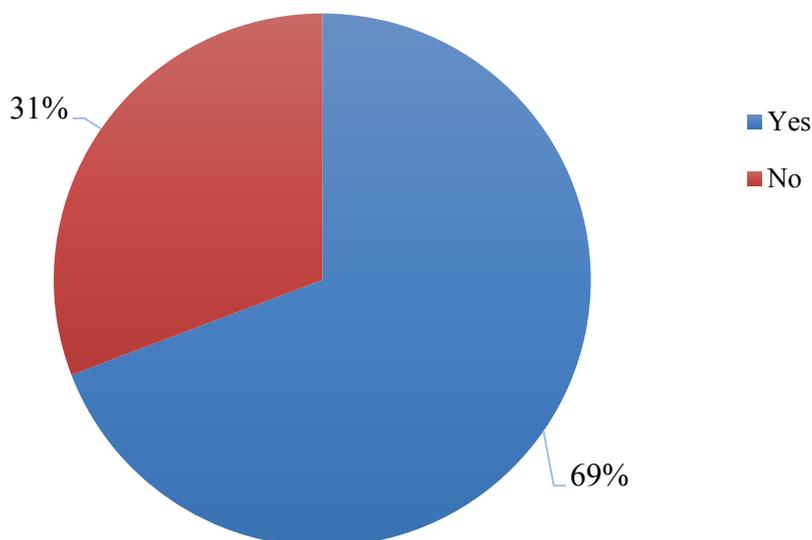


Figure 7: Response on the vaccination schedule

### Biosecurity

In terms of biosecurity, figure 8 shows that majority of the farmers adopted biosecurity measures and a substantial number of farmers did not adopt any biosecurity measure.



**Figure 8: Response on biosecurity availability**

### Biosecurity Measures Adopted By Farmers.

Table 2 shows that most farmers provided water and feed regularly as a biosecurity measure to prevent ducks from drinking and ingesting contaminated water and food. Prophylactic treatment was the second highly adopted measure to boost the immunity of ducks. Very few farmers considered control of ticks as a priority. Cleanliness of pens and provision of shelter were practiced by a few farmers who employed them as biosecurity measures. Culling and slaughtering were the third highly adopted measure to limit transmission of infection.

**Table 2: Biosecurity measures implemented by farmers**

Practice	Frequency	Percentage (%)
Provision of water and feed regularly	18	28.6
Cleaning of duck pens on regular basis	6	9.5
Culling and slaughtering of sick ducks	11	17.5
Protection of ducks from predators	7	11.1
Provision of shelter for ducklings from rain	6	9.5
Prophylactic treatment	13	20.6
Control of ticks	2	3.2
Total	63	100

Biosecurity is a security tool used in preventing and controlling diseases and it is the first line of defense that needs to be well implemented to protect the health of flocks. From the survey conducted, it was realized that majority of the farmers adopted biosecurity measures. The high proportion of the farmers who practice biosecurity measures could stem from the fact that farmers were duly equipped with knowledge about the need to have measures to protect the health of their ducks. It was however realized that most farmers were adopting one particular security measure at a time instead of implementing more than one security measure to effectively reduce disease occurrence. Hence, holistic implementation of biosecurity standards was in a way not met. This finding agrees with the work by Conan *et al.*, (2012) who indicated that biosecurity standards are poor in traditional poultry farming in developing countries. This was evidenced by the prevalence of paralysis as a result of Avian botulism as farmers testified that ducks were easily exposed to rotten food materials and poisonous substances in the environment. This agrees with the report by Meulen and Dikken (2004) who indicated that several ducks will become paralyzed very quickly and then die as a result of ducks eating food which is rotten caused by bacteria which are present in rotten plant remains, animal remains and also in stagnant water. The inability of most farmers to implement more than one measure could be attributed to the high cost involved in the implementation of biosecurity measures. From the survey conducted, a substantial number of farmers provided water and feed as biosecurity measures with the view that ducks feed a lot, hence the need to supplement their dietary requirements. This finding agrees with the report by Cristalli and Capua (2007) who indicated that birds need to be provided with supplemental feed. Ducks were provided with water for cooling their bodies. This is very important as ducks are noted to be water-birds. Cleaning of duck pens and providing shelter to ducklings from rain were practiced by a few farmers. Good hygiene is considered to prevent buildup of disease-causing organisms. This finding agrees with the report by Meulen and Dikken (2004) that by maintaining the shelter and its surroundings clean you limit the potential of disease occurrence. Farmers, therefore, need to be sensitized to see good hygiene of the pens and surroundings as the first and most important biosecurity measure. Ducklings need much attention as compared to ducks hence, the need to protect them from certain environmental conditions. Ducklings need to be kept enclosed and also need to be provided with warmth since they cannot maintain their body temperature (Meulen and Dikken, 2004). Culling and slaughtering of sick ducks were carried out by a few farmers in an attempt to ameliorate further transmission of any infectious disease. These farmers stated they have never attempted any curative treatment hence resort to this practice to prevent further transmission. Prophylaxis and control of ticks were also carried out to ensure security against further disease occurrence. Farmers stated that they resort to prophylactic treatment as a bit of advice

from veterinary agents. Farmers indicated that it helps to boost the immune system of ducks.

The considerable numbers of farmers without any biosecurity measure were mostly practicing extensive systems. In addition, implementation of biosecurity measures is accompanied by cost hence rural farmers with poor financial status are not able to implement any. This finding agrees with the report by FAO (2008) that planning for biosecurity must consider socio-economic analysis which includes the level of cost that people can afford to pay.

In terms of controlling diseases of poultry, ducks cannot be left out since ducks are well noted to be resistant to common diseases of chickens. Management of diseases of ducks needs to be given much attention as part of the fight against HPAI H5NI.

In a synopsis, the correct approach to controlling zoonotic infectious diseases should be holistic. It should be considered within the framework of improving personal and community hygiene to prevent all infectious diseases in traditional poultry to eventually palliate the risk of exposure and transmission to humans (Conan *et al.*, 2012).

## CONCLUSIONS

It is evident from the study that majority of duck farmers in the metropolis adopt biosecurity measures as the most important tool for health and disease management of ducks. Notwithstanding this, farmers are poorly equipped with knowledge regarding the effective implementation of health management practices. Good hygiene of duck pens and vaccination as the most important preventive health care of ducks were not considered as a priority by majority of the farmers but just a handful of farmers. The study also shows that majority of duck farmers offered no treatment to ducks and rather resorted to the slaughter and consumption of sick ducks and also through the means of unnoticed death of sick ducks due to the practice of extensive system of management. Modern treatment was given much priority by farmers to that of traditional treatment but much education need to be given about the judicious use of medicaments.

## RECOMMENDATIONS

On the whole, farmers need to be well educated through extensive education to equip them with knowledge on how to successfully implement health management practices and curative measures to ameliorate the occurrence of infectious and zoonotic diseases which pose a health challenge to humans and other poultry species.

Farmers keeping their ducks on an extensive management system also need to be educated and advised on the need to practice semi-intensive systems and if possible intensive system of management.

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