Bulletin of High Institute of Public Health
Vol. 39 No.4 [2009]

Avian Flu: Knowledge of Primary Health Care Centers Attendees in Al-Khobar City, Eastern Saudi Arabia

Amr Ahmed Sabra*, Attia Z. Taha**, Magdy A. Darwish**

Abstract: Background: Avian influenza is considered as a global health problem. Knowledge of the people about avian flu is important to implement different prevention and control measures and to raise the level of their awareness. **Objective:** was to assess the level of knowledge about avian flu among Primary Health Care Centers (PHCCs) attendees, and to determine possible associations between knowledge and some socio-demographic characteristics. **Methods:** This was a cross-sectional study conducted in two randomly selected PHCCs in Al-Khobar city, Kingdom of Saudi Arabia (KSA) during 2009. The total sample size was 1420 persons. Data collection was accomplished through using an interviewer-administered questionnaire which was composed of 2 main parts atttendees' socio-demographic characteristics and knowledge questions. The total knowledge score was divided into 2 equal categories: poor and good knowledge. Descriptive statistics, Chi-square test and stepwise logistic regression analysis were used. **Results:** The majority of the attendees were Saudis (89.4%), of young age (15-<30years) (56.2%) and were married (50.8%). About 41.5% were unemployed, and 42.7% had university or higher education. About three quarters (74.4%) of the PHCCs attendees had good level of knowledge and only 25.6% had poor knowledge regarding avian flu. The stepwise logistic regression analysis showed that the following factors were found to be independently significantly associated with increased level of knowledge: male gender (OR=1.44, CI=1.098-1.890), higher level of education (OR=1.7, 95% CI=1.439-2.009) and younger age (OR=1.546, 95% CI= 1.257-1.902). PHCCs were mentioned by only 2.9% of the attendees as a source of information about avian influenza**. Conclusion:** Although the majority of PHCCs attendees had good knowledge about avian flu, yet more efforts are needed to give priority to those who had poor knowledge (females, lower educational level, low monthly income and elderly people). Health messages should be designed in a way that they could be understood by all people using all available channels. PHCCs should have more roles in educating the public about avian flu.

Key words: Knowledge; Avian Flu; Primary Health Care Centers; Attendees; Saudi Arabia

INTRODUCTION

The term "avian influenza" is used to describe influenza A subtypes that primarily affect chickens, turkeys, guinea fowls, migratory waterfowl, and other avian species.(1) Outbreaks of influenza have been recognized in domestic

*Primary Health Care Division, High Institute of Public Health, Alexandria University
**Department of Family and Community Medicine, College of Medicine, University of Dammam, Dammam, Saudi Arabia

poultry (chickens and turkeys) for many years. The first outbreak H5N1 occurred 1997 In Hong Kong and resulted in 18 cases and 6 deaths. Sustained person-to-person transmission did not occur, and the outbreak stopped when all birds in the Hong Kong commercial poultry industry (about 1.4 million) were slaughtered.[2]

Most cases of avian flu have involved direct contact with poultry. In approximately 25% of cases, the source of exposure remains unclear and environment-to-human transmission is considered a possibility (such as through contact with virus-contaminated fomites). To date, sustained person-to-person transmission has not been recognized. Although probable person-to-person spread was identified in Thailand involving transmission from an ill child to her mother and aunt,[3] several other familial clusters have been recognized.[4]

Respiratory failure is the major complication in patients hospitalized with influenza A (H5N1) virus infection. No standardized approach exists for the clinical management of A (H5N1) - infected humans, and many patients progress rapidly to Acute Respiratory Distress Syndrome and multi-organ failure. The cumulative case-fatality proportion is approximately 60%. Since late 2003 the widespread occurrence across several continents of infection among poultry and birds with the highly pathogenic avian influenza A (H5N1) virus has increased the risk of human exposure to the virus and resulted in growing numbers of A (H5N1) virus-infected persons.[5]

Despite of extensive media attention for avian influenza, knowledge about risk perception is scarce. If and influenza

pandemic occurs, public health authorities will be dependent on the willingness and ability of the public to adhere to recommendations regarding personal hygiene, vaccination and prophylaxis, quarantine, travel restrictions, or closing of public buildings.[6]

Our ability to promote health-protective behavioral change depends on our knowledge of determinants of such behavior. The protection motivation theory posits that health-protective actions are influenced by risk perceptions.[7] Risk perceptions are defined by the perceived seriousness of a health threat and perceived personal vulnerability. However, the protection motivation theory explicitly states that higher risk perceptions will only predict protective behavior when people believe that effective protective actions are available (response efficacy) and that they have the ability to engage in such protective actions (self-efficacy).[7]

Knowledge of people about avian flu disease, its mode of transmission and preventive measures is important for them to take self-protection measures at the level of individual, family and community. Several studies have shown that people had good knowledge about avian flu transmission to humans and its symptoms in birds and man.[8-10] However, knowledge about its high risk and protective behaviors to avoid getting infected was shown by some studies to be inadequate.[9-11,12]

The objective of this study was to assess the level of knowledge about avian flu among Primary Health Care Centers (PHCCs) attendees in Al-Khobar city, Kingdom of Saudi Arabia (KSA), and to determine possible associations

between knowledge and some socio-demographic characteristics.

SUBJECTS AND METHODS

I-STATISTICAL DESIGN:

This was a cross-sectional study conducted in two randomly selected PHCCs in Al-Khobar city, KSA namely, Family and Community Medicine center, and Al-Akrabia PHCC, during 2009.

The sample size was calculated by systematic random sampling technique by interviewing every 5th adult person above 16 years, of both genders, Saudi or non-Saudi attending the PHCC clinics for any reason for five days per week for the three months of the study. The total sample size was 1420 persons (885 in Al-Akrabia PHCC and 535 in Family and Community Medicine center).

II-TECHNICAL DESIGN:

Data collection was accomplished through using an interviewer-administered questionnaire designed by the researchers. A pilot study was conducted in a sub-sample of attendees who were not included in the study. Proper and then necessary changes were made. The objectives of the study were explained to the PHCCs attendees involved in the study after that they gave their informed consent to participate. Confidentiality of the information was strictly adhered to by assuring the attendees that no details about their status will be released and data will be only used for research purpose. The interviewing of the attendees was conducted under standardized conditions to ensure valid responses. All the questions were close-ended. The questionnaire consisted of two main parts:

1- Atttendees' socio-demographic

characteristics: age, nationality, marital status, educational level, occupation, and monthly income

2- Knowledge of the attendees regarding avian flu such as definition, mode of transmission, etc……

A scoring system was used giving a value of one to each correct answer and a value of zero to the wrong or don't know answers. The maximum knowledge score was 38. The total knowledge score was divided into 2 equal categories: Poor knowledge: 0-18, and Good knowledge:19-38.

III-STATISTICAL ANALYSIS:

The collected data were reviewed, coded, verified and statistically analyzed using the Statistical Package for Social Sciences (SPSS) software version 16. Descriptive statistics for all studied variables and Chi-square test were used. Stepwise logistic regression analysis was used to find the association between the characteristics of the PHCCs attendees (independent variables) and their level of knowledge (dependant variable) and a p-value level of <0.05 was considered statistically significant throughout the study.

RESULTS

Table 1 shows socio-demographic characteristics of the PHCCs attendees. The majority of the attendees were Saudis (89.4%), of young age (15-<30years) (56.2%) and married (50.8%). About 41.5% were unemployed, 43.9% had a secondary school or higher education, and 42.7% had university or higher education.

Table 2 shows that quite a high proportion of PHCCs attendees had wrongly defined avian flu as a disease that mainly affects humans (34.9%) and

that death of large numbers of birds is a normal phenomenon (31.7%). However, attendees had good knowledge about the presence of the virus inside the eggs of infected birds (61.1%) and that daily contact with infected poultry can lead to human infection (85.5%). A high proportion of attendees wrongly thought that avian flu is not a serious disease and can rarely lead to death (32.9%).

Attendees knowledge about modes of transmission of avian flu (table 2) was to some extent good. The majority knew that man can get infected from handling and slaughtering living infected birds (79.4%) and after direct contact with infected chickens (76.2%). However, still some of

them had wrongly reported that use of undercooked eggs is safe (23.2%). Moreover, about one quarter of the attendees (25.6%) had wrongly mentioned that inhalation of avian flu virus with dust don't have any risk of transmitting infection.

In table 2, a high proportion of attendees (42.3%) wrongly reported that practicing good personal hygiene has nothing to do with the spread of infection while even 28.6% of them thought that adequate cooking of poultry meat doesn't affect virus activity. However, about 81% of them mentioned separating raw meat from cooked food as an important protective measure.

Table 3 shows that about three quarters (74.4%) of the PHCCs attendees had good level of knowledge and only 25.6% had poor knowledge regarding avian flu.

There was a statistically significant association between the level of knowledge about avian influenza and

the educational level as shown in Table 4. Good level of knowledge was found among 47.1% of the attendees who had university or higher education in comparison to lower educational levels (X^2=37.407, P<0.001). Moreover, it was found that civil service and unemployed attendees had statistically significant good knowledge levels (21.9% and 39.7% respectively) in comparison to doctors and engineers (19.9%) (X^2=27.259, *p*<0.001). Young age group (15-<30 years) was found to have a statistically significant association with good level of knowledge (52.4%) about avian flu in comparison to older age group. Married attendees had a statistically significant better knowledge level (53.9%) compared to single (42.2%). Also, male attendees were found to have better knowledge level (53.3%) than female attendees (46.7%). Attendees with high family income $\geq$ 4000 Saudi Riyals (SR) had good level of knowledge about avian flu in comparison to those with low family income (54.6% vs. 41.1%) (X^2=38.218, P <0.001).

Table 5 demonstrates the results of the stepwise logistic regression analysis of significant factors predicting knowledge about avian influenza among PHCCs attendees while controlling for confounding. The following factors were found to be independently significantly associated with increased level of knowledge: male gender (OR=1.44, CI=1.098-1.890), higher level of education (OR=1.7, 95% CI=1.439-2.009) and younger age (OR=1.546, 95% CI= 1.257-1.902).

Regarding the sources of information about avian influenza among PHCCs attendees, it was noticed that television and radio were mentioned as the main

source (62.4%), followed by newspapers (15.9%) and relatives (8.5%), while PHCCs were mentioned by only 2.9% of the attendees.

DISCUSSION

Our results show that PHCCs attendees had limited information about avian flu in birds and revealed gaps in knowledge about the disease. This result was in agreement with Khan et al study in Pakistan who showed that only 39% students correctly identified avian flu as a disease of birds and humans both.[13] In this study 60.4% of attendees reported that avian flu is a disease which does not affect humans only (i.e. affects both humans and birds). Di Giuseppe et al study in Italy showed that 52.5% of the population sample defined avian flu correctly as a disease that can affect all species of birds.[14] The majority of attendees in this study were aware of the effect of contact with infected poultry at homes in the transmission of avian flu to humans. Several other studies showed similar results to our study that contact with infected poultry is a major source of infection.[8,10,12,15]

Xiang et al study of avian flu knowledge in urban and rural China reported that only 4% of urban and 6% of rural participants were aware that humans could fail to recover fully with treatment.[16] The low-risk perception to health from handling or contact with infected poultry and that infection can rarely lead to death in this study was similar to other studies exploring knowledge, attitude and practice relating to avian flu.[14-17] Di Giuseppe et al survey in Italy revealed that 61.9% of the respondents thought that avian flu was a serious disease.[14] Abbate et al study showed that 69.7% of poultry workers

believed that avian flu was a serious disease.[15] These figures were higher than the 49.6% reported in this study. Al-Turki study among attendees of a primary health care clinic in Riyadh, Saudi Arabia, showed that 61% of the 516 participants were worried about avian influenza infection of humans.[18]

Handling and slaughtering living home poultry was the commonest mode of transmission mentioned by attendees in this study (79.1%). However, still their knowledge about other modes of transmission such as use of uncooked eggs and inhalation of virus with dust was inadequate. In Khan et al study only 26% of the 220 college students mentioned infection through air as a method of transmission.[13] Al-Turki study in Riyadh revealed that only 39.1% of attendees of a primary health care clinic were knowledgeable about the mode of transmission of avian flu.[18]

Our results suggested that knowledge of PHCCs attendees about prevention and control of H5N1 was unsatisfactory. This result was similar to Al-Turki study in Riyadh who showed that only 27.5% were aware of human preventive measures.[18]

Other studies showed good knowledge of the public about prevention and control of avian flu,[10,14,16,19] most probably due to effective and efficient health education through mass media. However, there is still a room for improvement regarding educating the public on personal hygiene and modes of disease transmission. This will be of great help in defense against other emerging infectious diseases such as swine flu.

The overall knowledge about avian flu among attendees was significantly

associated with gender (males more than females), educational level (higher education more than lower) and age (younger and middle age more than elderly) as shown in Table 4. These results were consistent with several other studies about avian flu knowledge.[14-16,20,21] Al-Shehri et al study among secondary school students in Taif, Saudi Arabia, showed no significant difference in knowledge scores between males and females and between young or old students.[21] However, their study showed similar results to our study in that knowledge scores were significantly higher among students whose fathers were civil service employees and had higher income (35% and 74.1% of the sample respectively).[21]

The results of Table 5 in this study were consistent with other studies which showed that the level of knowledge about avian flu was higher among persons with higher socioeconomic status (i.e. higher education), with younger age group and male gender).[15,16,20-22]

CONCLUSIONS AND RECOMMENDATIONS:

Although the majority of PHCCs attendees had good knowledge about avian flu, yet more efforts are needed to give priority to those who had poor knowledge. Those groups as shown by this study included females, those with lower educational level, with low monthly income and elderly people. Health messages should be designed in a way that they could be understood by people of lower social class and all available channels of mass media should be used. Help of community leaders and social organizations should be sought. More stress should be directed to hygienic and protective practices at home and outside. Primary health care centers and

hospitals should have more roles in educating the public about avian flu.

Table 1: Socio-demographic characteristics of primary health care centers attendees

Socio-demographic characteristics	(Total n=1420)	
	No.	**%**
1-Health Center:		
- Al-Akrabia primary health care center	885	62.3
- Family and Community Medicine health center	535	37.7
2-Nationality:		
-Saudi	1269	89.4
-Non -Saudi	151	10.6
3-Gender:		
-Males	779	54.9
-Females	641	45.1
4-Age in years:		
-15-<30 years	798	56.2
-30-<45 years	446	31.4
-45-<60 years	146	10.3
-≥ 60 years	30	2.1
(Mean ±1SD) = 30.5 ± 10.7		
5-Marital Status:		
-Single	640	45.1
-Married	721	50.8
-Divorced	37	2.6
-Widowed	22	1.5
6-Educational level:		
-Illiterate and read and write	34	2.4
-Primary and intermediate	157	11.1
-Secondary and diploma	623	43.9
-University and higher	606	42.7
7-Occupation:		
-Free Labor	130	9.2
-Faculty –doctor-engineer	245	17.3
-Military	114	8.0
-Civil service	299	21.1
-Retired	43	3.0
-Unemployed	589	41.5
8-Monthly income in Saudi Riyals (SR):		
-< 4000 SR	630	44.4
-4000 to 7999 SR	351	24.7
-≥8000 SR	383	27.0
-Refused to answer	56	3.9

Table 2: Distribution of attendees according to their knowledge about avian flu

Knowledge item	Attendees (n=1420)					
	Yes		No		Don't know	
	No.	%	No.	%	No.	%
A-General Knowledge						
1-Avian flu is primarily a disease that affects humans *	495	34.9	857	60.4	68	4.8
2-Death of a large number of migratory birds is a normal annual phenomenon *	450	31.7	734	51.7	236	16.6
3- Infected birds can excrete a large amount of virus without having any signs of the disease	792	55.8	290	20.4	338	23.8
4-A Highly infective avian flu virus can be present inside the eggs of infected birds	868	61.1	221	15.6	331	23.3
5-Peoples living in rural areas are more susceptible to avian flu infection due to their daily contact with infected poultry in their households	1214	85.5	109	7.7	97	6.8
6-Avian flu virus can live in normal temperature for several days	811	57.1	186	13.1	423	29.8
7-Avian flu in humans can rarely lead to death *	468	32.9	704	49.6	248	17.5
B-Mode of transmission:						
1-Humans can be infected from handling and slaughtering living infected birds	1128	79.4	173	12.2	119	8.4
2-Undercooked eggs can be used safely in foods that are not going to be cooked, baked or heated *	329	23.2	794	55.9	297	20.9
3-Most of the cases of human avian flu infections were acquired after direct contact with infected chicken either dead or alive	1082	76.2	177	12.5	161	11.3
4-Inhalation of avian flu virus with dust doesn't have any risk of transmitting infection *	363	25.6	740	52.1	317	22.3
5-Slaughtering, feathering and eviscerating practices on home poultry give the opportunity to the contaminated parts to spread infection	1123	79.1	126	8.9	171	12.0
C-Prevention and control						
1-Good Personal Hygiene has nothing to do with the spread of infection *	601	42.3	667	47.0	152	10.7
2-Well-cooked poultry meat doesn't affect virus activity*	406	28.6	766	53.9	248	17.5
3-It is better to separate the raw meat from the cooked food to prevent contamination	1143	80.5	135	9.5	142	10.0
4-As a precaution, travelers to epidemic areas with avian flu should receive a vaccine *	899	63.3	253	17.8	268	18.9
5-There is no specific medication for treatment of humans who are infected with avian flu *	578	40.7	457	32.2	385	27.1

* Indicates wrong statement

Table 3: Distribution of PHCCs attendees according to their knowledge level about avian flu

knowledge Level about avian flu	PHCCs attendees (n=1420)	
	No.	%
Good Knowledge	1056	74.4
Poor Knowledge	364	25.6

Table 4: Association between socio-demographic characteristics of the attendees and their total knowledge score about avian flu

Socio-demographic characteristics	Knowledge level				χ^2 Test	P Value
	Poor knowledge (n=364)		Good Knowledge (n=1056)			
	No.	%	No.	%		
1-Gender:						
-Males	216	59.3	563	53.3	3.970	0.046
-Females	148	40.7	493	46.7		
2-Marital Status:						
-Single	194	53.3	446	42.2		
-Married	152	41.8	569	53.9	15.953	0.001
-Divorced	11	3.0	26	2.5		
-Widowed	7	1.9	15	1.4		
3-Educational level:						
-Illiterate or read and write	11	3.0	23	2.2		
-Primary & Intermediate	60	16.5	97	9.2	37.407	< 0.001
-Secondary & Diploma	184	50.5	439	41.6		
-University & higher education	109	29.9	497	47.1		
4-Occupation:						
-Free Labor	39	10.7	91	8.6		
-Faculty members, doctor, engineer	35	9.6	210	19.9		
-Military	39	10.7	75	7.1	27.259	< 0.001
-Civil services	68	18.7	231	21.9		
-Retired	13	3.6	30	2.8		
-Unemployed	170	46.7	419	39.7		
5-Monthly income:						
-< 4000 SR	196	53.8	434	41.1		
-4000 to 7999 SR	102	28.0	249	23.6	38.218	< 0.001
->8000 SR	56	15.4	327	31.0		
-Refused answer	10	2.7	46	4.4		
6-Age in years:						
-15-<30 years	245	67.3	553	52.4		
-30-<45 years	82	22.5	364	34.5	25.107	< 0.001
-45-<60 years	30	8.2	116	11.0		
-≥ 60 years	7	1.9	23	2.2		

Table 5: Stepwise logistic regression analysis of significant factors predicting knowledge about avian flu among the PHCCs attendees

Variables	B coefficient	S.E. of B	p-Value	O.R.	95 % Confidence interval of O.R.	
					Lower	Upper
1- Gender	0.365	0.139	0.008	1.44	1.098	1.890
2-Eduational Level	0.531	0.085	< 0.001	1.70	1.439	2.009
3-Age	0.436	0.106	< 0.001	1.55	1.257	1.902
Constant	-1.814	0.625	-	-	-	-

Model $X^2_{(9)}$ = 71.47, P < 0.001

REFERENCES

1. Ong A, Kindhauser M, Smith I, Chan M. A Global Perspective on Avian Influenza. Ann Acad Med Singapore. 2008;37(6):477-81.
2. Yuen KY, Chan PK, Peiris M, Tsang DN, Que TL, Shortridge KF, et al. Clinical features and rapid viral diagnosis of human disease associated with avian influenza A H5N1 virus. Lancet. 1998;351(9101):467-71.
3. Ungchusak K, Auewarakul P, Dowell SF, Kitphati R, Auwanit W, Puthavathana P, et al. Probable person-to-person transmission of avian influenza A (H5N1). N Engl J Med. 2005;352(4):333-40.
4. Olsen SJ, Ungchusak K, Sovann L, Uyeki TM, Dowell SF, Cox NJ, et al. Family clustering of avian influenza A (H5N1). Emerg Infect Dis. 2005;11(11):1799-801.
5. World Health Organization. Update: WHO-confirmed human cases of avian influenza A (H5N1) infection, 25 November 2003–24 November 2006. Weekly Epidemiological Record. 2007; 82:41–8.
6. Bell DM; World Health Organization Writing Group. Non-pharmaceutical interventions for pandemic influenza, international measures. Emerg Infect Dis. 2006;12(1):81-7.
7. Sjoberg L. Factors in risk perception. Risk Anal. 2000; 20:1–11.
8. Marinos G, Vasileiou I, Katsargyris A, Klonaris C, Georgiou C, Griniatsos J, et al. Assessing the level of awareness of avian influenza among Greek students. Rural Remote Health. 2007;7(3):739.
9. El-Zanaty F, EL-Ghazaly N. Avian Influenza Survey: Knowledge, Attitudes and Practices of the Egyptian Public. (cited 2007 July 15). Available from: Soul Beat Africa, Institute Health & Development Communication, http://www.comminit.com/en/node/223876/38.(Accessed 16/5/2009).
10. Mossialos E, Rudisill C. Knowledge

about Avian Influenza, European Region. Emerg Infect Dis. 2008;14(12):1956–7.
11. Kristiansen IS, Halvorsen PA, Gyrd-Hansen D. Influenza pandemic: perception of risk and individual precautions in a general population. Cross sectional study. BMC Public Health. 2007; 7: 48.
12. Hsu JL, Liu KE, Huang MH, Lee HJ. Consumer Knowledge and Risk Perceptions of Avian Influenza. Poult Sci. 2008; 87(8):1526-34.
13. Khan SA, Hashmi I, Ranjha AN, Yosufzai MK, Hashmi SK, Anjum Q. Awareness of bird flu amongst young college students. J Pak Med Assoc. 2008;58(8):466-9
14. Di Giuseppe G, Abbate R, Albano L, Marinelli P, Angelillo IF. A survey of knowledge, attitudes and practices towards avian influenza in an adult population of Italy. BMC Infect Dis. 2008 17;8:36.
15. Abbate R, Di Giuseppe G, Marinelli P, Angelillo IF. Knowledge, attitudes, and practices of avian influenza, poultry workers, Italy. Emerg Infect Dis. 2006;12(11):1762-5.
16. Xiang N, Shi Y, Wu J, Zhang S, Ye M, Peng Z, et al. Knowledge, attitudes and practices (KAP) relating to avian influenza in urban and rural areas of China. BMC Infect Dis. 2010;21;10:34.
17. Fielding R, Lam WW, Ho EY, Lam TH, Hedley AJ, Leung GM. Avian influenza risk perception, Hong Kong. Emerg Infect Dis. 2005;11(5):677-82
18. Al-Turki YA. Awareness of avian influenza ("bird flu") among attendees of a primary healthcare clinic in Riyadh. Ann Saudi Med. 2006; 26(1): 245-7.
19. Maton T, Butraporn P, Kaewkangwal J, Fungladda W. Avian influenza protection knowledge, awareness, and behaviors in a high-risk population in Suphan Buri Province, Thailand. Southeast Asian J Trop Med Public Health. 2007;38(3):560-8
20. Leslie T, Billaud J, Mofleh J, Mustafa L, Yingst S. Knowledge, Attitudes, and Practices regarding Avian Influenza (H5N1), Afghanistan. Emerg Infect Dis. 2008;14(9):1459-61.
21. Al-Shehri AS, Abdel-Fattah M, Hifnawy T. Knowledge and concern about avian influenza among secondary school students in Taif, Saudi Arabia. East Mediterr Health J. 2006;12 Suppl 2:S178-88.
22. Ismail NA, Ahmed HA. Knowledge, Attitudes and Practices Related to Avian Influenza among a Rural Community in Egypt. J Egypt Public Health Assoc. 2010;85(1-2):73-96.