

Prevalence of helminths in the intestine and fecal material of infested chicken in district malakand of Pakistan

SAFDAR ALI KHAN¹, FARHEEN ANSARI¹, SANWAL ASLAM^{2*}, AMJAD HUSSAIN³, MUREED HUSSAIN¹, MAJID MAHMOOD⁴, ALI MUHAMMAD⁴, RAHMAT ALI¹, ASAD ASLAM³ AND FATIMA ALI¹

¹The University of Lahore, Institute of Molecular Biology and Biotechnology

²Jiangsu University, School of Environmental Science and Engineering

³Department of Zoology, University of Kotli Azad Jammu and Kashmir

⁴Department of Zoology, University of Poonch Rawalakot

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*Corresponding Author:

Sanwal Aslam:

knowledge123127@gmail.com

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ABSTRACT

In the present study, 150 farm chicken and 100 desi chicken were screened for the existence of parasitic helminthes. Among the desi chicken, 61 were reported positive for helminthes parasites by gross examination of gastrointestinal tract. In these 61 positive cases, 42 (68.85%) were found positive for nematodes, 6 (9.83%) for cestodes and remaining 13 (21.31%) had mixed infection; *Ascaridia galli*, *Heterakis gallinarum* and tapeworm. However, no adult helminthes were observed in farm chicken except that the gastrointestinal tract (GIT) contents of chicken have shown the presence of parasitic eggs by microscopic examination. The highest occurrence of helminthes parasitic infections 68.9% was recorded in growers, followed by adults (67.9%) and chicks (27.8%). This could be attributed to the existing maternal immunity in the chicks and the longer exposure of the older chicken to both helminthes and ova from the surroundings. Female desi chicken (65.5%) was more infected as compared to male desi chicken (58.8%).

Keywords: Desi Chicken, Farm Chicken, Nematodes, Cestodes, *Ascaridia galli* and *Heterakis gallinarum*

INTRODUCTION

Poultry industry has significant importance on the economies of commercial sector and traditional village based system since many decades. The chicken production covers bulk proportion of human dietary protein present in the form of egg containing ovalbumin, ovotransferin, ovomucoid and ovomucin. On commercial scale poultry industries have shown rapid and intensive development while, village poultry system relies on limited available resources. Sheds relate to village poultry system is constructed with local materials. Rural poultry development has shown greater incidence of parasitic disease due to cheap scavenging feeding (Moreki *et al.*, 2010). Domestic chicken species are world-wide, because it provides a large amount of protein that relates to human diet. Generally, species of chicken are referred to as domestic fowl or just as fowl. In southern areas of United States they are termed as yard bird. Chicken provides fiber and food in the form of meat, feathers and eggs. The most important sources of proteins

in Pakistan are milk, mutton, beef, poultry eggs and meat (Morse, 2017).

The most widespread diseases in chicken are helminthiasis and coccidiosis. The parasitic infections are most commonly present in the areas where the standard of animal's husbandry is very poor. The permanent occurrence of chicken in the same place favors the occurrence of parasitic diseases (Tomza-Marciniak *et al.*, 2014). The gastrointestinal (GIT) parasites invade the inside layer of the hosts intestine. The gastrointestinal parasites cause more significant damage and huge financial loss due to weight loss, malnutrition, decreased egg production, less feed conversion and death in immature birds and increased vulnerability to other diseases. Parasite infection may cause decreasing reproductive success or may slow down female reproduction by delaying reproduction. Some common risk factors that contribute to the spread of these helminthes into chicken include neighborhood infection, poultry transports and the introduction of infected strange birds. Good quality management and husbandry

are essential steps to control these parasitic infections (Johansson & Jones, 2007).

The chicken (*Gallus domesticus*) can easily be infected with various types of parasitic, viral, bacterial and fungal pathogen. Parasitic infection ranks more high among causes of threats chicken production (Lawal *et al.*, 2016). The cestodes (tapeworms) have flat, elongated and segmented bodies. The tapeworm body consists of a head (scolex), a neck region, and a chain of segments called as proglottids. The majority of tapeworms require one or more intermediate hosts in their life development. The developmental stages occur in a variety of vertebrate and invertebrate hosts. Eggs are discharged when tapeworms drop gravid proglottids into the host intestine, which are passed out in stool. All eggs develop into different larval forms in both the intermediate host (vertebrate) and immediate host (crustacean). Tapeworms that colonize the human gastrointestinal tract (GIT), larval stages, which are solid or cystic, live in host intestinal tissues (Ojewole, 2004).

MATERIALS AND METHODS

Study Area and Sampling

The study was conducted from December 2018 to April 2019 in rural and urban areas of District Malakand, KPK (Khyber Pakhtoon Khwa), Pakistan. The climate of District Malakand is temperate and warm which cause geological and phonological shift, leads to increase in potential for host shifting of parasites. The rain in Malakand falls mostly in the winter, with relatively little rain in the summer and annual average rainfall as 743 mm. Rain fall increases the concentration of parasites so it links with turbidity and flow volume. The soil of District Malakand is moist, loamy and is irrigated by the Swat River which flows down from Swat, passing through Swat Ranizai and joins the River Kabul near Charsadda. The average temperature is 19.9°C and Barometric Pressure is 96KPa. The geographical location of Malakand is approximately between Latitude: 34°33.9366' N and Longitude: 71°55.8258' E. Temperature and host parasite combination affect the length of latent period and it has significant impact on parasite development. A total of 250 chicken were collected (desi chicken 100, farm chicken 150) whole intestines of both desi and farm chickens were collected from local poultry stalls located in district Malakand i.e. Agra, Batkhela, Dargai, Khar, Matkani, Totakan, Mekhband, Malakand, Thana and Julegram. Two types of samples (farm and desi) were collected. Farm animals were vaccinated while other were not

vaccinated against any disease or parasite. The observations were done in institute of Molecular Biology and Biotechnology, The University of Lahore, Punjab Pakistan.

Collection of Parasites and Identification of Parasites

The chicken under observation were slaughtered and observed for the presence of intestinal helminthes parasites. The complete gastrointestinal track (GIT) from each chicken was collected, and divided into eight sections: esophagus, pro-ventriculus, crop, ileum jejunum, duodenum, rectum and caeca. These were dissected longitudinally and washed carefully via a 100 mm test sieve. The sample contents were examined with magnifying glass and adult parasites recovered from the GIT were preserved in 10% formalin for further identification. All adult parasites and their eggs were identified by using the parasitological keys (Soulsby, 1982) and with the help of light microscopic observation.

RESULTS

Out of 250 chicken examined, 150 (60%) were farm chicken and 100(40%) were desi chicken. Among the screened 100desi chicken, 61 were found positive for gastrointestinal parasites by gross examination of GIT while no adult parasites were observed in farm chicken because of vaccination. Gender wise analysis has shown that out of 42 male examine chicken, 23 (54.76%) were infected with gastrointestinal parasites, while 38 (65.5%) female chicken out of 58 were infected with GI parasites having P value of 0.3.

Out of 100 desi chicken 18 chicks, were the age 0-6 weeks, 29 having age 7-15 weeks and 53 had age greater than 16 weeks. Adults were age 7-15 week are more infected in percentage (68.9) as compared to 0-6 week (27.8%) and greater than 16 weeks age (67.9%). Significance difference was found among different age group having P value of 0.006. In case of desichicken 42 (68.8%) were infected with nematodes (*Ascaridiagalli* 28(45.9%) and *Heterakis gallinarum* 14 (22.9%), while 6(9.8%) chicken were infected with Tapeworm and remaining 13(21.4%) desi chicken showed mixed infections. *Ascaridia galli* and *Heterakis gallinarum* were common in Duodenum/Ileum. Tape worm was common in large intestine/cecum.

DISCUSSION

The most frightful and enervating parasitic

infection of poultry especially in chicken are caused by helminthes. The prevalence of parasitic infection as found in this study (desi chicken 61% and farm chickens 0%) was similar to those found in and around Bangalore, desi (71%) and farm (0%). The prevalence rates of helminthiasis have been greatly reduced in the farm chicken, mostly due to hygienic measures operations and improved housing (Sreedevi *et al.*, 2016).

Table I: Incidence of helminthes parasites based on gender, age and species infecting desi chicken in Malakand

Category	Total Numbers	Infected Number and Percentage of Individuals	Uninfected number and of percentage individuals	P value
Desi Chickens	100	61%	39%	
Gender	Male	42	23 (54.8%)	0.3
	Female	58	38 (65.5%)	
Age	0-6weeks (Chick)	18	5 (27.8%)	0.006
	7-15weeks Grower	29	20 (68.9%)	
	>16weeks Adults	53	36 (67.9%)	
Species of Parasite	Infected Number and Percentage of Individuals		Predilection Site	
<i>Ascaridia galli</i>	28 (45.9%)		Duodenum/Ileum	
<i>Heterakis gallinarum</i>	14 (22.9%)		Duodenum/Ileum	
<i>Tapeworm</i>	6 (9.8%)		Large intestine/cecum	
<i>Ascaridia galli</i> & <i>Heterakis gallinarum</i>	10 (16.5%)		Duodenum/Ileum	
<i>Ascaridia galli</i> & <i>Tapeworm</i>	3 (4.9%)		Small/Large & Intestine/Cecum	

In desi chicken, infection rate of helminthes was 61% similar to the previous report of 61.6% from Tembladeras Vista Hermosa region Mexico

and 58.32% from District Charsadda, KPK, Pakistan (Cervantes-Rivera *et al.*, 2016).

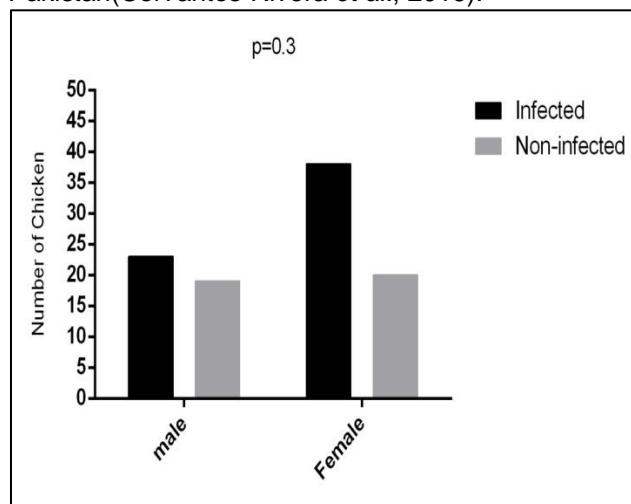


Fig 1: Non-significant ($p=0.3$) gender wise incidence of helminthes parasites among desi chicken

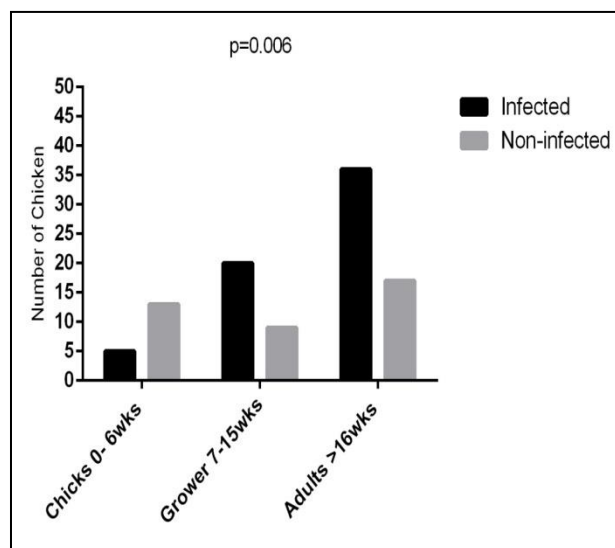


Fig 2: Age wise incidence of helminthes parasites in desi chicken

The prevalence of 61% reported here was greatly lower than 99.2% reported in Phayao province, northern Thailand (Butboonchoo & Wongsawad, 2017), 100% in Bangladesh (Rabbi *et al.*, 2006), 81.5% in Kaduna State, Nigeria (Junaidu, *et al.*, 2014), 82% in Tijo District, Oromiya region (Win *et al.*, 2020), 71% in and around Bangalore, India (Puttalakshamma *et al.*, 2008). The discrepancy in infection rates in different studies may be due to type of rearing System and seasonal differences, management systems, and age of chicken and breed of chicken. This study indicates that female chicken had high occurrence of

infection (65.5%) while male had less occurrence (54.8%).



Fig 3: Tapeworm embedded in the intestinal mucosa

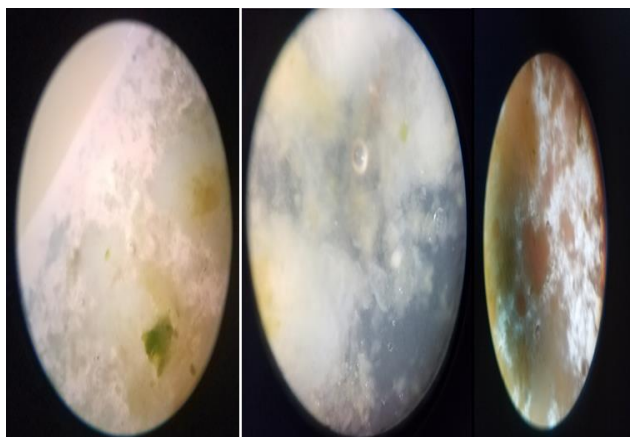
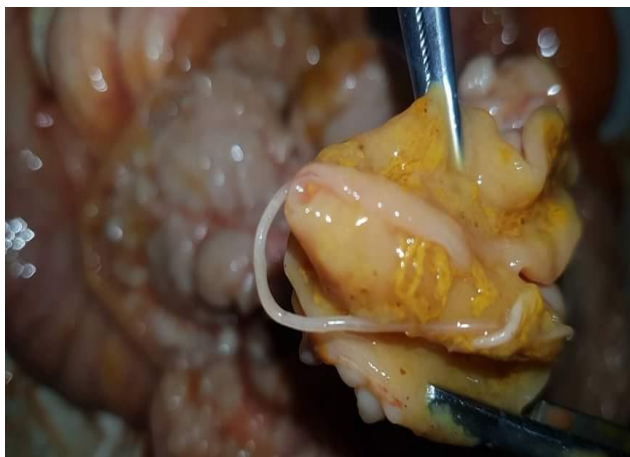


Fig 5: Eggs of parasites isolated from fecal material of chicken

It resembles with the report of Jegede *et al.*, 2015 from Nigeria where reported a 48.8% and 37.5% occurrences respectively. This result shows dissimilarity to another finding from Oromia Region, Ethiopia in which helminthiasis was higher common in males (40.69%) than females (25%) (Solomon & Yobsan, 2017). This study showed that there was significant difference ($p=0.006$) among the age groups, with highest infection rate occurring in Growers chicken (68.9%) using the Chi Square test, thus indicating that age played an important role in the infection of the chicken with helminthes parasite. This could be related to the existing maternal immunity in the chicks and the longer exposure of the older chicken to helminthes from the environment. The prevalence of 68.9% recorded here was greatly higher than 54.2% and 56.1% reported by Jegede *et al.*, 2015 and Cervantes-Rivera *et al.*, 2016. Different internal parasitic species were identified in this study including cestodes and nematodes i.e. *H. gallinarum*, *A.galli*. No trematodes (flukes) were detected in chicken. Other reports on helminthes infection in chicken were similar to present investigation (Junaiduet *al.*, 2014; Othman & Abdallah, 2017 in Kaduna State, Palestine and Chennai respectively).

The most common nematodes species found in the present study was *Ascaridia galli* (45.9%) followed by *Heterakis gallinarum* (22.9%). *Ascaridia galli* slows down growth of chicken and cause irritation and inflammation of the intestinal mucosa. While *H gallinarum* initiates infections and is found in small intestine.

CONCLUSION

The study has shown that a gastrointestinal parasite is less frequently seen in farm chicken. Farm-reared chickens are in good hygienic environments, while the occurrence of high infections loads shows poor health care, unhygienic conditions, improper management and no proper treatments in case of desi chicken. In addition to this, female desi chickens were more infected as compared to male desi chicken, because higher GI infection could be attributed to the fact that male chicken under any condition of management, tend to court the females by allowing them to feed first before the males.

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