

## Mortality of Chickens in Lower Broiler Poultry Farm Concentration Districts of Punjab

### Mortalidad de pollos en los distritos de concentración de granjas avícolas de pollos de engorde inferior de Punjab

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#### ABSTRACT

Poultry farming is a commercial venture, generating regular employment and income opportunities to the rural people. However, the major hindrance for the growth of broilers reared in this type of farming, is the mortality of chickens as it largely affects the economic aspects of the farmers. The present study is undertaken to analyse the mortality pattern in various broiler poultry farms situated in the lower concentration districts of Punjab. The mortality pattern in the flock of birds according to the age and variation in seasons is also taken into consideration. Using the Garrett Ranking Technique to analyse the cause of mortality among the birds and taking six factors into consideration, it has been found that mortality from diseases is the top most cause resulting in the death of the birds. Untimely provision of vaccinations to the birds is ranked second as it deteriorates chickens' health and improper litter management is ranked the least affecting factor for the mortality of birds. More than a half of the broiler poultry farmers have reported maximum chances of mortality in the summer season. Most of the birds die in the first week of their rearing period.

Keywords: Chicken, Diseases, Farmers, Poultry farming.

#### RESUMEN

La avicultura es una actividad comercial que genera empleos regulares y oportunidades de ingresos para la población rural. Sin embargo, la mortalidad es el principal obstáculo para el crecimiento de los pollos de engorde que son criados en este tipo de actividad, ya que afecta en gran medida a los aspectos económicos de los granjeros. El presente estudio tiene como objetivo analizar el patrón de mortalidad en varias granjas avícolas de engorde situadas en los distritos de menor concentración de Punjab. También, se tiene en cuenta el patrón de mortalidad en el averío según la edad y la variación estacional. Al utilizar la técnica de clasificación de Garrett para analizar la causa de mortalidad y, además, teniendo en cuenta seis factores, se ha descubierto que la mortalidad debido a enfermedades es la principal causa de muerte de las aves. El suministro inoportuno de vacunas ocupa el segundo lugar, ya que deteriora la salud de los pollos. Finalmente, la gestión inadecuada de la cama de pollos (CP) es el último factor que menos afecta a la mortalidad de las aves. Más de la mitad de los

avicultores de pollos de engorde han declarado que las probabilidades de mortalidad más altas son en verano. La mayoría de las aves mueren durante la primera semana del periodo de cría.  
Palabras clave: Pollo, Enfermedades, Granjeros, Avicultura.

## INTRODUCTION

One of the most rapidly expanding agricultural sectors in India is the animal raising activity. Poultry husbandry began as a home business in the livestock sector and eventually developed into a profitable agro-industry that pays farmers (Toor and Goel, 2022). Poultry farming is one of the most productive and quickly expanding sectors as far as the allied sectors of the agriculture are concerned. Broiler poultry farming is a short-term business that can be carried out in multiple batches over the course of a year with little capital outlay and a high rate of return on investment in the range of 6-7 weeks per batch. Farmers who understand how this venture will create jobs for both men and women and a steady stream of revenue are easily persuaded to pursue broiler farming on a commercial level (Adetola and Simeon, 2013). For tiny and marginal farmers in developing nations like India, raising broiler chickens is a lucrative business (Shreya and Murthy, 2017).

Production of chicken suffers significant financial losses due to bird mortality. In addition to diseases, predation is another cause of bird mortality. Therefore, a farmer should constantly be vigilant to spot any symptoms the flock displays so that management or treatment measures can be started quickly and the loss is minimised. However, it is vital for the farmer to take every preventative measure to keep the flock disease-free. Technical effectiveness and implementing newer techniques are acknowledged as crucial elements for achieving the best weight in broilers at market age and maximising the profit margin (Samarakoon and Samarsinghe, 2012). With the fast development of the poultry industry to supplement their revenue, the incidence of diseases has multiplied and continues to be the main issue affecting its economy. As a result, diseases play a crucial role in better understanding the status and pattern of diseases. The low productivity of chicken rearing is mostly due to the high occurrence of poultry illnesses. Farmers' unwillingness to participate in the production of poultry is mostly due to a lack of resources as well as the danger of uncontrolled infections (Bessei, 1988). A poultry farm's mortality statistics are crucial for determining disease prevalence and for implementing preventive and control measures. Poultry infections have frequently resulted in farmers suffering significant financial losses and pose a possible danger to the economics of the poultry business (Rahman and Samad, 2003).

Genetic and epidemiological variables affect the prevalence and spread of diseases. High stock density, poor biosecurity, selecting birds for high juvenile body weights, and shoddy managerial methods are the main risk factors for the onset or re-emergence of illness (Garcia-Martinez et al., 2013). Human-to-poultry host jump, adaptation and pandemic spread of pathogens under changing climatic conditions, and spill over of the pathogens from and into wild bird species are emerging challenges that call for continued clinical and laboratory surveillance. Zoonosis is an important human health concern (Lowder et al., 2009). Different locations have reported varying death rates (Saleque and Rehman, 2003; Bhende, 2006 and Awobajo et al., 2007). While the geographical region, the time period under research, the age of the birds as well as the season are the main variations, the management techniques at the farm and the study's design also have a significant impact on the observed mortality (Aengwanich and Simaraks, 2004; Behra et al., 2009). Additionally, the general mortality rate

at a particular time is significantly modified by illness outbreaks brought on by highly pathogenic infections. More critically, a precarious scenario has resulted from the shifting patterns of illnesses and infections. Due to temperate climate conditions, small-scale farming with closed housing is a problem for the poultry industry. Other problems include the importation of chicks, table birds, feed ingredients, vaccines, and culled birds, as well as a lack of a governing body and preventive biosecurity policies (Yunus et al., 2008).

Poultry birds represent a further risk element (Darzi et al., 2006). The industry is, therefore, possibly one of the most susceptible to a natural disaster and/or the introduction of a foreign, emergent, resurfacing, and/or zoonotic illness, offering a potential threat that could be seen as an impending disaster. A review of the literature finds scattered or isolated research on avian diseases that affect this region, as well as individual case reports (Salam et al., 2008; Shah et al., 2010). Infectious illnesses can affect broilers. According to the studies, different-sized farms experience different rates of death. Numerous experts have noted that the mortality rate has been higher on large and medium-sized farms than on small farms. Since most diseases are quite contagious, once they manifest in the farm, they swiftly spread to all the birds. Due to an amplified spill-over effect, broiler farms with large flock sizes are more likely to have a larger proportion of sick birds (Mohsin et al., 2008; Balamurugan and Manoharan, 2013). Hence, it becomes important to understand the mortality pattern of broiler chickens in the districts of Punjab having lower concentration of broiler poultry farms.

## MATERIAL AND METHODS

The information regarding the total number of broiler poultry farms and the bird population in each district was ascertained by the Department of Animal Husbandry (2019-20). The districts have been segregated on the basis of concentration of broiler poultry farms in each district and classified into two categories i.e. districts with higher concentration of broiler poultry farms and districts with lower concentration of broiler poultry farms. The purpose of the research has been to study the broiler poultry farms operating in those districts of Punjab where the concentration is low and for this, three districts i.e. Mansa, Faridkot and Fazilka have been chosen from those. A total of 79 broiler farms are operating in those three districts, out of which 30 have been selected randomly for the analysis purposes.

### Application of the Henry Garrett's Ranking Technique

Garrett Ranking method is used to rank the respondents' preferences on various factors/problems. In the present study, this method is used to investigate the causes of broiler chicken mortality in Punjab in the districts of lower concentration of broiler production. Rank is assigned to each problem and then it is converted into percentile position. From this, Garrett value is estimated and total scores are ascertained. Finally, the mean score are calculated and ranks are assigned.

## RESULTS AND DISCUSSION

### Reason for Mortality of Broiler Chickens

The causes of chicken mortality are numerous since every farmer raising a batch of poultry birds deals with a unique set of issues. As a result, each farmer ranked the six causes of mortality differently.

### Estimation of the Total Sample's Rank

The three districts with lower concentration of broiler poultry production have been enumerated. Table 1 shows the various ranks given to different problems by the broiler poultry farmers. From a total sample of 30, Rank 1 is given to mortality from diseases by 15 broiler poultry farmers, followed by Rank 2 given by 8 broiler poultry farmers to improper health check-ups. Some broiler poultry farmers (13 in number) have ranked untimely vaccinations as the third cause for broiler mortality and around 9 broiler poultry farmers have ranked it as the fourth cause for the mortality of chickens. Improper brooding has been ranked number 5<sup>th</sup> by 9 broiler poultry farmers and 8 of the total broiler poultry farmers ranked climate change as the least affecting factor in the mortality of broilers. This unsystematic ranking of all the factors can be properly computed by using Garrett Ranking Analysis.

Table 1: Ranking of Different Factors by Broiler Poultry Farmers and Computation of Percentile Position and their Garrett Score

Factors	Ranking of Different Factors by Broiler Poultry Farmers						Percentile Position	Garrett Score
	Untimely Vaccinations	Improper Litter Management	Climate Change	Diseases: Viral / Flu / Water	Improper Health Check-ups	Improper Brooding		
R1	0	2	8	15	0	5	8.33	77
R2	6	2	6	5	8	3	25	63
R3	13	8	1	0	5	3	41.67	54
R4	9	6	4	1	5	5	58.33	46
R5	0	5	3	5	8	9	75	37
R6	2	7	8	4	4	5	91.67	23

Source: Primary Survey, 2022.

#### Percentile Position and Garrett Score

Once the ranks are assigned to all the factors by the broiler poultry farmers, there is a need to estimate Percentile Position using Henry Garrett's technique of rank estimation i.e.,  $100 (R_{ij}-0.5) / N_j$ .  $R_{ij}$  denotes rank given to  $i$ th factor by  $j$ th farmer and  $N_j$  is total factors ranked by  $j$ th farmers. (Garrett & Woodworth, 1969). By using this formula, the Percentile position of each rank is determined. In order to calculate Garrett score - an important determinant, there is a need to find the score value from the Garrett Ranking Conversion Table. Table 1 shows that the Garrett Score for 8.33 percentile position is 77, for 25.00 percentile position its 63 and so on for Rank 3, Rank 4, Rank 5 and 6.

#### Estimation of Mean Scores and Ranks of Different Factors

In order to estimate the ranks, mean score are calculated by dividing the total scores with the number of respondents (30 in the current study). Total score can be estimated by multiplying the respective Garrett Score with the number of respondents that ranked the various factors responsible for mortality of chickens. To illustrate, in Table 2, Rank 1 to improper litter management is given by 2 broiler poultry farmers and the Garrett score against this rank is 77. By multiplying both these figures we get 154. Similar process is repeated until all the values are estimated and once the process is complete, total scores are calculated. The factor with highest

mean score which is simply the average of total scores is ranked number 1 and the factor with the least mean score is ranked number 6.

Table 2: Ranks of Different Factors Responsible for Mortality of Broiler Chickens

Ranks of Different Factors							
Factors	Untimely Vaccinations	Improper Litter Management	Climate Change	Diseases: Viral / Flu / Water	Improper Health Check-ups	Improper Brooding	
R1 x 77	0	154	616	1155	0	385	
R2 x 63	378	126	378	315	504	189	
R3 x 54	702	432	54	0	270	162	
R4 x 46	414	276	184	46	230	230	
R5 x 37	0	185	111	185	296	333	
R6 x 23	46	161	184	92	92	115	
Total	1540	1334	1527	1793	1392	1414	
Mean Score	51.33	44.46	50.90	59.76	46.40	47.13	
Rank	2nd	6th	3rd	1st	5th	4th	

Source: Primary Survey, 2022.

The above table reveals that mortality due to Viral/Flu and water borne diseases is the prime reason in the broiler chickens. If the broiler chickens are not given proper vaccinations on time, then it results into high rate of mortality as evident by the second rank placed to it by the broiler poultry farmers. The change in climate i.e. various seasons such as Summer, Winter, Spring and Autumn Season affects the chicken's health and farmers felt that this is the third major cause for chickens death. During brooding, an optimum temperature is maintained in the shed where the broilers are reared. Sometimes, due to negligence of the broiler poultry farmer, improper brooding result into mortality and it is given fourth place. Poultry birds suffer from different types of diseases and farmers need to keep a check on their health on daily basis. Improper health check-ups is the fifth reason for the death of the chicken and the least affecting factor for the cause of mortality is improper litter management (ranked 6th) as farmers make sure that after every batch the shed should be sanitized properly and if not taken care off then might cause huge number of deaths.

#### Mortality according to Age of Chickens

Mortality is a serious problem faced by the broiler poultry farmer. It not only results into huge financial loss but also weakens the position of the farmers. Sometimes, despite of putting strenuous efforts, farmers are no able to cope up with this situation. So, it becomes an important factor and hence needs to take into consideration while studying about the broilers and the associated broiler farmers. Table 3 throws light on the responses given by the broiler poultry farmers for the mortality of chickens at certain age during their rearing period. It can be seen that all the broiler poultry farmers (100.0 per cent) of Fazilka district feel that the maximum chances of occurrence of mortality in chickens is in the first week of their admission to the farm as the chick is

too small to cope up with the new environment. Almost 80 per cent of the farmers in Faridkot and 63.6 per cent farmers of Mansa district feel the same. A very less proportion i.e. 10.0 per cent of broiler poultry farmers in Faridkot and 9.1 per cent in Mansa noticed the higher chances of mortality in the second week of the rearing period. The same proportion i.e. 9.1 per cent of broiler poultry farmers in Mansa district have rated 3<sup>rd</sup> and 4<sup>th</sup> week as the higher chances for the deaths among all the districts whereas 18.2 per cent farmers reported that mortality can occur anytime between the day 1 when day old chicks are brought in the shed up till the last day of maturity i.e. around 40 days.

Table 3: Maximum Chances of Mortality According to the Age of Chickens

Districts	Maximum Chances of Mortality in Age										Total Sampled Farms
	First Week		Second Week		Third & fourth Week		Last Week		Anytime		
	No.	%	No.	%	No.	%	No.	%	No.	%	
Mansa	7	63.6	1	9.1	1	9.1	0	0	2	18.2	11
Faridkot	8	80	1	10	0	0	1	10	0	0	10
Fazilka	9	100	0	0	0	0	0	0	0	0	9
Total	24	80	2	6.7	1	3.3	1	3.3	2	6.7	30

Source: Primary Survey, 2022.

#### Mortality according to Season Variability

Variability in seasons play a significant role in the mortality of chickens. Among the sampled low concentration districts of broiler poultry farms in Punjab, it has been found that the maximum chances of occurrence of mortality according to seasons is in Summer Season as reported by 53.4 per cent of the farmers as evident from the table 4. Due to scorching heat, the death rate increases as the birds are not able to survive in the harsh conditions. Overall, the trends reveal that 43.3 per cent broiler poultry farmers feel that chances of mortality are equally likely in both the seasons as it depends upon the temperature maintained inside the shed because broiler poultry farming is undertaken into controlled conditions to a certain extent. Only 3.3 per cent farmers have reported that winter season also cause mortality. It may be attributed to the fact that the inner heat in the body of the chick is sufficiently high to save them from cold but only up to a certain temperature. When the cool in the winter increases, the artificial brooders are used to provide the required heat to the birds for their proper rearing due to which the chances of mortality are less in winter. District-wise analysis highlights that 77.8 per cent of the broiler poultry farmers of Fazilka district disclosed that summer season is the most affecting season among all as the rise in temperature enhances the risk followed by Faridkot (50.0 per cent) whereas in Mansa district only 36.4 per cent broiler poultry farmers noted the similar trend. None reported the chances of mortality in winter season in both Mansa and Faridkot district except Fazilka as 11.1 per cent broiler poultry farmer might have faced higher mortality in winter season. Mortality occurring in both summer and winter season has been narrated by 63.6 per cent farmers living in Mansa, followed by 50.0 per cent in Faridkot and the least in Fazilka i.e., 11.1 per cent.

Table 4: Maximum Chances of Mortality According to the Season

Maximum Chances of Mortality in Season							
Districts	Summer		Winter		Summer & Winter		Total Sampled Farms
	No.	%	No.	%	No.	%	
Mansa	4	36.4	0	0	7	63.6	11
Faridkot	5	50.0	0	0	5	50.0	10
Fazilka	7	77.8	1	11.1	1	11.1	9
Total	16	53.4	1	3.3	13	43.3	30

Source: Primary Survey, 2022.

#### Mortality due to Predation

Predation attack is another possible factor responsible for mortality of chickens but the severity of it largely depends upon the farmer. Farmers of these 3 districts reared birds with utmost care due to which the chances of predation decreases. Table 5 conveys that predation attack occurred in two farms only out of which in one broiler poultry farm it occurred twice. The average number of birds died in the first attack is near to 150 and in second attack its nearly 300. During the collection of data, the broiler poultry farmers revealed that mongoose and snake are the two predators that caused such a fear and death of birds. Usually, poultry farms are built in rural area on uncreted land mainly of mud and due to their inhabitant, these animals have a higher chance of mobility towards the shed. Although it may be prevented by using proper fencing techniques in and around the shed, yet sometimes it is not possible to evade them.

Table 5: Mortality due to predation

Mortality due to Predation							
Districts	No. of Farms where First Predation Occur	No. of Farms where Second Predation Occur	Total Sampled Farms	Total No. of Birds Died in First Attack	Total No. of Birds Died in Second Attack	Average No. of Birds Died in First Attack	Average No. of Birds Died in Second Attack
Mansa	1	0	11	100	0	100	0
Faridkot	1	1	10	200	300	200	300
Fazilka	0	0	9	0	0	0	0
Total	2	1	30	300	300	150	300

Source: Primary Survey, 2022.

#### CONCLUSIONS

The analysis of the study reveals that diseases play a dominant role in the mortality of broiler chickens, followed by improper vaccinations, change in climate, improper brooding, improper health check-ups and

improper litter management. Variations in season and age at different rearing periods also causes mortality of chickens as noticed from the analysis of the above data. The majority of farmers have reported that maximum chances of mortality occur in the first week of the rearing period. More than half of the bird population dies during the summer season due to enormous rise in temperature. Farmers of the lower concentration districts of broiler poultry farms have pointed out that the occurrence of predation attack is less in their broiler poultry farms. The proportion of mortality rate is nearly 6.2 per cent among all the sampled districts. Chronic Respiratory Disease (CRD) and Coccidiosis disease is the most frequent one among the broiler chicks. Although, Fowl Cholera is also prevailing yet its occurrence is less as compared to the above diseases.

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