



Impact of biosecurity practices on poultry production at Jhenidah Sadar, Jhenidah

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ABSTRACT

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The study was conducted at Jhenidah Sadar Upazilla in Jhenidah district during the period of One month (December, 2019) to determine the Impact of biosecurity on poultry production associated infectious diseases. A total 42 farms were investigated during the study where 78.57% were broiler farms and 21.43% were sonali farms. Out of 42 farms, about 50% farms were medium scaled (>1000) in size and 30.95% farms were located within residence. Visitor's entrance restriction was presence only 30.95% farms and vehicles entrance restriction were in 38.10% farms. Dedicated boots for workers were absence in 61.90% farms and total absence of footbath on farms entrance gate in the study area. Surrounding fences were presence in 64.29% studied farms. The present baseline investigation shows a clear status of the level of poor biosecurity practices among the small and medium scale poultry farms of the study area. The findings of this study would help designing a practicable biosecurity model for the small and medium scale poultry farms of Bangladesh.

Introduction

Poultry production has become a sub sector of livestock that contributes 1.47% in Gross Domestic Product (GDP) and share of Livestock in Agricultural GDP 13.46%. Poultry production creates an opportunities for reducing unemployment through job sector (Raha, 2007). Young educated people who had searched for job, now they are becoming the entrepreneur through rearing poultry. They are benefited and contribute in rising national economy rearing poultry (Ali and Hossain, 2012). Poultry sector will create job opportunity for people as claimed by poultry leaders. Poultry rearing is profitable for widespread implementation as low production cost, requires little manpower, highly productive and high market demand (Dolberg *et al.*, 1997).

In the last few years, the confession of small-scale commercial poultry production aid to increase the pace of poverty alleviation riding in new dimension in Bangladesh (Jabbar *et al.*, 2007). The poultry industry has been successfully becoming a leading industry of the country. The sector is also establishing rapidly for last two decades though it was started farming during mid-sixty in this country. During last 10 years, egg production increases approximately 4 times higher. At present status of

demand 104 eggs /year/head and production availability is 103.89 eggs /year/head. So it called, Bangladesh is a self-dependent on egg production. In 2018-19, 3470.35 lakh poultry were produced. During last 10 years, 24.32% poultry production increases significantly.

In the last few decades, poultry industry has become established. Sometimes poultry farmers have to face in loss because of infectious diseases. Massive mortality of poultry due to various infectious diseases is a main impediment for profitable poultry production. Farmers face a wide range of poultry diseases, which reduce the optimal production of flock. (Giasuddin *et al.*, 2002) reported about 30% mortality of chickens in Bangladesh every year due to outbreaks of several diseases. Diseases in poultry significantly affect the productivity and health status (Ahmed *et al.*, 2009) reported Salmonellosis 50.90%, Omphalitis 28.42%, Colibacillosis 13.36%, Mycoplasmosis 2.55%, Necrotic enteritis 1.88% and Infectious coryza 0.56% in poultry. Infectious bursal disease is an important viral disease which causing 10-40% mortality in broiler flock. Coccidiosis is one of the most important diseases of poultry, it results in a great economic loss all over the world (Nematollahi *et al.*, 2009) reported overall prevalence of coccidiosis in broiler chickens 55.96%. Most of these diseases disable the immune

system of the affected birds that causes vaccination failure and make them highly susceptible to other infectious diseases. Main reason for infectious diseases outbreaks in a poultry farm is management fault by the farmers. Lack of biosecurity practices is the most management problem for infectious diseases in farms. Due to poor biosecurity practices, infectious agents (bacteria, virus, protozoa, mycoplasma, chlamydia etc.) infect birds in the flock. As a result massive outbreak occurs in the farms those do not practice biosecurity strictly (Kirunda et al., 2014).

Biosecurity can be defined as application of measures that decrease the chance of introduction and spread of disease agents (Van Meirhaeghe et al., 2019). Biosecurity needed a set of task by people to decrease risk in all activities including domestic, captive exotic and wild birds and their products. Farm's production is directly related to good biosecurity practices (Al-Faisal, 2019). Biosecurity practices can be categorized into four classes such as a) Access control at farm entrance, b) Access control between loading and production

area, c) Personnel Management, d) Equipment Management. From the above discussion, the current study was under taken to know the impact of biosecurity on meat production in poultry and to compare infectious disease incidences among poultry farms in the study areas.

Materials and Methods

Study area

The study was conducted from Jhenidah Sadar Upazilla, Jhenidah. Jhenidah Sadar Upazilla consists of 17 Unions, among them Holidhani, Sadhuhati, Madhuhati, Kumrabaria, Ganna Union were selected for the study. The study areas were selected due to availability of large number of broiler and sonali farms and good communication facilities. Jhenidah Sadar Upazilla is located at 23° 34' 0" North and 89° 18' 0" East in DMS (Degrees Minutes Seconds). The city is in tropical climate area. The annual temperature ranged from 11.2-38.10°C. Average rainfall is 1467 mm per year.

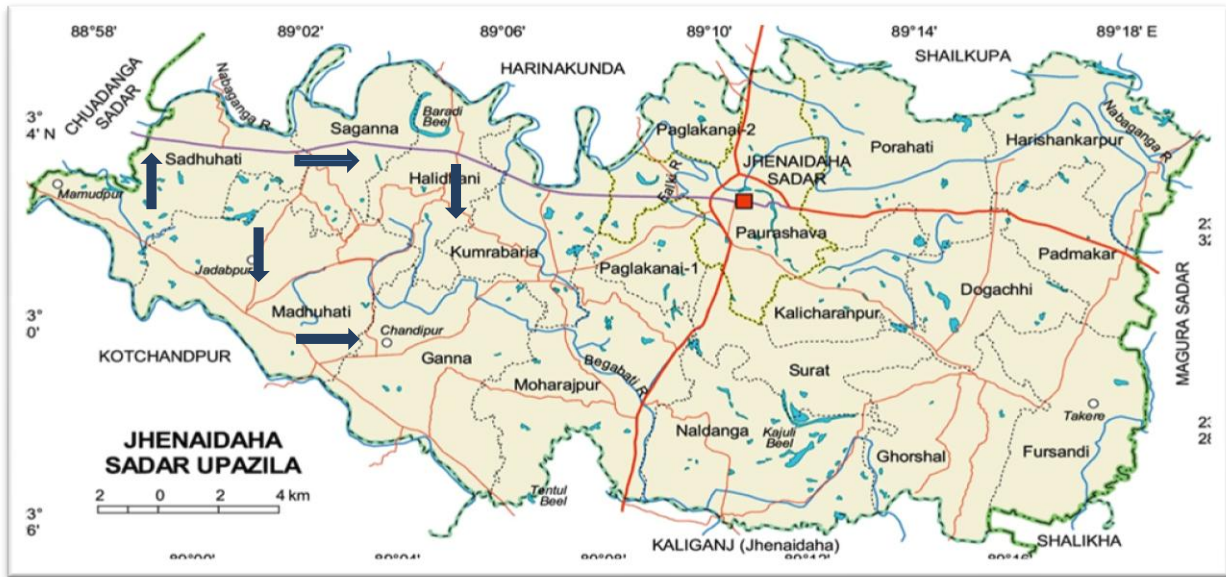


Figure 1: The figure shows the study area. (Blue marks indicate the particular union: Holidhani, Sadhuhati, Madhuhati, Kumrabaria, Ganna Union)

Study period

The study was conducted from different poultry (Broiler and Sonali) farms at Jhenidah Sadar Upazilla, Jhenidah during One month (December, 2019).

Sources of data

Data for this study was obtained from primary sources (Poultry Farmers). The primary data were collected from farmers regarding management system such as, farm type, farm size, location of farms from residence, diseases history, mortality rate and biosecurity practices using structured questionnaires.

Sampling procedure

In an empirical study, it is impossible to gather information from total population. Therefore, the authors were often forced to make hypothesis based on information attained from a representative sample of the population. The sample size and the degree of variation usually affect the quantity and quality of information gathered from the investigation. Using appropriate sampling techniques, both factors can be monitored (Scheaffer, 2011). The purpose is to devise a sampling design which is beneficial; easy to operate; and, provides unbiased calculation with small 'variance' (Barnett, 1991). Conferred limitations in terms of money, time, efforts, and data management - sampling is more suitable method. Further, sampling not only defense cost and time but can also impart more accurate results than a census which are more receivable (Kinnear and Taylor, 1987; Casley and Kumar, 1988).

Defining the population

Classification of the population is the first step in the sampling techniques, namely, the sector or element under study, the sampling unit, the area or extent of study, and the duration of investigation (Kinnear and Taylor, 1987). All the poultry farms of the study areas engaged in poultry production were classified as population of the study.

Sampling methods

The study areas were selected biasedly (Non random selection). Jhenidah Sadar Upazilla has 17 Unions. From these unions 5 unions were randomly (Stratified random sampling) selected for data collection and all types of farms were taken under considerations.

Sample size

Casely and Kumar, (1988) exposed that a standard survey sample should have both small sampling error and minimum standard error. This can be acquired if one has limitless resources. However, following impediments, such as finance, time and data management compromises have to be made in grading the sample size (Poate and Daplyn, 1993). Thus on the basis of - nature of research and analysis; number of variables; resource limitations; and, the importance of decision, a sample size of 42 (33 broiler and 9 sonali farms) poultry farms engaged in poultry production were selected.

Analytical techniques

The collected data were sorted on spreadsheets in Microsoft Excel 2010 and were arranged in tabular form. The obtained data imported to software STATA/IC-14 for analysis. Descriptive statistics was done to estimate the different variables.

Results and Discussion

The following investigation was designed on 42 farms, in which 78.57% were broiler farms on the contrary 21.43% were sonali farms (Table 1). About 50% farms were standard in size in which 19.05% farms were small ($n \leq 500$) in size (Table 2). Out of 42 farms, 30.95% farms were established within residence and followed by 33.33% farms were 2 to 5 meter, 21.43% farms were 6 to 10 meter and 14.29% farms were more than 10 meter far away from residence (Table 3). In 30.95% farms, less than 2 inch depth litter were used, on the other hand 23.81% farmers were used litter which was greater than 2 inch depth (Table 4).

Table 1: Total investigated poultry farms in the study area

Breed	No. of farms	Percentage (%)	95% Confidence Interval
Broiler	33	78.57	0.63- 0.90
Sonali	9	21.43	0.10- 0.37

Table 2: Studied farms are categorized into three types

Farm Size	No. of farms	Percentage (%)	95% Confidence Interval
≤ 500	4	19.05	0.03- 0.23
501-1000	17	40.48	0.26- 0.57
> 1000	21	50	0.34- 0.64

Table 3: Location of poultry farms from residence

Distance (meter)	No. of farms	Percentage (%)	95% Confidence Interval
Within House	13	30.95	0.18-0.47
2-5	14	33.33	0.16- 0.46
6-10	9	21.43	0.10- 0.39
>10	6	14.29	0.05- 0.29

Table 4: Depth of litter in the poultry house

Litter depth (Inch)	No. of farms	Percentage (%)	95% Confidence Interval
< 2	13	30.95	0.18- 0.47
2	19	45.24	0.30- 0.61
> 2	30	23.81	0.12- 0.39

Table 5: Flock interval before new chick arrival in the poultry houses

Flock interval (Days)	No. of farms	Percentage (%)	95% Confidence Interval
10-11	8	19.05	0.08- 0.34
12-13	20	47.62	0.32- 0.64
14-15	14	33.33	0.20- 0.50

Table 6: Access control at farm entrance in studied poultry farms

Farm entrance	No. of farms	Percentage (%)	95% Confidence Interval
Open	29	69.05	0.53- 69.82
Closed	13	30.95	0.18- 0.47

Table 7: Vehicles entrance inside the poultry farms

Vehicles entrance	No. of farms	Percentage (%)	95% Confidence Interval
Vehicles can't enter	16	38.10	0.24- 0.54
Vehicles can enter	26	61.90	0.46- 0.76

Table 8: Disinfection practices among the poultry farms

Disinfection practices	No. of farms	Percentage (%)	95% Confidence Interval
Entrance boots absence	26	61.90	0.46- 0.76
Entrance boots presence	16	38.10	0.24- 0.54
Footbath on gate	0	0.00	0

Table 9: Fence surrounding in the poultry farms

Fence	No. of farms	Percentage (%)	95% Confidence Interval
Absent	15	35.71	0.22- 0.53
Present	27	64.29	0.48- 0.78

Resting period before new chick arrival were found 10 to 11 days, 12 to 13 days and 14 to 15 days in 19.05%, 47.62% and 33.33% respectively (Table 5). This study was designed to express the production efficacy depending on biosecurity practices. There was no access control for people entrance in the 69.05% farms on the contrary 30.95% farms were no access of people (Table 6). Vehicles can't enter inside in 38.10% farms on the contrary 61.90% farms allowed to the vehicle (Table 7). In 61.90% farms, were not opportunities for disinfection of imported materials which will be used in farms while 38.10% farms had this facilities partially (Table 8). Surrounding fences for security was found in 64.29% farms so that animals can't enter into the farms on the other hand 35.71% had no fences around the farms (Table 9). There was no evidence for footbath on farm entering gate to avoid infectious diseases, that's why infectious diseases were high in the studies poultry farms.

Table 10: Different clinical diseases among studied poultry farms

Disease	No. of farms	Percentage (%)	95% Confidence Interval
Ascitis	4	9.52	0.03- 0.23
Cannibalism	5	11.90	0.04- 0.26
Coccidiosis	4	9.52	0.03- 0.23
Gamboro	10	23.81	0.13- 0.41
Heat Stroke	6	14.29	0.05- 0.29
Mycoplasmosis	3	7.14	0.01-0.19
Ranikhet	6	14.29	0.05- 0.29
Salmonellosis	1	2.38	0.006- 0.13
Colibacillosis	3	7.14	0.01-0.19

Table 11: Mortality rate in different studied poultry farms

Mortality rate (%)	No. of farms	Percentage (%)	95% Confidence Interval
≤ 1	18	42.86	0.28- 0.59
1.01-4	13	30.95	0.18- 0.47
≥ 4	11	26.19	0.14- 0.42

The following study also showed different types of diseases incidence in farms. Among the diseases, Gamboro (23.81%) was the most susceptible and followed by Salmonellosis (2.38%), Ranikhet (14.29%), Heat Stroke (14.29%), Coccidiosis (9.52%) (Table 10). In 42.86% farms were found equal less than 1% mortality. Besides, 26.19% farms were shown more than 4% mortality (Table 11).

The study was designed to express the impact of biosecurity on poultry production and related to infectious diseases such as Ranikhet, Gamboro, Coccidiosis, Salmonellosis etc. Biosecurity plays a key role to prevent infectious diseases in poultry farms. The study recorded 23.81% Gamboro (Infectious Bursal Disease) disease was found. Ahmed (2009) reported that Gamboro disease incidence was 11.06% in Gazipur, Bangladesh. Uddin (2010) reported that 24.92% Gamboro disease was found in Narsingdi, Bangladesh. Chakma (2015) reported that Infectious Bursal Disease was found in Feni 10.03%, Cumilla 10.04%, and Chattogram 10% respectively. The study revealed that the prevalence of Ranikhet was 14.29% in study area. The findings support the report of Uddin (2010) who exposed that 8.92% Ranikhet disease was found in Narsingdi, Bangladesh. Saleque (2003) reported 8.8% Ranikhet disease was found in Gazipur, Bangladesh. Giasuddin (2002) and Hassan (2016) reported 8.87% Ranikhet was found in broiler and 14.28% Ranikhet was found in cockrel. The study recorded 9.52% Coccidiosis was found in study area. Rahman (2017) reported 6.6% Coccidiosis was found in poultry in Gazipur, Bangladesh. Talukdar (2017) reported 16.67% Coccidiosis found in Sonali in Bogra, Bangladesh. Hossain (2004) reported that 10.70% Coccidiosis recorded in Rajshahi, Bangladesh.

The study recorded 30.95% poultry farms established within residence and 14.29% poultry farms established more than 10 meter far away from residence were facing infectious diseases. Abdalla (2016) reported that 39.8% farms were established > 50 meter besides 60.38% farms were < 50 meter far away from residence out of 43 farms in Sudan. The following study showed that 61.90% farms were no dedicated shoe for entrance and footbath was completely absent in entrance gate for disinfection of shoes. Racicot (2012) demonstrated that 85% farms were footbath on entrance for disinfection and > 90% farms were plastic boots for workers and visitors. The study recorded that 69.05% farms were no access control system for entrance of people along with 38.10% farms were no entrance access of vehicles inside the farms. Abdalla (2016) reported 61.10% farms were no access of vehicle and 84.32% farms were no access of people inside the poultry farms. The following study showed only 36.71% farms were surrounding fences for protection from wild birds and predators. Rimi (2017) reported access control from visitors and surrounding protection from human and animals reduces more than 80% infectious diseases.

Conclusion

Poultry industry is one of the important industries in Bangladesh in terms of employment creation and source of protein supply at cheaper rate for the nation. Besides it is a great opportunity for the rural people and youth as a means of income generation. Socioeconomic development might be achieved with the help of household and commercial poultry farming. But farmers are fallen into loss due to poor management practices. The present baseline investigation shows a clear status of the level of poor biosecurity practices among the small and medium scale poultry farms of the study area. The findings of this study would help designing a practicable biosecurity model for the small and medium scale poultry farms of Bangladesh.

Limitation

There were some limitations in the study. The study area was restricted to a particular district, for this reason the study findings may not reflect the whole country. There was absence of recording system in poultry farms under study as a result it was difficult to select valid data. Some of the farmers were not cooperative to give information.

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