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Associated Risk Factors of Coccidiosis in Poultry in District Layyah, Pakistan

Kashif Mahboob[1], Muhammad Tanveer[1], Farhan Towakal[2], Zahid Hussain[3], Sohail Manzoor[4]*, Fraz Munir Khan[5], Ahsan Ilyas[6] and Syed Abbas Ali[7]

[1]Poultry Production, L & DD, Layyah, Pakistan

[2]Poultry Production, L & DD, Sialkot, Pakistan

[3]Disease Diagnostic Laboratories, L & DD, Bahawalpur Division, Pakistan

[4]Disease Diagnostic Laboratories, L & DD, Multan Division, Pakistan

[5]Disease Diagnostic Laboratories, L & DD, Sargodha Division, Pakistan

[6]Sultan Feeds,Sargodha, Pakistan

[7]Provincial Diagnostic Laboartories, L & DD, Lahore, Pakistan

***Corresponding Author:** Sohail Manzoor, Disease Diagnostic Laboratories, L & DD, Multan Division, Pakistan.

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Abstract

The present study was under taken to evaluate the incidence of Coccidiosis and its association with various risk factors in poultry in District Layyah, Punjab, Pakistan. A total number of 500 specimens comprising of 250 gut samples and 250 fecal droppings were collected from chicks of different poultry farms in District Layyah. The microscopic examination of gut samples revealed overall 48.4% (n = 121/250) incidence of Coccidiosis and 50% (n = 125/250) faecal droppings were found positive for coccidial oocysts. The prevalence of Coccidiosis infections among adult chickens were 39.83% and among young chickens was 59.09%. The prevalence of coccidiosis was highest in the month of September (68.42 %) while lowest during December (34.78%).The prevalence of coccidiosis was higher on the farms having poor managemental practices (sanitation and medication), particularly litter moisture. A strong correlation was seen between the prevalence of coccidiosis and age of chicken. The difference was attributed to the managerial and environmental conditions especially due to climate change.

Keywords: *Associated Risk Factors; Poultry; Coccidiosis; Eimeria & Prevalence*

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Introduction

Poultry sector is one of the most vibrant segments of the livestock sector in Pakistan. This sector provides employment (Direct/Indirect) to over 1.5 million people. Pakistan has become the 11th largest poultry producer in the world. Poultry today has been a harmonizing force to keep check on the prices of mutton and beef, but also serving as backbone of agriculture sector. The poultry has contributed 1.4 percent in GDP of the country during 2015-2016. While its contribution in agriculture and livestock value added stood at 6.9 percent and 11.7 percent respectively. (Annonymus 2015-16). Commercial poultry in Pakistan was started in 1963 (Mohsin., *et al.* 2008). Commercial poultry farming is one of the most flourishing industry in Pakistan and it provides the cheapest source of animal protein (Ahmed., *et al.*

2011). However it has been prone to threats including viral, bacterial and parasitic diseases involving GIT system of the birds. (Hafez., *et al*. 2011). Among these parasitic diseases, coccidiosis is the main obstruction in the development of poultry sector in the country (Ayaz., *et al.* 2003). On the basis of its location in the gut, it is characterized by diarrhoea, cecal hemorrhages and anemia (Gardinar,1955) Intestinal coccidiosis caused by number of parasites such as Eimeria necatrix, E.acervulina, E.maxima, E.brunetti, E.mitis, E.mivati, E.praecox and E.hagani.(Lilie., *et al.* 2009). E.tenella, E.maxima, E.brunetti, E.necatrix are regarded as highly pathogenic while E.acervulina, E.mivati and E.mitis are less pathogenic and E.praecox and E.hagani are least pathogenic (Al-Natour., *et al*. 2002 and Nematollah., *et al.* 2008).

Chicks of all ages are susceptible to this infection but the disease is more prevalent in 6-8 weeks of age (Conway and McKenzie 1991 and Julie 1999). Several factors influences the prevalence of disease such as high air temperature, high animal density, high humidity, feed change, different age categories of birds (Calnek, M. 1997). Susceptible birds acquire the infection by ingesting infective (sporulated) oocysts in litter, soil, contaminated water and feed. The infected birds excrete oocysts in to the feaces and are major source of infection for other birds (McDougald. 2003). The infection can be transmitted by direct as well as indirect contact (Williams. 2002).

The infected oocyst can also be spread by dust, equipment, insects, rodents, wild birds as well as humans (Dimitrijevie and Ilie. 2003). The disease adversely effects the growth of the infected birds and cause high morbidity and mortality. (Anjum. 1990). The infection can be controlled by good management including dry and clean litter and good ventilation (Jordan. 1995) Since 1950s the control of coccidiosis has been achieved through anticoccidial compounds in the feed which reduce infection to a subclinical level (Danforth. 1998).

The proliferation of poultry farms and increasing interest in the poultry production, it is pertinent to continually evaluate the prevalence of poultry diseases such as coccidiosis in Layyah, Punjab, Pakistan. The efforts of this work is to expand the knowledge of the epidemiology of coccidial infection in poultry farms having open sheds by studying the geographical distribution of coccidial infections at district Layyah.

Materials and Methods

Study Area: The present study, was designed, to determine the prevalence of coccidiosis and associated risk factors in poultry of district Layyah, Punjab, Pakistan. The city has 148 meter elevation from the sea. The District is plain arid area with a unique Tehsil of Choubara consisting of sand dunes. The city is lying on the east of river Indus. Layyah has extreme hot and cold climate throughout its area. The poultry fecal samples were collected during July 2016 to December 2016.

Sample Collection: Two stage cluster sampling was done taking union councils as primary unit and poultry farms as secondary units. For this purpose out of 48 union councils 30 union councils were selected randomly. A total of 250 gut samples of broiler chicken were collected in polythene bags from different poultry farms of district Layyah. Fresh faecal droppings (n = 250) were collected in polythene bags from poultry farms of different union councils of district Layyah, from July 2016 to December 2016. First layer of faecal sample was removed as contaminated with sand etc. Both gut samples (n = 250) and faecal samples (n = 250) samples were processed in the disease diagnostic laboratory, district Layyah.

Questionnaires were designed to collection the information regarding potential risk factors associated positively or negatively with prevalence of parasitism in poultry. Information regarding age, area, season, management practices, like watering methods, feeding methods, nature of litter, frequency of change of litter etc. were collected through predesigned questionnaire. Birds of age 3-4 weeks, ranked as young, while birds of age 6 weeks and above were considered as adults.

Examination of Gut Samples: All the intestines and ceca were examined carefully for the presence of external lesions. The intestines were cut, opened and the gut contents were examined by direct smear method for the presence of Eimeria oocysts (Soulsby, 1982). The results for the presence or absence of Eimeria oocysts were recorded. If no oocysts found on three microscopic slides of the samples, it was recorded as negative sample.

Microscopic Examination

The fecal samples were soaked overnight at 37°C in 2.5% (W/V) aqueous solution of Potassium Dichromate. The samples were shaken vigour sly to break up the feces. The suspension was filtered through a cheese cloth in to beaker. The filtrate obtained was centrifuged at 2000 rpm for 5 minutes to settle down the oocysts. The supernatant fluid was discarded and the Eimeria oocysts present in the sediment were separated using floatation technique and then examined carefully through microscope using oil emersion lens for the presence of Eimeria oocysts. (Levine .1985).

Data Analysis: The prevalence of coccidiosis among different seasons and age groups was calculated. Data generated was analysed using descriptive statistics with emphasis on percentage

Results and Discussion

Out of 250, gut samples examined 48.4% guts were found infected [Table 1].The present study revealed moderately low prevalence rate of coccidiosis in broiler chickens in district Layyah, as compared to the previous report (71.8 %) on coccidiosis from Faisalabad District (Khan., *et al.* 2006) This difference could be due the existence of more humid weather in district Faisalabad, Pakistan, because, it is well known fact that, humidity plays a vital role for the sporulation of coccidial oocysts (Huge., *et al*. 2008 and Bachya., *et al*. 2012). In Pakistan, mostly salinomycin is used as anticoccidial drug for the control of avian coccidiosis and due to its frequent use for a long time, resistance could have developed (Abbas., *et al*. 2011, Gyorke., *et al*. 2013). The disease was observed among in all six months (Table 1). Among different months maximum coccidiosis was observed during the month of September 2016. This might be because of the high level of moisture during this month of the year. Higher humidity in August and September helped sporulation of oocysts which ultimately resulted in peak prevalence during these months. These results are in consonance with some of the previous reports (khan., *et al.* 2006) in which maximum occurrence of coccidiosis was reported during these months due to high humidity. A previous study (Amin., *et al.* 2014), the seasonal prevalence of Eimeriosis in broiler chickens in Abbottabad, Pakistan had been reported the highest percentage of infection during the months of August and September. Bachya., *et al*. in also observed the highest predominance of coccidiosis during the month of September in Pakistan. Hirani., *et al*. also indicated highest incidence during moon soon season in India, indicating seasonal influence on the prevalence of disease.

Sr. No	Months	No. of Gut Samples Examined	No. of Gut Samples Tested	Prevalence (Percentage)
1	7/2016	39	15	38.46
2	8/2016	58	27	46.55
3	9/2016	57	39	68.42
4	10/2016	24	11	45.83
5	11/2016	49	21	42.85
6	12/2016	3	8	34.78
Total	250	121	48.4%	

Table 1: *Prevalence of Coccidiosis in suspected guts of broiler chickens during different months.*

The findings of the microscopic examination of fecal droppings are represented in [Table 2]. Month wise prevalence of fecal droppings showed higher infection in September followed by October. Age incidence of infection showed that chickens aged 3-4 weeks (young) were more affected than the ones aged 5 weeks and above (adult). As the age of birds increases, they develop immunity against the disease. This may be the reason why ,disease rate decreases with the increasing age of birds (Champan., *et al.* 1997,Uza., *et al*. 2001) These upshots are in accord with the conclusion of (Omer., *et al.* 2011) who has also observed the same pattern of infection in the Farasan Gazzelles infected with the single species of Eimeria.

Sr. No	Month	No. of Fecal Sample Examined	Young Chicks*			Adult Chicks*		
			Samples Examined	Infected		Samples Examined	Infected	
				No.	%		No	%
1	7/2016	45	25	15	60	20	6	30
2	8/2016	35	20	12	60	15	5	33.33
3	9/2016	42	17	12	70.58	35	13	52
4	10/2016	43	25	16	64	18	8	44.44
5	11/2016	45	22	13	59.09	23	10	43.47
6	12/2016	40	23	10	43.47	17	5	29.41
Total		250	132	78	59.09 %	118	47	39.83 %

*Young (3-4 weeks) and *Adult (5 weeks and above)

Table 2: *Prevalence of coccidiosis in different age groups of Broiler chickens (Faecal droppings).*

Management of poultry houses plays a momentous function in the spread of coccidiosis because coccidial oocysts are omnipresent and are easily spread in the poultry house envierment. Further owing to their high reproduction potential. It is very complex to keep chickens coccidia free, especially under current intensive rearing conditions (Adhikari., *et al*. 2008). Oocysts sporulate readily in poultry house litter. However they can be damaged by bacteria, other organisms and ammonia that are also present and their viability can begin to reduce after three weeks (Jadhav., *et al.* 2011).

Prevalence of coccidiosis varied by management and did not vary by flock size (Hadipour., *et al*. 2011). The bad management such as, wet litter, encourages oocysts sporulation. The contaminated drinkers and feeders, bad ventilation and high stocking density, can worsen the clinical signs (Ruff,1993; Al-Quraishy., *et al*. 2009). Therefore coccidiosis can be controlled by good management practices including good ventilation, cleaning and decontamination of drinkers and feeders, dry and clean litter, and proper stocking density in the farm (Jordan,1995; Al-Quraishy., *et al*. 2009).

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