

# Study on Causes of Morbidity and Mortality in Selected Poultry Farms in Debre Zeit, Ethiopia

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Received date: August 03, 2021; Accepted date: August 17, 2021; Published date: August 24, 2021

Citation: Alemayehu MM (2021) Study on Causes of Morbidity and Mortality in Selected Poultry Farms in Debre Zeit, Ethiopia, J Vet Med Health, Vol.5 Iss.2 No:129.

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#### Abstract

The patterns and causes of mortality and morbidity in poultry farms in Lohmann brown and ISA-Brown of layers breeds and Cobb500 breed of broiler chickens were studied in six commercial poultry farms at Debre Zeit from dayold to 10wks (broiler) and 15wks (layers) of age of birds from December 2013 to April 2014. The study was accomplished by a weekly visit of farms and by a questionnaire survey by which general health and risk factor assessments were collected. Diseases and disorders were diagnosed based on the disease history, clinical signs and characteristics necropsy lesions. From the average total population of 57442 birds, the morbidity and mortality of chickens caused by different diseases and disorders were 4526 (7.88%) and 3808 (6.63%) respectively. In meat type chicken in three of the farms with average population of 21947 birds the overall morbidity and mortality rates were 1407 (6.41%) and 1202 (5.48%) respectively and in egg type chicken with an average total population of 35495 birds the morbidity and mortality were 3072 (8.66%) and 2605 (7.34%) respectively. Based on disease history, clinical signs and postmortem lesions the causes of mortality in the farms were Newcastle disease (3.18%), overcrowding (2.21%), infectious bronchitis (0.50%), stress (0.41%), coccidiosis (0.39%), pullorum disease (0.21%), infectious bursal disease (0.14%), fowl pox (0.12%) and cannibalism (0.01) were diagnosed in egg type birds and stress (1.99%), pullorum disease (1.19%), overcrowding (0.46%), Newcastle disease (0.43%), Ascites (0.29%), colibacillosis (0.06%) and coccidiosis (0.02%). The breed wise analysis on the overall mortality in chickens showed significantly highest (p<0.05) mortality in Lohmann brown (10.19%) followed by cobb500 (5.48%) and ISA brown (2.91%) breeds of chicken. The age-wise analysis on the overall mortality in egg type chickens showed significantly (p < 0.05) highest mortality in grower (13.56%) followed by brooding, (11.37%), and lowest in pullets (3.84%). And in that of meat type chicken the age wise analysis showed significantly (P<0.05) higher mortality in 1-5 weeks of age of birds (14.46%) than 6-8 and/or 10 weeks of age of birds (1.75%). The present study clearly indicates that birds kept under intensive management system were exposed to a wide range of diseases that mainly due to management failure of the farms. Therefore, the farm owners were advised to alleviate the problems and to maintain good management of the farm.

Keywords: Cobb500; ISA Brown; Debre Zeit; Lohmann Brown; Morbidity; Mortality; Necropsy; Questionnaire survey

#### Introduction

The world poultry population has been estimated to be about 16.2 billion, with 71.6 % in developing countries, producing 67, 718,544 metric tons of chicken meat and 57,861,747 metric tons of hen eggs. In Africa, village poultry contributes over 70% of poultry products and 20% of animal protein intake. In East Africa over 80% of human population live in rural areas and over 75% of these households keep indigenous chickens and Ethiopia is not exception to this situation [1].

Ethiopia has large population of chicken, estimated to be 42 million. Recent estimates put the poultry population in Ethiopia at around 40.6 million with native chicken of none descriptive breeds representing 96.6%, hybrid chicken 0.55% and exotic breeds of chickens mainly kept in urban and peri-urban areas 2.84%. From the total population of chicken in Ethiopia, 99 % are raised under the traditional back yard system of management, while 1 % is under intensive management system [2].

Infectious diseases of various etiologies and poor feeding, housing and management systems are the most important constraints of poultry industry worldwide. Diseases reduce chicken production by reducing productivity and causing economic losses as a result of sub-optimal productivity, high veterinary expense, and culling as well as actual chicken mortality. Broadly, continued persistence of diseases exerts severe impacts on food security, nutrition, health and financial costs at various levels from producer, local, regional and national economy. Mortality plays a major role in determining profit from layers and broiler and is a function of dead and culled birds over the growth and production period [3].

In Ethiopia, investigations of poultry diseases, that cause morbidity and mortality, have received little attention. However, very few reports have indicated the prevalent nature of infectious diseases. Nowadays, it is becoming a growing concern that there is introduction of diseases of various etiologies into several poultry farms concurrent with importation of exotic breeds. Furthermore, intensification is aggravating the rapid spread of the prevailing infectious diseases between and within poultry farms [4].

Diseases of chicken are mostly infectious in nature and therefore, wide variability in losses due to such diseases is expected in egg type layers and meat type broilers. These infectious diseases can be viral, bacterial, fungal, protozoan and parasitic and management problems share the lion's part in affecting poultry production. A number of diseases and disorders are known to affect poultry causing morbidity and mortality such as Aspergillosis, Pullorum disease, colibacillosis, Newcastle disease (ND), Infectious bursal disease (IBD), Coccidiosis, Fowl pox, Infectious Bronchitis (IB) and stress, overcrowding, cannibalism and Ascites [5].

Identification of the nature of infectious diseases, risk factors and establishing the patterns of occurrence of diseases of chickens are crucial in designing pragmatic control and preventive strategies.

Therefore, the aims of the present study were to:

- identify and characterize the causes of morbidity and mortality in poultry farms,
- · assess the magnitude of morbidity and mortality rates
- determine the patterns of morbidity and mortality causes between egg and meat type poultry breeds, and among the various age groups within a given production type

# **Materials and Methods**

#### Study area

This study was carried out in poultry farms found in Debre Zeit, Ethiopia. Debre Zeit is located 45kms southeast of Addis Ababa. The area is located at 9°N latitude and 40°E longitudes at an altitude of 1850 meters above sea level in the central high lands of Ethiopia and experiences a bimodal rainfall pattern with a long rainy season from June to October and a short rainy season from March to May. The average annual rainfall and average maximum and minimum temperature for the area are 800mm, and 27.7°C and 12.3°C, respectively. The 2007 national census reported a total human population for Debre Zeit of 99,928, of whom 47,860 were men and 52,068 were women.

#### **Study population**

The study was carried out in meat type broiler (from day old to 8 and/or 10 weeks of age) and egg type layers (from day old to 15 weeks of age) chickens from December 2013 to April 2014 in six privately owned commercial poultry farms located at Debre Zeit, central Ethiopia. The chicken in the farms were managed under intensive production system; the average total population was 57,442 chickens per farm. The first, second, third and fourth farms are large-scale and designated as farm A, B, C and D. Two of the farms are small-scale and designated as farm E and F. Among the total population, 35495 were egg type layer chickens of Lohmann brown and ISA brown and 21947 were meat type broiler chickens of Cobb-500 breed. The sampling units (poultry) were identified individually and in group and monitored throughout the study period.

### Study design

A longitudinal study design was employed to establish causes of morbidity and mortality in the six poultry farms from December 2013

to April 2014 along with structured questionnaire survey by which data were collected on general farm practice, general health assessment and risk factor assessments.

#### Results

# Morbidity and mortality rates in egg and meat type chicken breeds

During the study period chickens in the six poultry farms have been followed starting at the age of day old to 15 weeks in egg type chickens and day old to 8 and/or10 weeks in meat type (broiler) chickens and a total of 4526 sick and 3807 dead birds were observed from December 2013 to April 2014 in selected six farms at Bishoftu, Ethiopia. Out of the average total population of 57442 birds, the overall morbidity and mortality rates of chickens were 7.88% and 6.63%, respectively. Out of these 2.63% of dead birds and 1.77% of sick birds were opened for post mortem examination.

# Morbidity and mortality rates between egg and meat types of chickens

Of the total of 35495 average population of egg type chickens of the four farms the overall mortality due to different diseases and disorders was higher in farm F (12.03%) than farm A (9.61%), farm B (10.33%) and farm C (1.9%) (Figure 1). In line with this, farm F has no proper housing which is rented and the limited use disinfectants. Compared with farm A, B, and C in farm F layer chickens were raised overcrowded where the density on average was 12.82 chickens/m2.





In farms A and B the breed type was Lohmann brown and in that of farms C and F the breed type was ISA brown.

In meat type chicken in three of the farms, the average population of birds was 21947 from which 1407 birds were sick and 1202 birds were died. Therefore, the overall morbidity and mortality rates in broiler were 6.41% and 5.48% respectively.

The morbidity and mortality rates in broiler chickens were highest in farm A with values of 8.58% and 8.17%, respectively; the lowest rates were found in farm D with 4.87% morbidity and 3.84% mortality rates. In line with this farm A has been rearing both meat type and egg type poultry in addition to dairy in the same compound. Thus, the mortality (7.34%) of egg type breeds which has been reared in farm A, B, C and F was found higher than the mortality (5.48%) of meat type breeds which has been reared in farm A, D and E. The breed (egg and meat type) wise analysis on the overall mortality in chickens showed significantly (p<0.05) higher mortality in egg type breed (7.34\%) than meat type breed (5.48%) of chicken.

### Discussion

The present study was carried out to assess morbidity and mortality rates in selected poultry farms in Debre Zeit town, identify the causes of morbidity and mortality, and assess some risk factors that may favor for illness and death in poultry in selected farms.

Out of the average total population of 57442 birds, the overall morbidity and mortality rates of chickens were 7.88% and 6.63% respectively. This is a higher result than the expected normal level of mortality in intensive farms which is estimated to be 3%. However the present study report showed a slightly lower rate of mortality than the previous unpublished study in combolcha poultry breeding and multiplication center (KPBMC) and in Andassa government poultry farm (both are found in Ethiopia) the mortality rate in growing commercial chickens was recorded to be 8.92% and 16.23% respectively.

In meat type chicken in three of the farms, the average population of birds was 21947 from which 1407 birds were sick (6.41%) and 1202(5.48%) birds were died. The overall mortality (5.48%) in broiler recorded in this study supports the mortality reported by who reported 6.7% and 6.13% mortality respectively. However, a higher mortality rate (13.05%) was reported by. Overall mortality recorded in meat type in the present study (5.48%) could be considered higher when compared with the optimal range (2.5-5%) reported for higher profitability in broilers. Thus, efforts should be made to reduce it through better health care and appropriate management of the broilers in the farms. In egg type chicken the average total population of birds was 35495 of which the sick and dead birds were 3072(8.79%) and 2605 (7.34%) respectively. Reported a reduction in net profit when mortality was more than 2 to 5% in egg type chickens. The mortality (7.34%) in egg type chickens recorded in this study supports the mortality reported by who reported 6.67% mortality in egg type chickens in Pakistan. However, contrary to this study higher mortality of 14.2% was reported by in egg type layers in India.

## Conclusion

The current study clearly demonstrates that there is a relatively high mortality and morbidity in commercial chicken flocks. This study has clearly indicated the pattern of occurrence of diseases in layers and broiler chickens reared under intensive production system both at small scale and large-scale poultry farms and thus control measures should be devised accordingly. In addition to diverse disease problems, poor farm management practices adopted in all farms contributed significantly for the losses. Disease prevention through vaccination programs were also found to be variable among the study farms. However, even in farms that vaccinate against some diseases, losses due to such diseases were not prevented. By deeming the results of this study, poultry farms should strictly improve farm management practices and disease control approaches.

Based on the above conclusion the following recommendations are forwarded:

- In order to curb losses due to morbidity and mortality in poultry production in the country, thorough investigation should be conducted on the problems
- Causes attributed to morbidity and mortality should be thoroughly investigated
- Poultry farms should be properly managed to prevent morbidity and mortality
- Vaccines should be available and given timely for important poultry diseases

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