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Prevalence of Diseases in Broiler Farms of Gwalior District of Madhya Pradesh

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ABSTRACT

A field based research was done to evaluate the current technological adoption and problems of broiler entrepreneurs including disease prevalence among the farms. Information was gathered by visiting selected chicken farms and interviewing the owners using a prepared questionnaire. Socio-economic background of the farmers indicated that majority of farmers were young and are doing broiler farming as a subsidiary occupation. The study found 14.17 per cent mortality in broiler farms in all the seasons combined. The present study found 4.13%, 4.75% and 5.29% mortality in winter, summer and rainy season respectively. In Gwalior district the difference in mortality in each disease in the winter season is not significant while in other season, it is significant ($p< 0.05$). The present study conclusively indicate the need to implement the biosecurity measures, starting from farmers to veterinarians, public health practitioners and other stakeholders involved directly or indirectly in poultry production.

HIGHLIGHTS

- Most of the farmers were doing broiler farming as a subsidiary occupation.
- Maximum mortality in birds were in rainy season followed by summer and winter season.

Keywords: Broiler Poultry, diseases, mortality, coccidiosis, biosecurity

The livestock sector is of critical importance for the sustainability of agriculture growth. The share of livestock in agriculture and allied sector in the Gross Value Added (GVA) is estimated to be growing steadily from 21.79 per cent in 2011-12 to 30.13 per cent in 2020-21 at constant prices. The compound annual growth rate (CAGR) of livestock GVA is 7.63 per cent is much higher than that for agriculture and allied sector which is 3.64% (Kumar, 2022). The broiler chicken industry is the second-largest livestock in the world. Chicken meat consumption is increasing every year and it represents almost 29% of total meat production. In the livestock sector of India poultry has created a niche for itself showing an average annual growth rate of 9% from 2001 to 2019 (DAHD, 2020). There has accounted an intense peak in production of Indian poultry meat surpassing its major competitors of beef and veal since 2004 to 2005. About 36% of production now comes from poultry followed by buffalo, goat, pig, and sheep in various descending concentrations (DAHDF, 2015).

Broiler farming has been known to provide adequate employment opportunities in the field of poultry farming. Another reason that ensures the success of broiler farming is that with respect to equipment, vaccines and technical guidance we have come a long way ahead from the

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past times and management practices have decreased the mortality rate to a very large extent. Besides this, there are companies and institutes that provide training to entrepreneurs and as the national policy is giving considerable significance to broilers future scope seem to be very bright. The size of poultry sector in India is huge and it's price competitiveness and entrepreneurship abilities in this field, India is all prepared to impact greatly in world chicken meat business particularly exports towards Gulf countries (Hellin *et al.*, 2015). Taking a look at all livestock farming practices the output of money spent is greatest in chicken meat business so proper designing becomes all the more necessary. So that the farmers get maximum benefits and more young & unemployed population can be attracted towards this means of livelihood. Broiler industry has lesser climate restrictions and more adaptability to varied forms of farm climate available in India (Singh *et al.*, 2010).

Poultry meat is liked compare to other meats because it contains extra protein and less cholesterol (Kralik *et al.,* 2018). Chicken flesh, particularly broiler meat, is universally accepted in almost all the countries despite social restrictions about meat consumption (Sudharsan *et al.,* 2021). Now days, people are become more aware about the food and want functional food to improve their long-term health goals (Bharath *et al.,* 2017). Thenumber of studies demonstrating the positive effects of PUFA, including fats of animal origin, on human healthhas recently increased (Djuricic and Calder, 2021).Broiler poultry flesh contains various kinds of fats and the fatty acid content in the chicken, which can be readily tailored then in other livestock meats because it depends on the diet they are fed on and likewise few trace minerals and vitamins can be increased in chicken meat (DiNicolantonio and O'Keefe, 2018). A comprehensive understanding of disease prevalence, mode of infection and socio economic background of farmer is helpful in designing the proper strategy for disease containment and timely forecast for betterment of poultry farmers specially in case of broiler farmers. Keeping these facts in mind present study was designed to look into the current technological adoption and problems of farmers including diseases prevalence among the broiler farms of Gwalior district of Madhya Pradesh, because no work on the technology adoption and diseases among the broiler birds was done in recent past.

MATERIALS AND METHODS

The broiler farms of Gwalior district was identified with the help of Veterinary department personnel, commercial hatchery persons, and poultry feed manufactures and a list of 50 farms, was prepared. The list was arranged in the ascending order of number of birds kept in a farm. From this list 30 such farms were selected who were continuously in production for at least one year and where proper records were maintained. The list was divided into three categories based upon the number of birds viz. small farm group (below 1999 birds),medium farm group (2000 to 4999 birds) and large farm group (5000 and above birds). From the list, a sample of 15 farms was identified randomly keeping in mind the equivalent exhibition of the three farm sizes.

Information was gathered by visiting selected chicken farms and interviewing the owners using a prepared questionnaire. The questionnaire includes the questions regarding socioeconomic attributes of the farmers such as age of farmers, size of the unit, occupational status, and general education level of diverse farmers and disease among poultry birds. The poultry extension services of the Krishi Vigyan Kendra,Gwalior, affiliated to Rajmata Vijayaraje Sciendia Krishi Vishwa Vidayalaya, Gwalior, cover the majority of poultry farms in the district.Mortality rates for each disease and that too in 3 different seasons, namely, winter, summer and rainy seasons were collected. The data collected was tabulated, analyzed and interpreted for prevalence of diseases among broiler birds.

STATISTICAL ANALYSIS

Results obtained were subjected to analysis of variance (Snedecor and Cochran, 2004). Significance was declared at $P<0.05$ unless otherwise stated. The study used SPSS 25 for statistical analysis.

RESULTS AND DISCUSSION

Socio-economic background of the farmers

Average Age of Broiler farmers of Gwalior District

The study revealed that there were 20 per cent farmers in the age group between 25 to 29 years followed by the age

group between 30-34 years and 35-39 years having 33.33 per cent farmers in both age groups. The study found only 13.33 per cent farmers in age group of 40 years and above (Table 1 and Fig. 1).

Table 1: Average age of the broiler farmers in Gwalior district

Age group of Broiler farmers	Number	Per cent to total
25 to 29 years	3	20
30 to 34 years	05	33.33
35 to 39 years	05	33.33
40 years and above	02	13.33
Total farmers	15	100

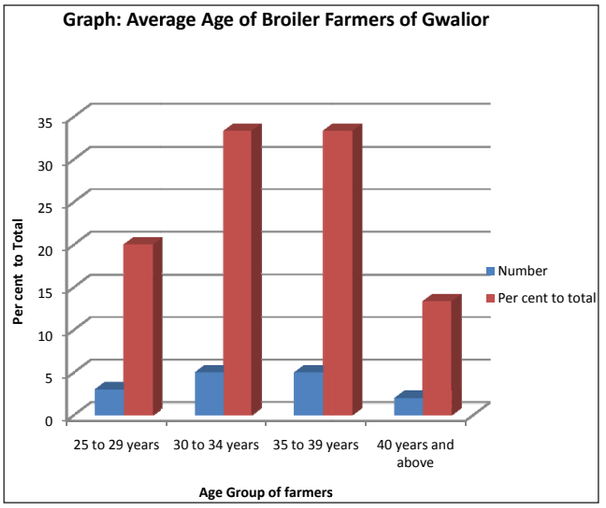

Fig. 1: Average Age of the Broiler Farmers of Gwalior District

Aganga *et al*. (2000) reported majority of farmers involved in poultry farming were in the age group of 35-40 years in their study in southern Botswana. Dongre (2015) in their study in Balaghat district of Madhya Pradesh reported majority of farmers involved in broiler farming were in the age group of 30 to 40 years. In a study of broiler farming in Karnataka, Telangana and Andhra Pradesh state it was observed that almost 68.3 per cent of contract farmers are young in the age group of 25 to 35 years and 20 per cent of farmers are middle age category of 36 to 45 years. In the case of non-contract farmers, 38.3 per cent of farmers are young as well as middle age category (Sasidhar and Suvedi, 2015). In a study of socio-economic attributes of contract broiler farmers of Suguna in Coimbatore District, Tamil Nadu it was found that the maximum number of the respondents 41.3% falls under the age limit 31 – 40 years followed by 41 – 50 (22.8%), above 50 (18.5%) and lastly 21-30 (17.3%) years (Sridharan, 2017). Less physical activities compared to other agricultural sectors, easy management process and good income source are the main driving factor for meat type chicken production being practiced by farmers of all age groups in India (Sasidhar and Suvedi, 2015).

Educational levels of broiler farmers of Gwalior District

On the basis of this study, all the farmers surveyed were literate but 6.66 per cent (Table 2 and Fig. 2) of the total farmers had only been to Primary education.

Table 2: Educational levels of the broiler farmers of Gwalior district

Education group of broiler farmers	Number	Per cent to total
Primary	01	6.66
Middle	03	20
High School	07	46.67
Inter- mediate and above	04	26.67
Total Farmers	15	100

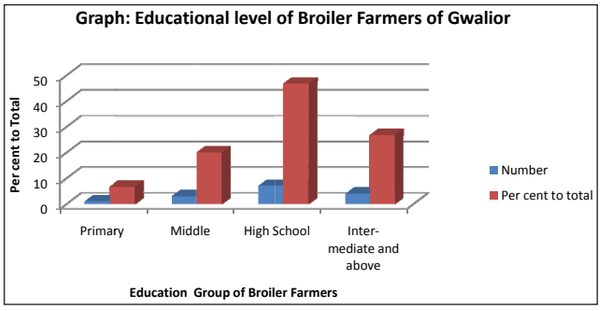

Fig. 2: Educational levels of Broiler Farmers of Gwalior District

It has been found that almost 46.67 per cent of the farmers in Gwalior were high-school educated. About, 20 per cent of the farmers were Middle School educated and 26.67 per cent of the farmers were Inter-mediate and above educated. Malarvizhi and Geetha (2015) in their study in Namakkal district reported majority of farmers were graduate (44.2%) followed by higher secondary (35.8%),secondary(19.2%) and post graduate (0.8%) individuals. Sasidhar and Suvedi

(2015) reported that among contract broiler farmers (CBF) almost 25.83 per cent, 44.17 per cent, and 30 per cent of farmers have education up to the 10th standard, 12th standard, and bachelor's degree respectively. On the other hand, in the case of non-contract farmers (NCBF) 10.83 per cent, 44.1 per cent, and 45 per cent of farmers have education up to the 10th standard, 12th standard, and bachelor's degree respectively. In India, it has been found that under CBF contractors usually select low and middle-literate farmers. Almost 70 per cent of farmers under the CBF category are 12th pass. On the other hand, in NCBF higher education is required as farmers have to bear all the costs and production risks. Sridharan (2017) reported that the maximum number of the farmers (47.2%) involved in poultry farming was educated to senior secondary level. In this 21st century, the application of technology is advancing rapidly. Indian poultry companies are also adopting new technology and scientific management practices such as automatic feeding and water supply system for mass production of broiler birds. Thus, education is going to be a vital part among the selected farmers so that they can improve their production efficiency.

Occupational/Professional status of the Broiler Farmers of Gwalior District

The study found that more than half of the farmers in Gwalior 53.33 per cent are doing broiler poultry farming as a subsidiary (business persons, agriculture and service) occupation while others practice as sole occupation 46.67 per cent (Table 3 and Fig. 3). Similar observations were recorded by many workers (Jabbar and Green,1983; Karim, 2001). Almost 35 per cent of contract farmers treat broiler farming as a primary occupation followed by 65 per cent who take broiler farming as a subsidiary occupation. In the case of non-contract farmers, 43.33 per cent treat broiler farming as a main occupation, and 56.67 per cent of them take broiler farming as a secondary occupation (Sasidhar and Suvedi, 2015). In Namakkal district it was observed that 48.3 per cent of farmers were businessmen followed by agriculturist 42.5 per cent, government servant 2.5 per cent, private job holder 5 per cent and professionals 1.7 per cent (Malarvizhi and Geetha, 2015). Vertical integration in broiler farming generates both primary and secondary sources of income for the farmers in India.

Table 3: Occupational status of the broiler farmers in Gwalior district

Occupation of broiler farmers	Number	Per cent to total
Subsidiary Occupation	08	53.33
Sole Occupation	04	46.67
Total Farmers	15	100

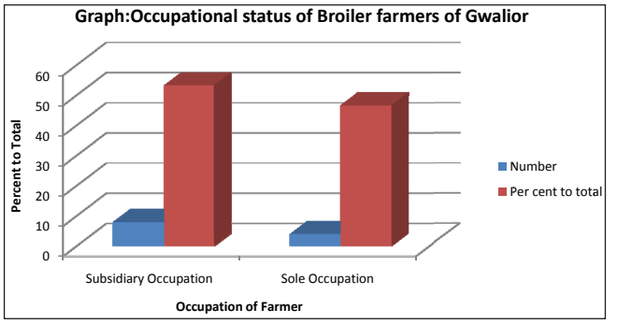

Fig. 3: Occupational status of Broiler Farmers of Gwalior District

Diseases in Broiler Birds

The study results revealed that the mortality of the farms in Gwalior was 14.17 per cent (Table 4) in all the seasons combined. The study found several bacterial diseases among the broilers including chronic respiratory disease, E. coli infection, Omphalitis and viral diseases such as Gumboro (IBD). The study also reported the cases of parasitic disease like Coccidiosis and some Non specific diseases. Verma and Yadav (2017) also reported mortality due to omphalitis, Colibacillosis and Gumboro in broiler birds in Azamgarh district of Uttar Pradesh. Hastuti *et al.* (2011) observed various microbial diseases in meat type chicken units in the Indonesia including Chronic Respiratory Disease (CRD), Colibacillosis, Gumboro and New Castle Disease (ND). In Faizabad district of Uttar Pradesh Yadav *et al.* (2018) observed maximum broiler mortality due to Aspergillosis (75.65%) followed by Salmonellosis 70.27%, Yolk sac infection 56.36%, Colibacillosis 54.71%, Mycoplasma-colibacillosis complex 54.54%, Gumboro (42.85%), Choline deficiency (42.85%), Hydropericardium hepatitis syndrome (41.43%) and Gout 41.26%. The present study reported (Table 4 and Fig. 4) 4.13% (2051), 4.75 (2362) and 5.29

Table 4: Season wise mortality rate (%) and diseases in broiler farms in Gwalior

Season	Season-wise Mortality Rate (n)	Disease						
		CRD	Coli	Omphalitis	Gumboro	Coccidiosis	Non specific Diseases	Significance
Winter	4.13 (2051)	0.91±0.14	0.94±0.16	0.96±0.14	0.97±0.18	0.03±0.05	0.14±0.08	NS
Summer	4.75 (2362)	1.02±0.14	1.06±0.15	1.07±0.12	1.12±0.14	0.24±0.08	0.20±0.08	*
Rainy	5.29 (2630)	1.10±0.13	1.15±0.15	1.15±0.13	1.19±0.14	0.33±0.12	0.46±0.13	*
Overall	14.17 (7043)	3.03±0.37	3.15±0.44	3.18±0.37	3.28±0.43	0.61±0.18	0.79±0.22	*
Significance	*	*	*	*	*	NS	NS	

*p< 0.05; NS, not significant.

(2630) mortality in winter, summer and rainy season respectively. Present study clearly indicates maximum mortality in rainy season followed by summer and winter season. Pandian *et al.* (2013) found that mortality during southwest monsoon was highest (53.81%) followed by summer (22.39%), Northwest monsoon (17.39%) and lowest in winter (5.86%). The present findings are in agreement with findings of Verma and Yadav (2017). The findings are not in agreement with Behara *et al.* (2012), Badruzzaman *et al.* (2015) and Udhayavel *et al.* (2020) who reported maximum mortality in summer followed by winter and rainy season. The presence of cases of Chronic Respiratory Disease (CRD), *E. coli* and Omphelitis in large numbers clearly indicates the poor maintenance of hygiene and water quality at farms.

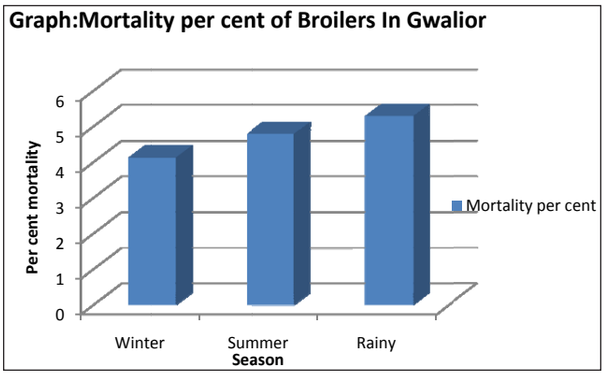

Fig. 4: Mortality Per cent of Broilers in Gwalior district

In Gwalior district (Table 1), the difference in mortality in each disease in the winter season is not significant while in other season, it is significant (p< 0.05). The mortality rate in present research for coccidiosis and Non-specific disease, for each season, has been insignificant. In the present study *E. coli* infection causes maximum mortality in rainy season among all the diseases. Gompo *et al.* (2020) observed in their study at Nepal that Cases of colibacillosis were found in abundance all year round. Mycotoxicosis was seen mostly during just before monsoon and monsoon season. Ascites and Gumboro were common during spring and winter seasons. In a similar study in Malwa region of Madhya Pradesh mortality in broiler birds due to colibacillosis were reported by Nidhi *et al.* (2019). Same workers found mortality in Kadaknath birds due to yolk sac infection and coccidiosis. Present research found the cases of viral disease Gumboro (IBD) throughout the year however the cases were more during rainy season, similar findings were reported in a study in Haryana (Kundu *et al.,* 2018) where maximum out breaks of Gumboro (IBD) were found in the month of August and in quarter from July to September (rainy season). In the present study coccidian was found regularly in farm though incidence was found more in rainy season followed by summer and winter months. Presence of coccidiosis in farms clearly indicates spillage of water from drinkers and water spillage during the rainy season at almost all the farms of the district. The study (Satapathy *et al*., 2017) revealed that litter attracts pathogens and causes ammonia emission. Chicken are susceptible to ammonia which could lead to loss of vision with reduced body weight gain and poor food to meat transformation proportion hence maintaining the bedding material perched through circulatory fans were recommended which would move the air within the house. Kalita *et al.* (2018) found high pervasiveness of coccidia infection in both clinical (29.36%) and subclinical farms (33.03%) and mortality due to caecal coccidiosis (62.50%) was much higher than the intestinal coccidiosis (37.50%). High incidence of the coccidiosis signals the

lack of awareness on the disease and poor managemental procedure adopted in the Assam region due to favorable climatic conditions.

CONCLUSION

One of the preferred veterinary solutions for controlling diseases in livestock is the implementation of biosecurity measures (Robertson, 2020). The present study clearly highlighted the presence of almost all important diseases in broiler birds causing the economic loss to farmers and ultimately to the country. It is a well established fact that diseases are caused by microorganisms in a susceptible host in a favorable and conducive environment. Biosecurity measures act on all the three components and minimizes the chance of disease outbreaks henceforth there is a urgent need for implementation of biosecurity measures. The fact that studies on disease control often focus on farmers inability to correctly adopt biosecurity measures, indicates why it is so important to develop tools that allow researchers to understand what biosecurity actually means, not just for farmers, but also veterinarians and public health practitioners and other stakeholders in poultry production in India who commonly advocate for biosecurity measures in practice.

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