

Prevalence of Coccidiosis among Local and Exotic Breeds of Reared Chickens in Azare Metropolis, Bauchi State Nigeria

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Abstract

Coccidiosis is a deadly disease that hampers chickens' productivity and welfare. The disease is a major menace to the global poultry industry. Coccidiosis is caused by the apicomplexan parasite of the genus Eimeria. This study investigated the prevalence of Coccidiosis amongst the chickens reared in Azare metropolis. A total number of four hundred 400 faecal samples of live and slaughtered chickens were collected and examined using standard parasitological methods between March and June, 2022. The samples comprised of 246 female and 154 male; 300 exotic species and 100 local species. Chi-square test and simple percentage were used to analyze the generated data and $p < 0.05$ was adopted to determine the level of significance. An overall prevalence rate of 173 (43.3%) was recorded. The prevalence rate was higher in female 138 (56.1%) than male with 35 (22.7%). There was statistically significant difference in infection rate between the sexes of the Chickens. The lower age (1-4weeks) had the highest rate of prevalence rate of 64(59.8%) followed by age (5-16weeks) with 97(38.1%) and Adult (16weeks>above) with lowest infection rate of 12(17.6%). Similarly, high infection rates were observed among local breed 64(64%) than exotic breed 109(36.3%). The difference between the age groups and the two breeds in prevalence rate was statistically significant ($p < 0.05$). Coccidiosis is endemic in both local and exotic chickens in the study area due to poor management system. It is therefore, recommended that good management system of rearing the chickens, regular vaccination against Coccidiosis, maintaining good hygienic practice as well as creating awareness among farmers on effect of this disease on their productivity and welfare should be ensured.

Keywords: Coccidiosis, Local and Exotic breeds, Chickens, Prevalence.

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INTRODUCTION

Coccidiosis is a parasitic disease of the intestinal tract of animals caused by coccidian protozoa. The disease spreads from one animal to another by contact with infected feces or ingestion of infected tissue. Symptoms of Coccidiosis include weight loss, paleness, ruffled feathers, depression, huddling, unwillingness to eat, and watery or bloody diarrhea (Wikipedia, 2022). In Nigeria, like most developing nations, chickens are the most important class of the poultry species in terms of number and rate of investment in poultry production (Zahraddeen, *et al.*, 2010). The exotic breeds are usually managed intensively either in battery cages or deep litter system of management, while the village chickens are reared extensively; where they are allowed to scavenge food for survival (Jallailudeen, *et al.*, 2016). Poultry's meat and eggs continue to be the major sources of protein for the rapidly expanding population worldwide (Jallailudeen, *et al.*, 2016). Coccidiosis has been reported as a major constraint to successful commercial and backyard poultry farming due to its significant high mortality rates and huge economic losses globally (Jallailudeen, *et al.*, 2016).

Out of the nine species of *Eimeria* that have been identified and recognized in domesticated chickens *E. brunette*, *E. maxima*, *E. necatrix* and *E. tenella* considered to be the most pathogenic, *E. acervulina*, *E. mitis*, *E. mivati* considered to be less pathogenic while *E. praecox* and *E. hagani* are known to be less or non pathogenic species (Haug, *et al.*, 2008; Amer, *et al.*, 2010). All avian *Eimeria* with the exception of *E. dispersia* infects only one poultry specie (Poultry World, 2022). *E. dispersia* may infect and cause disease in turkeys, quail and pheasants. The *Eimeria* oocyst contains four sporocysts. Each sporocyst contains two sporozoites. The organism undergoes two rounds of asexual reproduction (schizogony) and one round of sexual reproduction (gametogony). All chicken coccidia are species-related (occur only in the chicken) and are tissue trophic (occur in particular areas of the intestine). Acute to chronic disease can occur after seven days of age (Poultry World, 2022). Avian Coccidiosis is one of the most important diseases of poultry worldwide (Ola-Fadunsin and. Ademola 2014)

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 and George 2010; Dakpogan and Salifou 2013). 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, *et al.*, (2010). However, indiscriminate use of anti-coccidial drugs in feed and water has led to serious drug resistance problems (Usman, *et al.*, 2011).

Poultry industry in Nigeria has witnessed expansion in recent times and the estimated poultry population in Nigeria was over 150 million (FAO, 2006). The increase demand of chicken as well other birds as a source of protein (meat and egg) by the increasing human population saw an unprecedented growth and expansion their production in the study area. Therefore, this study was conducted to determine the prevalence of Coccidiosis among local and exotic chickens in the study area.

MATERIALS AND METHODS

Study Area

The study was conducted in Azare Area of Katagum Local Government. The town is located in the Northern part of Bauchi state with total population of 110,185 (National population Commission Census, 2006). It has a land area of about 1,158Km². The people there are mostly Hausa/Fulani by tribe and most of them engaged in farming, animal rearing, business as well

as government work. Rainfall starts around April to September, August is usually the wettest month. A very cold weather is experienced during harmattan which is around February to May. The weather tends to be very hot thereafter, which marks the summer. Chickens in this area are usually reared in both intensive and extensive management systems.

Sample collection

Samples were collected from poultry farmers in Azare metropolis. Samples were collected for a period of four months (March-June, 2022). The samples were collected from local and exotic species. Collection was done early in the morning as the chickens defecate. The sex, breed and age of the chickens were noted before sample collection. A total of four hundred 400 fecal samples were collected; two hundred and forty six (246) samples were collected from female species, one hundred and fifty four (154) from male species, one hundred (100) sample from local breed and three hundred (300) from exotic breed. Summarily, samples were collected from one hundred and seven (107) chickens in the age bracket of 1-4 weeks, two hundred and twenty five (225) chickens in the age bracket of 5-15 weeks and sixty eight (68) in the age bracket of 16 weeks >above.

Laboratory analysis of samples

Feecal samples collected were subjected to microscopic examination ($\times 10$ objective magnification) by direct wet mount smear method for the presence of *Eimeria* oocysts as described by Soulsby (1982). Feecal samples from chickens that recorded the presence of *Eimeria* oocysts were considered as being positive for the presence of Coccidiosis.

Identification of *Eimeria* species

Identification of the different species of *Eimeria* was carried out based on the shape and size of sporulated oocysts. The species of *Eimeria* were identified based on identification key given by McDougald (2003).

Data analysis

The data collected were subjected to Chi-square test as the relationships between two variables were compared and simple percentage to determine the prevalence rate. $p < 0.05$ was used to determine the level of significance. The data were all analyzed in Microsoft Office Excel Version 2010.

RESULTS

Out of the 400 samples collected and examined, one hundred and seventy three 173(43.3%) was positive for Coccidiosis and the prevalence rate was higher in female one hundred and thirty eight 138(56.1%) than male with thirty five 35(22.7%). Statistically, the difference in infection rate between the sexes was significant ($p > 0.05$) as shown in Table 1. The lower age (1-4weeks) had the highest rate of prevalence rate of sixty four 64(59.8%) followed by age (5-16weeks) with ninety seven 97(38.1%) and Adult (16weeks>above) with lowest prevalence rate of twelve 12(17.6%). Similarly, high infection rates were observed among local breed sixty four 64(64%) than exotic breed one hundred and nine 109(36.3%). The difference between the ages groups and the two breeds as regards prevalence rate was statistically significant ($p < 0.05$) shown in Table 1.

Also, four different species of *Eimeria* were identified in the study area with *Eimeria tenella* having the highest prevalence rate of eighty three 83(48%) followed by *Eimeria necatrix*, *Eimeria acervulina* and *Eimeria maxima* with thirty four 34(20%), thirty 30(17%) and twenty six 26(15%) respectively shown in Table 2.

Prevalence of Coccidiosis among Local and Exotic Breeds of Reared Chickens in Azare Metropolis, Bauchi State Nigeria

Table1: Risk Factors Associated with Coccidiosis in the Study Area

Risk factors	No. Examined	No. Infected	Prevalence (%)	P Value	X ²
Sex					
Female	246	138	56.1	42.97	0.02
Male	154	35	22.7		
Breed					
Local	100	64	64	23.39	0.02
Exotic	300	109	36.3		
Age(Weeks)					
1-4	107	64	59.8	30.12	5.991
5-15	225	97	38.1		
16>Above	68	12	17.6		

Table 2: Prevalence of *Eimeria* Species in Chickens Reared in Study Area

Species Identified	No. of Samples Infected (%)	Female	Male	Local Breed	Exotic Breed	1-4 weeks	5-15 Week	16>Above Week	Total
<i>Eimeria Tenella</i>	48	16	09	12	31	08	05	02	83
<i>Eimeria necatrix</i>	20	12	03	11	03	01	04	00	34
<i>Eimeria Acervulina</i>	17	10	04	08	03	00	03	02	30
<i>Eimeria Maxima</i>	15	07	03	09	01	02	02	02	26
Total	173	45	19	40	38	11	14	06	173

DISCUSSION

Coccidiosis is the major cause of economic losses in the poultry industry in the world (Shirley, *et al.*,2005) and specifically in Nigeria (Ola-Fadunsin and Ademola 2013). Coccidiosis is the most common enteric parasitic disease of poultry and a major constraint to successful poultry farming in Nigeria and in the world over (Lawal, *et al.*, 2016). For these reasons, routine examination of faeces of birds for Coccidiosis is recommended not only in Nigeria but in the world at large. An overall prevalence of 43.3% was observed in this study which corroborates the earlier report of Lucas and Zainab (2016) in Gombe that reported 42.7%. However, our currently reported prevalence (43.3%) of Coccidiosis is higher than the prevalence (31.8%) of Coccidiosis reported by Jallailudeen, *et al.*, (2016) in Maiduguri. The prevalence of the disease in the metropolis might be attributed to poor sanitation practices and unhygienic environmental conditions which provide a conducive environment for oocysts survival. Four species of *Eimeria* were identified in the present study, *Eimeria tenella* 83(48%), *Eimeria necatrix* 34(20%), *Eimeria acervulina* 30(17%) and *Eimeria maxima* 26(15%). All these species have been identified in the neighboring Gombe state by Lucas and Zainab (2016) in Gombe. Haug, *et al.*,(2008) and Amer, *et al.*,(2010) reported nine species of *Eimeria* which have been identified and recognized in domesticated chickens. According to these authors, *E. brunette*, *E. maxima*,

E. necatrix and *E. tenella* are reconsidered to be the most pathogenic, *E. acervulina*, *E. mitis* and *E. mivati* are considered to be less pathogenic while *E. praecox* and *E. hagani* are implicated to be less or non-pathogenic species.

The higher prevalence in young chickens compared to adults in this study agrees with the findings of (Omer, *et al.*, 2011; Ahmed, *et al.*, 2012), but disagrees with the findings of Etuk, *et al.*, (2004), who reported higher prevalence in the adults than young chickens and the difference between the age groups in prevalence rate was statistically significant ($p < 0.05$). This could be associated with the immature immune system in young chickens leaving them susceptible to infection even with the less pathogenic strains of *Eimeria* species reported by Chapman, *et al.*, (2005).

The prevalence rate in terms of sex of the chickens showed high prevalence among female 56.1% gender than to male 22.7%. The difference between the sexes in prevalence rate was statistically significant ($p < 0.05$). Each chicken regardless of its sex or breed has an equal chance to be infected with *Eimeria* oocysts during feeding or in an outbreak scenario depending on the way the chickens are exposed. This collaborates with previous studies of Gari, *et al.*, (2008); Jallailudeen, *et al.*, (2016).

However, in the present study local breed had a high prevalence rate of 64% with Coccidiosis than exotic breed 36.3% which is contrary to most of the previous studies that reported high prevalence rate in exotic breed. The difference between the two breeds in terms of prevalence rate was statistically significant ($p < 0.05$). This is possible because it usually depends on the system used in rearing the chickens, higher stocking densities and supply of their needs or not, allowing them to scavenge for survival, irregular vaccination as well as poor maintenance of good hygienic practice. In this study, most of the local breeds are reared in the cage or room with less care given to them which might be a reason for the high prevalence rate of Coccidiosis in our study area. Jallailudeen, *et al.*, (2016); Ola-Fadunsin, (2017), attributed the high prevalence rate of Coccidiosis in exotic breed to higher stocking densities and intensive husbandry management systems practiced when compared with the local breed that is allowed to scavenge around.

Conclusion

Coccidiosis is endemic in both local and exotic Chickens in the study area due to poor rearing system. It is therefore recommended that a good management system of rearing the chickens, regular vaccination against Coccidiosis, maintaining good hygienic practice as well as creating awareness among farmers on the effect of this disease on their productivity and welfare should be ensured.

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