

Prevalence and Risk Factors of Coccidiosis in Poultry Farms in and Around Ambo Town, Western Ethiopia

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Abstract: A cross sectional study was conducted to determine the prevalence of poultry coccidiosis and to assess its relationship with different risk factors in and around Ambo town, western Ethiopia from October 2010 to April, 2011. Flotation and McMaster counting techniques were used for qualitative and quantitative studies, respectively. Out of the total 384 chicken examined, 79 (20.57%) were positive for coccidian parasites. Statistically significant ($P>0.05$) difference in the prevalence of coccidiosis was not observed between sex and age groups of birds. The prevalence was significantly ($P<0.05$) higher in Bovans (25.10%) than local breeds (12.41%) of chickens. The mean oocyst count per gram of faeces was 96.4 ± 40.44 SD. The mean oocysts count per gram of faeces was significantly ($P<0.05$) higher in young than adult birds. However, no significant association ($P>0.05$) was observed among breed and sex groups. In conclusion, the present study showed that coccidiosis is an important disease of poultry in the study area and appropriate strategies have to be designed to reduce the effect of the disease.

Key words: Ambo • Bovans Breed • Coccidiosis • Local Breed • Prevalence

INTRODUCTION

Coccidiosis is an important parasitic disease that induces great economic loss particularly in poultry industry all over the world [1]. It is caused by different species of the genus, *Eimeria*. In domesticated chickens, at least nine species of *Eimeria* have been recognized [2, 3]. The infection occurs through ingestion of feed or water contaminated with sporulated oocysts [4].

In Ethiopia, the study conducted by Kinung'hi *et al.* [5] showed that coccidiosis contributes to 8.4 and 11.86% losses in profit in large and small-scale farms, respectively. Losses due to mortality following a severe outbreak may be devastating and incidence rates as high as 80% were sometimes observed in the country [2]. The prevalence of the disease and associated risk factors in and around Ambo town were not well addressed yet. Therefore, the objectives of this study were to determine the prevalence of avian coccidiosis in poultry farms and its association with different risk factors in the area.

MATERIALS AND METHODS

Study Area: The study was conducted from October 2010 to April, 2011 in poultry farms in and around Ambo town. The town is located at 107 km away from Addis Ababa (the capital) at $8^{\circ}47'-9^{\circ}20'$ North latitude and $37^{\circ}32'-38^{\circ}3'$ East longitude. The altitude of the area ranges from 1900-2275 metre above sea level. The area receives a bimodal rainfall with mean annual rainfall of 1225mm, in which the long rainy season extends from June to September, while the short rainy season occurs from March to May. The mean annual minimum and maximum temperatures are 13.5 and 24.5°C, respectively. Both local and exotic poultry breeds are available in and around Ambo town [6].

Study Animals: The study animals were Bovans and local breeds of chickens in poultry farm of Ambo University and owned by local farmers in and around the town. Chickens were kept under backyard and semi-intensive husbandry system. The study animals were grouped into sex (male

and female), breeds (Bovans and local) and ages as young (2-8 weeks) and adult (above 8 weeks of age).

Sample Size Determination: Since the prevalence of coccidiosis in chicken in and around Ambo town poultry farm has not been reported, 50% expected prevalence rate was used. In addition, 95% confidence interval and 5% desired absolute precision were also used [7]. Therefore, the total sample size required was 384.

Study Design and Methods: A cross sectional study was done and both qualitative and quantitative faecal examinations were conducted. The faecal samples were collected directly from the rectum and put in plastic bottles from each chicken and brought to Parasitology laboratory of the Department of Veterinary Laboratory Technology, Ambo University for examination. During sampling age, breed and sex were recorded. Oocysts in each faecal sample of chicken were detected by using flotation technique using saturated Sodium Chloride solution and counting of oocysts was done by using McMaster counting technique and was expressed as per gram of faeces [8, 9].

Data Analysis: The raw data were entered and managed in Microsoft Excel worksheet and descriptive statistic was utilized to summarize the data. The point prevalence was calculated for all data by dividing positive samples by total number of examined samples and multiplied by

hundred. The association between the prevalence of the disease and risk factors was assessed by Chi-square, whereas student t-test was used to examine the difference in mean oocysts count between positive samples. A statically significant association between variables was considered to exist if the computed *p value* was less than 0.05. All statistical analyses were done using SPSS statistical software version 17.

RESULTS

Prevalence: Out of the total 384 chickens examined, 79 (20.57%) were positive for coccidian oocysts. The prevalence was significantly ($P < 0.05$) higher in Bovans (25.10%) than local breeds (12.41%) of chickens. Infection rates were 21.43 and 19.38% in female and male chickens, respectively. The prevalence rates of 20.66 and 20.35% were also recorded in chicken grouped under the age category of 2-8 weeks (young) and greater than 8 weeks (adult), respectively. However, difference in the prevalence of coccidiosis in sex and age groups was not statistically significant ($P > 0.05$) (Table 1).

Quantitative Study: The mean coccidian oocyst count was 96.4 ± 40.44 SD per gram of faeces. However, there was no statistical significant ($P > 0.05$) difference between breed and sex groups whereas the mean number of oocysts per gram of which used litter or faeces in young was significantly ($P < 0.05$) higher than adult chickens.

Table 1: The prevalence of poultry coccidiosis in different risk factors

Risk Factors	Categories	N ^o . examined	N ^o . positive	Prevalence (%)	Chi Square	P value
Breed	Bovans	247	62	25.10	6.68	0.003
	Local	137	17	12.41		
Sex	Female	224	48	21.43	0.24	0.62
	Male	160	31	19.38		
Age	Young	271	56	20.66	0.005	0.94
	Adult	113	23	20.35		

Table 2: Comparison of poultry coccidiosis and mean oocysts count in different risk factors

Risk factors	Categories	No examined	Mean±SD	P value
Breed	Bovans	62	91.43±38.77	0.364
	local	17	104.62±43.32	
Sex	Female	48	95.83±45.29	0.889
	Male	31	98.00±27.41	
Age	Young	56	111.76±34.68	0.025
	Adult	23	81.17±40.91	

SD= Standard deviation

DISCUSSION

Coccidiosis is the most prevalent intestinal parasitic disease of poultry worldwide. In this study, the overall prevalence was 20.57%. This result agreed with the finding of Ashenafi *et al.* [10], Alemayehu [11] and Amare [12]. Moreover, this result was also inline with the finding of Gari *et al.* [2] who reported a prevalence of 22.58% in deep litter system of exotic breed (Rhode Island Red) of chickens in Tiyo districts, Arsi Zone, Ethiopia. The finding of this research was also very close to the finding of Etuk *et al.* [13] in Nigeria. However, the present result disagrees with the finding of Netsanet [14] and Mwale and Masika [15] who reported a prevalence of coccidiosis 38.5% and 41.43% in Kombolcha (Ethiopia) and Centane district (South Africa), 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 prevalence rate of the disease was significantly ($P < 0.05$) higher in Bovans breed (25.10%) than local chickens (12.41%). Higher prevalence in exotic breeds was also reported by Gari *et al.* [2]. This may be related with breed factors.

This study also indicated that the prevalence of coccidiosis was relatively higher in female (21.43%) than male (19.43%) chicken. But, it was not statistically significant ($P > 0.05$). This result agrees with the previous studies [2, 11]. Absence of statistically significant difference between male and female may be due to equal chance of exposure for the parasite infection.

The result of current study revealed that the prevalence of coccidiosis was almost similar in young (2-8 weeks) 20.75% and adult (greater than 8 weeks) 20.35% birds. This agreed with report of Julie [16] who stated that all ages of poultry are susceptible to infection. However, the result in this study contrasts with the finding of other researchers. The disease appears to reach climax at 5-7 weeks of age and as age exceeded 7 weeks, most birds will develop immunity and increase resistance to the disease [3, 17].

In conclusion, the result of this study indicated that coccidiosis is still the most important parasitic disease of poultry. Good biosecurity measures have to be practiced to reduce the losses induced by the disease.

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