

Seasonal prevalence of eimeriosis in broiler chicken

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Abstract

Background: Poultry sector is a vibrant segment of Pakistan economy and is a viable source of animal origin protein source. The growth of this sector is badly affected by different devastating problem's in-term of mortality and morbidity. Hazara region is so called Georgia of Pakistan for poultry Production. Coccidiosis is an economically devastating problem in the area and throughout the year its cases have been reported.

Methods: The present study was conducted to know the round the year and seasonal prevalence of disease. During July 2012 to June 2013, a total of 1440 (n=1140) postmortem cases were carried out for disease diagnosis. Cases suspected for coccidiosis were confirmed by gross pathological lesions manifestation on the intestine and ceaca. Brief history including age, flock size was taken. For morphological examination, the oocytes were sieved and centrifuged at 3000 rpm with sugar solution.

Results: A total no of (n=1440) cases brought to outdoor patient services of Veterinary Research & Disease Investigation Centre, Abbott bad for disease diagnosis and treatment. Out of the total cases n=546 were found positive showing the overall prevalence of 37.91%. During hot and humid climatic conditions of monsoon season its prevalence was significantly high, during the month of August and September the observed infection percentage as 60.16% and 62.29 % respectively while low infection rate has been observed during the month of April which was 20.17%. Predominance of eimeriosis was high in young birds (3-4 weeks) and adult birds and less than 3 week of age birds was 74.90%, 17.94% and 7.14% respectively.

Conclusion: In the present study the higher prevalence of infection during the rainy season of monsoon observed indicating that warmth temperature and humid condition favors the oocytes sporulation and subsequent transmission.

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Introduction

Poultry sector is a viable source of animal protein in term of meat and egg production in Pakistan. But the tremendous growth of the sector is adversely affected by lot of viral, bacterial, protozoan and metabolic disorders. Among the protozoan diseases coccidiosis remains one of the expensive problem in spite of intervention being made for its prevention and control through management, nutrition and chemotherapy [1].

Coccidiosis is caused by *Eimeria* species belongs to phylum *Apicomplexa*, family *Eimeriidae*. *Eimeria* species multiplication takes place in intestinal mucosa causing coccidiosis [2]. In poultry, the genus *Eimeria* is strictly host-specific and its different species parasitize specific sites in the intestine. The infectious process is rapid (4-7 days) and dysentery, enteritis, emaciation, drooping wings, poor growth, low production are major signs of illness [3,4] with high morbidity and mortality [5]. Its incidence is being increased in poultry due to higher stocking densities and intensive husbandry practices [6].

Nearly, 1800 *Eimeria* species have been reported affecting intestinal tract mucosa of different animals and birds [7] among those nine *Eimeria* spp has been reported affected the domestic fowl [8]. Highly pathogenic spp identified are *E. tenella*, *E. maxima*, *E. brunette* and *E. necatrix*, while *E. acervulina*, *E. mivati* and *E. mitis* are reported less pathogenic; and *E. hagani* and *E. praecox* are reported as lesser pathogenic, ceecal eimeriosis caused by *E. Tenella* predominantly observed [9,10]. Different researchers probed into the matter of coccidiosis prevalence in different

geographical regions of Pakistan [3,4]. This work is designed to expand the knowledge of the seasonal prevalence of coccidial infections among the broiler flocks.

Methods

During July 2012 to June 2013, a total of 1440 (n=1140) postmortem cases were brought to veterinary Research & Disease investigation centre, Abbottabad for disease diagnosis. Cases suspected for coccidiosis were checked for gross pathological lesions manifestation on the intestine and ceaca (Fig-1 and 2).



Figure 1: Cecal Eimeriosis in 16 days old broiler



Figure 2: Macroscopic view of Eimeriosis in 23 days old broiler

Brief history including age, flock size was taken. Samples were collected in sterile container and stored at 4°C for subsequent use. For morphological examination, the oocytes were sieved and centrifuged at 3000 rpm with sugar solution.

Subsequently, concentrated samples were kept in 2.5% potassium dichromate solution. Samples were kept at 30°C in Biological Demand Oxygen Incubator for Sporulation and Morphological Characteristics before and after sporulation.

Results

The results of microscopic studies of the 1440 samples are depicted in Table-2. The overall prevalence of coccidiosis in broilers round the year from July 2012 to June 2013 was 37.91% as mentioned in Table-1, and in most of the cases mixed type of infection, birds harbored by one or more *Eimeria* spp.

Age wise prevalence of the eimeriosis is mentioned in Table-3, suggested that it was high in 3-4 weeks of broiler which was 74.90% while 17.94% was observed in birds of 4-6 weeks and 7.14% was observed in the birds less than 3 weeks of age [11]. Similar studies stated that predominance of coccidial infection is more in young age [12].

Month	No of Cases	No of Positive Samples	Percentage Infection
Jul-12	125	68	54.4
Aug-12	118	71	60.16
Sep-12	122	76	62.29
Oct-12	115	65	56.5
Nov-12	114	41	35.9
Dec-12	118	35	29.6
Jan-13	126	29	23.01
Feb-13	120	31	25.83
Mar-13	138	32	23.18
Apr-13	114	23	20.17
May-13	116	27	23.27
Jun-13	114	48	42.10

Table 2: Month wise Coccidiosis prevalence in broilers

Total No of Positive Cases	1-2 week	3-4 week	4-6 week
546	Positive (%)	Positive (%)	Positive (%)
	39 (7.14%)	409 (74.90%)	98 (17.94%)

Table 3: Age wise prevalence of Coccidiosis in Broilers

The lowest prevalence of eimeriosis was observed during the spring season and during the month of April it was 20.17%. In the present study the higher prevalence of infection during the rainy season of monsoon observed indicating that warmth temperature and humid condition favors the oocytes sporulation and subsequent transmission.

Discussion

There are seven different *Eimeria* spp. which can cause coccidiosis. The identification of specific causative species was not the objective of the present study but to determine the prevalence of disease in distinct geographical location during special

Total No of cases	No of Positive Samples	Prevalence Percentage
1440	546	37.91%

Table 1: Prevalence Percentage of Coccidiosis

Throughout the months of June to September, the infection rate was high while during month of July, August and September the prevalence of infection was 54.4%, 60.16% and 62.29% respectively.

climate conditions. The prevalence of coccidiosis (37.91%) in this study is very much equal to figure found in 2003 i.e. 37.95% [13]. But if compared with studies more distant in time, this percentage is quite high. In 1990, it was as low as 26.3%, 1987 (7.23%), 1983 (30%) and in 1981 it was down to 10.2% [4]. This variation or decrease might be due to change in geographical/weather conditions as most of these studies were reported from Faisalabad regions, a district in the plains of central Punjab.

Another interesting aspect of this study was finding the fact that during the months of higher moisture and precipitation in the region (June to September), the infection rate was high up to 62.29%. In a previous investigation, it was indicated that the whole autumn season has high prevalence rate (60.02 ± 4.38) for the said infection, but here in this study higher trend of infection was witnessed till the end of September [4]. The prevalence during the moon soon was high due to warmth and moisture climatic condition favors transmission and contamination of the oocytes [14-16].

Most of the infections are caused by a mix of different *Eimeria spp.* Another study in somewhat same climate condition i.e. Jammu (India) has reported *Eimeria tenella* as a leading infectant.

Although, results of this study, in terms of age of the mostly infected birds, are not synchronized with previous studies. For example a study conducted in 2013 has reported high infection rate of 58.86% in 31-45 days old birds [17]. On the other hand, in the present settings birds of the age 21-28

days are found more susceptible to coccidiosis infection than any other age group.

The present findings on the prevalence of chicken coccidiosis in Abbottabad region are of much importance as of economic and pathological aspects as very little or no documented information is available on these aspects for said area of saturated poultry industry.

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