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Knowledge and Preparedness for Avian Influenza Among the First Year Medical Students and Interns of Tehran University of Medical Sciences

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Background: Medical staff's knowledge and preparedness has an important role in providing specialized care to the patients as well as controlling and preventing the epidemics.
Objectives: The aim of the study is to examine and compare the knowledge and preparedness in terms of avian influenza (AI) among the first year medical students (FYMS) and interns of Tehran University of Medical Sciences, Tehran, Iran.
Materials and Methods: A cross-sectional study was carried out on FYMS (n = 158) and interns (n = 158) in 2008. The data collected through a questionnaire, including 38 questions in two parts. The three statements were considered as follows: "true", "false" and "I do not know" for knowledge part and "yes", "no" and "I do not know" for preparedness part. We used the Chi-squared and Fisher's exact tests for the analysis.
Results: 145 FYMS (91.8%) and 140 interns (88.6%) affirmed that not only AI afflict wild birds (P = 0.002). 139 FYMS (88%) but 128 interns (81%) also noted that AI virus can be transmitted from birds to humans. 144 FYMS (91.1%) and 140 interns (88.6%) held frequent hand washing is effective in preventing the disease (P < 0.001). 153 FYMS (96.8%) and 149 interns (94.3%) did not participate in training classes regarding AI (P = 0.132). 138 FYMS (87.3%) and 140 interns (88.6%) did not take human flu vaccine (P = 0.035). 143 FYMS (90.5%) and 133 interns (84.2%) believed they were not prepared for AI pandemics (P = 0.014).
Conclusions: Although the general knowledge of our study groups on AI is relatively fair, they are not prepared for AI epidemics.

Keywords: Influenza in Birds; Disease Outbreaks; Knowledge; Students, Medical; Civil Defense

1. Introduction

Influenza type A and avian influenza (AI) have caused pandemics in recent years and similar pandemics would be likely to occur the coming years. If such diseases are not prevented, they can cause irreparable harms to the societies. Therefore, it is required for all countries to increase their knowledge and preparedness through setting coherent programs in order to prevent and control such diseases. AI was first introduced in 1997 in Hong Kong and has shown potential pandemic thread in regional and international health system (1, 2). According to statistics, after the disease outbreak, many people will die and 96% of the deaths would be in developing countries (3). It is worth mentioning that medical staff's knowledge and preparedness is the key feature in providing specialized care to patients as well as controlling and preventing the virus transmission as quickly as possible (4). At present, poliomyelitis, neonatal tetanus, rubella, diphtheria and measles are being controlled. However, other problems are threatening the general health status in Iran (5). There are a few articles reviewing information, practices and attitudes against AI in our country. Ghabili et al. evaluated 234 second and third-year medical students in Tabriz in 2008 (6). The students were examined through a self-administered questionnaire concerning history, modes of transmission, clinical symptoms and prevention against AI. Surprisingly, a relatively low level of knowledge about AI among medical students was concluded. We recently studied attitudes, concerns, perceived impact and coping strategies for AI among the first year medical students (FYMS) and interns in Tehran University of Medical Sciences (7). It is shown that although FYMS and interns were concerned about their personal and family health. They had positive attitudes towards the hazard of contracting AI as a possibly inevitable part

Implication for health policy/practice/research/medical education:
Medical students are not well prepared against avian influenza epidemics and it is an urge for our health care system to amend the defects.

of their profession and only a few would have changed their jobs because of the risk.

2. Objectives

The main goal of this study was to investigate the knowledge and preparedness of FYMS and interns on AI in Tehran University of Medical Sciences, Tehran, Iran.

3. Materials and Methods

This was a cross-sectional study carried out on FYMS and interns in 2008. The study was conducted based on a joint project with a group of Southeast Asia researchers, using a similar questionnaire contained of 38 questions in two parts: knowledge (29 items) and preparedness within the last six months (9 items). In the first part, we assessed the general knowledge of medical students, the routes of transmission, hand hygiene, protection, medicines and vaccination against AI. In the second part, we evaluated preparedness of medical students in accordance with participating in educational courses and supplying medicines, vaccines and protective measures. The questionnaire was formerly standardized in terms of validity and reliability (8, 9). The questionnaire was translated into Persian. Then, in order to ensure its compatibility with the original draft, the questionnaire was back-translated into English by a professional translator who did not know about of the original questionnaire, there the results were controlled. In the second stage, content validity was approved by two infectious disorders specialists and form validity was approved by another expert. The three multiple choices including "true", "false" and "I do not know" were considered as questions for knowledge part and "yes", "no" and "I do not know" were considered for questions of the second part. In the next stage, the questionnaire was completed as a pilot study among 30 FYMS and 30 interns and reliability and necessary considerations were taken Equal number of 158 FYMS and interns was studied, using the simple non-random sampling sequence. The samples were interviewed and only those were enrolled in the study who expressed their consent. Questionnaires were given back to students in case there were incomplete entries. We analyzed data using the Chi-square and Fisher's exact tests and considered type one error lower than 5%.

4. Results

Mean (SD) ages of FYMS and interns were 19 ± 0.6 and 25 ± 1.3 years, respectively. 90 FYMS (57%) and 81 interns (51.3%) were female. All FYMS and 109 interns (69%) were single.

4.1. Knowledge

145 FYMS (91.8%) and 140 interns (88.6) knew that AI would not only afflict wild birds (P = 0.002). 135 FYMS (85.4%) and 153 interns (96.8%) truly stated that human influenza did not only afflict elderly and children. 123 FYMS (77.8%) and 141 interns (89.2%) knew that sneezing and coughing were the possible ways of transmission of the virus (P = 0.009). 111 FYMS (70.3%) and 139 interns (88%) found the scientists' warnings regarding AI epidemics to be serious (P < 0.001). 139 FYMS (88%) and 128 interns (81%) noted the transmission of AI virus can occur from birds to humans. 144 FYMS (91.1%) and 140 interns (88.6%) believed that frequent hand washing is effective in disease prevention (P < 0.001). 95 FYMS (60.1%) and 56 interns (35.4%) found the paper mask to be effective against AI meanwhile 85 FYMS (53.8%) and 62 interns (39.2%) mentioned the effectiveness of surgical mask when exposing to suspicious AI cases (P < 0.001). 31 FYMS (19.6%) reported wearing glasses as an effective strategy to confront AI however 63 interns (39.9%) believed so (P < 0.001). Table 1 shows the full information of this section.

4.2. Preparedness Within Last Six Months

153 FYMS (96.8%) and 149 interns (94.3%) did not participate in the training classes regarding AI (P = 0.132). 148 FYMS (93.7%) and 140 interns (88.6%) (P = 0.121). 148 FYMS (93.7%) and 133 interns (84.2%) did not attend in conferences of AI (P = 0.016). 138 FYMS (87.3%) and 140 interns (88.6%) did not get human flu vaccine (P = 0.035). 138 FYMS (87%) and 109 interns (69%) did not get enough information regarding personal protective equipment (P < 0.001). 143 FYMS (90.5%) and 133 interns (84.2%) believed they were not prepared against AI pandemics (P = 0.014). Table 2 shows the full information of this section.

The challenging point was if medical students were well trained to be prepared for AI during their education in medical college.

5. Discussion

Our study assessed and compared knowledge and preparedness among FYMS and interns of Tehran University of Medical Sciences. In terms of knowledge, both groups knew fairly enough about the routes of transmission given both avian and human type influenza. However, the rate was significantly higher among interns than FYMS. Interns' knowledge based on what they have learned at university and clinics (given the fact that they have to deal with patients) and what they experience made them more prepared to study influenza. It may also be due to the fact that our study was taken after SARS pandemic (10). In terms of preparedness, neither of cases had ever been taught or informed about the management and control of AI and most of them had not been get vaccinated against human flu (11) eventhough the interns were more informed than FYMS. Lack of knowledge and training during medical college on AI and its pandemic were probably the main reasons of unprepared-

Table 1. Knowledge Regarding Avian Influenza in Medical Students and Interns of Tehran University of Medical Sciences, Tehran, Iran in 2012

Questions	First-Year Students			Interns			Total			P value
	True	False	I Don't Know	True	False	I Don't Know	True	False	I Don't Know	
1. Avian Influenza only afflict wild birds	0	145 (91.8%)	13 (8.2%)	11 (7%)	140 (88.6%)	7 (4.4%)	11 (3.5%)	285 (90.2%)	20 (6.3%)	0.002
2. Human influenza only afflict elderly and children	4 (2.5%)	135 (85.4%)	19 (12%)	1 (6%)	153 (96.8%)	4 (2.5%)	5 (1.6%)	288 (91.1%)	23 (7.3%)	-
Questions regarding transmission of human influenza (3-6)										
3. Transmission through a person who coughs onto a table top, then another person touch the table top ,and then his /her nose	70 (%44.3)	20 (%12.7)	68 (43%)	98 (%62)	36 (%22.8)	24 (%15.2)	168 (%53.2)	56 (%17.7)	92 (3.2%)	< 0.001
4. Transmission through coughing or sneezing	123 (77.8%)	15 (9.5%)	20 (12.7%)	141 (89.2%)	11 (7%)	6 (3.8%)	264 (83.5%)	26 (8.2%)	26 (8.2%)	0.009
5. Transmission through shared spoon	103 (65.2%)	25 (15.8%)	30 (19%)	93 (58.9%)	35 (22.2%)	30 (19 %)	196 (62%)	60 (19 %)	60 (19%)	0.337
6. Transmission via shaking hands and then touching your nose	56 (35.4%)	49 (31 %)	53 (33.5%)	100 (63.3%)	45 (28.5%)	13 (8.2%)	156 (49.4%)	94 (29.7%)	66 (20.9%)	< 0.001
7. The warnings of widespread bird flu outbreaks by scientists should not be taken seriously.	19 (12 %)	111 (70.3%)	28 (17.7%)	9 (5.7%)	139 (88%)	10 (6.3%)	28 (8.9%)	250 (79.1%)	38 (12%)	< 0.001
8. Human flu vaccination immunizes against AI	9 (5.7%)	131 (82.9%)	18 (11.4%)	3 (1.9%)	148 (93.7%)	7 (4.4%)	12 (3.8%)	279 (89.3%)	25 (7.9%)	0.012
9. Based on my knowledge turkey is one of the afflicted country with AI	42 (26.6%)	15 (9.5%)	101 (63.9%)	63 (39.9%)	12 (7.6%)	83 (52.5%)	105 (33.2%)	27 (8.5%)	184 (58.3%)	0.043
10. AI virus can be transmitted from birds to humans	139 (88 %)	10 (6.3%)	9 (5.7%)	128 (81 %)	21 (13.3%)	9 (5.7%)	267 (84.5%)	31 (9.8%)	18 (5.7%)	0.113
11. AI virus can be easily transmitted from human to human	56 (35.4%)	54 (34.2%)	48 (30.4%)	68 (43 %)	71 (44.9%)	19 (12 %)	124 (39.2%)	125 (39.6%)	67 (21.2%)	< 0.001
12. Currently there are lots of medicines for AI	0	73 (46.2%)	85 (53.8%)	4 (2.5%)	128 (81 %)	26 (16.5%)	4 (1.3%)	201 (63.6%)	111 (35.1%)	-
13. Annual human flu vaccination prevents against avian flu during a bird flu outbreak	38 (24.8%)	59 (38.6%)	56 (36.6%)	65 (41.1%)	72 (45.6%)	21 (13.3%)	103 (33.1%)	131 (42.1%)	77 (24.8%)	< 0.001

14. Antiflu medicines like tamiflu can protect against AI during a bird flu outbreak	43 (27.2%)	40 (25.3%)	75 (47.5%)	44 (27.8%)	65 (41.1%)	49 (31 %)	87 (27.5%)	105 (33.3%)	124 (39.2%)	0.003
15. Wearing gown is protective while exposing suspicious patients	48 (30.4%)	29 (18.4%)	81 (51.3%)	67 (42.4%)	68 (43 %)	23 (14.6%)	115 (36.4%)	97 (30.7%)	10 (32.9%)	< 0.001
16. Wearing gloves is effective when exposing suspicious patients	97 (61.4%)	14 (8.9%)	47 (29.7%)	129 (81.6%)	18 (11.4%)	11 (7%)	226 (71.5%)	32 (10.1%)	58 (18.4%)	< 0.001
17. Wearing paper mask is effective when exposing to suspicious patients	95 (60.1%)	34 (21.5%)	29 (18.4%)	56 (35.4%)	82 (51.9%)	20 (12.7%)	151 (47.8%)	116 (36.7%)	49 (15.5%)	< 0.001
18. Wearing surgical mask is effective when exposing the suspicious patients	85 (53.8%)	25 (15.8%)	48 (30.4%)	62 (39.2%)	62 (39.2%)	34 (21.5%)	147 (46.5%)	87 (27.5%)	82 (26%)	< 0.001
19. Wearing N95 mask is effective when exposing suspicious cases	52 (32.9%)	0	106 (67.1%)	95 (60.1%)	24 (15.2%)	39 (24.7%)	147 (46.5%)	24 (7.6%)	145 (45.9%)	< 0.001
20. Wearing glasses is effective when exposing suspicious cases	31 (19.6%)	52 (32.9%)	75 (47.5%)	63 (39.9%)	7 (45.6%)	23 (14.6%)	94 (29.7%)	124 (39.2%)	98 (31.1%)	<0.001
21. Frequent hand washing is effective when exposing suspicious cases	144 (91.1%)	0	14 (8.9%)	140 (88.6%)	12 (7.6%)	6 (3.8%)	284 (89.8%)	12 (3.8%)	20 (6.4%)	< 0.001
22. Hand washing with excess alcohol is effective when exposing suspicious patients	38 (24.1%)	49 (31 %)	71 (44.9%	69 (43.7%	57 (36.1%	32 (20.3%	107 (33.9%	106 (33.5)	103 (32.6%)	< 0.001
23. AI patients isolation is effective for prevention	116 (73.4%)	4 (2.5%)	38 (24.1%)	93 (58.9%)	38 (24.1%)	27 (17.1%)	209 (66.1%)	42 (13.3%)	65 (20.6%)	< 0.001
24. Changing cloths is effective before going home	86 (54.4%)	28 (17.7%)	44 (27.8%)	85 (53.8%)	45 (28.5%)	28 (17.7%)	171 (54.1%)	73 (23.1%)	72 (22.8%)	0.023
For protecting those close to me during a bird flu outbreak (25-29)										
25. Taking a shower is effective before going home	111 (70.3%)	23 (14.6%)	24 (15.2%)	49 (31 %)	69 (43.7%)	40 (25.3%)	160 (50.6%)	92 (29.1%)	64 (20.3%)	< 0.001
26. Temporarily being out of house is effective	28 (17.7%)	82 (51.9%)	48 (30.4%)	19 (12 %)	112 (70.9%)	27 (17.1%)	47 (14.9%)	194 (61.4%)	75 (23.7%)	0.002
27. Advising them not to share in my food and dishes	134 (84.8%)	19 (12 %)	5 (3.2%)	85 (53.8%)	52 (32.9%)	21 (13.3%)	219 (69.3%)	71 (22.4%)	26 (8.3%)	< 0.001
28. Encouraging them to go for flu vaccination	78 (49.4%)	29 (18.4%)	51 (32.3%)	77 (48.7%)	44 (27.8%)	37 (23.4%)	155 (49.1%)	73 (23.1%)	88 (27.8%)	0.070
29. Frequent hand washing is effective for prevention	144 (91.1%)	0	14 (8.9%)	147 (93%)	7 (4.4%)	4	(2.5%)	291 (92.1%)	7 (2.2%)	18 (5.7%)

ness in both groups (12). They also did not know about precautious measures to prevent the disease in case of outbreaks. Moreover, as mentioned before, public health education is a key factor in improving public information about influenza and it is the general practitioners' responsibility to prioritize the informative measures in healthcare system (13). Most of them had never participated in a congress regarding AI control. This could be again due to lack of knowledge and lack of urge in higher orders within the hospital and university that they did not take the risk of AI pandemic seriously. As one of the first steps to increase the level of public health information, media play an effective role to spread the basic knowledge concerning prevention and transmission of such diseases. This might be the most effective way of training in pre-college education (1, 10, 14, 15). This study was a complement for our previous study. There, attitudes, concerns, perceived impact and coping strategies for AI were examined among the same medical students in Tehran University of Medical Sciences (7).

Table 2. Statements Regarding Preparedness Within Last Six Months

	First-Year Students			Interns			Total			P value
	Yes	No	I Don't Know	Yes	No	I Don't Know	Yes	No	I Don't Know	
1. I have participated in the training classes regarding AI	5 (3.2%)	153 (96.8%)	0	5 (3.2%)	149 (94.3%)	4 (2.5%)	10 (3.2%)	302 (95.6%)	4 (1.3%)	0.132
2. I have attended in the congresses regarding AI	10 (6.3%)	148 (93.7%)	0	15 (9.5%)	140 (88.6%)	3 (1.9%)	25 (7.9%)	288 (91.1%)	3 (0.9%)	0.121
3. I have attended in the speeches related to AI	10 (6.3%)	148 (93.7%)	0	22 (13.9%)	133 (84.2%)	3 (1.9%)	32 (10.1%)	281 (88.9%)	3 (0.9%)	0.016
4. I have been vaccinated against human influenza	10 (6.3%)	138 (87.3%)	10 (6.3%)	16 (10.1%)	140 (88.6%)	2 (1.3%)	26 (8.2%)	278 (88 %)	12 (3.8%)	0.035
5. I have bought the anti AI medicine like tamiflu	5 (3.2%)	153 (96.8%)	0	4 (2.5%)	151 (95.6%)	3 (1.9%)	9 (2.8%)	304 (96.2%)	3 (0.9%)	0.210
6. I have bought a mask for myself	10 (6.3%)	148 (93.7%)	0	5 (3.2%)	152 (96.2%)	1 (0.6%)	15 (4.7%)	300 (94.9%)	1 (0.3%)	0.257
7. I have been educated regarding personal protective equipment	15 (9.5%)	138 (87.3%)	5 (3.2%)	46 (29.1%)	109 (69%)	3 (1.9%)	61 (19.3%)	247 (78.2%)	8 (2.5%)	<0.001
8. I have access to the ones that could teach me how to use the personal protective equipment	68 (43 %)	76 (48.1%)	14 (8.9%)	84 (53.2%)	69 (43.7%)	5 (3.2%)	152 (48.1%)	145 (45.9%)	19 (6 %)	0.043
9. I am personally prepared in case of AI epidemics	15 (9.5%)	143 (90.5%)	0	17 (10.8%)	133 (84.2%)	8 (5.1%)	32 (10.1%)	276 (87.3%)	8 (2.5%)	0.014

Our study was conducted with the help of a number of researchers in similar projects in Southeast Asia. The differences between the present and the previous studies are as follows: Wong et al compared the concerns and preparedness of the physicians in public and private sectors (9). They also compared level one and level three health workers in Singapore in another study (8). Koh et al. compared clinical and personal preparedness among healthcare workers in Singapore and south Jakarta, Indonesia (16). Cheong et al compared flu concerns and preparedness against the employees at a hospital in Singapore (17). The general knowledge among our groups comparing with the studies of Southeast Asia is lower especially regarding self-protection equipment which was much lower in comparison with those studies (16).

In our study 143 FYMS (90.5%) and 133 interns (84.2%) did not feel personally prepared in case of AI epidemics comparing with the study of Wong et al that almost three-quarters of health care workers (HCWs) felt personally prepared while 83.7% felt that their institutions were prepared (8). The majority in both HCWs in tertiary and public hospitals had received training for controlling

the infection (88.5%), knew about the outbreak preparedness measures (87.6%) and had been informed of the plan (77.5%) (9). These comments could be due to a previous SARS experience in the Southeast Asia that made them more experienced and more prepared for diseases such SARS or any type of influenza (18). Also the government was more concerned and made a control plan for all hospitals, especially the public ones (8, 9, 17, 19). Our study had several limitations. It was done before the recent pandemic of influenza type A (2009). Based on the international outcome of influenza A and its similarity to AI, it seems to change our knowledge and preparedness among our study groups. Another limitation was our target population since our results could not be easily generalized to ordinary people. We have made the conclusion that although the general knowledge of our study groups on AI is relatively good, they are not prepared in case of AI epidemics and it is an urge for our health care system to amend the defects and take more effective preventive measure. If the defects will not be resolved in near future, quality and quantity of services may pose thread to public health.

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Authors' Contribution

The manuscript is the combination of the following two theses: Dr. Masoumeh sadat Sabzevary's thesis entitled "Study of Knowledge, Attitudes, Concerns, Perceived Impacts, Coping Strategies and Preparedness for Avian Influenza among the First Year Medical Students, Tehran University of Medical Sciences" and Dr. Morteza Naderan's thesis entitled "Study of Knowledge, Attitudes, Concerns, Perceived Impacts, Coping Strategies and Preparedness for Avian Influenza Among the Interns, Tehran University Of Medical Sciences". The supervisors were Dr. Payman Salamati and Dr. Hamid Emadi Koochak and the advisor was Dr. Soheila Dabiran. Dr. Sasan Nowroozi helped in data analysis, literature review and manuscript writing.

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