Attitudes, Concerns, Perceived Impact and Coping Strategies for Avian Influenza Among the First Year Medical Students and Interns in Tehran University of Medical Sciences

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Abstract- To study and compare the attitudes, concerns, perceived impact and coping strategies for avian influenza (AI) among the first year medical students (FYMS) and interns in Tehran University of Medical Sciences. This was a cross sectional study carried out on FYMS (n=158) and interns (n=158) in 2008. The data collection tool was a questionnaire containing 37 questions in five parts. The three choices including "agree, disagree and unsure" were considered for all questions. We used Chi-square and Fisher's exact tests for analysis. Most of FYMS and interns (78.2%) believed their health would be depended on the care of their selves. Most of them (95.3%) believed that if they knew avian flu better, they could be more prepared for it. The majority were concerned about risk to their health from their work (62.7%). Most (67.7%) accepted the risk and only 5 (1.6%) would consider stopping work. For non-work concerns, 70.9% were concerned about their spouses/sexual partners and 65.8% about their children. For perceived impact, most (66.5%) believed that they would feel stressed at work and the majority (74.4%) expected an increased workload. FYMS and interns have positive attitudes but major concerns about contracting AI and its relation to medical practice.

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Introduction

Diseases such as Severe Acute Respiratory Syndrome (SARS), avian influenza (AI) and 2009 Influenza A (H1N1) have caused a pandemic in the world in the past decade and a similar incidence would not be unexpected in the coming years. Since new diseases emerge unexpectedly, such crises must be managed beforehand; national, regional and global systems should also get together to provide a coherent program and deal with the pandemics. Infection with avian influenza type H5N1 virus was found in Hong Kong for the first time in 1997; it has gradually caused small but growing epidemics in populations at risk and is now included in the context of regional and international health system for encountering a pandemic potential (1-9). According to the estimates, in case of a widespread AI pandemic, 2.5% to 5% of the world's population will die (175 to 350 million people) (10) and 96% of these deaths would occur in the developing countries (11). The virus is directly and indirectly transmitted from avian to humans (8,12) and in most cases, the infection appears within a week after having contact with infected birds. Although destroying contaminated birds is still the most effective method of infection control (13), it is very unlikely that killing birds can be the sole cause of infection control in affected areas. This has turned the issue into public education especially for populations at risk, including the healthcare staffs (9,14-16).

Meanwhile, medical staffs' knowledge and attitudes would have a considerable role in appropriate management of a pandemic, elimination of unreasonable fears and providing valid information for patients or healthy people (3,5-9,11-16). The main objectives of our

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research was to study and compare the attitudes, concerns, perceived impact and coping strategies for AI among the first year medical students (FYMS) and interns in Tehran University of Medical Sciences in Iran on AI.

Materials and Methods

This was a cross sectional study carried out on FYMS and interns in 2008. The period of general medicine education is seven years in the Islamic Republic of Iran now; the first two and a half years are basic sciences, the next one year is pathophysiology, the subsequent two years are practical education in teaching hospitals and the last one and a half year is the internship.

This study was conducted based on a joint project with a group of Southeast Asia researchers using a similar questionnaire contained 37 questions in five parts; attitudes (5 items), work related concerns (8 items), non-work concerns (9 items), perceived impact (10 items) and coping strategies (5 items). The questionnaire was formerly standardized in point of validity and reliability (17-20). 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 was unaware of the original questionnaire and the results were controlled. In the second stage, content validity was approved by two infectious disorders specialists and form validity was approved by one another expert. The three choices Likert scale including "agree, disagree and unsure" were considered for all questions.

In the next stage, the questionnaire was completed as a pilot study among 30 FYMS and 30 interns and necessary considerations were achieved. The equal number of 158 FYMS and interns were studied using the simple non-random sampling sequence. The samples were interviewed about the project and questionnaires were rejected to students for corrections if there were incomplete entries. Our study complied with the recommendations of the declarations of Helsinki and Tokyo guidelines and was approved by our instructional ethics committee. We analyzed data using Chi-square and Fisher's exact tests and considered type one error lower than 5%.

Results

Overall, we obtained 316 valid responses. The mean and standard deviation of the FYMS' ages were19±0.6 years and they were 25 ± 1.3 years for the interns. Ninety (57%) of the FYMS and eighty one (51.3%) of interns were female. All FYMS and 109 interns (69%) were single. Concerns sections contained five key points:

Attitudes

Two hundred and forty seven of medical students (78.2%) believed that their health status is due to the quality of their self-care. 120 (75/9%) of FYMS and 119 (75.3%) of interns (and 75.6% of all) disagreed with the issue that no way exists for preventing these diseases (P=0.013). 102 (64.6%) of FYMS and 113 (71.5%) of interns (and 68% of all) believed that preventing the disease depended on them (P=0.001). 301 of medical students (95.3%) believed that having a better understanding of AI is useful for dealing with the disease. 76 (48.1%) of FYMS and 88 (55.7%) of interns (and 51.9% of all) opposed this idea arguing that in case of a pandemic, nothing much can be done to increase the survival (P=0.007). Table 1 shows the full information.

Work related concerns

Seventy-nine (50%) of FYMS and 119 (75.3%) of interns (and 62.7% of all) felt that their job puts them at risk of exposure to AI (P<0.001); 62 (39.2%) of FYMS and 92 (58.2%) of interns (48.7% of all) were afraid of becoming ill (P<0.001). 124 of medical students (39.3%) thought that they should not be responsible for taking care of AI patients; however, 83 (52.5%) of FYMS and 99 (62.7%) of interns (and 57.6% of all) accepted the risk of contracting AI and considered it as a part of their job (P<0.001). 214 of medical students (67.7%) agreed with the risk of developing the disease as a part of their job. In a widespread epidemic, 285 of medical students (90.2%) would not only think of changing their jobs but also 260 of medical students (83.5%) would not believe that it was acceptable if their colleagues resign because of their fear. It was to be noted that only 45 (28.5%) of FYMS and 31 (19.6%) of interns (and 24.1% of all) believed that their employers would look after their medical needs (P=0.002). Table 2 shows the full information.

Non-work concerns

Sixty two (39.2%) of FYMS and 79 (50%) of interns (and 44.6% of all) believed the persons close to them were at high risk due to their jobs (P<0.001). Eighty five (53.8%) of FYMS and 49 (31.1%) of interns (and 42.4% of all) believed people close to them worried to be infected via them (P<0.001).

Table 1. Attitudes regarding an AI pandemic

	First year students			Interns			Total			*P* value
	Agree	Disagree	Unsure	Agree	Disagree	Unsure	Agree	Disagree	Unsure	
1- Whether I enjoy good health is dependent on how well I take care of myself	121 (76.6%)	22 (13.9%)	15 (9.5%)	126 (79.8%)	21 (13.2%)	11 (7%)	247 (78.2%)	43 (13.6%)	26 (8.2%)	0.691
2- If you are meant to get Avian-flu, you will get it; there is nothing you can do not prevent it	33 (20.9%)	120 (75.9%)	5 (3.2%)	22 (13.9%)	119 (75.3%)	17 (10.8%)	55 (17.4%)	239 (75.6%)	22 (7%)	0.013
3- Many types of disease can be prevented; it is up to us to do something about it	102 (64.6%)	24 (15.2%)	32 (20.3%)	113 (71.5%)	35 (22.2%)	10 (6.3%)	215 (68%)	59 (18.7%)	42 (13.3%)	0.001
4- If we know avian flu better, we can be more prepared for it	158 (100%)	0 (0%)	0 (0%)	143 (90.5%)	9 (5.7%)	6 (3.8%)	301 (95.3%)	9 (2.8%)	6 (1.9%)	-
5- If widespread Avian-flu occurs, there is not much you can do to improve your survival	35 (22.2%)	76 (48.1%)	47 (29.7%)	46 (29.1%)	88 (55.7%)	24 (15.2%)	81 (25.6%)	164 (51.9%)	71 (22.5)	0.007

Table 2. Work related concerns regarding an AI pandemic

	First year students			Interns			Total			*P* value
	Agree	Disagree	Unsure	Agree	Disagree	Unsure	Agree	Disagree	Unsure	
1- My job would put me at great exposure risk	79 (50%)	59 (37.3%)	20 (12.7%)	119 (75.3%)	31 (19.7%)	8 (5.1%)	198 (62.7%)	90 (28.4%)	28 (8.9%)	0.000
2- I am afraid of falling ill with Avian-flu	62 (39.2%)	72 (45.6%)	24 (15.2%)	92 (58.2%)	39 (24.7%)	27 (17.1%)	154 (48.7%)	111 (35.2%)	51 (16.1%)	0.000
3- I should not be looking after Avian-flu patients	67 (42.4%)	50 (31.7%)	41 (25.9%)	57 (36.1%)	56 (35.4%)	45 (28.5%)	124 (39.3%)	106 (33.5%)	86 (27.2%)	0.514
4- The risk I am exposed to is not acceptable	10 (6.3%)	83 (52.5%)	65 (41.1%)	29 (18.4%)	99 (62.7%)	30 (19%)	39 (12.3%)	182 (57.6%)	95 (20.1%)	0.000
5- I accept that the risk of contracting Avian-flu is part of job	103 (65.2%)	29 (18.4%)	26 (16.5%)	111 (70.2%)	27 (17.1%)	27 (12.7%)	214 (67.7%)	56 (17.7%)	46 (14.6%)	0.582
6- Might look for another job because of risk	0 (0%)	143 (90.5%)	15 (9.5%)	5 (3.1%)	142 (89.9%)	11 (7%)	5 (1.6%)	285 (90.2%)	26 (8.2%)	-
7- Acceptable if colleagues resign because of their fear	15 (9.5%)	128 (81%)	15 (9.5%)	6 (3.8%)	132 (83.5%)	20 (12.7%)	21 (6.6%)	260 (82.3%)	35 (11.1%)	0.099
8- Confident employer would look after my needs if I fall ill with Avian-flu	45 (28.5%)	59 (27.3%)	54 (34.2%)	31 (19.6%)	83 (52.6%)	44 (27.8%)	76 (24.1%)	142 (44.9%)	98 (31%)	0.022

Most of the subjects were concerned about transmitting AI to their spouse/sexual partner (70.9%), children (65.8%), parents (48.7%), friends (44.9%) and colleagues (41.3%). Table 3 shows the full information.

Perceived impact

One hundred and twenty four (78.5%) of FYMS and 96 (60/8%) of interns (and 69.6% of all) were not afraid of the risks facing their families (P<0.001). 20(12.7%) of FYMS and 51(32.3%) of interns (and 22.5% of all) reported concerns about the inadequate staff in demands (P=0.001). Forty (25.3%) of FYMS and 72 (45.5%) of interns (and 35.4% of all) thought that there could be more conflicts amongst colleagues at work (P=0.001) and 210 of medical students (66.5%) had mentioned that more stress would be faced when working. 129 (81.6%) of FYMS and 106 (67%) of interns (and 74.4% of all) believed that they would have to work overtime with an increased workload (P=0.008).101 (63.9%) of FYMS and 66 (41.8%) of interns (and 52.8% of all) considered the probability for overtime working (P<0.001). Table 4 shows the full information.

Table 3. Non-work concerns regarding an AI pandemic.

	First year students			Interns			Total			*P*
	Agree	**Disagree**	**Unsure**	**Agree**	**Disagree**	**Unsure**	**Agree**	**Disagree**	**Unsure**	**value**
1- People close to me would be at high of getting Avian-flu because of my job	62 (39.2%)	82 (51.9%)	14 (8.9%)	79 (50%)	50 (31.4%)	29 (18.4%)	141 (44.6%)	132 (41.8%)	43 (13.6%)	0.000
2- I would be concerned for my: spouse/sexual partner	111 (70.3%)	28 (17.7%)	19 (12%)	113 (71.5%)	20 (12.6%)	25 (15.8%)	244 (70.9%)	48 (15.2%)	44 (13.9%)	0.338
3- I would be concerned for my children	107 (67.7%)	22 (13.9%)	29 (18.4%)	101 (63.9%)	27 (17.1%)	30 (19%)	208 (65.8%)	49 (15.5%)	59 (18.7%)	0.705
4- I would be concerned for my parents	37 (23.4%)	111 (70.3%)	10 (6.3%)	117 (74%)	26 (16.5%)	15 (9.5%)	154 (48.7%)	137 (43.4%)	25 (7.9%)	0.215
5- I would be concerned for my friends	41 (25.9%)	83 (52.5%)	34 (21.5%)	101 (63.9%)	37 (23.4%)	20 (12.7%)	142 (44.9%)	120 (38%)	54 (17.1%)	0.061
6-I would be concerned for my colleagues	42 (26.6%)	68 (43%)	48 (30.4%)	88 (55.6%)	36 (22.8%)	34 (21.5%)	130 (41.3%)	104 (32.9%)	82 (25.9%)	0.067
7- I would be concerned for others	33 (20.9%)	50 (31.6%)	75 (47.5%)	60 (38%)	43 (27.2%)	55 (34.8%)	93 (29.4%)	93 (29.4%)	130 (41.2%)	0.071
8- People close to me would be worried for my health	28 (17.7%)	105 (66.5%)	25 (15.8%)	114 (72.1%)	14 (8.9%)	30 (19%)	142 (44.9%)	119 (37.7%)	55 (17.4%)	0.064
9- People close to me would be worried as they may get infected by me	85 (53.8%)	44 (27.8%)	29 (18.4%)	49 (31.1%)	41 (25.9%)	68 (43%)	134 (42.4%)	85 (26.9%)	97 (30.7%)	0.000

Table 4. Perceived impact regarding an AI pandemic

	First year students			Interns			Total			*P*
	Agree	**Disagree**	**Unsure**	**Agree**	**Disagree**	**Unsure**	**Agree**	**Disagree**	**Unsure**	**value**
1- I would be afraid of telling my family about the risk I am exposed to	23 (14.6%)	124 (78.5%)	11 (7%)	33 (20.9%)	96 (60.8%)	29 (18.4%)	56 (17.7%)	220 (69.6%)	40 (12.7%)	0.001
2- People would avoid me because of my job	20 (12.7%)	105 (66.5%)	33 (20.9%)	21 (13.2%)	102 (64.6%)	35 (22.2%)	41 (13%)	207 (65.5%)	68 (21.5%)	0.939
3- People would avoid my family members because of my job	10 (6.3%)	120 (75.9%)	28 (17.7%)	9 (5.7%)	115 (72.8%)	34 (21.5%)	19 (6%)	235 (74.4%)	62 (19.6%)	0.691
4- I would avoid telling others people about the nature of my job	0 (0%)	148 (93.7%)	10 (6.3%)	5 (3.1%)	133 (84.2%)	20 (12.7%)	5 (1.6%)	218 (88.9%)	30 (9.5%)	-
5- There would be inadequate staff at my workplace to handle the increased demand	20 (12.7%)	38 (24.1%)	100 (63.3%)	51 (32.3%)	62 (39.3%)	45 (28.5%)	71 (22.5%)	100 (31.6%)	145 (45.9%)	0.000
6- There would be more conflicts amongst colleagues at work	40 (25.3%)	47 (29.7%)	71 (44.9%)	72 (45.5%)	33 (20.9%)	53 (33.5%)	112 (35.4%)	80 (25.4%)	124 (39.2%)	0.001
7- I would feel stressed at work	97 (61.4%)	28 (17.7%)	33 (20.9%)	113 (71.5%)	23 (14.5%)	22 (13.9%)	210 (66.5%)	51 (16.1%)	55 (17.4%)	0.142
8- I would have an increase in workload	129 (81.6%)	9 (5.7%)	20 (12.7%)	106 (67%)	23 (14%)	30 (19%)	235 (74.4%)	31 (9.8%)	50 (15.8%)	0.008
9- I would have to work overtime	101 (63.9%)	9 (5.7%)	48 (30.4%)	66 (41.8%)	31 (19.6%)	61 (38.6%)	167 (52.8%)	40 (12.7%)	109 (34.5%)	0.000
10- I would have to do work not normally done by me	85 (53.8%)	29 (18.4%)	44 (27.8%)	84 (53.2%)	28 (17.7%)	46 (29.1%)	169 (53.5%)	57 (18%)	90 (28.5%)	0.967

Table 5. Coping strategies regarding an AI pandemic

	First year students			Interns			Total			*P*
	Agree	Disagree	Unsure	Agree	Disagree	Unsure	Agree	Disagree	Unsure	value
1- Learning as much as I can about avian flu	91 (57.6%)	59 (37.3%)	8 (5.1%)	122 (77.2%)	26 (16.5%)	10 (6.3%)	213 (67.4%)	85 (26.9%)		0.000
2- Adhering to infection control protocols and recommended measures	109 (69%)	30 (19%)	19 (12%)	135 (85.4%)	12 (7.6%)	11 (7%)	244 (77.2%)	42 (13.3%)	30 (9.5%)	0.002
3- Accepting this risk that I may be infected	115 (71.8%)	35 (22.2%)	8 (5.1%)	129 (81.6%)	20 (12.7%)	9 (5.7%)	244 (77.2%)	55 (17.4%)	17 (5.4%)	0.084
4- Not thinking too much about the risk	97 (61.4%)	34 (21.5%)	27 (17.1%)	114 (72.1%)	33 (20.9%)	11 (7%)	211 (66.8%)	67 (21.2%)	38 (12%)	0.017
5- Keeping my mind positive and convincing myself that I would not be infected with avian flu	68 (43%)	81 (51.3%)	9 (5.7%)	54 (34.2%)	85 (53.8%)	19 (12%)	122 (38.6%)	166 (52.5%)	28 (8.9%)	0.072

Coping strategies

Ninety one (57.6%) of FYMS and 122 (77.2%) of interns (and 67.4% of all) agreed with the need for having maximum awareness about the disease (P<0.001), and 109 (69%) of FYMS and 135 (85.4%) of interns (and 77.2% of all) believed that adhering to the recommended criteria for infection control was necessary (P=0.002). Ninety seven (61.4%) of FYMS and 114 (72.1%) of interns (and 66.8% of all) agreed with not thinking too much about the risks (P=0.017). Table 5 shows the full information.

Discussion

Although being concerned for their personal and family's health, FYMS and interns had positive attitudes, accepted the risk of contracting AI as part of their profession and only a few numbers would change their jobs because of the risk. Interns' occupational concerns were more than the first medical students including the fear of developing the disease, fear of the disease, lack of support from employers, infection of people close to them, talking to the family about the dangers and the likely debates among the co-workers. In other words, interns with more responsibility for managing the crisis concerned more in comparison of the students. On the other hand, adaptability concerns of the interns are more logical; they believed that in case of an epidemic, they should have maximum awareness, adhere to infection control recommendations and not excessively think about the risks.

This study was conducted with the help of a number of researchers in similar projects in Southeast Asia. The differences between the present and previous studies were as follows: Wong *et al*. compared the concerns and preparedness of the physicians in public and private sectors. They also compared level one and level three health workers in Singapore in another study. Koh *et al.* compared flu concerns among healthcare workers in Singapore and south Jakarta, Indonesia. Cheong *et al*. compared flu concerns and preparedness against the employees at a hospital in Singapore (17-20).

In our study, 62.7% of the participants felt that their jobs put them at the risk of infection; such results were similar to those of physicians (95%) and health system employees (82.7%) in the study of Wong *et al.* (18,19); hospital staff (75.4%) in the study of Cheong *et al.* (20), heath workers in south Jakarta (56.1%) and Singapore (85.6%) in the study of Koh *et al.* (17) and in health workers (75%) in the study of Imai *et al*. (21). These comments should be considered important because their performance could be affected at the time of an epidemic.

Among the subjects, 67.7% accepted that developing AI was a part of their jobs; this was similar to the results on physicians (82.5%) and healthcare staff (75%) in the study of Wong *et al*. (18,19). Ehrenstein *et al.* conducted a study on hospital staffs in Germany too; 72% of the participants believed that their jobs put them at risk of the disease (22). On the contrary, a study carried out on health care workers in America showed that 50% of them were not interested in accepting the risk as a part of their jobs (23) and this might be because of the fear of spreading the disease to their family members. In the study of Abbate *et al*. on poultry workers, only 4.3% of them were concerned about the risk of the disease (24). Another study by Willis *et al*. performed on nurses in America indicated that unvaccinated nurses believed that they were not at risk of influenza, because their immune system had

become powerful due to their exposure to various diseases (25).

Forty eight percent of participants of our study were afraid of the disease, although the findings were less than the studies of Koh *et al*. in south Jakarta and Singapore showing 82.4% and 78.5% respectively (17), Imai *et al*. indicating 65% (21), Wong *et al*. with 89.7% among the physicians and 75.9% among the healthcare staffs (18-19). Perhaps the differences between these studies were because of the higher prevalence of the disease in East Asia. Ninety percent of the participants in our study did not think of changing jobs, or resigning in case of an epidemic; they even did not agree with the resignation of their co-workers. In the study of Wong *et al.* physicians (88.2%) and healthcare workers (85%) did not think of changing their jobs; accordingly, 44.2% and 49.4% did not agree with the resignation of their colleagues (18,19). In the study of Cheong *et al*. 85% of the participants did not think of changing their jobs and also 52.3% did not agree with their colleagues resignation (20); in the study of Koh *et al*. in south Jakarta and Singapore, 80.3% and 85.9% of the participants did not think of changing their jobs and also 87.4% and 48% of the participants did not agree with the resignation of co-workers respectively (17). In the study of Imai *et al*. 85% of the participants did not think of changing their jobs too (21). Interestingly, in the study of Wong *et al*. 55.8% of the physicians agreed with the resignation of their colleagues due to their fear of the disease but 11.8% of them were willing to change their jobs (18). Balicer *et al*. conducted a study on 308 local heath workers in America and found that 50% of them were not willing to attend their work in case of an epidemic (23).

It was noteworthy that only 24.1% of the participants believed that the authorities would fulfill their needs in case of becoming ill and this was a point to hesitate. However, over 80% of the physicians and 90% of the health workers agreed with this comment in Wong *et al.* study (18,19); and 88.5% agreed with the idea raised in the study of Cheong *et al.* (20). Also, in the study of Koh *et al*. in South Jakarta and Singapore, 76.2% and 91% of the participants believed that the authorities would fulfill their needs in case of becoming ill respectively (17).

In our study, more concerns inscribed toward spouses and sexual partners (70.9%), but in studies of Wong *et al*. and Koh *et al*. more than 96% and 95% are concerned about the risk respectively and this could be due to a higher percentage of married persons (17-19).

Seventy four percent of the participants believed that their work would be increased and this was similar to Wong *et al*. study on physicians and health workers at 81.3% and 78.6%, respectively (18,19). Koh *et al.* study in South Jakarta and Singapore demonstrated 40.6% and 81.3%, respectively (17) and it was 73.6% in Cheong *et al.* study (20). Fifty two percent of the participants believed that they would be forced to work overtime but in the study of Wong *et al*. on physicians and health workers, 77% and 79% of the subjects believed to work overtime respectively (18,19) and Koh *et al*. study believed 35.1% and 83.5% in South Jakarta and Singapore respectively (17) while Cheong *et al*. study believed 69.4% (20).

The majority of participants were not afraid of saying their jobs to others (88%) or social isolation (74%) but in the Wong *et al*. study they were 33% and 72.7% respectively (18-19) and in Koh *et al.* study they were 87.9% and 72.3% respectively (17).

This study had several limitations. It had been done before the recent pandemic flu type A. As a whole it seems to affect people under study and their concerns would change. Another limitation was our target population that our results could not be generalized to ordinary people.

In conclusion, the FYMS and particularly interns have major concerns about AI and its relation to their medical practice. If these concerns cannot be resolved in the future, quality and quantity of services may be imposed with problems.

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