



## KNOWLEDGE, ATTITUDES AND PRACTICES ON BIOSECURITY OF WORKERS IN LIVE BIRD MARKETS AT MYMENSINGH, BANGLADESH

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### ABSTRACT

An understanding about knowledge, attitudes, and practices of poultry workers mainly on biosecurity regarding avian influenza was assessed in Live Bird Markets (LBMs) at urban and periurban areas at Mymensingh district, Bangladesh. Three hundred and eighteen workers were interviewed confidentially in their workplace using a structured pretested questionnaire regarding demographics, knowledge of transmission and prevention of avian influenza, attitudes toward this disease, precautions at work, sources of information and pattern of selling birds and cleanliness. The majority was male and Muslim of average aging 35 years. About half the respondents had attended up to primary school and below one-third were illiterate. Most of them (84% and 77% in urban and periurban LBMs, respectively) had knowledge about avian influenza and they gathered knowledge through the mass media, and about 59.32% and 32.20% LBM workers of urban and periurban correspondingly agreed that avian influenza is a serious but preventable disease. Knowledge about mode of transmission, source of infection and preventive practices varied greatly. About 57.16% urban and 78.97% periurban LBM workers washed their hands with soap as a preventive measure. Conversely, One-third (77.62%) urban and nearly half (44.06%) periurban LBM workers cleaned the stalls or cages daily and more percentage of respondents used water as a cleaning material. Selling of mixed birds is a more common practice in urban LBMs than that of periurban. Therefore, a concerted effort is required to enhance knowledge and change the behavior among those most at risk in low-income countries and the precautions necessary to avoid spreading the virus among poultry and humans.

**Keywords:** biosecurity, avian influenza, live bird markets, urban, periurban.

### INTRODUCTION

Avian influenza, commonly known as bird flu, one of the most serious health threats today (WHO, 2005) is an infectious disease of birds caused by influenza virus type A (Ergin, 2006). It has imposed serious threat for the growing poultry industry of Bangladesh with a risk of affecting humans. Domestic poultry are highly vulnerable. In its highly pathogenic form, the disease is extremely contagious and mortality in poultry can approach 100%. The disease is an agricultural disaster that can wreck local economies. Avian influenza a virus subtype H5N1 has caused many human fatalities and continues to pose an increasing pandemic threat (WHO, 2005). Human cases of avian influenza result from contact between humans and infected poultry, and to date in Bangladesh, there has been one confirmed case of avian influenza A (H5N1) reported to WHO (2008). This virus can be transmitted if a person has direct contact with infected poultry or surfaces and objects contaminated by poultry droppings (WHO, 2005). Live bird markets (LBMs) are essential for marketing poultry in many developing countries, and they are a preferred place for many people to purchase poultry for consumption throughout the world. Live bird markets have been linked with many outbreaks of avian influenza internationally (Cardona *et al.*, 2009; Ming *et al.*, 2006). The LBMs provide optimal conditions for the zoonotic transfer and evolution of infectious disease agents. Traditional Asian wet markets provide major contact

points for people and live animal mixing, making them important potential sources of viral amplification and infection (Feilding *et al.*, 2005; Capua *et al.*, 2006).

In our country significant numbers of people in both urban and periurban locations are entirely dependent on live bird marketing. The interaction of humans with poultry in these settings provides considerable risk of exposure to virus. The likelihood of transmission risk to human populations is unknown and needs to be assessed. Therefore, this study has been conducted to obtain an in-depth understanding of Knowledge, Attitude and Practices (KAP), mainly on biosecurity of the poultry workers of Live Bird Markets.

### MATERIALS AND METHODS

A cross-sectional survey was conducted from January 2008 to March 2009 at Mymensingh district. The study was employed using a pretested structured questionnaire. A total of 318 respondents in LBMs were interviewed. Among them, 159 respondents of LBMs were of urban and 159 were of periurban areas. The workers were interviewed confidentially in their workplace regarding demographics, knowledge of transmission and prevention of avian influenza, attitudes toward this disease, precautions at work, and sources of information pattern of selling birds and cleanliness. All interviews were undertaken on spot in the Live Bird Markets. Using the questionnaire, information about demographics, work



activity, knowledge of the transmission and prevention of avian influenza, attitudes towards the disease, and compliance with precautions at work were obtained from each participant. After data entering into a computer, frequencies were obtained for all variables.

## RESULTS AND DISCUSSIONS

### Socio-demographic status of the respondents of LBMs

The demographics data of the respondents both in urban and periurban live bird markets indicated that they were generally young adults (average 35 years) and the majority was male which is consistent with the findings of Akinola and Mobolaji (2008) and Fawole (2006) who reported an average age of respondents was 30 years and 36 years, respectively. About half of the respondents had attended upto high school and below one-third were illiterate which is corresponds the findings of Abbate *et al.*, (2006) who reported that one third of the workers had a high school or college education. Akinola and Mobolaji (2008) observed in their survey that the majority (70%) of respondents had attended at least a high school. Almost all the LBM workers were of religion of Muslim except a few (3.39-6.78% of religion of Hindu) both in urban and periurban localities (Table-1).

**Table-1.** Socio-demographic status of the respondents of LBMs.

Indicators	Urban (%)	Periurban (%)
<b>Gender</b>		
Male	96.61	98.30
Female	3.39	1.69
<b>Age</b>		
<20 yrs	10.17	8.47
20-29 yrs	28.81	32.30
30-39 yrs	40.67	35.59
40+ yrs	20.38	23.72
<b>Education level</b>		
Illiterate	23.72	28.81
Primary level	15.25	16.94
High School level	54.23	45.76
Higher Secondary level or above	6.77	8.47
<b>Religion</b>		
Muslim	96.61	93.22
Hindu	3.39	6.78
Other	0.00	0.00

### Knowledge of the studied population about avian influenza

Table-2 indicates knowledge and idea of LBM retailers about avian influenza. About 84% retailers of urban and 77% retailers of periurban LBMs had idea about AI in birds. Among them, the greatest number of respondent stated that AI means bird flu which comprises of about 41% in urban and 34% in periurban LBMs workers. They gathered this knowledge of AI through different ways. About half (45%) and one-third (36%) retailers in urban and periurban LBMs respectively stated that they gathered knowledge about avian influenza or bird flu through mass media (Table-2) such as T.V., Newspaper etc. followed by buyers and own experience. Abbate *et al.*, (2006) conducted a study in Italy on knowledge, attitudes, and practices of avian influenza, and found that the most common sources to gather knowledge about AI were mass media (91.8%), health professionals (47.5%), and employers (6.2%). Akinola and Mobolaji (2008) conducted a survey where nearly all the respondents (92.9%) had heard about avian influenza infection; with the majority (74.3%) reporting mass media (television, radio and newspapers) as their main source of information.

WHO (2005) also agrees that a strong, unfulfilled need for public awareness about bird flu is evident in Asian countries. Control strategies require public awareness for success. Workers in the poultry industry, who commonly have contact with live, sick, or dying poultry, are at high risk for avian influenza. These workers are at increased risk because of food handling and preparation of raw poultry meat and products. Concern exists that avian influenza could be transmitted from uncooked birds or bird products to humans (Bridges *et al.*, 2002; Swayne, 2006). Majority workers of LBMs (85% and 77% in urban and periurban respectively) had the knowledge of transmission of AI where maximum percentage retailers of urban (91%) and periurban (68%) LBMs mentioned direct contact with infected birds as a source of infections. For direct contact with infected areas/cages, the number of respondents was second maximum for both markets (87% in urban and 90% in periurban localities). However, the percentage of the workers those had the conception of mode of transmission was infected vehicle was the lowest. Improving knowledge of transmission is a useful public health strategy for reducing the effects of avian influenza in poultry workers (Abbate *et al.*, 2006).

**Table-2.** Knowledge about avian influenza of the studied population.

Question	Knowledge	Urban (%)	Periurban (%)
<b>Have any idea about flu in birds/chickens/ducks?</b>			
	Yes	83.05	76.27
	No	16.95	23.73
<b>If yes, what type of flu?</b>			
	Virus contaminated flu	15.25	6.77
	Bird flu	40.67	33.89
	Catch cold (common cold)	18.64	33.89
	Normal fever/flu	8.46	1.69
	Confused about type	16.98	23.76
<b>How did you come to know about highly pathogenic avian influenza (HPAI)?</b>			
	Through other business man	4.08	13.32
	From buyers	26.53	26.66
	Through media (TV, Radio, Newspaper, poster, Leaflet)	44.89	35.54
	Own experience	16.32	17.77
	From veterinarian	8.18	2.22
	Other sources	0.00	4.49
<b>Knowledge about transmission of HPAI (From bird to human body)</b>			
	Yes	84.75	76.27
	No	15.25	23.73
<b>Knowledge about sources of infection of the target groups</b>			
Direct contact with infected poultry	Yes	90.5	67.8
	No	9.5	32.2
Direct contact with areas or cages where infected poultry have been kept	Yes	86.4	89.7
	No	13.6	10.3
Through the air	Yes	64.6	36.9
	No	35.4	63.1
Through water supply	Yes	62.9	57.8
	No	37.1	42.2
Through contaminated transporter (e.g. rickshaw, truck, bus etc)	Yes	60.4	25.3
	No	39.6	74.7

#### **Knowledge about protective measures for reducing the risk of transmitting highly pathogenic avian influenza (HPAI)**

Biosecurity is an extremely important safety measure. Indeed, the lack of biosecurity on many farms is a key factor behind the persistence of bird flu (WHO, 2005). Knowledge about biosecurity is very much essential to reduce the chance of transmission of transmissible diseases. The result of Table-3 explained that more than half (60%) and one-third (33%) of urban and periurban LBM workers respectively thought that

avian influenza is a serious disease but can be prevented by taking preventive measures. This scenery is almost similar in everywhere of Bangladesh but in Italy, most poultry workers believed that avian influenza was a serious (69.7%) but preventable (70.8%) disease (Abbate *et al.*, 2006), which corresponds to this study. Surprisingly, almost three-fourth LBM workers of periurban localities were unaware about the preventive measures for reduction of the risk of HPAI transmission. Regarding preventive measures, the highest number of respondents (57.16% in urban and 78.97% in periurban



areas, respectively) used soap for washing hands. In addition, respondents also used facemask (about 23% and 11% in urban and periurban areas, respectively), disinfectant spray (17% for urban areas) and own towel (almost 3% and 6% in urban and periurban areas, respectively). Akinola and Mobolaji (2008) conducted a survey where the majority (81.4%) reported always washing their hands and only 11.4% reported that they

always used a facemask as preventive measure to protect the transmission of avian influenza which was consistent to the present study. Though the LBM workers took different protective measures to prevent the transmission of avian influenza, awareness of avian influenza infection was not satisfactory among the poultry workers studied here.

**Table-3.** Knowledge on protective measures for reducing the risk of transmitting highly pathogenic avian influenza (HPAI).

Indicators	Urban (%)	Periurban (%)
<b>Knowledge on protective measures for reducing the risk of transmitting HPAI</b>		
Yes	59.32	32.20
No	40.67	71.19
<b>Protective measures taken usually</b>		
Use mask	22.86	10.53
Use own towel	2.85	5.25
Use disinfectant spray	17.13	0.00
Use soap while washing hands	57.16	78.97
Others	0.00	5.25

#### **Practices on selling live and sick birds and average time of stalling the birds**

Mode of selling birds varies in different localities. The various modes of selling birds are adopted according to demand. In this study, the most of the retailers (about 58%) of urban areas used to sell different species of birds (e.g. broiler, layer, duck, pigeon etc.) together which matches with the result obtained by other authors (Webster, 2004; Choi *et al.*, 2005; Lau *et al.*, 2007). On the other hand, in periurban areas, maximum number of retailers (44%) inured to sell single species of birds. In urban LBMs, the unsold birds/chickens were

remained in the stall for highest 2 days while in periurban areas the greatest duration was 3-7 days.

Selling of sick birds/poultry is very common practice in urban and periurban LBMs in our country. Majority of retailers (about 58% in urban and 49% in periurban markets) sold sick birds. Almost 4% retailers of urban markets returned sick birds to the farm but for periurban LBMs this figure increased three times. Moreover, only 10% (urban) and 25% (periurban) LBMs retailers were used to provide medication to the sick birds and 15-17% retailers both markets slaughtered and consumed ill birds (Table-4).

**Table-4.** Practices on selling, average time of the birds remaining in the stall, frequency of cleaning the cages.

Indicators	Urban (%)	Periurban (%)	
<b>Selling of live birds</b>			
Broiler	33.90	54.23	
Cockerels	3.39	1.69	
Layer	0.00	0.00	
Duck	5.08	0.00	
Broiler/layer/duck/pigeon/native chickens	57.63	44.08	
<b>Average time of remaining birds in the stall</b>			
1 day or less	27.11	23.72	
2 days	52.54	35.59	
3-7 days	15.25	38.98	
More than 7 days	5.08	1.69	
More than 2 weeks	0.00	0.00	
<b>Practices on selling of sick birds</b>			
Birds are accepted in the market for sale even if sick	Yes	57.62	49.15
	No	42.38	50.85
Returned to the farm	Yes	3.39	15.25
	No	96.61	84.75
Provide medication	Yes	10.17	25.42
	No	89.83	74.58
Slaughtered and consumed by the vendors or family	Yes	15.25	16.94
	No	84.75	83.06

#### Frequency of cleaning the stalls or cages and material used for cleaning

Cleaning of cages and surroundings are very important factor from biosecurity practices because bird, excreta and garbage attract the wild animals and birds. Confining the birds in restrictive multistage cages (Senne *et al.*, 2003; Fielding *et al.*, 2005) and feathers, feces, as well as, blood and intestines soiled and contaminate the market which help in spreading the virus into the markets (Parry, 2003). The highest number of retailers both in urban (78%) and periurban (45%) LBMs cleaned their cages on daily basis rather than weekly and monthly. A variety of chemicals including water is used for cleaning. Among these water only was used by most of the retailers (33-36%) of both markets following using soap and water (about 24% and 29%), water wash and dusting (21% and 14%) and disinfectant (11.86% and 13.56%) to clean the stalls or cages in urban and periurban LBMs respectively (Table-5). Based on these findings retailers should be encouraged to continue the practice of cleaning the stalls and cages daily. Proper orientation on hygienic cages, and cleaning the stalls and cages could be an intervention to stop the propagation of virus.

**Table-5.** Frequency of cleaning the stalls or cages and material used for cleaning.

Indicators	Urban (%)	Periurban (%)
<b>Frequency of cleaning stalls and cages or pens</b>		
Not required to clean	3.39	5.08
Clean daily	77.62	44.06
Clean weekly	11.42	42.37
Clean monthly	3.39	5.08
Whenever gets dirt	4.16	3.39
<b>Materials used for cleaning stalls and cages or pens</b>		
Water only	33.89	35.59
With soap and water	23.72	28.81
Use disinfectant	11.86	13.56
Sweep/dusting only	10.20	8.47
Water wash and dusting	20.33	13.57

#### CONCLUSIONS

In conclusion, this study has identified gaps in the knowledge and preventive practices among LBMs workers. For narrowing the gaps in knowledge and to avoid spreading the avian influenza virus among poultry and humans, effective and coordinated information about



avian influenza and taking the necessary precautions are essential. It is suggested that compliance with preventive measures may be enhanced through behavioural modification and building awareness through communication programs to the live bird market workers.

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