PREVALENCE OF GASTROINTESTINAL PARASITES IN FAYOUMI CHICKEN IN REGIONAL POULTRY FARM, PAHARTOLI, CHATTOGRAM

A Clinical report presented in partial fulfillment of the requirement for the degree of

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Submitted by

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ABSTRACT

Around the world, chicken is frequently infected with GI parasites, which is mainly caused by *Ascaridia galli* and *Heterakis gallinarum*. This infection is widespread in all types of production systems and poses serious economic challenges due to decreased feed consumption, decreased weight gain, decreased egg production, and in severe cases, even mortality.

Understanding the interaction between the host and the parasite and developing efficient control strategies for this economically significant parasites both depend on information regarding phenotypic diversity. Therefore, the purpose of this study was to gather up-to-date data on the incidence of GI parasites infection in chickens. 100 chicken droppings total were gathered for this study. Out of 100 samples, 27% were confirmed to be infected with *Ascaridia galli* and 17% with *Heterakis gallinarum*.

The sample was taken from Regional Poultry Farm Pahartali, Khulshi, Chattogram.Direct smear,floatation and sedimentation technique was used to identify eggs of parasites.The prevalence of *Ascaridia galli*(30.00%) in 2 years that was higher and in *Heterakis gallinarum* (20.00%) in 1.5 years respectively.According to body weight the highest prevalence of *Ascaridia galli* (30.00%) in case of 2.5 kg body weight which was higher and *Heterakis gallinarum* (20.00%) in case of 2 kg body weight. was in Anthelmintics were employed more frequently in the farm. The infection rate was less after deworming.Mebendazol (20.00%) was used and Levamisol(16.00%) used as anthelmintics.Poultry farmers must be made more aware of the need to control and prevent the spread of poultry parasites.The careful disposal of chicken droppings ought to be the main focus and avoid over-crowding of the chickens.

Key words: GI parasites, Egg identification, Prevalence, Post-mortem findings, Microscopic examination.

CHAPTER 1: INTRODUCTION

The poultry industry is serving as a significant and affordable source of proteins (meat and eggs) and jobs (Bachaya et al., 2012). In Bangladesh, the chicken industry is crucial for preserving agricultural growth and reducing malnutrition (da Silva and Rankin, 2014). It is an integral component of Bangladesh's farming system and contributed to the creation of opportunities for direct and indirect employment, as well as support services, for around 6 million people (Ansarey et al., 2012). This subsector has shown to be an attractive economic activity, roughly, indicating its significance for the entire economy. According to Raihan and Mahmud (2008), the industry accounts for 14% of the overall value of livestock output and is expanding quickly. According to a report, 37% of Bangladesh's total meat production is consumed in Asia. About 22-23% of the nation's entire supply of animal protein comes from poultry (Prabakaran, 2003). In recent years, commercial chicken farming has advanced significantly. According to Chowdhury (2011), Bangladesh has an estimated 326.44 million poultry, of which 272.92 million are chickens. The largest, most prosperous, and most successful agro-based enterprises in Bangladesh today are the broiler and sonali (Fayoumi- Rhode Island Red Crossbred) industries. Broiler and sonali make up 88.6% of all chicken meat consumed, making them an important source of protein and food (BER, 2017).

The most common disease affecting chickens, particularly in developing nations, is parasitic disease, which can result in large financial losses (Fatihu et al., 1991). Chickens have been found to host more than 30 helminths (Shifaw et al., 2021). The caecal nematode *Heterakis gallinarum*, which frequently manifests as a mixed infection, is the second most prevalent parasite among them, after *Ascaridia galli.* In intensive agricultural settings where particular temperatures and humidity are suitable for larval development, species with a direct life cycle are more common. on contrast, species with indirect life cycles are particularly prevalent on traditional farms, particularly in soils that are wet and humus-rich, which are favorable for the growth of earthworms. Due to improved housing, cleanliness, and management practices, the prevalence of the majority of parasite illnesses in chicken seems to have greatly decreased in commercial poultry production systems (Permin and

Hansen, 1998). However, poultry diseases are a significant factor in reducing poultry productivity, which reduces economic returns and can consequently have a detrimental impact on the growth of the business (Abebe et al., 1997).

The frequency of gastrointestinal helminth infection in chickens in Bangladesh has only been investigated in a very small number of research (Rabbi et al., 2006; Ferdushy et al., 2014). In a steep area, no such research has been conducted. Therefore, this study was carried out to identify the diseases brought on by intestinal parasites in commercial broiler and sonali farms and to assess the prevalence of each disease in relation to age, sex, farming system, and seasonality.

Objectives of the study:

i. To find out the most recent statistics on the frequency of GI parasite infection in farm chicken.

ii. To detect GI parasites by post-mortem of chicken.

iii. To determine the risk factors for GI parasitic infection in chicken.

CHAPTER 2: MATERIALS AND METHODS

2.1 Study period

The intended study was carried out in March 2023.

2.2 Sample size

In this study, the presence of GI parasites was tested in 100 fecal samples from foyoumi chickens collected from regional poultry farm, Pahartoli, Chattogra. Using a standardized questionnaire, the authority provided demographic data regarding the rearing system, deworming history, seasonal variation, age, sex, etc.

2.3 Collection of sample and preservation

In order to conduct a parasitological examination, feces were collected in plastic container while wearing hand gloves, carefully identified, and transported via ice box within 24 hours while keeping a cool chain. Sample was kept in 10% formalin for use in direct, floatation, sedimentation to identify parasite eggs. Each vial was marked with a special identification number at that time, and basic demographic data (owner's name and address, animal ID, flock size, age, sex, weight, deworming history, etc.) were also gathered through a questionnaire. The samples were then promptly moved to the lab at the Department of Pathology and Parasitology, CVASU, and chilled to 4℃ for further analysis.

Fig: Sample collection

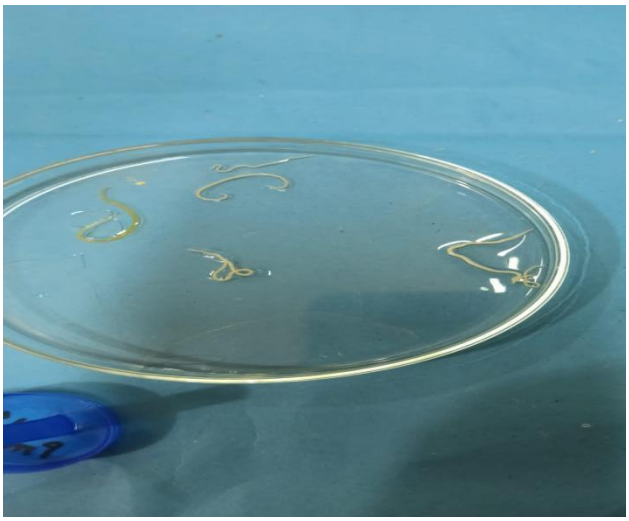


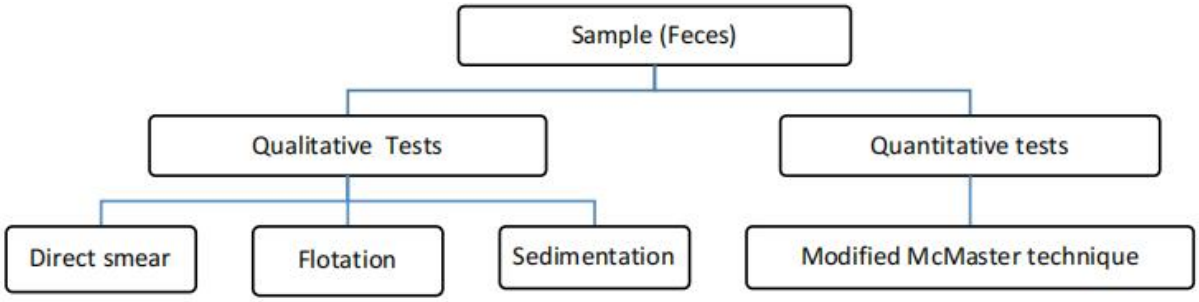
Fig: Gross sample of *Ascaridia galli*

2.4 Laboratory examination

Urquhart et al. (1996) described three methods for screening out positive samples: direct smear, flotation, and sedimentation. It was also done to calculate the parasitic eggs load (epg) using the modified McMaster Counting technique created by Soulsby (1982) and Tibor (1999).

2.5 Experimental design

According to Tibor (1999), the study's design was made.



Experimental design for the diagnosis of *Ascaridia galli*

2.6 Fecal Egg Counts

Using a modified McMaster counting approach with a sensitivity of 50 EPG on each individual fecal sample, the number of eggs per gram of feces (EPG) was calculated. As it is difficult to distinguish between the eggs of *Heterakis spp*. and *A. galli,* they were tallied together in the following and given the designation "Ascarid eggs," due to their similar form.

2.7 Postmortem Examination

For dead birds, a postmortem investigation was performed. For *Ascaridia galli*, the GI tract was thoroughly studied.

2.8 Statistical analysis

The data from the survey are imported into Microsoft Excel and then evaluated in STATA 13.

CHAPTER 3: RESULTS

3.1 Overall prevalence of *Ascaridia galli* infection and its association with different risk factors

Out of 100 hens examined throughout the study period, 27 were discovered to have *Ascaridia galli* infections.

In this investigation, the prevalence rate at various chicken ages was noted. There was found that, *Ascaridia galli* infection rates vary according to age group. According to age, the infection rate for *Ascaridia galli* was 23.33% in the 1year range, 26.67% in the 1.5 years range, and 30.00% in the 2 years' range.

According to body weight, the infection rate of *Ascaridia galli* was 23.33% in the 1.3 kg of body weight range, 26.67% in 2 kg range and 30.00% in 2.5 kg range.

27.00% prevalence of *A. galli* was found in non-dewormed chicken which were treated with anthelmintic before 3 months ago. Moreover, Fenbendazol (45.00%) was the most commonly used anthelmintic, followed by Mebendazol (23.33%), Levamisole (22.00%). In this investigation, we found that deworming the chickens reduced their worm infection. The infection rate in chicken after deworming was 5%, compared to 95% in poultry without deworming (Table 1).

Table 1: Overall prevalence of *Ascaridia galli* infection and its association with different risk factors

Traits	Categories	Frequency	Percentage	*p*-Value
Avg. Age (Years)	1 year (n=30) 1.5 years (n=30) 2 years (n=40)	7 8 12	23.33% 26.67% 30.00%	0.823
Avg. body weight (kg)	1.3 kg (n=30) 2 kg (n=30) 2.5 kg (n=40)	7 8 12	23.33% 26.67% 30.00%	0.823
Deworming in last 3 months	Dewormed (n=100)	27	27.00%	-
Daily cleaning feeder and waterer	Cleaning (n=100)	27	27.00%	-
Used Anthelmintic	Levamisole Mebendazol Fenbendazol	11 7 9	22.00% 23.33% 45.00%	0.127

Fig:Egg of *Ascaridia galli*

3.2 Post mortem findings of *Ascaridia galli*

An inflammatory proventriculitis with superficial epithelium, sub-epithelial hemorrhages, and underlying fibrosis was discovered in the proventriculus of chicken after death. The ulcerated region showed signs of secondary bacterial infection. The small intestine was blocked by *A. galli*, which also produces petechial bleeding in the duodenum, pronounced inflammation, and a rise in mucus secretion in the small intestine.

Fig: Post mortem findings of *Ascaridia galli*

3.3 Overall prevalence of *Heterakis gallinarum* and its associated risk factors

In our investigation, the prevalence rate at various chicken ages was noted. This study found that *Heterakis gallinarum* infection rates varied according to age group. According to age, the infection rate for *Heterakis gallinarum* was 13.33%, 20.00%, and 17.50% in the 1year, 1.5 years, and 2 years' chicken, respectively.

According to body weight, the infection rate of *Heterakis gallinarum* was 13.33% in the chicken having 1.3 kg of body weight, 20.00% in chicken weighing 2 kg and 17.50% in chicken of 2.5 kg body weight.

The percentage of *H. gallinarum* was about 17.00% in dewormed chicken whereas it was 83.00% in non- dewormed chicken. Moreover, Fenbendazol (15.00%) was the most commonly used anthelmintic, followed by Mebendazol (20.00%), Levamisole (16.00%). In this investigation, we found that deworming the chickens reduced their worm infection.

Table 2: Overall prevalence of *Heterakis gallinarum* and its associated risk factors

Avg. age (Years)	1 year (n=30) 1.5 years (n=30) 2 years (n=40)	4 6 7	13.33% 20.00% 17.50%	0.785
Avg. body weight (kg)	1.3 kg (n=30) 2 kg (n=30) 2.5 kg (n=40)	4 6 7	13.33% 20.00% 17.50%	0.785
Deworming (last 3 months)	Dewormed (n=100)	17	17.00%	-
Daily cleaning feeder and waterer	Cleaning (n=100)	17	17.00%	-
Used Anthelmintic	Levamisole Mebendazol Fenbendazol	8 6 3	16.00% 20.00% 15.00%	0.868

Fig: Egg of *Heterakis gallinarum*

3.4 Results of Mc Master Technique

According to the study, Fayoumi chicken had the highest epg (650), of Ascaridia galli which indicates severe infection with GI parasites (Table 3).

Table 3: Results of Mc Master Technique

Study area	Average epg (Egg per gram of feces)
Regional poultry farm, Pahartoli (fayomi chicken)	650

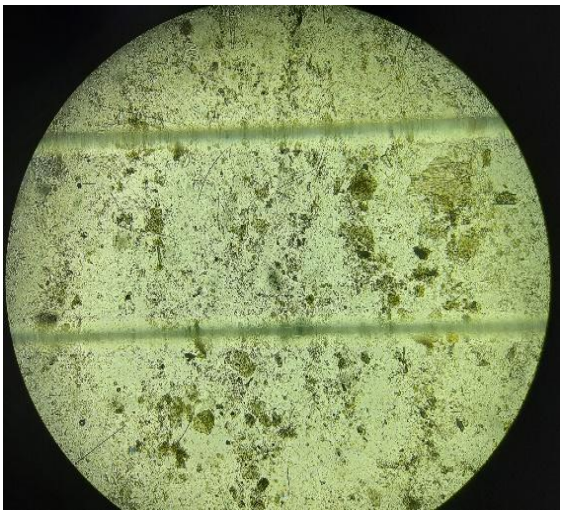


Fig: Counting of egg in McMaster technique

CHAPTER 4: DISCUSSION

It was observed that *Ascaridia galli* in chickens exists in a number of nations. Out of 100 hens raised in farms, the current study found that 27 % had *Ascaridia galli* infection. In Thailand, 22% of people had *A. galli* infection, according to Ayudhyinvestia and Sangvaranond (1993), which is consistent with our findings. In contrast to earlier research in Bangladesh, our study's findings indicate a lower infection rate. *A. galli* infection was more common (87.50%) in native chickens in the Mymensingh district, according to Rabbit et al. (2006). (70–85%) *A. galli* infections in chickens were found in Bangladesh's Narsingdi district by Ferdushy et al., (2016).

The study found that the overall prevalence of *Heterakis gallinarum* was about 17%. In Bangladesh's different districts, 84.6% (95% CI: 77.9-90.0) of chickens had gastrointestinal helminth infections, according to Ferdushy et al., (2014). The findings of Rabbi et al. (2006) were based on a non-random sample of the viscera of 80 native chickens. Mekibib et al., (2014) observed a comparable prevalence (88.5%) of gastrointestinal helminth infections in Ethiopian scavenging chickens.

In our study, the incidence rate at various chicken ages was noted. *Ascaridia galli* infection rates varied according to age group. According to age, the highest prevalence of *Ascaridia* galli (20.00%) was in 1.5 years range whereas *Heterakis gallinarum* (20.00%) was in the age range 1.5 years. According to different body weight *Ascaridia galli* prevalence was about 30.00% in case of 2.5 kg body weight which was higher than others and *Heterakis gallinarum* was the highest (20.00%) in 2 kg body weight.

According to the current study, *Ascaridia galli* and *Heterakis gallinarum* were found in hens raised on commercial farms, with prevalence rates of 20.79% and 7.42%, respectively. The current study found no statistically significant difference (P>0.05) between age and breed in *Ascaridia galli.* On the other hand, the sex difference was statistically significant.

Ascaridia galli prevalence, which was 20.79% in this study, was less than what other authors from different regions of Ethiopia had found. 67.2% in Dire Dawa (Gedion,

1997), 61.2% in Bahir Dar (Yami, A. (1995), 64.3% in Sodo 35.6% 9 (Tolossa, Y. H., & Tafesse, H. A. (2013). in the North East of Amhara Regional State, Eshetu, Y., Mulualem, E., Ibrahim, H., Berhanu, A., & Aberra, K. (2001).

A prevalence of 7.42% was found for *Heterakis gallinarum* in the chicken farm at the Debrezeit Agricultural Research Center.

Nevertheless, it was determined that there was no statistically significant difference in the prevalence of age and sex (P>0.05).

The prevalence was 21.05% in Addis Ababa, (Abebe, W., Asfaw, T., Genete, B., Kassa, B., & Dorchies, P. H. (1997),27.17% in Dire Dawa and 43.24% which was lower than the findings of the earlier study conducted in Ethiopia. In other nations, it has been reported that the prevalence of *Heterakis gallinarum* from the Zoka farm is 60% in Sudan (. Belihu, K., Aytenfsu, S., & Dinka, A. (2011).

CHAPTER 5: LIMITATION

Low positive case made it challenging to obtain an adequate number of adult worms in time to conduct this experiment effectively. Though there are so many farm in Chattogram, sample collection was from only regional poultry farm. Additionally, the authority wasn't properly sharing all the data and there also had time constraints as the study conducted during internship placement only in a single visit to the farm.

CHAPTER 6: CONCLUSION

Ascaridia galli was found in the study with a moderate prevalence of 27% and *Heterakis gallinarum* was about 17% in the chickens, indicating that the environment and the nature of poultry rearing are favorable for the transmission and persistence of the parasite species. The results of this study showed that *Ascaridia galli* and *Heterakis gallinarum* infections could affect Fayoumi chickens housed in the intensive management system of the regional poultry farm.

It could be mentioned that epidemiologic research will be useful in determining *A. galli* approach in treating and managing parasites in Bangladesh. Even though these parasites are one of the less well-known ones. This strategy will give poultry farmers hope as they battle the deadly helminth infection in their animals. We are able to give them better economic returns as a result.

Finally, we have discovered that a confirmed diagnosis requires a time-consuming but very sensitive microscopic inspection of parasite eggs.

BIOGRAPHY

I am Halia Naznin Tusa, daughter of Nasir Uddin and Lutfun Nasa Nuri. I completed my Secondary School Certificate (SSC) examination from Chakaria Korak Biddyapith, Chakaria in 2014 and Higher Secondary School Certificate (HSC) from Govt. City College, Chattogram in 2016. Right now I'm an intern student at Chattogram Veterinary and Animal Sciences University in the faculty of Veterinary Medicine. I am very motivated to learn new things and to expand my practical knowledge in order to be ready for the new era of science.

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