

Assessment of the prevalence of gastrointestinal parasitic infestation in local and exotic breeds of chickens at slaughter point in Kuje area council, Abuja.

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TARGET AUDIENCE: Scientists, Poultry farmers, Researchers.

Abstract

This study was aimed at determining the prevalence of gastrointestinal (GI) parasites in local and exotic breeds of chicken slaughtered at Kuje Area Council slaughter slab, Federal Capital Territory (FCT) Abuja, Nigeria. From August to November, 2021, a total of 150 faecal samples obtained from 75 exotic breeds and 75 local breeds of slaughtered chickens were examined for gastrointestinal parasites using concentration flotation technique. Results revealed that 6 different gastrointestinal parasites eggs and oocysts were identified with a prevalence of 76.7%. These include 5 nematodes namely: *Ascaridia* spp (15.4%), *Capillaria* spp (10.0%), *Heterakis* spp (6.7%), *Strongyloides* spp (4.6%) and *Syngamus* spp (4.0%), and a protozoan – *Eimeria* spp (36.0%). Prevalence of GI parasitic infestation was significantly higher ($p < 0.05$) in local (42.0%) than exotic breed (34.7%) of chickens. Also, females (51.3%) had a higher prevalence of infestation than males (25.4%) in both breeds of chickens. *Eimeria* spp and *Ascaridia* spp are major gastrointestinal parasites of both local and exotic chickens slaughtered in Kuje. Proper management practices such as biosecurity measures, hygienic feeding, cleaning drinking water and regular deworming, especially of local breed of chickens, are recommended for adequate reduction of infestation.

KEYWORDS: Gastrointestinal parasites; Kuje Area Council; Local and exotic breeds of chicken; Prevalence

Description of Problem

Birds domesticated for growth and production of products such as eggs, meats, feather, bone meals, with significant commercial value are referred to as "poultry"

(1). It is believed that humans have been domesticating chickens for almost 4,000 years. Early domesticated poultry have also been utilized throughout history for religious sacrifices and rituals (2).

In many places of the world, people either keep chickens in their backyards or use commercial production techniques (3; 4). Chickens, ostriches, turkeys, ducks and geese are among the species that commonly provide food security to large population globally in terms of meat, eggs, fertilizer, feathers, and other by-products (5). Local or indigenous breed of chicken in particular have helped in enriching the lives of poor farmers in developing nations of the world, providing them subsidiary revenue (6).

Genetic selection has produced two types of commercial birds - meat-producers and egg-laying birds - as well as different breeds which are mainly exotic in Nigeria. Production systems for meat chickens are of similar configuration and management conditions, although, there are some uniqueness due to the species or breeds (4).

The Food and Agriculture Organization (FAO) forecasted further growth in poultry production. However, several production constraints abound, affecting farmers' profitability. It is thought that GI parasites are to blame for the poor health and low production of birds. The average weight of parasite-infested hens is substantially lower than that of non-infested flocks (7). *Ascaridia galli* infestation in chickens causes reduction in growth, decreased egg production and increased mortality (8). Intestinal helminth prevalence is, however, less common in hens raised for economic purposes. Domestic hens consume a variety of foods, such as grains, fruits, and insects, which may include parasites infestive stages, making them more susceptible to parasitic infestation, particularly gastrointestinal parasites (9; 10).

Helminth parasites of poultry are

majorly divided into three groups namely; Cestodes, Nematodes and Trematodes. The genera of Cestodes of importance includes; *Railleitina* and *Hymenolepsis*. Nematodes which are the most prevalent group of helminth parasites in poultry include: *Capillaria*, *Heterakis* and *Ascaridia* species (7). GI parasites such as round worms (*Ascaridia*) and tape worms (*Ratinella*) are mostly found in the intestine, while thread worms such as (*Capillaria*) is found in the crop or oesophagus of the chicken (11). The study was therefore aimed at determining the common gastrointestinal parasites in both local and exotic breeds of chicken slaughtered in Kuje Area Council as well as their association to sex and breed.

Materials and Methods

Study Area

This study was conducted at a slaughterhouse at Forest Market, Paseli, in the Kuje Area Council of the Federal Capital Territory (FCT) of Abuja, Nigeria. The FCT is situated in the heart of Nigeria, between latitudes 8° 25" and 9° 20" north of the equator and longitudes 6° 45" and 7° 39" east of the Greenwich meridian (Plate 1). The FCT is found in a semi-seasonal equatorial climate zone, with distinct rainy and dry seasons (12).

Sample Collection (Intestine)

Samples were collected from local and exotic breeds of chicken slaughtered at the Kuje slaughter slab according to age groups and sexes. Intact entire intestinal samples were obtained at random from a total of one hundred and fifty (150) slaughtered chickens, comprising of seventy-five (75) local and seventy-five (75) exotic breeds.

The intestine samples were taken immediately after the slaughter and

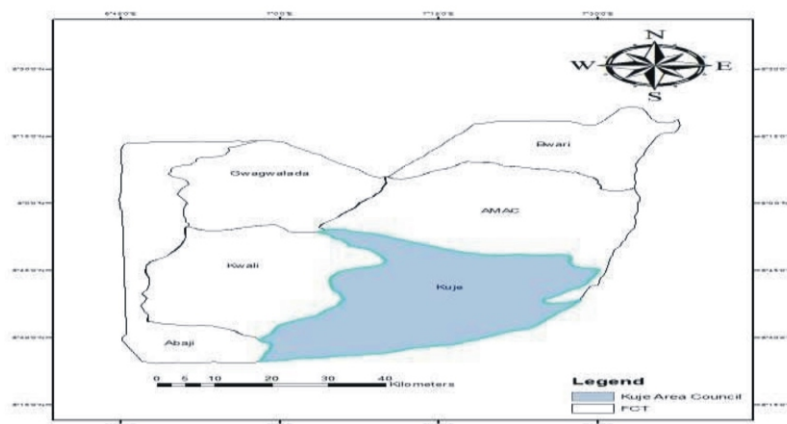


Plate 1: The map of Kuje Area Council, Abuja

transported to the helminthology unit laboratory, Department of Veterinary Parasitology and Entomology, University of Abuja, where faecal samples were analyzed appropriately.

Parasitology Technique and Identification of Parasites

The intestines were dissected longitudinally and faecal samples collected and kept in 10% formalin for identification of the eggs, based on microscopic and morphological appearances.

Faecal Sample Analysis

To avoid contamination, the samples were collected with a spatula that was cleansed and disinfected using 70% alcohol, after each collection. Each faecal sample was placed in a sample bottle with the site, dates, breed, and sex of the chicken written on it. Using the concentration by floating method, the presence of ova/eggs and oocysts was confirmed. The eggs were able to float to the top of a solution with a higher specific gravity (S.G), concentrating at the top and leaving detritus lower down. More eggs of

various sorts will float as the solution's specific gravity rises. A top loader balance was used to weigh one gram of faecal sample, which was then placed in a faecal sample vial and mixed (13).

Floatation

The method of floating faecal analysis was used as floating technique was used to determine the presence of oocysts. A saturated salt and sugar solution was used to make the floating solution. The eggs were able to float to the surface of a solution with a higher specific gravity (S.G), which concentrated at the top of the test tube and left detritus at the bottom. 450 grams of salt was dissolved in 1 liter of water, and 150 grams of salt were dissolved in the same 1 liter of water. To sterilize the solution, it was briefly heated, and the specific gravity varied somewhat depending on the surroundings. In a mortar, 2 grams of faecal sample was inserted and homogenized (10).

Data Analysis

The data were analyzed using "Microsoft Excel 2010" and statistical

package for social science; version 22.0, Chicago, USA. Chi-square (X^2) test odds ratios with 95% confidence interval (C) were used to determine the association between each risk factor and the presence or the absence of GI parasites. $P < 0.05$ was considered significant.

Results

The overall prevalence of infestation was 76.7%. Birds (n=115) were found to be infected from the total of 150 birds examined (Table 1).

Furthermore, prevalence reflected higher in females in both breeds with a total of 51.3% and 25.4% in female and male respectively (Table 2), with the exotic female percentage recorded as 23.4%, underweighing the local females (24.0%). On the other hand, the male's percentages were recorded as follows local (11.3%) and exotic (18.0%) (Figure 1). The local breed prevalence rate (42.0%) was significantly higher ($P < 0.05$) than the exotic breed (34.7%) (Table 3).

Eimeria spp was seen to be the most prevalent from the total samples examined with a prevalence of 36.0%, followed by

Ascaridia spp (15.40%). *Syngamus spp* was least prevalent (Table 4).

Discussion

The findings of this study indicate that 76.7% of slaughtered chickens in Kuje Area Council, Abuja, had gastrointestinal parasites. Such infestation is associated with reduced health, welfare, immunity, and increased mortality among birds. This is detrimental to farmers in kuje as significant financial losses in poultry production and reproduction are largely due to intestinal parasite infestation. (14). The overall prevalence of infestation in local breeds (42.0%) was significantly higher ($P < 0.05$) than that of the exotic (34.7%). Poor management practice employed predisposes local chickens to lot of GI parasites (15). Given that local varieties of chickens are considered to be strays, having unfettered access to a variety of intermediate hosts, making them more vulnerable to a variety of illnesses (16). Due to their domestication, exotic breeds have an advantage when it comes to having access to medical treatment and drugs, which also accounts for their lower prevalence rate. The duration of local breeds to attain table size is much longer

Table 1: Prevalence of parasite-infested chickens

Sample	Frequency	Percentage (%)
Infested birds	115	76.7
Non-infested birds	35	23.3
Total	150	100

Table 2: Prevalence showing comparison between sexes (male & female)

Sex	Infected (%)	Non infected (%)
Male	38 (25.4)	14 (9.3)
Female	77 (51.3)	21 (14.0)
Total	115 (76.7)	35 (23.3)

Figure 1: Comparison of gastrointestinal parasite infestation in chickens according to breed and sex

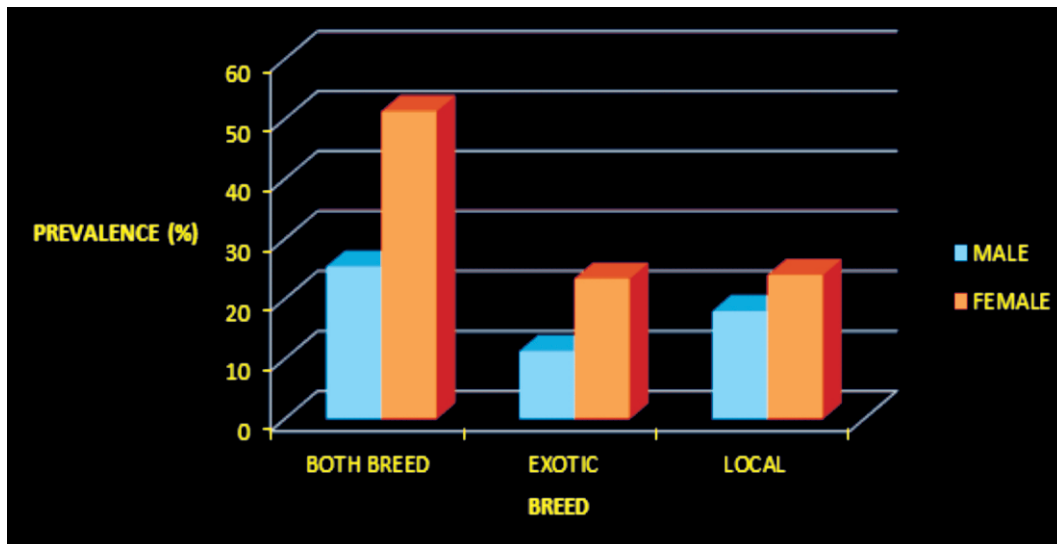


Table 3: Prevalence of gastrointestinal parasites between local and exotic breeds of chicken

Breed	Infested birds (%)	Non-infested birds (%)
Exotic	52 (34.7)	23 (15.3)
Local	63 (42.2)	12 (8.0)
Total	115 (76.7)	35 (23.3)

$\chi^2(1, N = 115) = 4.51, p = 0.034$

Table 4: Different gastrointestinal parasites present in slaughtered chickens at Kuje slaughter slab.

Parasites	Number of infected	Prevalence (%)
<i>Eimeria spp</i>	54	36.0
<i>Ascaris spp</i>	23	15.4
<i>Capillaria spp</i>	15	10.0
<i>Heterakis spp</i>	10	6.7
<i>Strongyloides spp</i>	7	4.6
<i>Syngamus spp</i>	6	4.0

compared to the exotic breeds which are fed strictly on artificial diets. This could also be a reason for the higher prevalence in the local than the exotic breeds of chicken (17).

Both male and female birds were infected with helminth parasites and *Eimeria spp* as observed by (18). Despite the fact that these parasitic conditions are not sex biased,

it was observed that females were more prone to *Eimeria* and helminths infestations than the male counterparts. Contrary result was obtained in Kaduna State, Nigeria, where no sex-association was reported (16). It was revealed that this high prevalence of GI parasites in females than males could be related to mode of feeding as females are

known to be more voracious in their feeding habits especially during egg production than the males which remain highly selective (19). Nonetheless, this result is in contrast to another study (20) which revealed that there is no affinity of helminths species to sex of the host.

Eimeria oocysts had the highest prevalence, being the most common intestinal parasite (36.0%), while *Ascaridia spp* are the most common nematodes, (15.4%). Similar position was presented in 2019 (21), reporting *Ascaridia spp* to be among the most prevalent helminths in Kwara State, Nigeria. Coccidiosis has been shown to be one of commonly encountered parasitic conditions of birds in Nigeria. The low prevalence (4.0%) of *Syngamus spp* in both breeds is similar to findings from other studies (22; 23).

Conclusion

1. The findings in this study give a reflection of the intestinal fauna of both local and exotic breeds chickens slaughtered at slaughter slab in Kuje Area Council, Abuja. GI parasites were highly prevalent (76.7%) in the slaughtered chickens, with the local breed having significantly higher prevalence than the exotic counterpart.
2. Female birds were found to have higher prevalence rate than male birds.
3. *Eimeria* oocysts are the most common intestinal parasites; *Ascaridia spp* the most prevalent helminth; while *Syngamus spp* had the least prevalence rate among both breeds.

Recommendation

Improved veterinary care is recommended and farmers, especially those rearing local breeds of birds should give more intense attention to good management practices such as improved biosecurity measures, hygienic feeding, clean drinking and periodic deworming.

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