



Prevalence of Intestinal Parasitic Infection in Some Poultry Slaughter at Tsohuwar Kasuwa, Gusau, Zamfara State, Nigeria

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Abstract

Poultry diseases such as gastrointestinal helminthes (cestodes, nematodes and trematodes); viruses; bacteria and the coccidians or eimeria species remain one of the major threats to boosting poultry production especially in Nigeria. Gastrointestinal tracts 400 hundred of poultry comprising of 189 chicken, 107 guinea fowls and 104 pigeons slaughtered at Tsohuwar Kasuwa Market slaughtering slabs, into sterile bottles containing 10% formalin and transported to the laboratory for examination. The faecal flotation technique was used to analyse the faecal samples collected. 17.8% (71) of the 400 poultry examined were positive for intestinal parasites. Out of the six parasites isolated, four were nematodes (*Heterakis gallinarum* 6.0%, *Ascarid* egg 3.5%, *Strongyloides* sp 2.25% and *Trichostrongylus* spp. 1.8%) and two were cestodes (*Railletina* spp. 2.25% and *Hymenolepis* spp. (2.0%) ($P > 0.05$). The prevalence was highest in guinea fowl (20.6%) followed by chicken (19.6%) while the least prevalence was obtained among the pigeon (11.5) ($P > 0.05$). That the prevalence of infection was highest among the young 32 (18.9%) compared to the adult poultry (16.9%) in the 400 birds sampled. This difference obtained was not statistically significant ($P > 0.05$). The results of the study also showed that female poultry were more infected (21.4%) than the male (13.1%) but the difference obtained among them was not statistically significant ($P > 0.05$). Regular and proper deworming of the poultry should be done. Moreso, efforts should be directed toward improving our management systems as adequate housing, improved sanitary condition of the environment.

Keywords: Poultry; Tsohuwar Kasuwa; Nematodes; Cestodes

Introduction

The name poultry refers to all domestic birds such as chickens (domestic fowl), turkeys, ducks, geese, guinea fowls, ostriches and others, which are mainly kept for the production of meat and egg for human consumption [1,2]. Apart from providing meat and eggs for human consumption, poultry production has a less detrimental impact on the environment than other livestock, and

uses less water. Semi-scavenging backyard indigenous poultry are extremely important in providing income and high-quality protein in the diets of rural people whose traditional foods are typically rich in carbohydrate but low in protein. Their manure is important in maintaining soil fertility and is widely used by farmers. Over the years there has been an increase in attention given to the health care of the birds by poultry farmers [3].

In Nigeria, consumption of poultry products has substantially increased with respect to today due to population growth and decreasing inequalities. Per capita annual consumption has doubled to 3.6 kg for poultry meat, and egg consumption has increased by almost three times to 10 kg per person per year. The national demand is of around 1.5 million tonnes of poultry meat and 4 million tonnes of eggs per year [4]. It has been estimated that about 85 million Nigerians are involved in poultry production with many on a small to medium scale production [5].

Poultry diseases remain one of the major threats to boosting poultry production especially in Nigeria. The most common parasites affecting in poultry include gastrointestinal helminthes (cestodes, nematodes and trematodes); viruses; bacteria and the coccidians or eimeria species [6,7]. Nematodes are the most common and most important helminth species and more than 50 species have been described in poultry; the majority of which cause pathological damage to the host [8].

Transmission of this parasites is attributed to limited housing and veterinary care services; the environment plays a major role in determining the severity of the infection. The chickens pick up the parasite eggs directly by ingesting contaminated feed, water, litter or by eating snails, earthworms, millipedes and other insects which can carry the eggs of the parasites [9].

Apart from the detrimental impact of these gastrointestinal parasites to poultry, their occurrence in Nigeria has led many poultry farmers into psychological breakdown due to losses incurred as well as a gross decline rate in commercial poultry production [3].

In Nigeria, documented evidences abound on the prevalence of gastrointestinal parasites in a variety of poultry [3,10-17]. Due to the paucity of information about gastrointestinal parasites of poultry in Gusau, the present study is aimed at determining the occurrence of gastrointestinal parasites in the study area.

Materials and Methods

Study area

The study was conducted in Tsohuwar Kasuwa in Gusau which is the state capital and is located in Southwestern of Zamfara State between latitude 12° 20' 34.62 N to 12° 23' 27.48 E and longitude

12.150° N and 6.667° E. The occupation of most of the inhabitants is farming as well as livestock poultry rearing under the extensive and semi-intensive animal husbandry management systems. The annual rainfall ranges between 1000-1,071 mm, with two distinct seasons. The rainy season which starts from May to October and dry season, from November-April.

Collection of samples

The study was conducted between April to July, 2023. The samples were collected twice in every week in the Tsohuwar Kasuwa Market Gusau. Gastrointestinal tracts 400 hundred of poultry comprising of 189 chicken, 107 guinea fowls and 104 pigeons slaughtered at Tsohuwar Kasuwa Market slaughtering slabs, Gusau local Government Area, Zamfara State were collected at random in sample bottles containing 10% formalin and transported to the laboratory for examination.

Laboratory examination of samples

Macroscopic examination of samples

In the laboratory, the gastrointestinal tracts were separated into different regions: the gizzard, crop, small intestine, large intestine and caecum. Each region was cut open using a dissecting scissors. The intestinal tracts of the male chickens were separated from the female ones, in order to determine the difference in worm infection between the two sexes. Each alimentary tract was spread on a dissecting board and the content was scrapped into Petri dishes containing 0.9% physiological saline.

The lumen of each section was opened to expose its content. The content was then observed under a binocular microscope for helminthes. Counting of the collected worms was done with the aid of a pair of thumb forceps and morphological appearance of the parasite aided the separation into tape worms (cestodes) and round worms (Nematode). The compound microscope was used for identification and counting at low magnification. Worms from each section were isolated, counted and preserved in labeled cap bottles containing 10% formalin prior to identification.

Microscopic analysis

The faecal flotation technique as described by [18] was used to analyse the faecal samples collected. Approximately 3g of faeces was dissolved in 5 ml of the Sodium Chloride (NaCl) flotation medium in a tube. The mixture was filtered through double layer

gauze into test tube, more medium was added until a meniscus was formed. A cover slip was placed gently on the test tube and allowed to stand on a test tube stand for 10 minutes. The cover slip was then carefully removed and placed on a glass slide and examined immediately for parasite eggs at ×10 and ×40 objective lens. Identification was done using the keys of [19] and [20].

Statistical analysis

The prevalence was be calculated using percentages (%). Chi-square, Odds ratio and 95% confidence interval was used to test the association between the prevalence of infection and associated risk factors.

Values of P < 0.05 were considered as statistically significant.

Results

In this study, 17.8% (71) of the 400 poultry examined were positive for intestinal parasites. Out of the six parasites isolated,

four were nematodes (*Heterakis gallinarum* 6.0%, *Ascarid* egg 3.5%, *Strongyloides* sp 2.25% and *Trichostrongylus* spp. 1.8%) and two were cestodes (*Raillietina* spp. 2.25% and *Hymenolepis* spp. (2.0%) (P > 0.05) (Table 1).

Although there was no statistically significant difference among the three types of poultry examined, the prevalence was highest in guinea fowl (20.6%) followed by chicken (19.6%) while the least prevalence was obtained among the pigeon (11.5) (Table 1).

The results of this study also showed that the poultry with single infection recorded the highest prevalence with 5.8% followed by those with double infection (3.8%) while those with multiple infection had the least prevalence with 1.9%. (Table 2)

Type of Poultry	No. Examined	No. +Ve, (%)	Type ASC	of HTG	Parasite HMS	RTS	Species SGS	TSS
Chicken	189	37 (19.6)	9	12	8	0	6	2
G. Fowl	107	22 (20.6)	3	10	0	3	3	3
Pigeon	104	12 (11.5)	2	2	0	6	0	2
Total/%	400	71 (17.8)	14 (3.5)	24 (6.0)	8 (2.0)	9 (2.25)	9 (2.25)	7 (1.8)

Table 1: Prevalence of gastrointestinal parasites in relation to type of host and parasite species.

ASC: *Ascaridia* Egg; HTG: *Heterakis gallinarum*; HMS: *Hymenolepis* spp; RTS: *Raillietina* sp; SGS: *Strongyloides* spp; TSS: *Trichostrongylus* spp $\chi^2 = 3.76, P = 0.15$

	Chicken (N = 189)		Guinea Fowl (N = 107)		Pigeon (N = 104)	
Mode of Infestation	No. +ve, (%)		No. +ve (%)		No. +ve (%)	
Single	13	6.9	6	5.6	6	5.8
Double	15	7.9	9	8.4	4	3.8
Multiple	9	4.8	7	8.5	2	1.9
Total	37	19.6	22	20.6	12	11.5

Table 2: Prevalence of gastrointestinal parasites in relation to the mode of infestation.

Table three shows that the prevalence of infection was highest among the young 32 (18.9%) compared to the adult poultry (16.9%) in the 400 birds sampled. This difference obtained was not statistically significant (P > 0.05).

The results of the study also showed that female poultry were more infected (21.4%) than the male (13.1%) but the difference obtained among them was not statistically significant P > 0.05) (Table 4).

Age	Number examined	Number positive	Prevalence (%)
Young	169	32	18.9
Adult	231	39	16.9
Total	400	71	17.8

Table 3: Prevalence of intestinal Parasite in relation to Age.

$$\chi^2 = 0.28, P = 0.69 \text{ OR} = 1.15 \text{ 95\% CI} = 0.69-1.93.$$

Sex	Number examined	Number of positive	Prevalence (%)
Male	176	23	13.1
Female	224	48	21.4
Total	400	71	17.8

Table 4: Prevalence of intestinal parasites among poultry in relation to sex.

$$\chi^2 = 4.72, P = 0.03, \text{OR} = 0.72, \text{95\% CI} = 0.32-0.95$$

Discussions

The results of this study revealed an overall prevalence of 17.8% among the different poultry slaughtered at Tsohuwar Kasuwa.

The findings of this study showed that the birds were infected with four nematodes with a varying proportion (*Heterakis gallinarum* 6.0%, *Ascarid* egg 3.5%, *Strongyloides* spp. 2.25% and *Trichostrongylus* spp. 1.8%) and two were cestodes (*Raillietina* spp. 2.25% and *Hymenolepis* spp) (2.0%). (P > 0.05).

The highest prevalence obtained among the nematodes compare to cestodes obtained in this study is in agreement with the findings of [21] and [15] who also reported a similar finding. [14] however reported a higher prevalence of cestodes compared to the nematodes among helmeted guinea fowls which is in contrast with the result of this study. This could be due to difference in the season of conducting these studies, availability of intermediate hosts, individual host resistance and ecological parameters.

The finding findings of this study also contradicts the previous report of [22] who reported a higher prevalence of coccidia compared to the nematodes with no cestodes recorded. Elsewhere, [23] reported higher protozoans than helminths among household and temple pigeons (*Columba livia*) in Central Nepal.

The observed variation may be attributed to the continuous exposure of the poultry to different insects that may serve as intermediate hosts for parasites as a result of their free ranging which may influence their exposure to infection [3].

The results of this study show a higher prevalence of *Heterakis gallinarum* compared to the other parasites. This calls for attention due to its pathology and role as a carrier of an important pathogen namely, *Histomonas meleagridis* in poultry which is agent of black head disease of Guinea fowls [24,25], thereby serving as reservoir of infection to other local and exotic domesticated birds in the study area [13,26].

The presence of ascarid infestation in this study should not be ignored because infection with *Ascaridia galli* can cause reduction in the growth rate and weight loss, which may be related to damage to the intestinal mucosa. *Ascaridia galli* significantly affects the health of chickens by sharing the feed consumed by the host thus causing stunted growth and reduced egg and meat production [26].

Despite the fact that only two cestodes were isolated (*Hymenolepis* sp. and *Raillietina* sp.) their low prevalence should not be overlooked because parasitic cestodes in poultry are known to cause retarded growth, enteritis, diarrhoea and haemorrhage even in severe cases it may cause death of young birds.

Observations from this study showed that single infection is more prevalent than double and triple infections which disagree with the result of by [15] but agree with the report of [27] among domestic pigeons in Tripoli, Libya. The mixed infection of two or more species of parasites per bird obtained in this study could be due to food preference at a particular time, which determines the establishment of mixed or single infection in chickens.

This study reveals that more female birds were infected with helminth parasites compared with the male birds. This is in agreement with previous studies in Nigeria [12,13]. This could be due to the voracious feeding habits of female birds especially during the egg production period, while males largely remain selective in their feeding habits [28].

Although there was no statistically significant association between the prevalence of infection to their age, adult birds were reported to have a higher prevalence compared to the

young poultry. This finding disagrees with the report of [29] who attributed their higher prevalence in adult chickens to chicks and growers to may their gregariousness relative to growers and chicks thus exposing themselves more than the former.

The results of this study shows that the chicken, guinea fowl and pigeon slaughtered in Tsohuwar Kasuwa, Gusau, Zamfara State of Nigeria are infected with four types of nematodes namely; *Heterakis gallinarum* 6.0%, *Ascarid* egg 3.5%, *Strongyloides* sp 2.25% and *Trichostrongylus* spp. 1.8%) and two were cestodes (*Raillietina* spp. 2.25% and *Hymenolepis* spp. (2.0%) ($P > 0.05$).

The prevalence of gastrointestinal parasitic infection was highest in guinea fowl (20.6%) followed by chicken (19.6%) while the pigeon recorded the least (11.5%). The difference obtained among these birds was not statistically significant. This could be as a result of their equal exposure to the sources of infection. However, higher prevalence has been obtained in previous studies. For example, [15] reported a prevalence of 49.5% in Local and Broiler Chickens in Ibesikpo Local Government Area, Akwa Ibom State, Nigeria. Similarly, [3] reported a prevalence of 81.7% in Giwa Local Government Area, Kaduna State. A higher prevalence of 96.3% has earlier been reported in Eastern Nigeria by [10]. [17,32] reported an 80% prevalence among guinea fowl in Sokoto and Kano States, Nigeria respectively. Similarly, [14] reported 88 prevalence among helmeted guinea fowl (*Numida meleagris galeatus*) in Maiduguri, Northeastern Nigeria.

Elsewhere, [22] reported an 87.1% prevalence of intestinal parasites in household and temple pigeons (*Columba livia*) in central Nepal. [31] reported a prevalence of 97% in different localities in Giza governorate, Egypt. The lower prevalence obtained among chicken, guinea fowl and pigeon in this study compared to previous studies can be attributed to the period of sampling as this work was conducted just at the beginning of the rainy season when there was little moisture and little humid. Moreso, the sample size as well as the sampling method are factors that could have yielded this prevalence.

The high gastrointestinal parasitic infection in guinea fowl and chicken than pigeon as revealed in this study could be attributed to environmental conditions and traditional breeding which are suitable for infection establishment. This is because they guinea

fowl and chicken may have been reared extensively therefore, making them seek their food in the soil thereby exposing them to contaminated soil which may harbour the infective stages of parasites and living organisms which may serve as intermediate hosts [32].

Conclusions

The results of this study shows that the chicken, guinea fowl and pigeon slaughtered in Tsohuwar Kasuwa, Gusau, Zamfara State of Nigeria are infected with four types of nematode namely; *Heterakis gallinarum* 6.0%, *Ascarid* egg 3.5%, *Strongyloides* spp. 2.25% and *Trichostrongylus* spp. 1.8%). Their presence may be due to favourable conditions such as availability of intermediate hosts and suitable climatic conditions which could influence the prevalence.

The presence of cestodes (*Hymenolepis* spp and *Raillietina* sp) is of veterinary concern. This because, their presence in poultry is known to cause retarded growth, enteritis, diarrhoea and haemorrhage even in severe cases it may cause death of young birds.

The result of this study also shows that there is no association between prevalence of infection to the type of poultry, age and sex of the poultry because all the poultry may have been exposed to similar management and climatic conditions.

Recommendations

Further and extensive studies involving more samples size as well as more study areas should be carried out to get a better understanding of the impact of the infection.

Regular and proper deworming of the poultry should be done.

Efforts should be directed toward improving our management systems as adequate housing, improved sanitary condition of the environment.

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