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PREVALENCE OF RESPIRATORY DIEASES IN DIFFERENT BROILER AND LAYER POULTRY FARMS IN RAWALPINDI OF PUNJAB-PAKISTAN

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Abstract. The purpose of this study was to document the frequency of respiratory diseases in broiler and layer flocks in the Rawalpindi District of Pakistan from July 2020 to June 2021. *Infectious coryza, colibacillosis,* and CRD were identified in 48, 30, and 22 of 240 broiler flocks, respectively. *Infectious coryza, colibacillosis,* and CRD were reported to be prevalent in 20%, 12.50%, and 9.17% of the population, respectively. *Infectious coryza, collibacillosis,* and CRD were discovered in 41, 34 and 28 of 160 layer flocks, respectively.

Infectious coryza, colibacillosis, and CRD were reported to be prevalent in layer at 25.63%, 21.25%, and 17.50%, respectively. Respiratory diseases were observed throughout the year, but were more common during the winter months. A total of n = 201 samples (liver, heart, and lungs) were cultured during the investigation, with n = 89 proving to be positive for E.coli isolates. Lincomycin, norfloxacin, and neomycin were the most effective antibiotics against E.coli infections, while oxytetracyclin, doxycyclin, and colistin had the least effective zones of growth suppression. Prevalence, respiratory diseases, and poultry are some of the terms used in this study.

Keywords: *Respiratory diseases, season, broiler, layer, Rawalpindi.*

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1. Introduction

The poultry industry has long recognized the significance of good health management in order to maximize the genetic potential of the birds (Jabbar *et al*., 2019). Because the avian respiratory system has limited spare capacity and its gas exchange and thermoregulation activities are so vital, controlling respiratory diseases is critical to achieving the desired results (Yousaf *et al*., 2018). Respiratory infections have become one of the most serious threats to the industry in recent years, resulting in significant financial losses (Yousaf *et al*., 2019). In comparison to other Mycoplasma species, *Mycoplasma gallisepticum* is the leading cause of chronic respiratory disease and produces larger economic losses (Hussain *et al*., 2018; 2019). This disease affects birds of all ages, but young birds are more susceptible to infection than adults (Hossain *et al.*, 2010). In comparison to the summer, the diseases was more widespread in the winter (Yousaf *et al.*, 2017). When compared to flocks with lower bird density, flocks with high bird density have a greater prevalence rate (Islam *et al*., 2011; Mukhtar *et al*., 2012).

Broilers had a greater incidence of respiratory infections (coryza, CRD, colibacillosis, I.B, pneumonia) than layer chickens (Yunus *et al*., 2008; Balasubramaniam & Dorairajan, 2009). Respiratory discomfort, open-mouth breathing, sneezing with nasal discharge, torticollis, reflect feathers, uneven development, diarrhea, enlarged heads, and a decrease in egg production are among symptoms of CRD, which has varied rates of morbidity (Hasan *et al*., 2002; Ahmad *et al*., 2008; Islam *et al*., 2011). CRD-related mortality rates in layer flocks have been observed to range between 1.11% and 5.59 % (Babiker *et al*., 2009; Uddin *et al*., 2011). *Infectious coryza (IC)* is a highly contagious chicken respiratory bacterial disease caused by *Haemophilus paragallinarum* that mostly affects the nasal passages and air sacs but not the trachea (Rajurkar *et al*., 2009; Jurgen *et al*., 2001). The mortality rate from IC has been estimated to be as high as 0.41 % (Uddin *et al*., 2011). *Collibacillosis* is an acute septicemia disease caused by the bacteria Escherichia coli in intensively bred fowl. Young birds between the ages of 4 and 12 weeks are most typically affected. They will die uniformly and display reduced feed intake, ruffled feathers, and respiratory difficulty at first (Jabbar *et al*., 2017). Fibrinous pericarditis, air sacculitis, tracheitis, salpingitis, and enteritis were discovered postmortem (Jurgen *et al.*, 2001). The goal of this study was to determine the prevalence of various respiratory diseases in broiler and layer flocks in and around Rawalpindi. It is intended that the information presented would aid in the development of a poultry sector monitoring programme.

2. Materials and methods

In and around Rawalpindi, the seasonal dynamics of respiratory diseases in broiler and layer flocks were investigated. Samples were acquired from the following sources for this purpose. Farms that raise commercial broilers and layer chickens. Birds brought to the lab for disease diagnosis. The flock's detailed history was recorded, including the number of birds, their age, the farm's capacity, management, vaccination schedule, feed and medicine utilized, and mortality. A postmortem was performed on the sick/dead birds in order to diagnose the disease and record the gross pathological abnormalities. The prevalence of respiratory disorders was documented, and the data was utilized to draw conclusions. Antibiotic sensitivity testing was also used to lower the cost of medicine in complex cases of respiratory infections.

3. Results and discussion

Tables 1, 2, and 3 show the findings of the current investigation. In broiler and layer flocks, the average flock size was 10000 and 8000, respectively. *Infectious coryza, colibacillosis,* and CRD (chronic respiratory disease) were found to be present in 48, 30, and 22 of the 240 broiler flocks, respectively. *Infectious coryza, colibacillosis,* and CRD were shown to have prevalence rates of 20%, 12.50%, and 9.17%, respectively (Table 1).

According to the findings of this study, *infectious coryza, colibacillosis,* and CRD were found in 41, 34 and 28 of 160 layer flocks, respectively. *Infectious coryza, colibacillosis,* and CRD were reported to be prevalent in layer at 25.63%, 21.25%, and 17.50%, respectively (Table 2).

Table 1. Season wise prevalence of respiratory diseases in broiler flocks in and around Rawalpindi

Season	# Flock Examination	Infectious Coryza	%age	Colibacillosis	%age	CRD	%age
Summer	52	6	11.54	5	9.62	3	5.77
Autumn	56	12	21.4	4	7.14	4	7.14
Winter	76	24	31.58	11	14.47	10	10
Spring	56	6	10.71	10	17.86	5	5
Total	**240**	**48**	**20**	**30**	**12.50**	**22**	**22**

Table 2. Season wise prevalence of respiratory diseases in layer flocks in and around Rawalpindi

Season	# Flock Examination	Infectious Coryza	%age	Colibacillosis	%age	CRD	%age
Summer	32	3	9.38	4	12.50	7	21.88
Autumn	38	10	10	5	13.16	8	21.05
Winter	65	20	30.77	17	26.15	9	13.85
Spring	25	8	32	8	32	4	16
Total	**160**	**41**	**25.63**	**34**	**21.25**	**28**	**17.50**

During the current investigation, the prevalence of *infectious coryza* in broilers was highest in winter 31.58%, followed by autumn 21.4%, summer 11.54% and spring 10.71%.

Poor management techniques, such as temperature fluctuations during the winter and increased ammonia gas concentrations due to poor ventilation, appear to be the cause of such a high prevalence of the disease. Our findings differ from those of (Yunus *et al.* 2008), who found that the prevalence of *infectious coryza*, *colibacillosis*, and CRD in broiler flocks were 16.8%, 12.5 %, and 11.5 %, respectively. The overall prevalence of *infectious coryza* in layer was 25.63% during the current investigation. Spring had the highest prevalence of coryza infections in layer 32%, followed by winter 30.77% and autumn 26.32%, while summer had the lowest prevalence 9.38%. *Infectious coryza* was predominantly seen in broilers aged 3-6 weeks during the current study. (Yunus *et al*. 2008) observed similar data, stating that the incidence of respiratory diseases increased with age.

The total prevalence of *colibacillosis* in broiler flocks was 12.50% in our study, with spring 17.86% being the highest, followed by winter 14.47%, summer 9.62%, and autumn 7.14%. Poor management procedures appear to be the cause of the disease's high prevalence. Our findings differ from those of (Yunus *et al*., 2008), who found a prevalence of 12.5 % for colibacillosis.

In our research, E. coli infection was most common in broilers aged 4 to 8 weeks. *Colibacillosis* was most common in the winter and spring. According to (Javed *et al*. 1991), the prevalence of E. coli levels were greater in broilers 13.13% than in layers (11.74%), indicating that E. coli isolates were susceptible to gentamycin, ampicillin, and neomycin, according to (Gordan & Jorden, 1982). Although E. coli is found in the intestines of all species, including humans, only a small percentage of them are pathogenic, with approximately 10-15% of intestinal coliforms proven to be dangerous in chickens.

In this study, a significant rate of *E.coli infection* was found as a result of unsanitary conditions at most chicken farms and hatcheries, poor brooding management, and the provision of polluted water at the majority of poultry farms.

Colibacillosis was found to be prevalent in 21.25% of the layer population. Spring had the highest prevalence of *E.coli infection* 32%, followed by winter 26.15%, autumn 13.16%, and summer 12.50%. Our findings are comparable to those of (Khan *et al.*, 2016) and (Javed et al. 1991), who found an *E.coli infection* rate of 11.74% in the layer. According to (Yunus *et al.*, 2009), *E.coli infections* and *coryz*a outbreaks were equally distributed throughout the year in broilers, but more than half of all chronic respiratory disease (CRD) cases were seen from April to June, and half of coryza and one-third of CRD outbreaks were seen in layers from April to June.

The greater prevalence of CRD 13.16% seen in broilers in winter and spring 8.93% during the current investigation could be attributable to a fast shift in climate. The chronic respiratory disease complex has severe consequences on birds, resulting in significant financial losses for farmers due to high mortality, limited weight gain, and a low feed conversion ratio. Our findings are similar to those of (Rehman & Samad, 2003), who found a 13.65% prevalence of *avian mycoplasmosis* in chicken. The overall prevalence of CRD in layer was 17.50% in this study. Summer 21.88% had the highest prevalence of CRD in the layer, followed by autumn 21.05%, spring 16%, and winter 13.85%. (Mukhtar et al. 2012) found that the disease was more common in the winter than in the summer in layer.

Our findings differ from those of (Yousaf, 2016) and (Abu Baker *et al*., 2012), who found that the majority of isolates collected in seropositive flocks belonged to MG 39.6%, E.coli, and *Salmonella* 24.4%. *Mycoplasma gallisepticum* and *Mycoplasma gallisepticum Synoviae* are important poultry diseases that generate enormous economic losses all over the world (Kleven, 2008). Sneezing, coughing, nasal discharge, and tracheal riles were the most common signs and symptoms of respiratory distress observed at the farms in our study.

The severity of the disease is largely influenced by the environment, the mycoplasma species involved, and other respiratory tract pathogens. With simple MG involvement or in combination with MS, mild or subclinical disease can be noticed, but the severity of the diseases increases with the involvement of other infections. Other factors that may contribute to respiratory distress cases in the current study include poor sanitation, overcrowding, and poor management. Similar findings have been reported by others (Chanie *et al*., 2009). In flocks with a high bird population, a higher MG prevalence rate 48.11% was observed. According to (Islam *et al*., 2011), *Mycoplasma gallisepticum* was found in 44% of broiler chickens. Involvement of MG in respiratory problems is shown to be quite high during the winter season, according to the researchers. (Haghighi Khoshkhoo *et al*., 2011) are in the same boat. According to a study published in 2011, the prevalence of MG in layer was 10%, whereas the prevalence of MS was 42.5%.

A total of 201 samples were cultured (liver, heart, and lungs). Table 3 shows the results of the 89 samples that tested positive for E.coli isolates.

Table 3. Samples cultured for E.coli isolates

Period	**Sample Culture**	**Positive**	**Negative**
July-Sep 2020	36	12	24
Oct-Dec 2020	72	34	38
Jan-March 2021	45	22	23
April-June 2021	48	21	27
Total	**201**	**89**	**112**

The findings of the antibiotic sensitivity discs are shown in Table 4.

Table 4. Antibiotic sensitivity test against E.coli isolates

Antibiotic	Results	Antibiotic	Results
Lincomycin	+ + +	Oxytetracyclin	+
Norfloxacin	+ + +	Colistin	+
Enrofloxacin	+ +	Neomycin	+ +
Chloramphenicol	+ +	Doxycyclin	+

Lincomycin, norfloxacin, enrofloxacin, chloramphenicol, neomycin, doxycyclin, oxytetracyclin, and colistin were among the antibiotic discs utilized in this investigation. Lincomycin, norfloxacin, and neomycin were found to have the best efficacy against E.coli infection, but oxytetracyclin, doxycyclin, and colistin had limited growth inhibition zones.

Recommendations

- Ensure sanitary and management conditions on farms.
- Birds should be fed a well-balanced diet rich in nutrients.
- Strict bio-security measures should be implemented to prevent pathogen exposures from breeders, hatcheries, feed, water, and the environment.
- Farmers would benefit from medicating their flocks after receiving the laboratory's cultural sensitivity data. They can lower their drug costs and achieve better antibiotic(s) administration results this way.

Conflict of Interests

The authors declare that they have no conflict of interest with respect to the research, authorship, and/or publications of this article.

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