Int.J.Curr.Res.Aca.Rev.2021; 9(10): 53-58

EXCELLENT PUBLISHERS

International Journal of Current Research and Academic Review

ISSN: 2347-3215 (Online) Volume 9 Number 10 (October-2021)

Journal homepage: http://www.ijcrar.com

doi: https://doi.org/10.20546/ijcrar.2021.910.008

Occurrence of Coccidiosis in Poultry Farms in Bishoftu and Adama Areas of Ethiopia

Beksisa Urge, Temesgen Kassa* and Beritu Borena

Ethiopian Institute of Agricultural Research Holeta Animal Health Research program, Holeta Ethiopia

**Corresponding author*

Abstract

Coccidiosis is a protozoan disease that resulted in tremendous loss in the poultry farms. A cross sectional study was conducted from 2019 to 2020 in Bishoftu and Adama Poultry farms to determine the occurrence of coccidiosis and its risk factors. A total of 120 diarrheic chicken up to the age of 6 months were selected purposively. Out of 120 chicken subjected for fecal examination 58.33%, (n=70) showed coccidia infection in the study farms. The highest prevalence of coccidiosis was noted in poorly high hygienic farms which was statistically significant (p<5%) higher in one to fourth months. Old age chicken and lower in chickens that aged less than one month (6.7%). The variation was statistically insignificant among these groups (p=0.06). The result also showed that females harbored higher coccidia (34.2%) parasites than male chickens (24.2%) in the farms. The current result indicated that coccidiosis is a common problem in the poultry farms. Therefore, introducing prevention and control measures that comprises of strategic prophylaxis against coccidiosis than therapeutic regimens should be appropriately practiced in the farms.

Article Info

Accepted: 18 September 2021
Available Online: 20 October 2021

Keywords

Age, chicken, coccidian, coccidiosis.

Introduction

Parasitic diseases have remained the major problem limiting the expansion and profitability of the developing agricultural countries, where skilled husbandry in-puts have not matched the rate of expansion and intensification of poultry holdings. Poultry coccidiosis is one of the most common and economically most important diseases of poultry worldwide (Haug *et al.*, 2008).

Poultry coccidiosis, caused by several distinct species of *Eimeria*, remains the most economically significant parasitic infection of the poultry industry, worldwide (McDougald, 2003). The disease is endemicin most of the tropical and subtropical regions where ecological and management conditions favour an all year round development and propagation of the causal agent (Obasi *et al.*, 2006).

Eimeria species is the genus *Eimeria* family *Eimeridae* order *Eucoccidiorida* and phylum *Apicomplexa* (Taylor MA, *et al.*, 2007). Eimeria colonize and infect the intestinal tract of different animals and birds (Haug *et al.*, 2008) and infection with this parasite normally occurs through ingestion of feed or water contaminated with sporulated oocysts (Allen P and Fetterer R H (2002); Haug A *et al.*, 2008). About nine species of *Eimeria* have been recognized in domesticated chickens, of which *Eimeria brunette, Eimeria maxima, Eimerianecatrix, Eimeriatenella* are the most pathogenic; *Eimeria acervulina, Eimeria mitis, Eimeria mivati* are the less

pathogenic and *Eimeria praecox* and *Eimeria hagani* are the lesser pathogenic (Jadhav B N *et al.*, 2011).

The most common and pathogenic species that affects the poultry industry globally is the *E. tenella* with 100% morbidity and a high mortality due to extensive damage of the digestive tracts of chickens (Hadipour, *et al.*, 2011). Mortality rates are usually high in young chicks, because most of the Eimeria species affects birds between the age of 3 and 18 weeks. The occurrence of clinical coccidiosis is directly related to the number of oocysts ingested by poultry at one time, the pathogenicity of the *Eimeria* species, the age of the infected chicken and the management system (Dakpogan HB, and Salifou S, 2013).

The most frequent symptoms is at the beginning yellow diarrhea then become depressed, have ruffled feathers, the wings droop and tend to huddle together (Kahn C M, 2005). High incidence of coccidiosis is usually observed in poultry managed under intensive management system like deep litter due to increased likelihood of high oocysts accumulation in the litters (Nnadi P and George S, 2010). Furthermore, higher stocking densities have been linked with increased incidence of coccidiosis due to a higher rate of infection and transmission of the coccidian oocysts in dense flocks from one poultry house to another (Lunden A *et al.*, 2000).

In Ethiopia, despite the immense research works done by several outstanding researchers in the area of poultry coccidiosis in different parts of the country(Ashenafi, 2000; Methusela, 2001; Methusela *et al.*, 2002; Lobago *et al.*, 2003; Methusela *et al.*, 2004; Gari *et al.*, 2008), the disease is still continued being a major problem demanding much research and investigation. There was lack of information in the present poultry farms about poultry coccidiosis. Therefore, the objectives of this study were to determine the occurrence of poultry coccidiosis and its predisposing factors in different scale poultry farms of the study sites.

Materials and Methods

Study Area

The study was conducted in Bishoftu and Adama poultry farms central east shoa zone, Oromia region Ethiopia.

Bishoftu is located about 47 kilometers South East of Addis Ababa. The area is located at about 1850 meters above sea level. The town has the population of about 95,000 people. The soil and climate of the area are similar to those in many highland areas in Ethiopia. The main rainy season of the area ranges from June to September with an average rain fall of 800 millimeters, of which 84% of the rain is expected.

There is also a short rainy season from March to May. The annual average temperature ranges from 12.3o c to 27.7o c with an average temperature of 18.7o c. The highest temperature is reached in May (CSA, 2001).

Adama city is located in the Oromia Regional State, 99 kms East of Addis Ababa. The average annual temperature is about 21 °C, with altitudes ranging from 1,600 to 1,700 m above sea level and average rainfall of 760 mm (CSA, 2001).

Study Animals and sampling techniques

The study was performed in both layers and broilers of grower chickens age up to six months, which were kept for commercial purpose. A total of 120 diarrheic chickens at the time of sample collection reared under intensive deep litter management system, were considered as study population.

Purposive techniques were used in the study farms and chicken that showed diarrhea were included in the study

Study Design and Sample Size Determination

The study design consists of cross sectional study type and the sample size was determined based on the assumption of the possible or expected prevalence rate of the disease recorded in Kombolcha located at the same attitude of the study area which was 80.65% (Getachew Gari1 *et al.*, 2008). The sample size was calculated based on the formula indicated by (Thrusfield, 2005). Hence, a minimum of 120 diarrheic birds were purposively considered for this study.

Sample Collection and Fecal Examination

Freshly deposited 10 g feacal samples collected from diarrheic chickens of different ages, breed, and sex kept under intensive and free-range system; samples were examined thoroughly. Samples were collected with a spatula, which was washed and cleaned after each collection in order to avoid contamination. Each feacal sample was placed in a pre-labeled bottle indicating the age, house hygiene and sex of the chicken. The presence of feacal oocysts was determined using the concentration

by flotation method. The principle allowed the eggs to float to the surface of the solution of higher specific gravity (S.G), which concentrates at the top and leaves debris lower down. The higher the S.G of the solution, the more the eggs of various types will float, and S.G of eggs various types will float. One gram of faecal sample was weighed using a top loader balance. Put into a beaker and mixed with saturated salt solution of NaCl(40%w/v), it was thoroughly mixed and strained using 90 mesh sieves into another beaker. The filtrate was poured into test-tube of respective faecal sample number and these were placed in test-tube stands.

Each test tube was then filled to the brim with salt solution of NaCl. Cover-slip was placed on test tube surface and was left to stand for 15 min after which they are gently lifted (without brushing against the tubes). They were then placed on microscope slides sideways in one quick movement to avoid bubbles on the glass-slide and viewed under the microscope. Examinations of slides were carried out using x40 objective lens (Conway and McKenzie, 2007).

Data management and Analysis

The raw data was entered and managed using Microsoft Excel work sheet and summarized with descriptive statistics. R. software version 4.0 was used to determine the prevalence of the disease and the association between prevalence and risk factor was assessed by using Pearson's Chi-square and odd ratio. A statistically significant association between variables was considered to exist if the computed p-value is less than 0.05.

Results and Discussion

Overall Prevalence of Coccidiosis

Out of 120 chickens (79female and 41male) screened for coccidiosis, 70 of them were infected and harbored coccidia parasites. Accordingly, the overall prevalence of poultry coccidiosis in the study area was 58.33% (Figure 1).

Poultry Coccidiosis According to Different Risk Factors

A few cases, 6.7% (N=8) were occurred during the first one month age. The highest numbers of clinical coccidiosis (30%) were recorded at the age of 1 to 4 months. Layers were highly infected (30%) than broilers. The most cases (43.3%) of coccidiosis was occurred in poorly hygiene poultry farms. Hygiene status of poultry house has statistically significant association with the occurrence of coccidiosis (p=0.000).

Association of Predictor Variables

The results of Multivariable Logistic Regression analysis showed the association of predictor variable poultry coccidiosis. There was no multicollinearity between variables. Accordingly the stepwise multivariable Logistic Regression analysis results showed important risk factors for poultry coccidiosis. Therefore, sex and house hygiene were included in the final model. However, only poultry house hygiene was significantly associated with coccidiosis

Thus the reduced model depicted that chicken reared in poor and medium hygienic house were 24.4 and 184.2 times more likely to be positive to coccidia infection than good hygiene poultry farms respectively (Table 2).

Coccidiosis is an intestinal disease affecting the small intestine and caecal portion of the large intestine. The overall prevalence of chicken coccidiosis in the study area was 58.33%. The result is higher than the finding of Diriba *et al.,* (2012) and Gari *et al.,* (2008) who reported prevalence of 20.57% in poultry farms in and around Ambo town, Western Ethiopia, 22.58% in litter system of exotic breed (Rhode Island Red) in Tiyo districts, Arsi zone Ethiopia, and respectively. This variation in prevalence of the disease may be due to epidemiology of coccidian infection and differences in management systems of the farms.

The present study indicated that the prevalence of coccidiosis was relatively higher in female (34.2%) than male (24.2%) chickens; however, there was not statistically significant difference among sex (p = 0.07). Absence of statistically significant difference between male and female might be due to equal chance of exposure for the parasite infection.

The current study also revealed that all ages of poultry are susceptible to coccidiosis but age between 1 to 4 month (30%) are more susceptible to infection than age between 4 t0 6 months (20.8%). This also agreed with the report of Julie (1999) who stated that all ages of poultry are susceptible to infection. The result is in concurrence with the report of Muazu *et al.,* (2008) which stated that the predominance of coccidial infection among adult chickens were 36.7% and among the younger chickens were 52.9%.

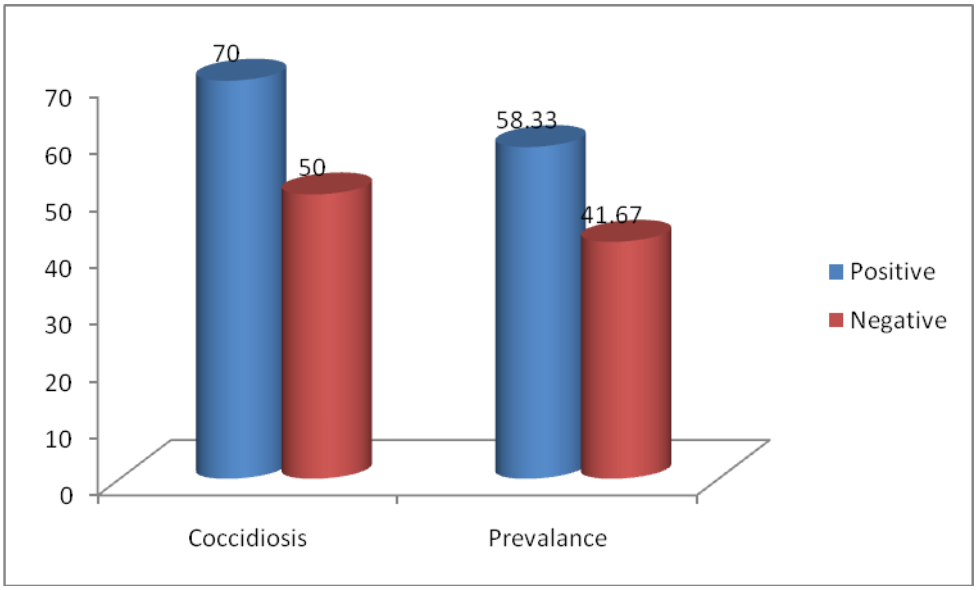
Table.1 Poultry coccidiosis according to different risk factors

Risk factors	Variables	No. Positive (%)	X- value	P-Value
Sex	Male	29(24.2)	3.202	0.07
	Female	41(34.2)		
Age	< 1 month	8(6.7)	5.563	0.06
	1-4month	37(30)		
	4-6month	25(20.8)		
Type	Chicken	8(6.7)	8.452	0.014
	Layer	36(30)		
	Broiler	26(21.7)		
Farm type	Small scale	26(21.7)	0.0314	0.98
	Medium scale	24(20)		
	Large scale	20(16.7)		
Farm location	Adama	28(23.3)	0.47	0.45
	Bishoftu	42(35)		
Hygiene	Poor	52(43.3)	71.813	0.000
	Medium	15(12.5)		
	Good	3(2.5)		

Table.2 Multivariable logistic regression analysis of risk factors associated with risk factors of poultry coccidiosis

Risk factors	Variables	No. positive (%)	OR(95%CI)	P-value
Sex	Female	41(34.2)	Ref	
	Male	29(24.2)	3.1(12.476-25.436)	0.0912
Farm hygiene	Good	3(2.5)	Ref	
	Medium	15(12.5)	24.4(18.149-48.859)	0.000
	Poor	52(43.3)	184.2(37.632-70.515)	0.000

Fig.1 Overall prevalence of poultry coccidiosis



The prevalence rate of the disease was no significantly different (p = 0.06) between age groups. This was because most coccidian infections occur at the age of 3 to 4 weeks but clinical diseases develop one or more weeks later. The disease appears to reach climax at 5 to 7 weeks of age and as age exceeded 7 weeks, most birds will develop immunity and increase resistance to the disease (Taylor *et al.*, 2007; Bowman, 2009).

Recommendations

Coccidiosis is a major problem in Bishoftu and Adama poultry farms, with increasing prevalence in grower chickens. Management problems such as poor hygiene and management of the litter and the presence of birds of different ages were the main predisposing factors for the higher prevalence of clinical coccidiosis. Poultry coccidiosis is a major burden to poultry producers and veterinary health professionals from time to time by changing its mode of occurrence and with variation in the conditions of the different management system and level.

Therefore, based on the above conclusion the following recommendations are forwarded:

Management procedures which limit contamination of litter should be applied with high emphasis as well as keep litters dry through proper installation and management of watering systems.

Appropriate stocking density should be maintained and rising of multiple ages in the same house should be avoided.

Continuous coccidiosis monitoring should be conducted via regular monitoring of litter oocyst counts and appropriate measures should be taken accordingly.

Further research has to be conducted to assess natural relative resistance among different breeds.

References

Allen P C, Fetterer R H (2002) Recent advances in biology and immunobiology of Eimeria species and in diagnosis and control of infection with these coccidian parasites of poultry. Clinmicrobiol Rev 15: 58-65.

Bowman D (2009).George's parasitology for veterinarians. 9thed. India: Saunders Elsevier. 2-94.

Conway D P, McKenzie M E (2007). Poultry Coccidiosis: Diagnostic and Testing Conway, D. P. and M. E. McKenzie, 1991. Poultry Coccidiosis. Diagnostic and Testing Procedures, 2nd Edn.Pfezer Inc., The Netherland, pp: 7-14, 37-40.Procedures. 3rd ed. Blackwell Publishing. Ames, IA, USA. pp. 134-165.

CSA, Central Statistical Authority: Federal Democratic Republic of Ethiopia, Central Statistical Investigatory, Statistical abstract. 2001.

Dakpogan H B, Salifou S (2013) Coccidiosis prevalence and intensity in litter based high stocking density layer rearing system of Benin. J Anim Plant Sci 17: 2522-6.

Diriba O, Achenef M, Basaznew B (2012). Prevalence and Risk Factors of Coccidiosis in Poultry Farms in and Around Ambo Town, Western Ethiopia. Am. Eur. J. Sci. Res. 7(4):146-149.

Gari G, Tilahun G, Dorchies P (2008). Study on poultry coccidiosis in Tiyo district, Arsi

Getachew Gari, Getachew Tilahun and Ph. Dorchies, (2008). Study on Poultry Coccidiosis in Tiyo District, Arsi Zone, Ethiopia. International Journal of Poultry Science 7 (3): 251-256

Hadipour M M, Olyaie A, Naderi M, Azad F, Nekouie O (2011) Prevalence of Eimeria species in scavenging native chickens of Shiraz, Iran. Afr J Microbiol Res 5: 3296-9.

Haug A, Gjevre A G, Thebo P, Mattsson J G, Kaldhusdal M (2008) Coccidial infections in commercial broilers: epidemiological aspects and comparison of Eimeria species identification by morphometric and polymerase chain reaction techniques. Avian pathol 37: 161-70.

Jadhav B N, Nikam S V, Bhamre S N, Jaid E L (2011) Study of Eimeria necatrix in broiler chicken from Aurangabad District of Maharashtra state India.Int Multi Res J 1.

Julie D H (1999). Coccidiosis in poultry Livestock. Poultry Health Programs, Clemson, Columbia, February. 17:191-199.

Kahn CM (2005) The Merck Veterinary Manual (9th Edn). White house station, NJ, USA, 2201-6.

Lunden A, Thebo P, Gunnarsson S, Hooshmand-Rad P, Tauson R., *et al.*, (2000) Eimeria infections in litter-based, high stocking density systems for loose-housed laying hens in Sweden. Br PoultSci 41: 440-7.

McDougald, L. R., 2003. Coccidiosis. In: Y. M. Saif, H. J. Barnes, J. R. Glisson, A. M. Fadly, L. R. McDougald & D. E. Swayne (Eds.), Diseases of

Poultry (11th ed., pp. 974-991). Ames, Iowa, USA: Iowa state press.

Muazu A, Masdooq A A, Ngbede J, Salihu A E, Haruna G, Habu A K, Sati M N, Jamilu H (2008). Prevalence and Identification of Species of Eimeria Causing Coccidiosis in Poultry with in Vom, Plateau State, Nigeria. Int. J. Poult. Sci. 7: 917-918.

Nnadi P A, George S O (2010) A cross-sectional survey on parasites of chickens in selected villages in the subhumid zones of South-Eastern Nigeria. J Parasitol Res.

Obasi, O. L., Ifut, O. J. and Offiong, E. A., 2006. An outbreak of caecal coccidiosis in a broiler flock post Newcastle disease vaccination. Journal of Animal and Veterinary Advances, 5 (12), 1239-1241.

Taylor M A, Coop R L, Wall R L (2007). Veterinary parasitology.3rdEd. UK. Black well Science, pp. 475-484.

Taylor M A, Coop, Wall R L (2007) Veterinary Parasitology (3rd Edn).Oxford, UK, Blackwell Publishing 475-83.

How to cite this article:

Beksisa Urge, Temesgen Kassa and Beritu Borena. 2021. Occurrence of Coccidiosis in Poultry Farms in Bishoftu and Adama Areas of Ethiopia. *Int.J.Curr.Res.Aca.Rev*. 9(10), 53-58.
doi: https://doi.org/10.20546/ijcrar.2021.910.008