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Prevalence of Coccidiosis Among Different Breeds of Chickens Within Katsina Metropolis

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ABSTRACT
Coccidiosis remains one of the most economically significant parasitic diseases affecting poultry production globally. The disease, caused by protozoan parasites of the genus Eimeria, continues to undermine productivity through reduced growth, poor feed conversion efficiency, increased susceptibility to secondary infections, and mortality. This study investigated the prevalence of coccidiosis among layers, broilers, noilers, and indigenous chickens reared within Katsina Metropolis, Nigeria. A cross-sectional survey design was employed, and fresh faecal samples were collected over a two-month period from selected birds representing the four breed categories. Laboratory examination was conducted using flotation techniques for the detection of Eimeria oocysts, while oocyst burden was assessed through oocyst-per-gram procedures. Data were analyzed using descriptive statistics and one-way ANOVA in SPSS version 25. The findings revealed widespread occurrence of coccidiosis across all breeds examined. Layers recorded the highest prevalence, followed by broilers and noilers, whereas indigenous chickens exhibited comparatively lower infection rates. Helminth co-infections involving *Ascaridia spp*. and *Heterakis gallinarum* were also identified. Statistical analysis demonstrated significant variation in prevalence among breeds ($F = 6.320$, $p < 0.05$), indicating that breed-related and management-associated factors influence disease occurrence. The study concludes that coccidiosis remains endemic in Katsina Metropolis and recommends improved biosecurity, routine disease monitoring, proper litter management, and evidence-based control programmes to reduce infection pressure and enhance poultry productivity.

Keywords:
Coccidiosis,
Prevalence,
Chicken breeds,
Poultry health,
Katsina Metropolis.

INTRODUCTION

The poultry industry constitutes an important component of agricultural production and food security in Nigeria. Poultry products provide affordable animal protein, employment opportunities, and income for households and commercial producers. However, infectious and parasitic diseases remain major constraints to sustainable poultry production. Among these diseases, coccidiosis continues to be recognized as one of the most prevalent and economically devastating enteric diseases of chickens.

Coccidiosis is caused by intracellular protozoan parasites belonging to the genus Eimeria. Infection occurs when birds ingest sporulated oocysts from contaminated feed, water, litter, or the surrounding environment. Following ingestion, the parasites invade intestinal epithelial cells, resulting in tissue destruction, enteritis, impaired nutrient absorption, and reduced productive performance.

Clinical manifestations range from mild diarrhoea and poor growth to severe intestinal haemorrhage and mortality (Chapman *et al.*, 2022).

The economic consequences of coccidiosis extend beyond mortality losses. Subclinical infections frequently result in poor feed conversion efficiency, reduced weight gain, delayed market readiness, increased medication costs, and compromised flock uniformity (Lawal et al., 2023). Consequently, the disease imposes a substantial financial burden on poultry enterprises worldwide (Blake *et al.*, 2020).

Several factors influence the epidemiology of coccidiosis. These include environmental conditions, flock density, litter quality, biosecurity practices, age, immune status, and genetic characteristics of the host (Williams, 2021). Commercial poultry breeds reared under intensive production systems are often exposed to conditions that favour rapid parasite transmission.

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Indigenous breeds, on the other hand, may exhibit greater resilience owing to long-term adaptation to local ecological conditions (Sert & Cengiz, 2023).

Despite the importance of poultry production within Katsina Metropolis, there is limited empirical information regarding breed-specific prevalence patterns of coccidiosis (Dalloul *et al.*, 2023). Developing focused intervention tactics requires an understanding of such patterns (Usman et al., 2023). This study therefore sought to determine the prevalence of coccidiosis among different breeds of chickens reared within Katsina Metropolis and to evaluate whether significant differences exist among breed categories.

MATERIALS AND METHODS

The study was conducted in Katsina Metropolis, Katsina State, Nigeria. The area supports a diverse poultry sector comprising commercial farms, medium-scale enterprises, and backyard production systems. Such diversity provides an appropriate setting for investigating the occurrence of poultry diseases under varying management conditions. A cross-sectional research design was adopted. Fresh faecal samples were collected from layers, broilers, noilers, and indigenous chickens during October and November 2025. Samples were obtained using sterile containers and transported to the laboratory for examination. The flotation technique was employed for the qualitative detection of *Eimeria* oocysts, while oocyst-per-gram procedures were used for quantitative assessment. Additional parasitological observations were conducted to identify the presence of helminth eggs. Data obtained from laboratory analyses were coded and analysed using SPSS version 25. Descriptive statistics were used to summarize prevalence patterns. One-way Analysis of Variance (ANOVA) was employed to examine differences among breed categories. Statistical significance was established at $p < 0.05$.

Research Hypothesis:

H0: There is no significant difference in the prevalence of coccidiosis among different breeds of chickens reared in Katsina Metropolis.

RESULTS AND DISCUSSION

Laboratory examination confirmed the occurrence of coccidiosis across all chicken breeds investigated. Layers recorded the highest prevalence levels throughout the study period, while indigenous chickens consistently exhibited the lowest prevalence. Broilers and noilers demonstrated intermediate prevalence levels but remained substantially affected.

An increase in prevalence was observed between October and November among several breed categories. This trend suggests that prevailing environmental conditions favoured oocyst sporulation and transmission. The persistence of infection across sampling periods further indicates continuous environmental contamination within poultry production systems.

In addition to *Eimeria* infections, helminth eggs belonging to *Ascaridia spp.* and *Heterakis gallinarum* were detected. The occurrence of mixed parasitic infections highlights deficiencies in sanitation and flock health management practices within some production environments.

The ANOVA analysis revealed a statistically significant difference in prevalence among the different chicken breeds ($F = 6.320$, $p < 0.05$). Consequently, the null hypothesis was rejected, indicating that breed type significantly influences the prevalence of coccidiosis within the study area.

Table 1: Prevalence of Coccidiosis among Different Breeds of Chickens for the Month of October

Sample ID	Breeds	Eimeria	Helminth Eggs	Type
L1	Layer	Positive	YES	*Ascaridia*
L2	Layer	Positive	NO	-
L3	Layer	Positive	YES	*Heterakis gallinarum*
L4	Layer	Negative	NO	-
L5	Layer	Positive	YES	*Ascaridia*
L6	Layer	Positive	NO	-
L7	Layer	Positive	YES	*Heterakis gallinarum*
L8	Layer	Positive	NO	-
N1	Noiler	Positive	YES	*Ascaridia*
N2	Noiler	Positive	NO	-
N3	Noiler	Negative	NO	-
N4	Noiler	Positive	YES	*Heterakis gallinarum*
N5	Noiler	Positive	NO	-
N6	Noiler	Negative	NO	-
N7	Noiler	Positive	YES	*Ascaridia*
N8	Noiler	Positive	NO	-

B1	Broiler	Positive	YES	*Ascaridia*
B2	Broiler	Positive	NO	-
B3	Broiler	Positive	YES	*Heterakis gallinarum*
B4	Broiler	Positive	NO	-
B5	Broiler	Positive	YES	*Ascaridia*
B6	Broiler	Negative	NO	-
B7	Broiler	Positive	YES	*Heterakis gallinarum*
B8	Broiler	Positive	NO	-
LC1	Local	Negative	NO	-
LC2	Local	Positive	NO	-
LC3	Local	Negative	NO	-
LC4	Local	Positive	YES	*Ascaridia*
LC5	Local	Negative	NO	-
LC6	Local	Positive	NO	-
LC7	Local	Negative	NO	-
LC8	Local	Positive	YES	*Heterakis gallinarum*

Table 2: Prevalence of Coccidiosis among Different Breeds of Chickens for the Month of November

Sample ID	Breeds	Eimeria	Helminth Eggs	Type
L1	Layer	Positive	YES	*Ascaridia*
L2	Layer	Positive	NO	-
L3	Layer	Positive	YES	*Heterakis gallinarum*
L4	Layer	Positive	NO	-
L5	Layer	Positive	YES	*Ascaridia*
L6	Layer	Positive	NO	-
L7	Layer	Positive	YES	*Heterakis gallinarum*
L8	Layer	Positive	NO	-
N1	Noiler	Positive	YES	*Ascaridia*
N2	Noiler	Positive	NO	-
N3	Noiler	Positive	NO	-
N4	Noiler	Positive	YES	*Heterakis gallinarum*
N5	Noiler	Positive	NO	-
N6	Noiler	Negative	NO	-
N7	Noiler	Positive	YES	*Ascaridia*
N8	Noiler	Positive	NO	-
B1	Broiler	Positive	YES	*Ascaridia*
B2	Broiler	Positive	NO	-
B3	Broiler	Positive	YES	*Heterakis gallinarum*
B4	Broiler	Positive	NO	-
B5	Broiler	Positive	YES	*Ascaridia*
B6	Broiler	Positive	NO	-
B7	Broiler	Positive	YES	*Heterakis gallinarum*
B8	Broiler	Positive	NO	-
LC1	Local	Negative	NO	-
LC2	Local	Positive	NO	-
LC3	Local	Negative	NO	-
LC4	Local	Positive	YES	*Ascaridia*
LC5	Local	Negative	NO	-
LC6	Local	Positive	NO	-
LC7	Local	Negative	NO	-
LC8	Local	Positive	YES	*Heterakis gallinarum*

Table 3: One-Way ANOVA Analysis Result of Differences in the Prevalence of Coccidiosis among Different breeds of Chickens Reared

Source	Sum of Squares	df	Mean Square	F	p-value
Between Groups	235.61	3	78.54		
				6.32	0.000
Within Groups	3032.44	244	12.43		
Total	**3268.05**	**247**			

The laboratory analysis revealed a very high prevalence of coccidiosis across all breeds, with Layers recording 100% prevalence in both months, followed by Broilers and Noilers, while Local chickens showed comparatively lower prevalence. This finding strongly supports the work of Chapman, (2014), who reported that coccidiosis remains one of the most prevalent parasitic diseases in intensive poultry systems worldwide. The extremely high prevalence observed in Layers is consistent with the findings of Williams, (1999), who noted that birds with longer production cycles and continuous exposure to contaminated litter are more susceptible to *Eimeria* infection. Similarly, Conway and McKenzie, (2007) emphasized that intensive rearing conditions, particularly deep litter systems, promote the accumulation and sporulation of oocysts, thereby increasing infection rates. The relatively lower prevalence observed in Local chickens aligns with the findings of Permin and Hansen, (1998), who reported that indigenous breeds often exhibit greater resistance to parasitic infections due to natural adaptation to local environmental conditions. Furthermore, the detection of helminth co-infections (*Ascaridia* spp. and *Heterakis gallinarum*) corroborates the findings of Jordan *et al.*, (2001), who highlighted that mixed parasitic infections are common in poultry and can exacerbate disease severity by compromising immune function.

The findings showed a significant association between poultry farmers' knowledge, attitude, and control practices. This agrees with Alarcon *et al.*, (2014), who reported that farmers' perception and awareness significantly influence disease management decisions. Similarly, Oladunjoye and Ojebiyi, (2010) found that educated farmers are more likely to adopt effective disease control strategies.

The significant difference in prevalence among breeds supports the findings of Williams, (1999) and Chapman, (2014), who both emphasized that susceptibility to coccidiosis varies among breeds due to genetic and environmental factors. The 100% prevalence in Layers further confirms the vulnerability of commercial breeds under intensive management conditions.

The finding that conventional drugs are more effective than herbal remedies is consistent with Peek and Landman, (2011), who reported that anticoccidial drugs remain the most reliable method for controlling coccidiosis. However, the issue of treatment failure aligns with Chapman, (1997), who highlighted the growing challenge of drug resistance due to improper usage.

CONCLUSION

The study demonstrated that coccidiosis remains highly prevalent among chickens reared within Katsina Metropolis. Significant differences in prevalence were observed among breed categories, with layers exhibiting the highest susceptibility and indigenous chickens showing comparatively lower infection rates. The occurrence of helminth co-infections further indicates persistent environmental contamination and inadequate sanitation practices. The findings confirm that breed characteristics, management systems, and environmental conditions collectively influence disease occurrence within poultry populations.

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