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Assessment of Intestinal Parasites of Commercial Broilers in Five Selected Local Government Areas of Rivers State, NigeriaWokem, G.N¹ and Obiyor, E.T.²

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Abstract

The study was carried out from April to July 2016 in selected Local Government Areas of Rivers State; Ikwerre, Emohua, Etche, Ahoada and Obio/Akpor. The aim was to assess the presence of intestinal parasites in commercial broiler birds. Three hundred (300) faecal samples were randomly collected and analyzed using salt saturation floatation technique; Out of 300 faecal samples examined, 214 (66.8%) samples were infected with *Ascaridia galli* 50(23.3%), *Eimeria* species 79(36.9%), *Heterakis gallinarum* 17(7.9%) and a mite. Mixed infection was observed in 68(31.8%) samples which were *A. galli* + *Eimeria* spp, *A. galli* + *Eimeria* spp + *H. gallinarum* and *Eimeria* spp + *H. gallinarum*. Parasite prevalence from each of the LGAs were 71.69%, 66.23%, 75%, 56% and 81.25% respectively. There was no statistically significant difference observed in the different LGAs ($p < 0.05$) but Obio/Akpo recorded slightly higher prevalence (81.25%) than other LGAs. Broiler age groups were categorized in weeks so as to ascertain the age group with more parasitic burden. The infection rate for 1-5 weeks old was 75%, 6-10 weeks 67.5%, 11-15 weeks 45% and 16-20 weeks was 65%. It was observed that broiler age group 1-5 weeks old recorded the highest parasitic burden ($X^2 = 7.240$, $p = 0.065$). Well-constructed questionnaire was used to evaluate poultry farmers' management practices, information extracted showed that most of the farms were having poor ventilation, overcrowding of birds, water spillage on the floor, poor hygienic practices and negligence by farmers to treat their birds at the right stage.

Keywords: Intestinal parasites burden, Commercial broilers, Mixed infection, Rivers State, Nigeria.

Introduction

Coccidiosis is an important intestinal parasitic protozoan disease that causes great economic loss particularly in farm animals enterprise all over the world (Wokem and Obiyor, 2018). Coccidiosis is transmitted by ingestion of water and food contaminated with infested faeces. Clinical signs of coccidiosis in chickens are due to destruction of the intestinal epithelium, and frequently, the underlying connective tissue of the mucosa as well as dehydration. Diarrhoea which may become bloody in severe cases is the primary symptom. Most animals infected with *Coccidia* are asymptomatic, but young or immunocompromised animals may suffer severe symptoms and death.

In Ethiopia, the study conducted by Heyradin *et al.* (2012) showed that coccidiosis contributes to 8.4% and 11.86% losses in profit in large and small-scale farms respectively. Losses as a result of mortality following a significant outbreak may be devastating and incidence rates as high as 80% were sometimes recorded in the country (Heyradin *et al.*, 2012). Infection results from ingestion of oocyst. Oocysts contaminate the environment through the faeces of an infected host. Of all the numerous species of *Eimeria* that can affect a particular host, not all are pathogenic. Concurrent infections with two or more species, some of which may not normally be considered pathogenic, also influence clinical disease. Within pathogenic species, strains may vary in virulence.

In Nigeria, studies were carried out by some researchers like Jatau *et al.* (2012) on prevalence of coccidian infection and preponderance *Eimeria species* in free range indigenous and intensively managed exotic chickens during wet season in Zaria. The result showed that 33.3% of all the collected samples had coccidian infection, with specific prevalence rates of 44.3% in layers and 37.1% in broilers and 18.6% in indigenous chickens. Mixed infections were common among sampled chicken with prevalence of 61.4%. Kolade *et al.* (2014) carried out a study on intestinal parasites of local and exotic domestic fowl using supersaturated saline floatation technique. The Local breed had a prevalence of (60.0%) and Exotic breed has a prevalence of (70.0%). Agishi *et al.*, (2016) carried out a study in Benue state Nigeria on prevalence of coccidiosis and *Eimeria species* in layers and broilers slaughtered in Makurdi, using simple floatation method and examined each of the intestinal tract microscopically. The result showed that the overall prevalence of coccidial infection was 40.1% for layers and 39.5% for broilers. In the study seven species of *Eimeria species* were identified with different prevalence rate. Mixed infections were also observed as well as a single infection in both layers and broilers.

A study in Enugu on the prevalence of gastrointestinal helminthic infections in slaughtered chickens reared in the Nzukka by Ngongeh *et al.* (2014). The study was carried out on 305 gastrointestinal tracts of chickens, 177 and 128 from broiler and layers respectively. The intestines were incised longitudinally and the content was washed into cups for the recovery of eggs and worms using centrifugal floatation method. The result of the study showed positive, reviewing that *Ascaridia galli*, *Heterakis sp* and *Raillietina species* were common the 22.3, 0.6 and 6.2% prevalence. The result also showed the prevalence of *A. galli* was higher in layers (34.4%) than broiler with a prevalence of (14.1%), proving that grown birds has higher helminth infection than the younger birds.

A study of prevalence of gastrointestinal helminth parasites of the 200-domestic fowl slaughtered in Giwa market using floatation method, showed the presence of gastrointestinal

helminthes. From the results, 163 birds were infected representing 81.5% of the study population. It was also observed that six helminthic parasites were encountered at different rates. Adewole *et al.* (2015) study on parasites and diseases of poultry, showed that January and October had the highest prevalence of coccidiosis.

Kolade *et al.* (2014), investigated intestinal parasites of local and exotic domestic fowls and observed that parasites infect both local and exotic domestic birds. The study was carried on 150 birds, examined both qualitatively and quantitatively. The result showed that the pooled prevalence of intestinal parasites in the fowls was 66.7% for local breed and 60.0% for exotic breed. Mixed infestation was also observed in the study. Similar research was conducted by Ogbaje *et al.* (2012) on prevalence of *Ascaridia galli*, *Heterakis gallinarum* and Tapeworm in local birds, broilers and layers. A total of 440 samples were examined, 200 from broilers and 140 from layers. The result showed that out of 440 samples examined 280(63.6%) were infected with one or more species of helminthes. The researches recorded single, double and triple infections.

Poultry industry contributes about 88.60% of all meat consumed in the world and thereby constitute a food and protein sources (Singh and Seepersade, 2001). In Africa, Nigeria records the highest number of poultry farms. Meat and eggs are the most consumed animal protein unrestricted by any culture (Agro Nigeria, 2014).

Losses due to reduced productivity such as poor weight gain, poor egg production and rate of mortality caused by protozoans and helminthes are economically very important to the poultry industry. The parasites have serious impact on poultry health, productivity, quality and quantity of products (Wokem and Obiyor, 2017). This present study is aimed at assessing the presence of intestinal parasites of commercial broilers in five selected Local Government Areas of Rivers State, Nigeria.

Materials and Methods

Study Areas

The investigation covered Ikwerre, Obio /Akpo,

Emohua, Ahoada and Etche Local Government Areas. Climatic conditions are typical of the rainforest ecological zone. The Ikwerre LGA has a total area of 1,380 KM². It lies at latitude 4° 54 N and longitude 6° 53 E, Obio/Akpo has a total area of 260 KM², it lies at latitude 4° 45 N and longitude 6° 51 E, Etche lies at latitude and longitude 4° 58 N and 7° 31 E, latitude and longitude of Emuoha are at 4° 88 N and 6° 87 E and Ahoada lies at latitude 6° 87 N and longitude 6° 38 E.

Sample Collection and Examination

The study involved weekly collection of faecal samples for a period of three months, from April to July 2016. Prior to faecal sample collection, poultry farm owner's informed consent was sort using an introductory letter from the Department of Animal and Environmental Department, University of Port Harcourt, Nigeria. Only those farmers who consented to the request had their farms included for the study. A total of 300 faecal samples were collected from commercial broilers. The age of the chicken was grouped in weeks.

Data were collected using a well-structured questionnaire, observations and interview from the twenty-five selected poultry farmers, who were respondents in the study. Freshly voided faecal samples were randomly collected using spatula into a labelled wide-mouthed bottle. They were taken to the laboratory for microscopy. In the laboratory each sample was analysed for intestinal parasites qualitatively using two different techniques as described by Urquhart *et al.* (1987) and Chesbrough (2005) salt saturation floatation technique. Estimated 2g of each faecal sample was put into a separate test tube and 10ml of saturated salt solution was added into the test tube, stirred to get a uniform mixture. The mixture was strained through a guaze into a wide mouthed specimen bottle, after which more saturated salt solution was added to the mixture filling the bottle to the brim until the test tube almost overflowed with an upper meniscus. A clean glass slide was placed on top of test tube with contents touching the slide. The mixture was allowed to stand for 20 minutes in an erect position and the coccidian oocyst and worm ova were expected to float to the top.

Afterward, the glass slide was carefully removed by lifting it straight up and turned and then covered with a cover slip for microscopy and identification of ova and oocyst. The slides were examined under x10 and x40 objective respectively. The process was repeated until the whole samples were examined.

Statistical analysis

Chi –square test was used to compare the prevalence among groups for statistical differences and similarities. A p-value (≤ 0.05) was considered significant in statistical analysis.

Results

Five Local Government Areas were assessed for intestinal parasites of commercial broilers and out of a total of 300 faecal samples examined, 214(66.8%) faecal samples were infected as shown in Table 1. Obio/Akpo recorded the highest prevalence with 81.25%. Parasites recovered were *Eimeria oocyst* 79(36.9%), *Ascaridia galli* 50(23.3%), *Heterakis gallinarum* 17(7.9%) and a mite. Mixed infections were observed in 68(31.8%) samples, which were *A. galli* + *Eimeria spp*, *A. galli* + *Eimeria spp* + *H. gallinarum* and *Eimeria spp* + *H. gallinarum*. A total of twenty-five filled out questionnaires were retrieved from the farmers. The information from them revealed that 100% had incidence of water spillage. Presence of foot bath at the entrance of the poultry rooms were observed in only 20% of the farmers. Also, 60% of the farmers have separate rooms for their sick birds and 60% only disinfect their poultry rooms before restocking. All the farmers use quality feed for their birds, good ventilation was observed in 80% of the farms and hygienic level was poor in 60%. Farmers who used good water sources were 60%, only 20% of the farmers dispose their litters once in two weeks, 30% dispose theirs once per batch and 50% dispose once in a month. The information gotten also revealed that 80% of the farmers purchase their birds when they are a day old from different large farms like Zartech, Chimero, Obasanjo and Niger chicks companies and only 20% of the farmers purchase 2-4 weeks old bird from retailers.

Table 1: Prevalence of Intestinal Parasites in the five selected Local Government Areas, in Rivers State, Nigeria

| LGAs | No. of birds examined | No. infected | % Prevalence |
|-----------|-----------------------|--------------|--------------|
| Ikwerre | 60 | 43 | 71.67 |
| Ahoda | 60 | 34 | 56 |
| Obio/Akpo | 60 | 57 | 81.25 |
| Emuoha | 60 | 53 | 66.23 |
| Etche | 60 | 45 | 75 |

Table 2: Age- related prevalence of Intestinal Parasites of the Broiler Chicken in the study population

| Breed | Age (Weeks) | No. of sample Examined | No. of Positive sample | Prevalence (%) | X ² | p-value |
|---------|-------------|------------------------|------------------------|----------------|----------------|---------|
| Broiler | 1-5 | 100 | 75 | 75 | 7.240 | 0.065 |
| | 6-10 | 160 | 108 | 67.5 | | |
| | 11-15 | 20 | 9 | 45 | | |
| | 16-20 | 20 | 13 | 65 | | |

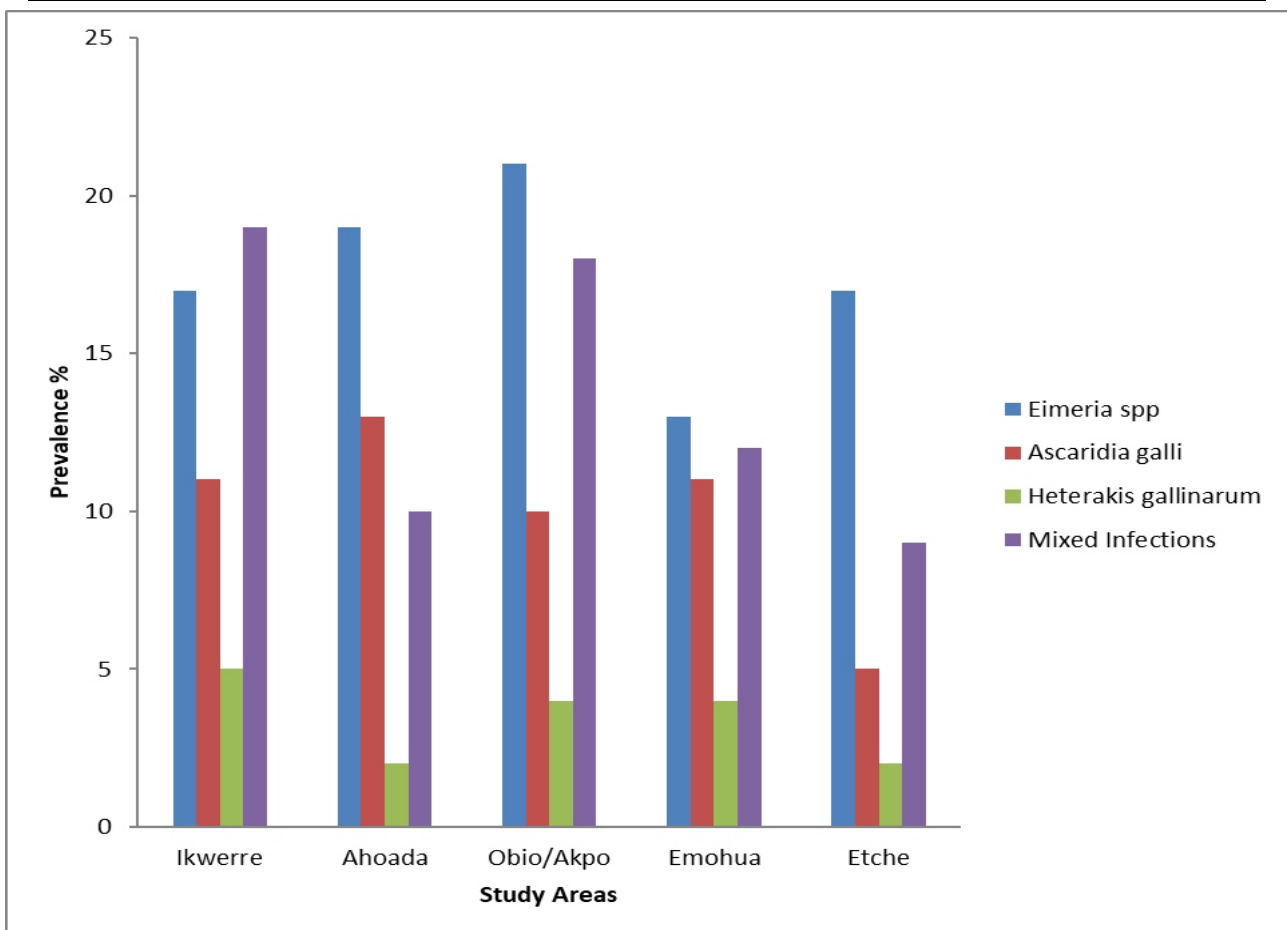


Figure1: Location related prevalence of Intestinal Parasites of Broilers sampled.

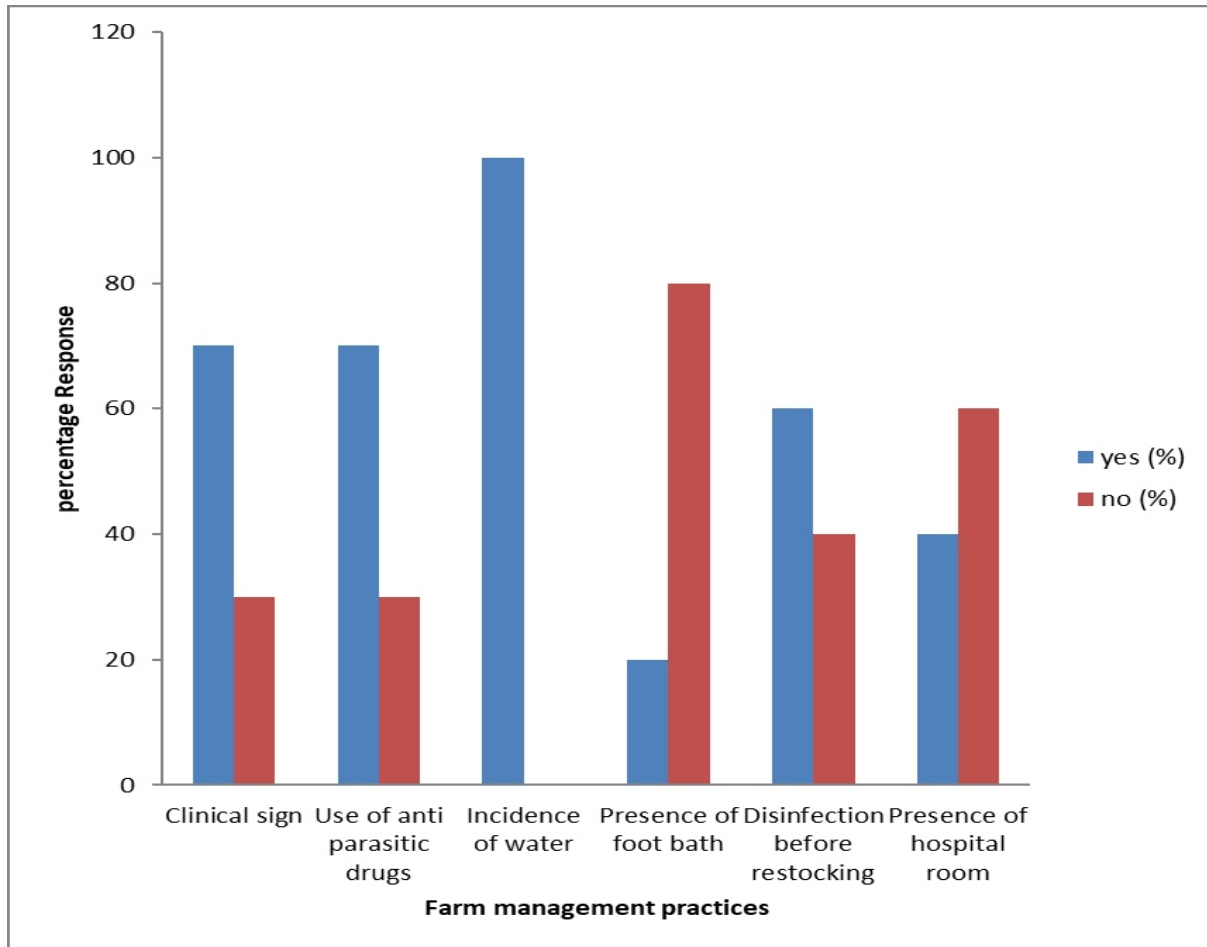


Figure 2: Farmers management practices seen as risk factors

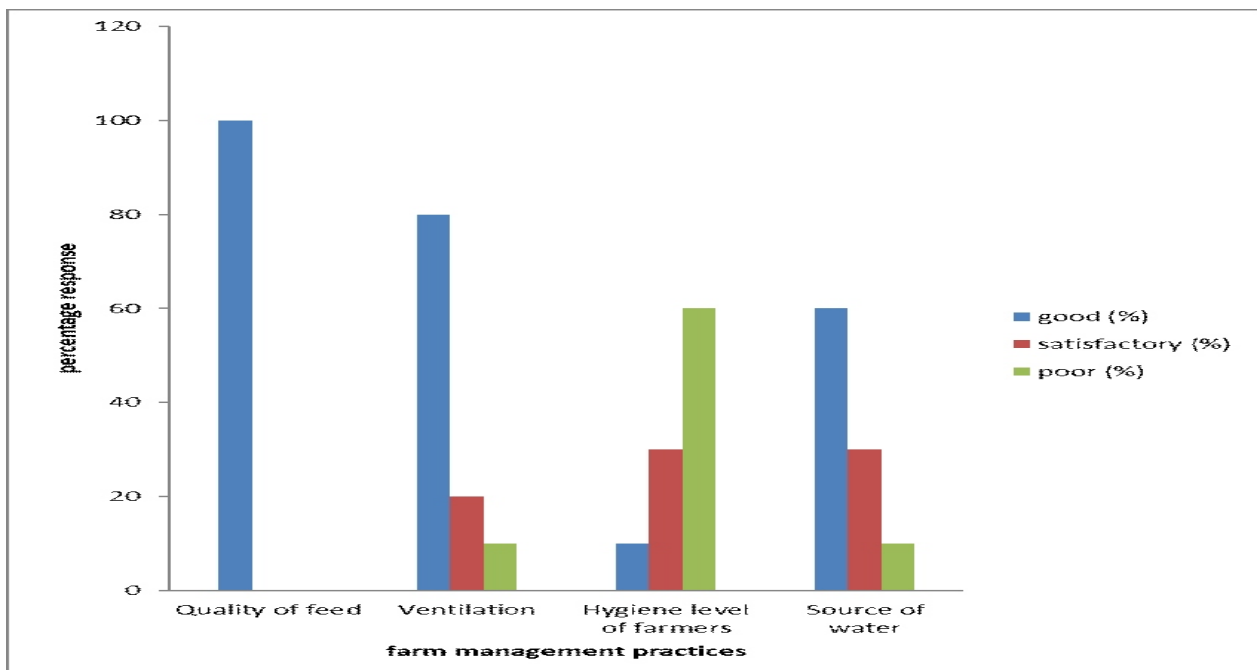


Figure 2a: Farmers management practices seen as risk factors

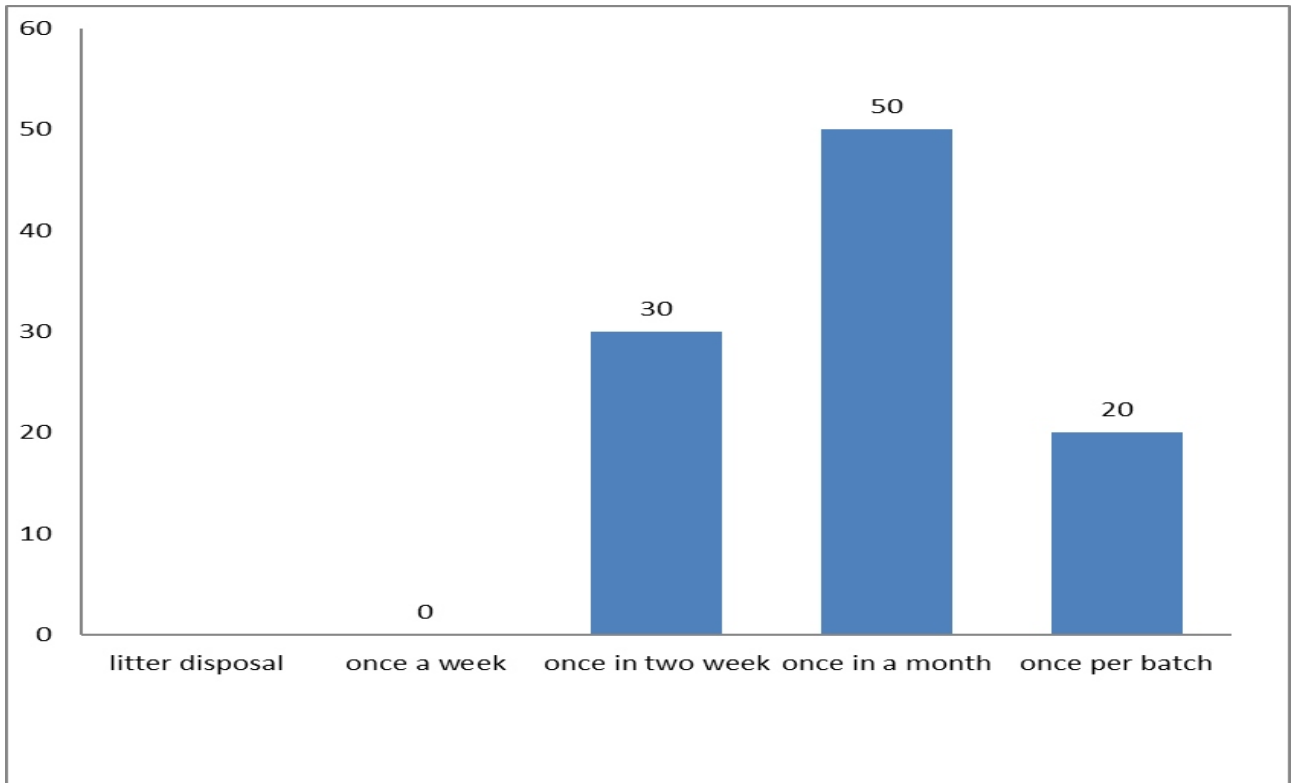


Figure 2b: Percentage frequency of litter disposal by poultry farmers

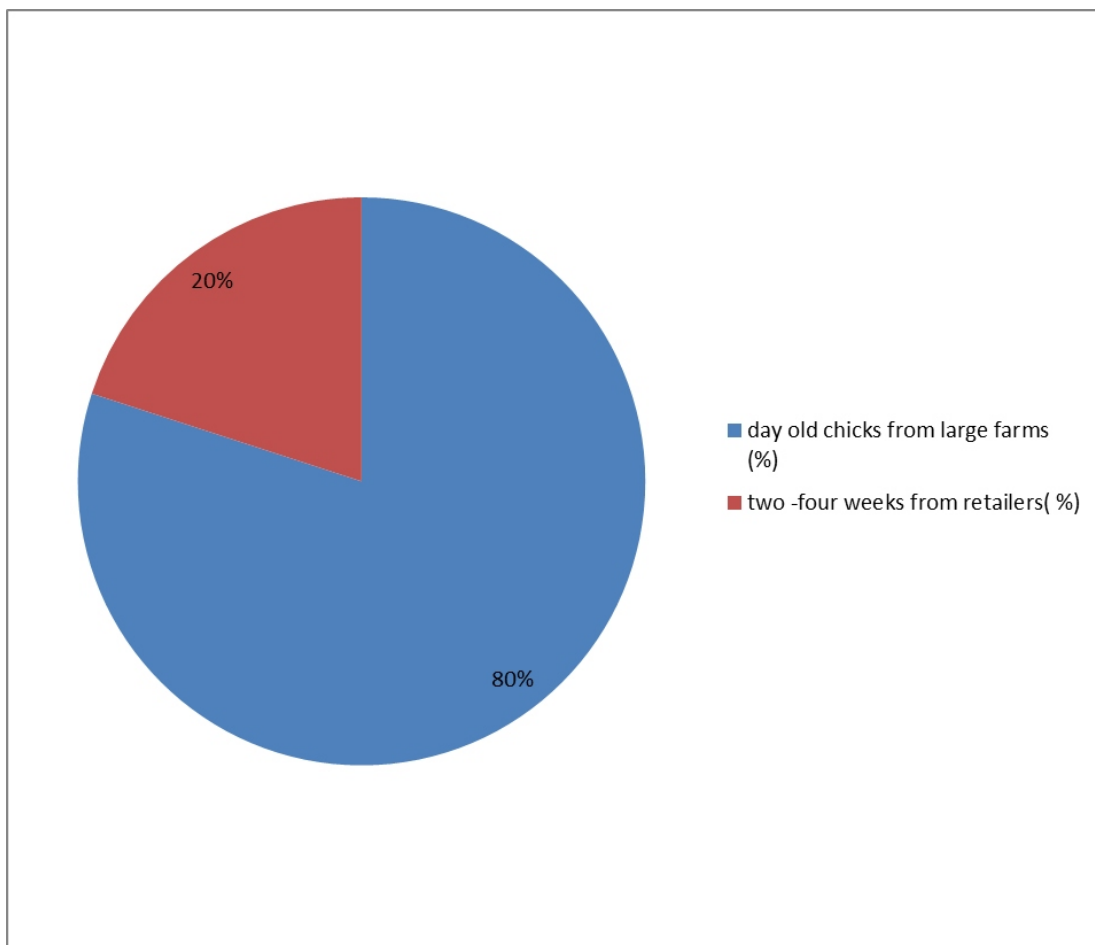


Figure 3: Percentage of poultry farmers sources of birds as a risk factor

Discussion

The overall prevalence of intestinal parasites in the studied population is 66.8%. Out of which, infection with *Ascaridia galli* was 50(23.3%), *Eimeria species* 79(36.9%), *Heterakis gallinarum* 17(7.9%) and a mite. The mite found in the sample might have been picked up by the host during feeding since it is an ectoparasite of birds. Infection rate of *Eimeria species* was statistically significantly higher than *Ascaridia galli*. These findings are within the range of that of Ngongeh *et al.* (2012) who reported 21% prevalence of *A. galli* in Umuahia and Ngongeh *et al.* (2014) 22% in Enugu State. The high prevalence of intestinal parasites may be due to poor management of the poultry birds by the farmers as observed in the farms during sample collection. The prevalence of *Eimeria* oocyst in this present study was slightly higher when compared to the 14.3% of *A. galli*, and 33.9% of *Eimeria spp* reported by Ndaleh *et al.* (2014). The higher prevalence of *Eimeria* oocyst may be due to poor management practices and other environmental risk factors that support the survival and the transmission dynamics hence this protozoan can sporulate in the litters which enhances its transmission through oral faecal route.

Mixed infections were observed in 68(31.8%) samples which were *A. galli* + *Eimeria spp*, *A. galli* + *Eimeria spp* + *H. gallinarum* and *Eimeria spp* + *H. gallinarum*. Parasitic prevalence rates from each of the LGAs namely Ikwerre, Emohua, Etche, Ahoada and Obio/Akpo were 71.69%, 66.23%, 75%, 56% and 81.25% respectively. There was no significant difference between the prevalence rates of the intestinal parasites in the different LGAs ($X^2 = 8.744$, $p = 0.068$, $CI = 95\%$). This percentage prevalence is an indication that intestinal parasitic infections can be a serious problem for commercial broilers in the study areas. This finding is within the range of reports of other researchers in different parts of the world (Garbi *et al.*, (2015) (19.5%); Ferdushy *et al.*, (2014) (84.6%); Mer kibib *et al.*, (2014) (88.5%); Olyira *et al.*, (2012) (20.5%) and Mwale and Masika (2011) (50.2%). However, it is higher than the findings from some other researchers in Nigeria like Muazu *et al.* (2008) 36.6% in Plateau state; Jatau *et al.*

(2012) 33.3% in Zaria and Agishi *et al.* (2016) 40.1% in Makurdi. In the same vein, Ngongeh (2012) had (43.2%) in Abia, whereas Ngongeh *et al.* (2014) reported a prevalence of 27% in Enugu. The difference in the present study when compared to these findings above may be related to difference in relative humidity of Rivers State and the fact that this current study was conducted during the rainy season. Poor management practices by farmers such as overcrowding, water spillage, lack of foot bath and many more, seemed also to have contributed to the high prevalence of intestinal parasites observed in this study. Similarly, Adewale *et al.* (2015) reported that uninfected chickens get infected by direct and indirect contact with droppings from infected chickens. This is an indication that the infective stage of the parasites is shed in faeces. The high parasitic prevalence may also be attributed to negligence of farmers; older litters not removed and replaced with new dry wood shaving or saw dust very often; thereby making the poultry room floor wet and cake. Again, water spillage, leakages from the roof of the poultry house, and the wet litters served as favorable environment for the parasites to incubate as previously reported (Elenwo *et al.*, 2014; Kolade *et al.*, 2014).

The age of the birds was considered and it was observed that birds between the ages 1-5 weeks had a higher prevalence of intestinal parasites. This may be as a result of their active feeding stage which exposed them to viable parasites in the surrounding. Also, because of their smaller sizes, the infected birds might jump into their feeders, pass out faeces and still feed on it unlike the older bigger birds which may not due to their size. Our finding is at variance with previous reports (Alemayehu *et al.*, 2015; Abadi *et al.*, 2012; Amer *et al.*, 2010 and Taylor *et al.*, 2007) who reported that prevalence of gastrointestinal parasites was more in adults greater than 8 weeks than younger birds (2-8 weeks).

Summarily, the findings of the study have shown that intestinal parasites are highly prevalent in commercial broilers in the studied local government areas of Rivers State, Nigeria. There is high incidence of poor management practices and negligence among the farmers which

exposes the broiler birds to these prevailing parasites. This implies that poultry farmers need to take appropriate measures in the control of intestinal parasitic diseases in Rivers State.

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