

Evaluation of healthcare providers' approach towards pandemic influenza and their vaccination ratio

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ABSTRACT

Objectives: Pandemic influenza is a contagious disease caused by the new pandemic influenza A H1N1 virus, originated from the genetic combination of human, pig and avian influenza viruses. Our research aimed to determine the level of pandemic influenza vaccination in healthcare providers and the factors influencing this level. **Methods:** Doctors, midwives and nurses working in primary, secondary and tertiary health institutions in Denizli established the universe of the research. Four nurses visited these health institutions on five work-days between the 4th and 8th of April 2011, informed the healthcare providers that participation to the research was voluntary and handed over data collection forms in the institutions visited. Then, these data collection forms were collected by the same nurses. Research data were analyzed with SPSS package program. Frequency, percentage, chi-square and logistic regression analyses were used in the evaluation. **Results:** 44.7% of the healthcare providers participating in the study stated that they had been vaccinated with pandemic influenza vaccine. When factors effecting the vaccination decision with pandemic influenza vaccine of the individuals participating the study was evaluated; statistically significant difference between vaccination and occupation ($p=0.001$), sex ($p=0.001$), and age ($p=0.026$) was detected. The proportion of doctors, males and individuals older than 40 years was higher among the vaccinated professionals. **Conclusions:** It is important to make announcements about vaccination with determination and by taking support from media and non-governmental organizations. Statements and explanations should be released with this in mind and media, and non-governmental organizations should also take responsibility regarding this matter.

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Introduction

Pandemic influenza is a contagious disease caused by the new pandemic influenza A H1N1 virus, originated from the genetic combination of human, pig and avian influenza viruses. In infections like influenza that transmit easily and rapidly, healthcare providers may also form an important focus in respect to transmitting the disease to the high risk group. Healthcare providers are recommended to be vaccinated with seasonal influenza vaccine every year. Although many methods reducing the risk of transmission of influenza exists, the most effective method today is still vaccination [1].

Influenza affects approximately 5-10% of the community and may result in admission to the hospital and therefore results in a significant social cost in the government budget [2]. Vaccination of the healthcare providers with influenza vaccine is recommended by CDC (Center for Disease Control and Prevention) since 1981, and by WHO (World Health Organization) since 2002 [3-5]. Vaccination of healthcare providers with influenza vaccine reduces the occurrence of diseases like influenza, absence rates and also reduces the infection risk by preventing nosocomial transmission to the patients [6-9].

During the influenza pandemic experienced in our country, 43 million doses of vaccine was provided by the Ministry of Health and applied to the healthcare providers starting from November 2, 2009.

Our research aimed to determine the level of pandemic influenza vaccination of healthcare providers and the factors influencing this level.

Methods

Eight-hundreds and forty-six doctors and 1542 midwives/nurses working in primary, secondary and tertiary health units in Denizli established the universe of the research. No samples were selected in the research and it was aimed to reach the whole population. For this purpose, related health units were visited by four nurses between the 4th and 8th of April, 2011 on five workdays. Doctors and midwives/nurses were informed that participation to the research was voluntary and data collection forms were left to the healthcare units. Then, these data

collection forms were collected by the same nurses. A total of 360 individuals filled the forms; 86 of them were from primary health institutions, 102 from secondary and 171 from tertiary health institutions. 174 of the participants were doctors and 186 were midwives/nurses. Before the collection of data, approval of the health directorate, management of the Faculty of Medicine and the local ethics board were obtained. Data collection form consisted of questions covering socio-demographic characteristics, research activities and factors influencing the vaccination status of the participated individuals.

Research data were analyzed with SPSS package program. Frequency, percentage, chi-square and logistic regression analyses were used in the evaluation. For statistical comparisons $p < 0.05$ was set as statistical significance.

Results

Of the individuals participating to the study 29.4% was below and 70.6% was above the age of 40. When the working life duration of the participants was evaluated it was determined that 34.2% was working for 5 years or less, 13.3% was for 6-10 years, 17.5% was for 11-15 years, and 35.0% was for 16 years or more. Their ratio of vaccination with seasonal influenza vaccine was found to be 32.4%, 45.3% and 18.6% in the years 2008-2009, 2009-2010 and 2010-2011, respectively (not provided in the Table). 44.7% of the healthcare providers participating in the study stated that they have been vaccinated with the pandemic influenza vaccine (Table 1).

When factors influencing the vaccination of participants with pandemic influenza vaccine were evaluated; statistically significant difference between vaccination and occupation ($p=0.001$), sex ($p=0.001$), and age ($p=0.026$) was detected. Doctors, males and individuals older than 40 years were more among the vaccinated ones (Table 1).

When the effects of research activities of the participants on the vaccination ratios with pandemic influenza vaccine was evaluated no statistically significant difference between the institution he/she

Table 1. Distribution of socio-demographic characteristics of the healthcare providers regarding the vaccination status

Variables	Vaccination status		Total Number (%)**	X ²	p
	Vaccinated Number (%)*	Not vaccinated Number (%)*			
Age					
40 years and below	104 (40.9)	150 (59.1)	254 (70.6)	4.979	0.026
Over 40 years	57 (53.8)	49 (46.2)	106 (29.4)		
Sex					
Male	67 (57.3)	50 (42.7)	117 (32.5)	11.030	0.001
Female	94 (38.7)	149 (61.3)	243 (67.5)		
Occupation					
Doctor	98 (56.3)	76 (43.7)	174 (48.3)	18.330	<0.001
Nurse	63 (33.9)	123 (66.1)	186 (51.7)		
Total	161 (44.7)	199 (55.3)	360 (100.0)		

*Row percentage, ** Column percentage

Table 2. Distribution of research activity characteristics of the healthcare providers regarding the vaccination status

Variables	Vaccination status		Total Number (%)**	X ²	p
	Vaccinated Number (%)*	Not vaccinated Number (%)*			
Institution					
Primary Care	44 (51.2)	42 (48.8)	86 (23.8)	1.984	0.384
Secondary Care	43 (42.2)	59 (57.8)	102 (28.3)		
Tertiary Care	74 (43.0)	98 (57.0)	172 (47.9)		
Number of patients examined in a day					
25 and below	59 (39.6)	90 (60.4)	149 (41.4)	2.701	0.100
26 and above	102 (48.3)	109 (51.7)	211 (58.9)		
Department					
Polyclinic	88 (49.2)	91 (50.8)	179 (49.7)	2.839	0.092
Service	73 (40.3)	108 (50.7)	181 (51.3)		
Total	161 (44.7)	199 (55.3)	360 (100.0)		

*Row percentage, ** Column percentage

is working in ($p=0.384$), department he/she is working in ($p=0.092$) and the number of patients examined in a day ($p=0.100$) was found (Table 2).

When an assessment was conducted regarding whether the announcements made by official authorities had an effect on vaccination with pandemic influenza vaccine; a statistically significant difference between vaccination and information provided by Ministry of Health ($p=0.001$) and information level ($p=0.006$) was found, while no statistically significant differences were detected between the announcements of the official authority (Ministry of Health) ($p=0.233$) and vaccination.

Vaccination level is higher in the individuals influenced by the announcements of the Ministry

of Health on vaccination and in individuals who think that they have sufficient information on the vaccine (Table 3).

Independent risk factors found to be statistically significant in Logistic regression analysis. According to this, vaccination with pandemic influenza vaccine was 2.9 times higher in those who were influenced by the announcements of the Ministry compared to those who were not influenced (OR: 1.9- 4.6); was 2.3 times higher in physicians compared to the other healthcare providers (OR: 1.5- 3.7); was 3.4 times higher in those who had received an influenza vaccination in the year preceding the pandemic compared to those who had not received vaccination (OR: 2.1- 5.6) (Table 4).

Table 3. The effect of being influenced or not by the statements of official authorities about vaccination on the vaccination status

Variables	Vaccination status		Total Number (%)**	X ²	p
	Vaccinated Number (%)*	Not vaccinated Number (%)*			
Information provided by the ministry has influenced my decision on vaccination					
Yes	80 (60.6)	52 (39.4)	132 (36.7)	16.248	<0.001
No	80(35.2)	147 (64.8)	227 (63.3)		
Official authority statements have influenced my decision on vaccination					
Yes	38 (50.7)	37 (49.3)	75 (20.8)	2.915	0.233
No	123 (43.2)	162 (56.8)	285 (79.2)		
I have sufficient information on pandemic influenza					
Yes	93 (52.0)	86 (48.0)	179 (49.7)	7.534	0.006
No	68 (37.6)	113 (62.4)	181 (50.3)		
Total	161 (44.7)	199 (55.3)	360 (100.0)		

*Row percentage, ** Column percentage

Table 4. The results of logistic regression analysis covering the factors that influence SDPE

Independent variables		Odds Ratio	95% Confidence Interval
Information provided by the ministry has influenced my decision on vaccination	Yes	2.9	1.9-4.6
	No	Reference	
Occupation	Physician	2.3	1.5-3.7
	Healthcare providers other than physician	Reference	
Vaccination with seasonal influenza vaccine a year before the pandemic	Yes	3.4	2.1-5.6
	No	Reference	

Discussion

The case of pandemic influenza was first detected in our country in May 15, 2009 and the number of cases did not increase during summer. However the number of cases started to increase rapidly in the fall of 2009-2010 due to reasons such as opening of the school year and preferring indoor places more frequently due to weather conditions [10]. Fatal pandemic fear arose throughout the world and because the number of pandemic influenza vaccines manufactured was limited, it was decided that the risk groups should be vaccinated first.

According to the results of our study, the ratio of being vaccinated with pandemic influenza vaccine was found to be 44.7%, and different results were obtained in the studies performed in our country. In a study by Ormen *et al.*, which was performed in 2012 among healthcare providers the ratios of getting vaccinated with pandemic influenza vaccine was found to be 40%; in a study performed by Ertek *et al.*, it was found to be 9.3% in 1164 participants from Ankara and 3.7% in 804 participants from Diyarbakir [11, 12]. In a survey on pandemic influenza vaccination performed among healthcare providers in Greece in 2009, vaccination rate was found to increase with advanced age, being male, being doctor and having a seasonal influenza vaccination history [13]. In another study, age was found to be an important factor in the preference of being vaccinated [14]. It was found that individuals who consider vaccination were older, and who do not consider

vaccination were younger [14].

In a study performed in US, the ratio of those who accepted to be vaccinated with pandemic influenza vaccination was 81%, and it was thought that this high ratio might have occurred as a result of various methods used by CDC to increase vaccination [15]. CDC recommended vaccinations to be administered free of charge and seminars related to the risks of the disease and probable side effects of the vaccine to be arranged for healthcare providers in order to increase vaccination ratios [16, 17].

In studies conducted in our country it was found that the most frequent reasons for not getting a vaccination with pandemic influenza vaccine were the fear of the side effects of the vaccine and the lack of adequate studies on the vaccine [18]. Again in a study performed in Greece, though 97% of healthcare providers accept the importance of vaccination, only 17% were reported to have a vaccination with pandemic influenza vaccine [19]. In another study about the vaccine (28%) and thinking that he/she does not have the risk of contracting the disease (11%) were found to be the most important reasons in rejecting vaccination [20]. In our study, rationale of those who have rejected vaccination was the doubts about the protectiveness of the vaccine in 24.9% and fear of the side effects in 1.9%. Our results were similar to the other studies performed in our country and also in the world.

In the studies performed, the most important reasons for accepting vaccination with 2009 pandemic influenza vaccine were protecting himself/herself and the patients from the disease, fear of transmitting the disease to the people close to them and following the recommendations of the health authorities [21, 22]. However in our study, most frequent reasons to accept vaccination were being in the high risk group and the presence of a pandemic.

Conclusions

It is important to make announcements about vaccination with determination and by taking support from media and non-governmental organizations. Statements and explanations should be released with this in mind and media and non-governmental organizations should also take responsibility regarding this matter.

Conflict of interest

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References

- [1] Nuno M, Chowell G, Gumel AB. Assessing the role of basic control measures, antivirals and vaccine in curtailing pandemic influenza: scenarios for the US, UK and Netherlands. *J R Soc Interface*. 2007 Jun 22;4(14):505-21.
- [2] Malattie infettive e vaccinazioni. In: Ministry of Health of Italia. 2013. <http://www.salute.gov.it/malattieInfettive/aginaInternaMenuMalattieInfettive.menu=vaccinazioni>. Accessed 15 May 2013.
- [3] World Health Organization. Influenza vaccines. *Wkly Epidemiol Rec*. 2002 Jul 12;77(28):230-9.
- [4] Harper SA, Fukuda K, Uyeki TM, Cox NJ, Bridges CB. Centers for Disease Control and Prevention (CDC) Advisory Committee on Immunization Practices (ACIP). Prevention and control of influenza: recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR Recomm Rep*. 2004;53(RR-6):1-40.
- [5] National Advisory Committee on Immunization. In: Public Health Agency of Canada. Canadian Immunization Guide. <http://www.phac-aspc.gc.ca/publicat/cig-gci/index.html>. Accessed 15 May 2013.
- [6] Salgado CD, Giannetta ET, Hayden FG, Farr BM. Preventing nosocomial influenza by improving the vaccine acceptance rate of clinicians. *Infect Control Hosp Epidemiol*. 2004 Nov;25(11):923-8.
- [7] Lester RT, McGeer A, Tomlinson G, Detsky AS. Use of, effectiveness of, and attitudes regarding influenza vaccine among house staff. *Infect Control Hosp Epidemiol*. 2003 Nov;24(11):839-44.
- [8] Oshitani H, Saito R, Seki N, Tanabe N, Yamazaki O, Hayashi S, et al. Influenza vaccination levels and influenza-like illness in long-term-care facilities for elderly people in Niigata, Japan, during an influenza A (H3N2) epidemic. *Infect Control Hosp Epidemiol*. 2000 Nov;21(11):728-30.
- [9] Carman WF, Elder AG, Wallace LA, McAulay K, Walker A, Murray GD, et al. Effects of influenza vaccination of health-care workers on mortality of elderly people in long-term care: a randomised controlled trial. *Lancet*. 2000 Jan 8;355(9198):93-7.
- [10] Ertek M, Durmaz R, Guldemir D, Altas AB, Albayrak N, Korukluoglu G. Epidemiological, demographic, and molecular characteristics of laboratory-confirmed pandemic influenza A (H1N1) virus infection in Turkey, May 15-November 30, 2009. *Jpn J Infect Dis*. 2010 Jul;63(4):239-45.
- [11] Ertek M, Sevencan F, Kalaycioglu H, Gozalan A, Simsek C, Culha G, et al. Pandemic influenza A (H1N1) vaccination status and factors affecting vaccination: Ankara and Diyarbakir 2009 data from Turkey. *Mikrobiyol Bul*. 2011 Oct;45(4):684-96.
- [12] Ormen B, Turker N, Vardar I, Kaptan F, El S, Ural S, et al. Hastane personeline pandemik influenza A (H1N1) asi uygulamasinin ardindan asilama hakkindaki gorusler ve gozlenen yan etkiler. *Mikrobiyol Bul*. 2012 Jan;46(1):57-64.
- [13] Maltezou HC, Dedoukou X, Patrinos S, Maragos A, Poufta S, Gargalianos P, et al. Determinants of intention to get vaccinated against novel (pandemic) influenza A H1N1 among health-care workers in a nationwide survey. *J Infect*. 2010 Sep;61(3):252-8.
- [14] Riphagen-Dalhuisen J, Gefenaite G, Hak E. Predictors of seasonal influenza vaccination among healthcare workers in hospitals: a descriptive meta-analysis. *Occup Environ Med*. 2012 Apr;69(4):230-5.
- [15] Walker DW, Sloan SS, Kozlica JD. Public health worker attitudes and beliefs concerning 2009 H1N1 and seasonal influenza vaccines. *Am J Infect Control*. 2012 Apr;40(3):267-9.
- [16] Canning HS, Phillips J, Allsup S. Health care worker beliefs about influenza vaccine and reasons for non-vaccination: a cross sectional survey. *J Clin Nurs*. 2005 Sep;14(8):922-5.
- [17] Clark SJ, Cowan AE, Wortley PM. Influenza vaccination attitudes and practices among US registered nurses. *Am J Infect Control*. 2009 Sep;37(7):551-6.
- [18] Arda B, Durusoy R, Yamazhan T, Sipahi OR, Tasbakan M, Pullukcu H, et al. Did the pandemic have an impact on influenza vaccination attitude? A survey among health care workers. *BMC Infect Dis*. 2011 Apr 7;11:87.
- [19] Rachiotis G, Mouchtouri VA, Kremastinou J, Gourgoulis K, Hadjichristodoulou C. Low acceptance of vaccination against the 2009 pandemic influenza A (H1N1) among healthcare workers in Greece. *Euro Surveill*. 2010 Feb 11;15(6):19486.
- [20] Maltezou HC, Dedoukou X, Patrinos S, Maragos A, Poufta S, Gargalianos P, et al. Determinants of intention to get vaccinated against novel (pandemic) influenza A H1N1 among health-care workers in a nationwide survey. *J Infect*. 2010 Sep;61(3):252-8.
- [21] Virseda S, Restrepo MA, Arranz E, Magan-Tapia P, Fernandez-Ruiz M, de la Camara AG, et al. Seasonal and pandemic A (H1N1) 2009 influenza vaccination coverage and attitudes among health-care workers in a Spanish University Hospital. *Vaccine*. 2010 Jul 5;28(30):4751-7.
- [22] Kaboli F, Astrakianakis G, Li G, Guzman J, Donovan T, Naus M. Influenza vaccination and intention to receive the pandemic H1N1 influenza vaccine among healthcare workers of British Columbia, Canada: a cross-sectional study. *Infect Control Hosp Epidemiol*. 2010 Oct;31(10):1017-24.