

## Knowledge, Attitudes, and Practices Regarding Pandemic H1N1 Influenza Among Medical and Dental Residents and Fellowships in Shiraz, Iran

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### ABSTRACT

**Background:** Influenza disease is one of the oldest medical problems that can cause severe illness and high mortality rates, worldwide. In flu pandemics, medical and dental students' knowledge, attitudes, and practices (KAP) is critical to save patients life. The aim of this study was to determine the score of KAP toward the Pandemic H1N1 and their predictor factors among the medical and dental residents and fellowships of Shiraz University of Medical Sciences, Iran.

**Methods:** In 2009, 125 participants were recruited in a convenient sampling cross-sectional survey. Self-reported questionnaire were used and results were analyzed applying appropriate statistical tests.

**Results:** The mean score of participants' knowledge, attitude and practice were 22.6, 21.1 and 26.5 respectively. Participants practice had significant linear positive correlation with knowledge and attitude. Also, their age was significantly and directly correlated to knowledge and practice. The educational major, age, and sex were significant predictors of responder's knowledge score and age was the only significant predictor of both attitude and practice scores.

**Conclusions:** High knowledge is not sufficient lonely for improve attitude and practices. It seems that traditional educational models are not efficient and governments should emphasize to advanced and motivational education methods including health belief model and motivational interview at postgraduate levels. Perhaps younger students, dentists and males have less motivation to change their attitude and behavior, so we can focuses our interventions in these groups.

**Key words:** Attitudes, fellowships, influenza, knowledge, pandemic H1N1, practices, residents, Shiraz

### INTRODUCTION

Influenza disease is affected approximately 5-15% of global population, annually. This changeable virus is responsible for several pandemic events such as 1947, 1976, 1977, and 2009 pandemics.<sup>[1,2]</sup> The novel H1N1 virus was detected in 2009

pandemic that was reported in Mexico first and then spreading around the world.<sup>[3,4]</sup>

Iran, experienced this terrible event, like other countries. Formal statistics reports explained that 3,672 known cases of influenza were confirmed from June to December 30, 2009.<sup>[4,5]</sup>

Most of patients presented mild symptoms and their disease was self-limited but some of them presented with severe complications including deaths.<sup>[3]</sup>

During the epidemic distribution of infection diseases such as influenza, health care workers are responsible for delivering good quality management and treatment. Their knowledge and correct behavior can play an important role in disease spreading among individuals, and also protecting them from illness. Thus, medical and dental students especially residents education about preventive strategies, effective treatment and follow-up is critical, as well as their actions and behaviors in these fields.<sup>[1,6]</sup> Medical and dental residents and fellowships usually donot have any longtime experiences and therefore they may have a greater risk comparison to other health care workers. Proper knowledge, attitude, and practices are crucial to prevent and control the disease, particularly among residents who has a greater risk of infection.<sup>[7]</sup>

The current study reports the knowledge, attitudes and practices (KAP) toward the pandemic H1N1 among the medical and dental residents and fellowships of Shiraz University of Medical Sciences. Also, we associated some demographic factors with residents' knowledge, attitudes and practices, to determine the probable predictors.

## METHODS

### Subjects and sampling

This study was a cross-sectional survey conducted from September through October 2009, within Shiraz school medicine in Iran. Shiraz University of Medical Sciences is ranked as one of the best medical universities in Iran. It is the home for 13 hospitals, which makes it a regional health care service and the reference medical center in south half of Iran.

The self-administered questionnaire was offered to 125 residents and fellowships regarding

influenza sign and symptoms, preventive and treatment efforts, as well as precautions activities. Annually, 153 medical residents and 21 fellowships are accepted to studying in Shiraz University of Medical Sciences as post graduate students in different majors and faculties. Every year, in Shiraz University of Medical Sciences, Education development center (EDC) invite all of the new medical and dental residents and fellowships to teach them several key points about their educational role toward medical students. All of the participants in the EDC programs were included in our study applying convenient sampling. Dissatisfaction was the only exclusion criteria in this study. After coordinating with EDC master, the researchers went to the meetings and waited to gather the completed questionnaires. The researches described participants about the importance of their participation and request them to fill the questionnaires completely and carefully. Researchers receive oral informed consent from participants before performing the questionnaires.

### Questionnaire design

The questionnaire had two components: a guideline to filling the questionnaire for participants and their demographic factors; and knowledge, attitudes, and practices questions about pandemic swine influenza disease. All questions were close-ended except the participant's age. Some expert professors in influenza field and some expert professors in KAP study were consult to improve the validity of the questionnaire. A pilot study was performed on 50 participants in order to establish the reliability of the questionnaire using Cronbach's alpha test that was 0.83 for knowledge item, 0.74 for attitudes item and 0.66 for practices item.

Demographic factors including age, gender, marital status, educational faculty (medicine, dental), and educational grade (resident, fellowship) were asked. One close question on the necessity of educational programs from participants' point of view was designed (yes/no).

Participant's knowledge was measured using 35 items. They were allowed to choose answers "correct", "incorrect", and "do not know". The score value of 1 was allocated to answers that were agreed to "WHO" and "CDC" guidelines.<sup>[8,9]</sup> All other responses were give 0 score value. In 7

questions among 35 knowledge questions, the valid answer was “incorrect” to minimize the risk of halo effects. Thus, the Total score of knowledge questions ranged between 0-35.

Twelve questions were assessed participants attitudes. According to the subject importance from participant’s perspective the responses were made on a 5 point Likert scale (very high importance, high importance, moderate importance, low importance, doesnot have importance). Two reverse phrases were asked to prevent from halo effects. Therefore, participants’ score for each question ranged 1-5, and the attitudes score for each participant ranged in between 12-60.

Twelve questions were designed to measure the participant’s ideal behaviors. The responses were made on a 5 point Likert scale. Two reverse questions were asked in this section. The participants’ score for each question ranged in between 1-5 and the total score of practice questions ranged 12-60. Finally, one question was asked about the participants’ knowledge resource that they could choose more than one selection among conferences and pamphlets, specialized internet resources, unspecialized internet resources, scholarly journals, public journals, books, media, and other resources.

### Statistical analysis

We used version 16 of SPSS software to analysis the study results. Independent sample T-test was used to determine the significant differences in the means of knowledge, attitudes, and practices according to demographic factors. To compute the correlation between knowledge and attitudes, knowledge and practices, attitudes and practice, as well as age with knowledge, attitudes, and practices we analyzed data using Spearman correlation coefficient statistic method. Finally to determine the significant predictor factors of the level of knowledge, attitudes, and practices we used Multivariate linear regression and Multiple multivariate analyses.  $P$  value  $< 0.05$  was considered as statistical significance for all analysis.

## RESULTS

One hundred and twenty five selected individuals completed the questionnaires. The response rate of this survey was very high; about 98%. The mean age of the overall responders was 30.62( $\pm 5.17$ ) years. Approximately, 40.8% of participants were

female and 54% of participants were married. Among responders, 79.7% were physician, 20.3% were dentist also 81.3% of all population was medical residents. Ninety five percent of them believed that educational course about influenza is necessary and they should pass it to improve their information. The mean score of knowledge, attitude and practices did not differ significantly among males and females.

Forty five percent of participants used conferences and pamphlets for improving their knowledge about influenza infection, 7.1% used specialized internet resources, and 12.4% unspecialized internet resources. Approximately, 16.8%, 31.9%, 27.4% used scholarly journals, public journals, and books, respectively. Media and other resources were allocated 54.9% and 8.9% of answers to themselves.

Student T-test analysis didnot show any statistical significant differences among several demographic categories; except knowledge scores that were greater in married than single participants, physicians than dentists and fellowships than residents [Table 1]. Calculating the correlation showed the presence of significant linear positive correlation between knowledge and practice items (Correlation Coefficient: 0.45,  $P$  value  $< 0.001$ ) and attitude with practice (Correlation Coefficient: 0.50,  $P$  value  $< 0.001$ ). Our data was not sufficient enough to show significant correlation between attitude and knowledge. Analysis the correlation between age and participant’s knowledge, attitude and practices showed significant positive linear correlation between age and knowledge and behavior scores (knowledge Correlation Coefficient: 0.49,  $P$  value  $< 0.001$ , practice Correlation Coefficient: 0.352,  $P$  value 0.002). Tables 2, 3 and 4 show the frequency of participants responses to Knowledge, Attitude and Practice questions, respectively. Table 5 shows multivariate linear regression and multiple multivariate analyses of the KAP scores in relation to several independent variables. The educational major, age, and sex were significant predictors for responders knowledge score in multivariate linear regression model. A high score of knowledge was taken by females, older individuals and physicians. Age was the only significant predictor for both attitude and practice scores and aging was associated with getting better scores in these items. After applying the multiple multivariate analysis, age and sex was

**Table 1:** Mean of knowledge, attitude and practice scores towards pandemic influenza A (H1N1) in different groups

	Marital status		Educational major		Educational grade		Gender	
	Single	Married	Physician	Dentist	Resident	Fellowship	Male	Female
Knowledge score mean±SD	21.4±6.9	23.6±4.0	23.9±4.5	17.1±6.3	22.0±5.8	25.2±3.4	22.6±5.9	22.7±4.9
P-value	0.039		0.001		0.018		0.206	
Attitude score mean±SD	19.5±5.1	19.1±4.2	19.3±4.7	19.5±4.6	19.4±4.5	18.7±5.2	19.5±4.8	18.9±4.3
P-value	0.664		0.786		0.522		0.481	
Practice score mean±SD	27.1±6.3	26.1±4.7	26.2±4.9	28.2±8.4	26.9±5.7	24.7±4.1	26.3±5.1	26.7±6.2
P-value	0.394		0.264		0.129		0.748	

**Table 2:** The frequency of responses of participants to knowledge questions regarding pandemic influenza A

Questions about knowledge of H1N1 influenza	Participants answers N (%)		
	Yes	No	Don't know
Influenza Signs and symptoms including fever, sneeze, malaise, vomiting, etc.	115 (91.9)	7 (5.6)	3 (2.4)
Influenza causes severe illness than common cold	94 (75.2)	20 (16.0)	11 (8.8)
Influenza does not cause atypical symptoms in children*	32 (25.6)	70 (56.0)	23 (18.4)
Fever and malaise are prominent and sometimes only symptoms of influenza in infants	100 (80.6)	4 (3.2)	20 (16.1)
Confusion, cyanosis, apnea and irritability are severe influenza symptoms in children	97 (78.2)	8 (6.5)	19 (15.3)
Influenza may not lead to death*	10 (8.2)	104 (85.2)	8 (6.6)
The incubation period of influenza is 1-14 days	83 (67.5)	3 (2.4)	37 (30.1)
Transmission period of influenza is 1 day before onset of symptoms and 7 days after them	77 (63.1)	15 (12.3)	30 (24.6)
children are contagious for a shorter period than adults*	32 (26.2)	32 (26.2)	58 (47.5)
Sometimes contagious period is longer than 7 days	64 (52.5)	23 (18.9)	35 (28.7)
Influenza causes less severe illness in pregnant women*	8 (6.5)	82 (66.1)	34 (27.4)
Breast feeding is protective factor against influenza in infants	108 (87.8)	2 (1.6)	13 (10.6)
Persons older than 60 years have natural immunity against influenza	13 (10.6)	99 (80.5)	11 (8.9)
High risk groups for influenza are:			
Children < 5 years	110 (89.4)	3 (2.4)	10 (8.1)
Pregnant women	99 (79.8)	11 (8.9)	14 (11.3)
Patients with renal failure	98 (79.0)	6 (4.8)	20 (16.1)
Patients with cardiovascular disease	116 (94.3)	1 (0.8)	6 (4.9)
Old persons	73 (59.8)	30 (24.6)	19 (15.6)
A person in good health with common cold symptoms may not need to see a doctor.	42 (34.1)	73 (59.3)	8 (6.5)
Influenza needs immediate reporting	114 (91.9)	4 (3.2)	6 (4.8)
There is not an effective vaccine against influenza*	59 (47.6)	54 (43.5)	11 (8.9)
Seasonal influenza vaccination for all children aged 6 months to 18 years old is recommended	49 (39.8)	42 (34.1)	32 (26.0)
People should wash their hands regularly to avoid influenza	103 (83.1)	16 (12.9)	4 (4.0)
Isolation precautions should be performed by all patients	68 (55.7)	26 (21.3)	28 (23.0)
Wearing N95 mask by patient is an effective prevention strategy	105 (85.4)	11 (8.9)	7 (5.7)
Wearing N95 mask by HCWs is an effective prevention strategy	107 (87.0)	1 (0.8)	15 (12.2)
HCWs should wash their hands regularly	110 (88.7)	6 (4.8)	8 (6.5)
Following standard precautions during airway management is important	71 (57.7)	14 (11.4)	38 (30.9)

Contd...

**Table 2:** Contd...

Questions about knowledge of H1N1 influenza	Participants answers N (%)		
	Yes	No	Don't know
Influenza has several complications including chronic diseases	108 (87.1)	4 (3.2)	12 (9.7)
Influenza causes less deaths among children than adults*	18 (14.5)	90 (72.6)	16 (12.9)
Salicylates are contraindicated in children younger than 18 years	103 (83.1)	9 (7.3)	12 (9.7)
The ideal duration of Treatment is 5 days	46 (37.7)	21 (17.2)	55 (45.1)
Antiviral drugs can reduce the influenza symptoms	90 (73.2)	16 (13.0)	17 (13.8)
Antiviral drugs regimen should be initiated within 2 days of symptoms	91 (74.0)	8 (6.5)	24 (19.5)
Influenza virus is resistant to amantadine and rimantadine*	11 (8.9)	64 (51.6)	49 (39.5)

\*Reverse, HCWs: Health care workers

**Table 3:** The frequency of responses of participants to attitude questions regarding pandemic influenza A

Questions about attitude of H1N1 influenza	Participants answers N (%)				
	Very high importance*	High importance*	Moderate importance*	Low importance*	Does not have importance
Understanding the influenza symptoms in children and pregnant women is important	83 (66.4)	31 (25.6)	7 (5.8)	0 (0.0)	0 (0.0)
Breast feeding is an easy way to prevention	78 (64.5)	31 (25.6)	10 (8.3)	2 (1.7)	0 (0.0)
Examining a person in good health with common cold symptoms is important**	87 (72.5)	30 (25)	3 (2.5)	0 (0.0)	0 (0.0)
Immediate reporting of confirmed cases is important	50 (42)	50 (42)	17 (14.3)	2 (1.7)	0 (0.0)
Hand washing is important for influenza prevention	47 (38.8)	52 (43)	14 (11.6)	7 (5.8)	1 (0.8)
Isolating patients is critically important	82 (68.3)	33 (27.5)	5 (4.2)	0 (0.0)	0 (0.0)
Using N95 masks by patients is critically important	93 (76.9)	25 (20.7)	2 (1.7)	1 (0.8)	0 (0.0)
Using N95 masks by HCWs is critically important	41 (34.2)	38 (31.7)	31 (25.8)	7 (5.8)	3 (2.5)
Following hand hygiene by HCWs is critically important	57 (48.3)	32 (27.1)	26 (22)	2 (1.7)	1 (0.8)
Avoid salicylates prescription in patients is important**	59 (50)	40 (33.9)	17 (14.4)	2 (1.7)	0 (0.0)
Rapid case identification and treatment is important	59 (49.2)	34 (28.3)	20 (16.7)	2 (1.7)	5 (4.2)
Prescribing amantadine and rimantadine drugs for patients is important	85 (71.4)	23 (19.3)	8 (6.7)	2 (1.7)	1 (0.8)

\* Very high importance: (80-100%), High importance: (60-79%), Moderate importance: (40-59%), Low importance: (20-39%), does not have importance: (0-20%) \* Reverse Questions

the main predictors of knowledge, attitude and practices.

## DISCUSSION

The health care workers immediate and appropriate responses have a crucial role to control H1N1 influenza pandemic.<sup>[10]</sup> In Iran, Medical residents and fellowships are important health care

providers because they visit patients immediately after hospitalization and often manage patients in major referral hospitals. Dentists have an important role by their contacts with several patients and their essential roles in disease transmission trends. Medical staffs and students are responsible to aware peoples and educate them about how to manage their diseases.<sup>[11]</sup>

Most of participants answered the knowledge

**Table 4:** The frequency of responses of participants to practice questions regarding pandemic influenza A

Questions about practice of H1N1 influenza	Participants Answers N (%)				
	Always*	Often*	Sometimes*	Seldom*	Never*
Patients could go to work after 24 h of fever subsides	48 (46.2)	23 (22.1)	16 (15.4)	17 (16.3)	0 (0.0)
Pay more attention to children and pregnant women's symptom	90 (80.4)	18 (16.1)	3 (2.7)	1 (0.9)	0 (0.0)
Advising all people to seek the care if they have common cold syndrome**	62 (53.9)	37 (32.2)	8 (7.0)	7 (6.1)	1 (0.9)
Reporting the confirmed case immediately	77 (68.1)	24 (21.2)	6 (5.3)	4 (3.5)	2 (1.8)
Advising people to washing their hands regularly	91 (79.1)	16 (13.9)	5 (4.3)	1 (0.9)	2 (1.7)
Isolating patients with influenza symptoms	50 (44.2)	25 (22.1)	18 (15.9)	10 (8.8)	10 (8.8)
Following hand washing hygiene recommendations	76 (66.7)	30 (26.3)	4 (3.5)	2 (1.8)	2 (1.8)
Advising the patients to use N95 mask	69 (60.5)	35 (30.7)	7 (6.1)	2 (1.8)	1 (0.9)
Following Isolation precautions to all patients	55 (53.9)	22 (21.6)	8 (7.8)	15 (14.7)	2 (2.0)
Prescribing salicylate drugs in patients with influenza symptoms**	11 (9.7)	1 (0.9)	2 (1.8)	8 (7.1)	91 (80.5)
Prescribing antiviral drugs in patients for 10 days	20 (18.9)	24 (22.6)	22 (20.8)	16 (15.1)	24 (22.6)
Prescribing neuraminidase drugs in patients with influenza symptoms	6 (5.8)	7 (6.8)	15 (14.6)	24 (23.3)	51 (49.5)

\*Always: (80-100%), Often: (60-79%), Sometimes: (40-59%), Seldom: (20-39%), Never: (0-20%). \*\*Reverse questions

**Table 5:** Multivariate linear regression and multiple multivariate analyses of knowledge, attitudes and practice towards pandemic influenza A

Univariate analysis	$\beta$	95% CI for $\beta$	t	P-value
Knowledge score: F=20.23, P< 0.05, R2=41%, adjusted R2=39.6%				
Educational major(dentist=1)	-6.62	-9.33 to -3.90	-4.84	<.001
Age	0.42	0.21 to.62	4.12	<.001
Sex(male=1)	-3.69	-5.82 to -1.56	-3.45	0.001
Constant	12.90			
Attitude score: F=4.81, P< 0.05, R2=5%, adjusted R2=4.1%				
Age	0.46	0.04 to.88	2.19	0.031
Constant	-5.55			
Practice score: F=10.66, P< 0.05, R2=13%, adjusted R2=12.1%				
Age	0.19	0.07 to.31	3.26	0.002
Constant	0.41			
Multivariate analysis*		F		P-value
Age		4.66		0.006
Sex		2.83		0.047

\*Knowledge, attitude, practice score

questions correctly. Their responses to attitude and practice questions were good but weaker than knowledge questions. One study in Thailand also showed the high level of scores in these items regarding influenza H1N1 among medical students.<sup>[7]</sup>

Data analysis showed that knowledge was influenced by educational major and degree that physicians had better awareness than dentists, in addition fellowships also aware more. This pattern is expected because medical students and fellowships

spend more courses about infectious diseases than dental students and medical residents, respectively.

The attitude and knowledge scores were not different among several groups, so the high knowledge is not sufficient alone for improving attitudes and practices. Using motivational educating models can be helpful to convert individual's knowledge to correct attitudes and behaviors, subsequently.<sup>[12]</sup>

Analyzing the correlation between age and knowledge, attitude and practice showed that

younger students had low experiences, little awareness, less study knowledge about the current medical subjects. There was a significant correlation between knowledge and attitude and also attitude and practice in this study. One study mentioned among medical students in Thailand showing similar results.<sup>[7]</sup> Another study among health care workers showed that knowledge correlated significantly with attitude and practices.<sup>[13]</sup>

The significant predictors for participants' knowledge were their educational majors, age and sex. Medical residents had better awareness, also females and older participants had better awareness. Age was the only participants' predictor variable in attitude and practice scores. Thus, we should emphasize on medical and also dental students and motivate male students to improve their knowledge about pandemic flu diseases. Younger students and physicians are important target groups for advanced educational programs about infection diseases.

Most of participants in this study reported media as their references for their information about influenza disease. Medical and dental students should be educated to use evidence-based medicine resources.

This study has some limitations, such as the convenient sampling method and self-reported questionnaires that may cause several biases including recall and social desirability bias. We suggest in future studies more comprehensive variables will be recruited to better understanding. It would be helpful to policy makers if further researches for providing the effective educational and motivational methods would perform.

## CONCLUSION

The residents and Fellowships' knowledge, attitude and behaviors about the Influenza disease are important due to the residents and Fellowships' role model to general population and also their essential role in distributing the disease to the community. Young and male residents especially dentists need more motivation to follow the standard percussions. Governments should provide advanced and motivational education methods to educate medical and dental residents and Fellowships for possible future pandemics

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