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ARTICLE

Five years Retrospective Study of Avian Coccidiosis in a Veterinary Clinic Bukuru Plateau State Nigeria

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ABSTRACT

This study was conducted to evaluate the incidence of avian coccidiosis and its associated various risk factors such as age, type of birds and season in a private veterinary clinic in Bukuru, Plateau State Ngeria. A total of 9406 cases during 2013 – 2017 were analysed and 1556 of them were positive for coccidiosis. There are several reports on the prevalence of avian coccidiosis by previous researchers; however, in this study we evaluated the prevalence of avian coccidiosis in the study area and its economic impacts. Total prevalence of 12.14% in 2013, 18.78% in 2014, 18.21% in 2015, 16.82% in 2016 and 19.07% in 2017 were reported. An overall prevalence of 85.02% was recorded. The average prevalence of coccidiosis based on this five years study is 17%. The association between coccidiosis and age of the birds was determined and age 5-8 weeks becomes most effective period with wet season having high percentage prevalence of coccidiosis. Based on the type of birds, coccidiosis is prevalence almost in equal proportion in both broilers and layers. The losses caused by avian coccidiosis could be both direct and indirect components which may include the cost of control measures, inadequate good hygiene practices, production losses and lack of prophylaxis treatment. The control of avian coccidiosis can be achieved through good sanitary measures by avoiding water spillage on the pen floor, overcrowded stocking density, the use of prophylaxis- anticoccidials and proper good vaccination practices.

1. Introduction

The business of poultry farming in Nigeria has in recent times witnessed enormous expansion [1]. The estimated commercial poultry birds population in Nigeria rose from 110 million at the beginning of this century, to over 150 million in 2006 [6]. In spite of this enormous growth, the poultry industry has suffered a lot of constraints of which poultry disease is a major player in this setback/contraint [5]. Avian coccidiosis in poultry is caused by several species of the genus Eimeria [16]. The disease causes reduced growth, emaciation, anaemia

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and mortality in the infected birds [7]. This could results in heavy economic losses due to the cost of treatment and prevention measures [17]. Warm and humid weather provides favourable conditions for the growth and development of infective ooysts [5] which could result in a high prevalence of coccidiosis in any tropical location like Bukuru.

Avian coccidiosis is caused by protozoan parasite of genus eimeria species of the family *Eimeriadae* and order *Eucoccidiorida* [3]. The parasites develop within the intestine of most infected poultry birds. Seven species of eimeria (*E. acervulina, E. brunetti, E. maxima, E. mitis, E. necatrix, E. praecox and E. tenella*) are recognised that infect chickens [13,18]. Despite the fact that coccidiosis is a disease known for plenty years, it is still considered as the most economical important parasitic disease condition affecting poultry production world-wide uptil now [15,18]. Coccidiosis has played a major role in economic loses to poultry famers the world wide, for example in 1995 the United Kingdom was estimated to have lost thirty eight million pounds due to avian coccidiosis [10]. Many poultry famers have not taken sanitary measures serious in their poultry business so disease like coccidiosis have had its way in destroying such farms badly [10,15]. Diagnosis of coccidiosis could be based on the history of bloody diarrhea/feces in infected birds or carcasses/moribund birds, with post mortem and microscopy examination considered as one of the best option to be used to confirm its diagnosis. Post mortem examination of infected poultry carcasses may revealed lesions on the serosal and mucosal surfaces of the intestine most times. Some of the lesions observed may include; enteritis of the interior one third, the middle and the posterior one third of the intestine depending on the type of coccidian and these could manifest as hyperemia, necrosis of the intestinal mucosa and bloody feces in the lumen, thus serving as pointer to the presence to the disease, and this could be complimented by microscopy to observe for, gamonts, schizonts and oocysts usually with a lot of successes recorded [11,17]. Although prevalence of coccidiois has been reported in various locations in Nigeria by some researchers [2,9], however, in Bukuru Plateau State there is a dearth in data of Eimeria species and the prevalence of coccidiosis. Hence this study seeks to investigate the prevalence of coccidiosis and Eimeria species in Bukuru Plateau state. It is therefore important to survey for the disease that occur most frequently among poultry farmers in Bukuru and environs through this retrospective study. The aim is to conduct a five years retrospective study of avian coccidiosis in a private veterinary clinic Bukuru, Jos south Plateau state during 2013-2017.

2. Materials and Methods

2.1 Study Area

The study was conducted at ECWA veterinary clinic in Bukuru- Nigeria. It is a private clinic which operates in Bukuru near Jos where diagnosis, treatment and other veterinary service are offered for all classes of livestock and pets. The clinic also undertakes vaccination; meanwhile they provide upon request the feasibility studies for different classes of livestock investment. The clinic has a workforce comprising of two veterinary doctors and many attendants, sales men as well as a security man. The clinic under review has a laboratory, post-mortem room, treatment room, surgery room, three quarantine pens, drug and feed stores and three offices.

Bukuru geographical co-ordinates are 90 48' 0' NORTH, 80 52' 0' EAST.

2.2 Methodology

The record of diseases as presented and diagnosed at the ECWA veterinary clinic Bukuru during the five years (2013-2017) period was retrieved and analysed retrospectively. The diagnosis at the clinic was based on clinical signs and post-mortem findings using the method described by Olabode et al. [13].

2.3 Statistical Analysis

Descriptive statistic frequency and percentage was used for categorical variables. Association between infections and other factors such as types of birds, age, etc. were accessed using chi-square test for the association and odd ratio. $P<0.05$ was considered significant. Descriptive statistic was used to analyse data, tables were used for results and proportions presented in percentages.

3. Results

Table 1. The prevalence of coccidiosis in chickens based on ages

Month of occurrence	1-4 weeks	5-8 weeks	3-6 weeks	> 6months
January	46	32	32	26
February	55	128	121	55
March	43	37	27	27
April	40	46	21	15
May	37	43	22	16
June	57	48	31	19
July	29	36	33	12
August	41	27	22	27
September	40	32	31	25
October	40	49	25	19
November	35	38	27	21
December	35	26	24	25

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Note: Ages 5-8 weeks and 1-4 weeks appeared to be more infective age. Although at age 3-8 months, the prevalence was also recorded higher but only in Februaries in the 5 years study. While ages above 6-months had least infective periods [10].

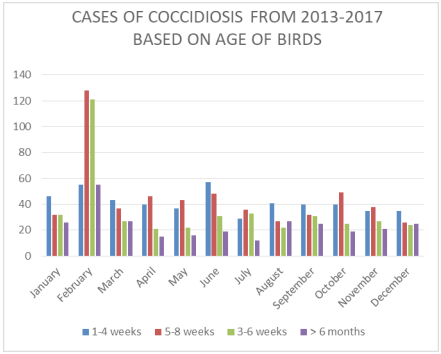

Figure 1. Reports of coccidiosis during 2013-2017 based on the age of birds

Table 2. The association between disease and season

Season			Occurrence of coccidiosis		Total
			present	absent	
wet or dry season	dry	Count	795	3660	4455
		Expected Count	725.1	3729.9	4455.0
		Adjusted Residual	3.9	-3.9	
	wet	Count	731	4190	4921
		Expected Count	800.9	4120.1	4921.0
		Adjusted Residual	-3.9	3.9	
Total		Count	1526	7850	9376
Expected Count		1526.0	7850.0	9376.0	

Note: P<0.05 [P=0.01] df=1 T=15.345 since the P is less than 0.05, it means there is an evidence of significant of association between disease and season in chicken occurring during 2013 to 2017

wet or dry season * coccidiosis or no coccidiosis Cross tabulation

Table 3. Prevalence of coccidiosis during 2013-2017 based on types of birds, (Layers and broilers). Here the infection of coccidiosis is slightly high in the layers than in the broilers with the period under review

BASED ON TYPES OF	BIRDS FROM 2013-2017	
MONTHS	LAYERS	BROILERS
January	64	69
February	177	182
March	70	64
April	64	69
May	66	53
June	75	80
July	58	50
August	60	51
Septembe	66	63
October	60	73
Novembe	61	44
Decembe	36	47
	857	845

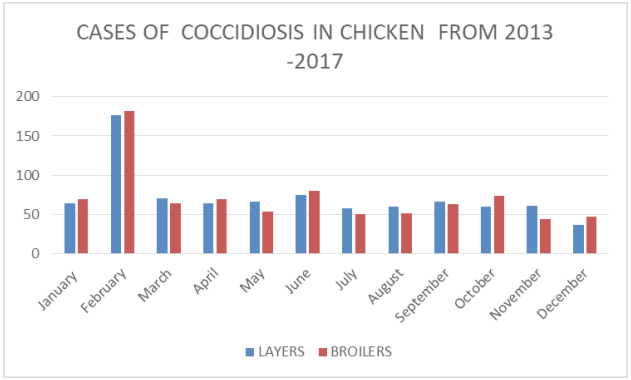

Figure 2. Prevalence of coccidiosis during 2013-2017 based on types of birds

Table 4. The total prevalence of chicken coccidiosis yearly

YEAR	TOTAL PREVALENCE	
2013	12.14	
2014	18.78	
2015	18.21	
2016	16.82	
2017	19.07	

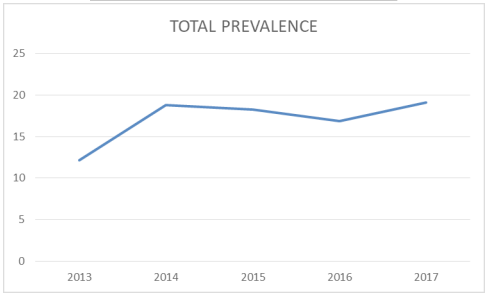

Figure 3. The total prevalence of coccidiosis yearly in chickens

4. Discussion

Based on results of this study, it was observed that age of the birds plays a vital role in infectivity of coccidiosis which is much prevalent in age 5-8 weeks birds as indicated in table 1 and figure 1. The prevalence showed a decline in birds with age 1-4 weeks, though prevalent in age 3-6months birds was highest but only in the months of February throughout the five years study. This means that age 3-6 months and above were the least infective period which could be due to previous exposure of the old birds. This agrees with the report of Chauham and Sushovan [4] and Mark et al. [10]. There is an evidence of significant association between the presence of coccidiosis in chicken and the age group occurring within 2013-2017 where the observed value in the adjusted residual value of coccidiosis presence in chicken with age group 1-8 weeks was

less than what would have been expected through chance alone. While in the other hand the adjusted residual value the observed value of coccidiosis in chicken with age 1-8 group was more than what would expect. Meanwhile, in the adjusted residual value of coccidiosis presence in chicken with age group of > 24 weeks was found to be less than what would expect. The overall results show that the disease is much prevalent in the younger birds. Chickens within ages 1-8 weeks were most diagnosed with coccidiosis. The highest infective period was between 9-24 weeks of age with great declined at age > 24 weeks old, this is in agreement with Chauhan and Sushovan [4] and Mark et al. [10].

Table 2 indicates the association between disease and season ($P<0.05$). There is a significant association between disease and season in chicken occurring during 2013 to 2017. From the adjusted residual value we had more coccidiosis than expected through chance alone in the dry season' also we had in the wet season less observation than we expected through chance alone. *Eimeria* oocysts remain viable in litter for many months, hence they contaminate the farm year in year out thereby maintaining infection of the poultry flock. The *Eimeria* oocysts can killed by freezing and extreme dryness and high temperature, thereby making it difficult for the infection to get spread in the dry and cold month as agreed by [4,5]. Also wet area constitutes a source of avian coccidiosis infection. The poultry pen litters are supposed to be applied in thick layers in order to facilitate maximum absorption of the bird's waste droppings. The wet litters enhances sticking of materials to boots, utensils, shoes, vehicle wheels and clothing leading to a faster rate of transfer of the organism to other farms. Bukuru is a wet and damp place hence the prevalence of coccidiosis among poultry farmers as agreed with the point raised by Chauham and Sushovan [3,4,12].

Table 3 shows prevalence of coccidiosis during 2013-2017 based on types of birds, (Layers and broilers). Here the infection of coccidiosis is slightly high in the layers than in the broilers within the period under review but figure 2 shows that there is no significance difference in coccidiosis prevalence based on the types of birds. This means that coccidiosis is prevalence almost in equal proportion in both boilers and layers in this study. The observed value presence in broilers was more than the expected and this occur by chance alone while compared to the layers where in the adjusted residual value, the value observed of coccidiosis presence in layers occur was more than the expected and this occur by chance alone. There was no significant difference ($p>0.05$) between the prevalence rate of coccidiosis in layers and broilers. This is in agreement with the report of Olanrenwaju and Agbor [14]. In layer and broiler, the prevalence rate of coccidiosis in birds reared under deep litter system and battery cage system of management shows a strong association between system of management and occurrence of the disease with the former system being higher. The higher prevalence rate in broilers and layers reared under deep litter system of management compared with the battery cage system of management is in agreement with the report of Etuk et al. [5], Hadipour et al. [7] and Jatau et al. [8]

Table 4 and figure 3 show the total prevalence of coccidiosis was lower in 2013, having the least of 12.14% prevalence, while in 2014 the prevalence elevated to about 18.78%, and then declined a little bit to 18.21% in 2016. Reasons could be because of adequate awareness in hygiene practice in poultry production. This agrees with the point earlier raised by Chauham and Sushovan [4]. Subsequently the infection became high on 2017 with increase rate of 19.07% which might be due to decrease in the awareness of good bio-security practice.

5. Conclusion

The average prevalence of coccidiosis in this study was 17 %. Age plays a great role in infectivity of coccidiosis with age 5-8 weeks birds showing much prevalent, with wet season having high prevalence. Coccidiosis had prevalence almost in equal proportion in both boilers and layers in present study. Poultry farmers should adhere to good vaccination and hygienic practices as well as the use of both drugs and vaccines to prevent the incidence of the disease. Farmers should adhere to routine chemoprophylaxis and avoid factors of predisposition to cooccidiosis especially during the raining season. A further study of the genetic basis of parasite survival on the hosts and the key molecules associated with the disease would be essential so as combat the disease effectively.

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Competing Interest

The authors declare that they have no competing interests.

Authors' contributions

BIJ and LHB designed the research; ISI, ISE,SA and OVB performed the research and analysed the data; OMO wrote the manuscript; IBS have taken part in the revision of the manuscript. All authors read and approved the final

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