

*Article*

**Assessment of present bio-security practices in live poultry markets in some selected areas of Bangladesh**

Mohammed Sirajul Islam<sup>1</sup>, Md. Yousuf Ali<sup>1\*</sup>, Md. Humayun Kabir<sup>1</sup>, Md. Obayed Al- Rahman<sup>1</sup>, Most. Sumona Akter<sup>2</sup>, Md. Rezaul Karim<sup>1</sup>, Khandoker Touhidul Islam<sup>1</sup> and Md. Kamrul Hasan Majumder<sup>3</sup>

<sup>1</sup>Bangladesh Livestock Research Institute, Regional Station, Baghabari, Shahjadpur, Sirajgonj, Bangladesh

<sup>2</sup>Department of Livestock Services (DLS), Dhaka, Bangladesh

<sup>3</sup>Bangladesh Livestock Research Institute, Savar, Dhaka-1341, Bangladesh

Corresponding author: Md. Yousuf Ali, Bangladesh Livestock Research Institute, Regional Station, Baghabari, Shahjadpur, Sirajgonj, Bangladesh. E-mail: 113yousuf.bau@gmail.com; myousuf@blri.gov.bd

Received: 07 August 2016/Accepted: 23 August 2016/ Published: 31 August 2016

**Abstract:** A study was conducted to assess the existing bio-security practices in different live poultry markets in some selected areas of Bangladesh such as Dhaka City Corporation, Sirajgong Sadar and Sahjadpur Upazila from January 2015 to May 2015 using semi-structured and pre-tested questionnaire along with observation. A total number of one hundred twenty (120) respondents were purposively selected from the above mentioned locations. Forty (40) respondents were selected involved in live bird market and information collected from each area of markets to know the different contributing factors of live bird market bio-security situation through personal interviewing method. The results of the present study reveals that around seventy one percent (71%) live bird's sellers used different type's drugs to keep their birds sound and alive until sold out all birds. This study noticed that more than 71 percent respondents did not dispose the dead birds scientifically. The survey result showed that about fifty percent (50%) respondents used separate dress during working period at their sale centers. It was also observed that 87 percent respondents did not use commercial disinfectant to clean their dressing materials. Further it is noted that the sanitary and hygienic practices of the most live poultry sale centers were poor. This study clearly revealed that there was a high risk of disease transmission and dissemination both to poultry and human beings due to poor bio-security of live poultry markets in the study areas. It could be concluded that immediate necessary steps need to be undertaken by the government and other regulatory organizations to improve the live bird market situation for ensuring the safe poultry meat in the country.

**Keywords:** bio-security; live poultry; market; hygienic practices

## **1. Introduction**

Poultry is one of the most important fastest growing agricultural sectors in Bangladesh. Chicken and ducks population are 259.42 and 48.05 million, respectively (BER, 2014). Total investment approximately US\$2 billion in the poultry sector of Bangladesh where about 50 million people directly involved in it (Samad, 2005). About 38 percent animal protein comes from poultry eggs and meat in Bangladesh (FAO, 1999). Akbar and Hossain (2015) reported that per capita consumption poultry eggs and meat increased significantly over the last two decades compared to beef and mutton consumption. Needless to say that increasing trend of consumption of meats and eggs need to continue in future for exploring our country into a developed country by 2041. However, marketing system of poultry and its products are almost still traditional in the country. Live bird (LB) markets are the essential places for marketing the poultry in all over the country of Bangladesh. As LB markets always represent a significant health hazards to both consumers and sellers by disseminating diseases in relatively short

period of time (FAO, 2007). Hence, bio-security and hygienic measures are the crucial elements to prevent and control the infectious diseases of poultry (Babiker *et al.*, 2009).

LB markets are the key mixing points of different poultry species with various diseases. It is the most fertile sites of disease producing organisms as well as transmissions of infectious diseases in animals and humans (Wan *et al.*, 2011). Slaughter of birds, selling sick birds and poor disposal system are particularly associated with contamination of LB markets environment for spreading infectious disease viruses like avian influenza and Newcastle disease virus. Recently, detection of Newcastle disease virus and avian influenza virus in different poultry species in LB markets in Uganda reported by (Kirunda *et al.*, 2014). Bio-security and hygienic practices in LB markets are key strategies to reduce the spread of any diseases from birds to humans (Honhold *et al.*, 2008; FAO, 2010).

Bio-security of live bird markets is very much important in connection to maintain health hazards in humans. Poultry handling is the emerging issue along with bio-security measure in LB markets. Birds and livestock are responsible to transfer zoonotic diseases in humans. Animal food from poultry sources should be free from any disease causing agents to ensure public health (Sharma, 2010). Key factors of bio-security are segregation, cleaning and disinfection. Bio-security covers a broad range of measures. Good bio-security practices significantly prevent the introduction, replication and spread of the risk of disease producing organisms (Firman, 2008; Fox, 2012). In relation to bio-security, special attention has to give in LB markets to prevent and control the spread of infectious poultry diseases especially during the outbreak of emerging and re-emerging diseases. But there is no information about current bio-security practices in live poultry markets in Bangladesh. Therefore, this study was undertaken with the objective to assess the existing bio-security practices in different live poultry markets in some selected areas of Bangladesh.

## **2. Materials and Methods**

### **2.1. Location of study areas**

The study was conducted in different live poultry markets in separate three locations of Bangladesh such as Dhaka City Corporation, Sirajgong Sadar and Sahjadpur Upazila from January 2015 to May 2015. Different live poultry markets at Uttara, Khilkhet, Mohakhali and Malibag under Dhaka City Corporation, Chatal bazar, mesua bazaar and baro bazaar under Sirajgong sadar and Putazia, Baghabari and Dilruba under Sahjadpur Upazila were purposively selected for this study.

### **2.2. Questionnaire preparation**

A standard semi-structured questionnaire was prepared based on mixing of different poultry species and batches, cleaning practices, use drugs against various diseases and environmental factors associated with bio-security in LB markets. Emphasize were focused on using separate dress, hand gloves, mask during selling slaughtering, eviscerating and cleaning activities, selling systems of birds, causes of mortality, measures on sick bird, dead bird disposal system, waste materials disposal system, sources of fresh water for drinking or cleaning and hot conception for dressing works etc in relation to bio-security condition in LB markets. Furthermore, different problems in LB markets like space, parking areas, drainage system, obstacles of disposal system, threats of flies or rats, lack of fresh and hot water, hand wash by soap before and after works, spray of disinfectant mixing water etc were also considered for making the semi-structured questionnaire. Single and multiple responses questions were considered for preparing the questionnaire. Before doing survey, the semi-structured questionnaire was pre-tested in the respective live bird markets for finalizing prepared questionnaire.

### **2.3. Questionnaire survey**

A total number of one hundred twenty (120) respondents were purposively selected from three locations. A total of forty (40) respondents were surveyed in each different live bird market to know the different contributing factors of live bird market bio-security situation. Data were collected by face to face interviewing method. Before collecting information, the semi-structured questionnaire was pre-tested in the respective LB markets for finalizing prepared questionnaire.

### **2.4. Observational study**

It was conducted by visiting directly the live poultry markets and collecting information on existing bio-security situation.

### 2.5. Statistical analysis

Collected data through survey under this study were coded, compiled, tabulated and analyzed by Descriptive statistical analysis through Microsoft Excel. A total of bio-security measures were calculated and expressed as frequencies and percentages.

### 3. Results and Discussion

Current bio-security practices in the live bird (LB) markets to prevent disease outbreak are shown in Table 1. This study reveals that about 68 percent respondents have no training on live bird managements in the sale centers. It was found from the present study that about 95 percent respondents were kept birds of different poultry species in the same house for selling which clearly indicates poor bio-security of live birds markets. Mixing of different poultry species from various areas with their individual health problems makes fertile ground of disease producing organisms reported by Grandin, 2000 and Mullaney, 2003. The results of the present study almost similar with the findings of Halid *et al.*, 2014 who reported that 86.1 percent different species of birds were sold together from the same place. It was found that almost 75 percent respondents were confined their birds together of new and old batches in the same cage/box/ground. Around seventy one percent (71%) live bird's sellers used different type's drugs to keep their birds sound and alive until sold out all birds (Table 1). Either single points or combined points demonstrated poor bio-security situation in LB markets by the current study. The present findings were mostly agreed with the results reported by Halid *et al.* 2014, Shewantasew *et al.* 2012 and Wssene, 2006).

Existing bio-security practices in live bird markets relating to sources of water, causes of mortality, sick birds, dead birds and types of sale birds are demonstrated in Table 2. It was found that there were 57.50, 19.20 and 23.33 percent respondents used tube well, pond and water tape, respectively as the source of fresh water for drinking and cleaning works as a source. It also revealed that 38.33, 26.67 and 17.50 percent respondents were used gas cylinder, electric heater and kerosene stove, respectively to make hot water for dressing works. Sixty five percent respondents claimed that diseases were the major causes of mortality of birds in the LB markets followed by stresses (22.25%) and others (12.50%), respectively (Table 2). The study revealed that only more than nine percent respondents isolated their sick birds while more than ninety percent respondents measured their sick birds by selling and slaughtering. Table 2 showed that around thirty percent respondents scientifically disposed the dead birds through buried in ground whereas 49.17 and 21.67 percent respondents disposed the dead birds by throwing in the open field and selling for fish feed, respectively. Almost one-third respondents sold live birds against birds were sold by hand dressing and machine dressing (Table 2). About eighty eight percent respondents cleaned their slaughtering spaces and materials daily compared to clean in thrice and twice in a week, respectively. Sick birds always have a high risk of disseminating the highly contagious pathogens from poultry to human. The present study revealed that more than ninety percent sick birds were sold and slaughtered that clearly expressed the poor bio-security situation of live bird markets under the study areas. Almost quite similar results reported by Wosseene, 2006 and Shewantasew *et al.*, 2012 who demonstrated that selling of sick birds having the highest chance of diseases transmission. This study noticed that more than 71 percent respondents did not dispose the dead birds scientifically which is fully against the Terrestrial Animal Health Standards Commission Report on Bio-security Procedures in Poultry Production (OIE, 2009).

Existing cleanliness practices in relation bio-security in studied live birds markets are demonstrated in Table 3. About eighty seven percent respondents did not wash their dressing equipments using commercial disinfectant daily (Table 3). Less than fifty percent respondents were used separate dress whereas only around thirty and three percent respondents used mask and hand gloves, respectively during selling, slaughtering, de-feathering, eviscerating and cleaning works showed by Table 3. In relation to proper bio-security measures, about one-third respondents did not wash their hand by soap after catching, slaughtering and dressing working and going to home at the end of a day. For hygienic aspects of view, more or less than seventy four percent did not have any kind of protective measures to control flies and rats in their live birds markets. It was obtained from the current study that about sixty four percent respondents were not used to clean waterer with disinfectant mixing water daily for ensuring better health of poultry birds in their LB markets. This study also revealed that approximately seventy three percent respondents did not spray disinfectant mixing water in the sale centers and its premises to keep pathogen free environment. All factors mentioned in Table 3 were not obtained the satisfactory level with bio-security aspects.

Existing problems associated with bio-security in live bird markets are shown in Table 4. Ninety five percent respondents claimed the shortage of appropriate spaces for smoothly operating their business. Crisis of fresh water for dressing the slaughtered birds as well as cleaning the dressing equipments, slaughtering materials, feeder, water pot, slaughter places etc were reported by about three quartered respondents. About sixty percent

respondents did not dispose properly all kinds of waste materials like litter, viscera, feathers, blood etc due to the deficiency of suitable drum/dustbin/spaces. Lack of appropriate drainage system and threats of flies and rates were claimed by almost same percent respondents in the studied areas (Table 4). More than seventy seven percent respondents did not take any kind training on bio-security in live birds markets. Scarcity of sufficient gas and electricity in LB markets were reported by more than forty eight percent respondents. Considering aforesaid single or combined problems of live birds markets, it's very clearly seen to maintain good bio-security in connection of poultry food safety and security issues.

**Table 1. Present bio-security practices in LB markets to prevent disease outbreak (N=120).**

Points	Frequency	Percentage
Have training on live birds management in markets	39	32.50
Different poultry species kept in the same house	113	94.17
New and old batches kept in the same cage/box/ground	89	74.17
Duck and chicken always kept in separate cage /box	116	96.67
Use specific dustbin for disposing blood, viscera and feathers	69	57.50
Use different types drugs to alive birds	85	70.83

**Table 2. Existing bio-security practices in LB markets in the studied areas (N=120).**

Points	Frequency			Total (%)
Sources of fresh water for drinking and cleaning	Tube well 69(57.50)	Pond 23(19.20)	Water tape 28(23.33)	120 (100)
Sources of hot water for dressing work	Gas cylinder 46(38.33)	Electric heater 32(26.67)	Kerosene stove 21(17.50)	120 (100)
Causes of mortality of birds in LB markets	Diseases 78(65.00)	Stresses 27(22.25)	Others 15(12.50)	120 (100)
Measures of sick birds	Sales 86(71.67)	Isolation 11(09.20)	Slaughter 23(19.20)	120 (100)
Disposal system of dead birds	Throwing 59(49.17)	Buried 35(29.16)	Sale for fish feed 26(21.67)	120 (100)
Types of sale birds	Hand dressed 49(40.83)	Machine dressed 32(26.67)	Live bird 39(32.50)	120 (100)
Cleaning of slaughtering spaces and materials	Daily 105(87.50)	Thrice a week 11(09.17)	Twice a week 04(03.33)	120 (100)

Values in first brackets shows percentage

**Table 3. Existing cleanliness practices in relation to bio-security in studied LB markets.**

Points	Frequency		Total percentage
	Yes	No	
Do you wash dressing equipments by using commercial disinfectant daily?	16(13.33)	104(86.67)	120(100)
Do workers use separate dress during slaughtering, de-feathering and eviscerating of birds?	59(49.17)	61(50.83)	120(100)
Do workers always use mask during slaughtering, de-feathering and eviscerating of birds?	16(13.33)	104(86.67)	120(100)
Do workers use hand gloves during slaughtering, de-feathering and eviscerating of birds?	03(2.50)	117(97.50)	120(100)
Do workers wash their hands by soap after each dressing?	77(64.17)	43(35.83)	120(100)
Do workers wash their hands by soap before going out?	81(67.50)	39(32.50)	120(100)
Have any protective measures to control flies/rats?	32(26.67)	88(73.33)	120(100)
Do they clean waterer with disinfectant mixing water daily?	44(36.67)	76(63.33)	120(100)
Do they spray regularly disinfectant mixing water?	33(27.50)	87(72.50)	120(100)

Values in first brackets shows percentage

**Table 4. Existing problems associated with bio-security in LB markets.**

Problems in LB markets	Frequency	Percentage
Lack of spaces for sale center and van parking,	114	95.00
Lack of fresh water for dressing and cleaning	89	74.20
Lack of dustbin/drum /space for keeping waste materials	71	59.20
Lack of appropriate drainage system	69	57.50
Threats of flies and rats in LB markets	68	56.67
Lack of training on bio-security of live birds markets	93	77.50
Lack of sufficient gas/electricity	58	48.33

#### 4. Conclusions

From the findings of the present study revealed that there was a high risk of diseases transmission and dissemination both to poultry and human beings due to poor bio-security of live poultry markets in the study areas. It could be concluded that immediate necessary steps need to be undertaken by the government and other regulatory organizations to improve the live bird market situation for ensuring the safe poultry meat in the country.

#### Acknowledgements

The author felt proud to express his deepest sense of gratitude and profound appreciation to all the associated author for their scholastic and constructive thinking, sharing of experienced during survey and generous help in carrying out of the research work.

#### Conflict of interest

None to declare.

#### References

- Akbar MA and MM Hossain, 2015. Role of livestock and poultry in food and nutrition security: Reference Bangladesh. 9<sup>th</sup> Biennial Conference and International Seminar 2015 on 10-11 December, 2015 at KIB, Dhaka-1215 organized by BAHA. pp. 55-65.
- BER, 2014. Bangladesh Economic Review 2014.
- FAO (Food and Agricultural Organizations of the United Nations), 1999. Bio-security for highly pathogenic Avian Influenza. Room, Italy.
- FAO (Food and Agricultural Organizations of the United Nations), 2007. The importance of bio-security in reducing HPAI risk on farms and in markets. Proceedings of the International Ministerial Conference on Avian and Pandemic Influenza, December 4-6, 2007, New Delhi.
- FAO (Food and Agricultural Organizations of the United Nations), 2010. Integrated National Plan for highly pathogenic Avian Influenza. Animal Health and Livelihood Sustainability Strategy, Arab Republic of Egypt.
- Firman JD, 2008. Bio-security for small flock owners. *Avian Dis.*, 31: 560-563.
- Fox JQ, 2012. Bio-security in Avian Influenza Control Retrieved from <http://en.engomix.com/MA-poultryindustry/health/articles/bio-security-avian-influenza-contro-12402/165-po.htm>.
- Grandin T, 2000. *Livestock Handling and Transporting*. CAB International, Wallingford, UK.
- Honhold NA, Mcleod and S Satyajit, 2008. Bio-security for highly pathogenic Avian Influenza. *Issues and Options*, FAO, Room, Italy, available at: <http://www.fao.org/ag/subjects>.
- Halid K, K Hannah, B Achilles, M Edison, B Josephine, L Lukwago, M Millard, WM Fred and KB Denis, 2014. Poor bio-security in live bird markets in Uganda: A potential risk for highly pathogenic avian influenza disease outbreak in poultry and spread to humans. *International Journal of Public Health and Epidemiology*, 3: 67-74.
- Mullaney R, 2003. Live bird market closure activities in the Northeastern United States. *Avian Dis.*, 47: 1096-1098.
- OIE, 2009. *Terrestrial Animal Health Standards Commission Report on Bio-security Procedures in Poultry Production* (OIE, 2009).
- Shewantasew M, B Melese, S Mesfin and B Mihreteab, 2012. Assessment of bio-security situation and practices in live poultry markets of Addis Ababa, Ethiopia. *Asian Journal of Animal and Veterinary Advances*, 7 : 427-433.
- Samad MA, 2005. *Poultry Science and Medicine*. Lyric – Epic Prokasoni, BAU, Mymensingh, p.769
- Sharma B, 2010. Poultry Production, Management and Bio-security measures. *J. of Agric. Environ. Res.*, 11: 120-124.
- Wossene A, 2006. *Poultry Bio-security study in Ethiopia*. A consultancy report for food and Agriculture Organization of the United Nations.