

Vaccination against pandemic influenza A H1N1 among health care workers. *Lessons for the next pandemic*

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The World Health Organization (WHO) declared the first influenza pandemic of the 21st century in June 11, 2009.¹ As a consequence of the preparedness of the international health authorities for an influenza pandemic, a safe and effective vaccine was ready for use in October 2009, while the pandemic was at an early stage in the Northern Hemisphere. As stated by WHO, health care workers (HCWs) are one of the priority groups for pandemic vaccination due to their critical role in maintaining vital healthcare structure. Many countries including Turkey, advocated the national vaccination campaigns starting with HCWs. Unfortunately, influenza A/H1N1 vaccine uptake rates of HCWs remained very low in many countries.²⁻⁴ The Turkish Ministry of Health started vaccination of HCWs on November 2, 2009. Vaccination against influenza A/H1N1 was not obligatory. Vaccines were offered free of charge to all HCWs. We conducted a comparative descriptive study to investigate the factors that facilitate, or inhibit vaccine uptake among physicians and nurses of a tertiary care university hospital in Ankara, Turkey.

The study was conducted at a 2000-bed tertiary-care hospital of Ankara University with an HCW population of 1,234 physicians, 1125 nurses, 385 nurse-assistants, and 549 medical technicians. Health care is mainly provided by nurses and physicians, the main HCW groups who are in close contact (less than one meter) with patients in our institution. Other HCWs are employed by various sub-contracting companies, and they have no reliable records of their vaccination status. Therefore, only physicians and nurses were included in the study. From the beginning of the pandemic, the infection control committee of the hospital organized 11 informative meetings in order to brief every HCW regarding the course of the pandemic and control measures, including vaccination. All the meetings were interactive and many questions on safety of pandemic vaccines were answered by an infectious diseases professor. A total of 1400 HCWs attended these meetings. Vaccination of HCWs was organized by the infection control committee in 2 separate rooms, open between 9:00 am and 4:00 pm everyday on weekdays. The vaccination campaign at the hospital was terminated in February 1, 2010.

After the termination of the vaccination campaign, a questionnaire consisting of 22 items grouped in 6 sections (demographics, seasonal influenza vaccine uptake, reasons for accepting or refusing the pandemic vaccine, the source of knowledge on pandemic vaccines, self reported assessment of reliability of these sources, and preventive measures) was prepared.

With a given overall vaccination coverage of 20%, assuming a confidence interval (CI) of 95%, and a maximum error of 5%, the sample size was calculated to be at least 236 HCWs. Considering the non-responders, we randomly selected 300 HCWs from the list of vaccinated HCWs. We then randomly selected 300 HCWs who did not receive pandemic vaccine from the list of hospital employees obtained from the Department of Human Resources. The questionnaires were applied to both HCW groups by the medical students who had been trained in interviewing. Interviews began on March 1, 2010, and data collection was stopped on May 12, 2010 when we reached 236 HCWs in each groups. Refusals to participation were 9.3% in the vaccinated, and 10.8% in the unvaccinated groups. Before answering the questionnaire, all HCWs were informed of the aim of the study, and informed consents were obtained. The study was approved by the institutional research board of the hospital.

Chi-square test was used for categorical, and Student's t-test was used for continuous variables. Bivariate analysis was carried out to evaluate the effect of each independent variable on pandemic influenza vaccine uptake. Multivariate logistic regression analysis was used in determining independent predictors for refusal of the pandemic influenza vaccine. Only significant variables were put into multivariate analysis. A $p < 0.05$ was considered statistically significant.

A total of 472 HCWs (236 vaccinated, and 236 unvaccinated) were included in the study. Of the 472 HCWs, 333 (70.5%) were female, 253 (53.6%) were physicians, and 149 (32.6%) were working in the surgical wards. Demographic characteristics of surveyed HCWs and vaccination rates for pandemic influenza according to different variables are summarized in Table 1. By using a multivariate logistic regression modelling 4 variables were found to be independently associated with the pandemic influenza vaccine uptake: being a nurse in a surgical department (OR:0.19; 95% CI:0.08-0.45; $p < 0.001$); using internet as the main source of information (OR:0.31; 95% CI:0.13-0.74; $p = 0.009$); receiving seasonal influenza vaccine in the previous year (OR:2.59; 95% CI:1.13-5.95; $p = 0.024$); and being informed by the meetings held at the hospital (OR:4.54; 95% CI:1.14-17.9; $p = 0.031$).

Table 1 - Characteristics of surveyed health care workers and vaccination rates for pandemic influenza A/H1N1 according to demographics and professional variables.

Variable	Total (n=472)	Pandemic influenza A/H1N1		P-value
		Vaccinated n (%)	Unvaccinated	
<i>Gender</i>				0.363
Male	139 (29.4)	74 (53.2)	65 (46.8)	
Female	333 (70.5)	162 (48.6)	171 (51.4)	
Mean age, years (minimum-maximum)	35.8 (20-70)	35.2 (20-70)	36.5 (21-66)	0.118*
Mean working experience, years (range)	13.6 (1-42)	13 (1-36)	14.2 (1-42)	0.161*
<i>Profession</i>				0.782
Physician	253 (53.6)	125 (49.4)	128 (50.6)	
Nurses	219 (46.4)	111 (50.7)	108 (49.3)	
<i>Ward</i>				0.002
Surgical	149 (32.6)	59 (39.6)	90 (60.4)	
Medical	308 (65.2)	170 (55.2)	138 (44.8)	
Having child at home	260 (55.1)	140 (53.9)	120 (46.1)	0.064
Living with a CUD person	58 (12.3)	32 (55.2)	26 (44.8)	0.475
Receiving seasonal influenza vaccine	190 (40.3)	113 (59.5)	77 (40.5)	0.001
<i>Source of knowledge on flu pandemic</i>				
Scientists' briefings on TV	312 (66.1)	141 (45.2)	171 (54.8)	0.006†
Politicians' talks on TV	120 (25.4)	34 (28.3)	86 (71.7)	<0.001†
Internet	277 (58.7)	118 (42.6)	159 (57.4)	<0.001†
Newspapers, and/or magazines	244 (51.7)	101 (41.4)	143 (58.6)	<0.001†
Friends	289 (61.2)	130 (45.0)	159 (55.0)	0.017†
Scientific articles, and/or magazines	372 (78.5)	177 (47.6)	195 (52.4)	0.109
Informative meetings at the hospital	331 (70.1)	183 (55.3)	148 (44.7)	<0.001†

*Student t-test, †Chi-square - reference to no contribution of the given source on the knowledge regarding the pandemic. CUD - chronic underlying diseases (asthma, chronic obstructive lung disease, diabetes, chronic renal failure, cirrhosis, congestive heart failure).

The most common reasons for receiving pandemic influenza vaccine were being a HCW (66.2%), protection of family members (60.6%), complying with scientific recommendations (53.2%), thinking that it is a safe and effective vaccine (42.9%), advice of physicians (35.2%), and being in a high risk group (18.9%). As stated by other authors "being a HCW" is the expression of self-protection by the HCWs.^{2,3} In our survey, the question "why did you get pandemic vaccine?" was asked open-ended, and none of the HCWs mentioned regarding protection of patients in their answers. Thus, we can conclude that HCWs were more interested in their own health, and protection of patients is not as important as self-protection. These findings point out that educational efforts should be focused on not only the self-protection, but on the role of HCWs in transmitting infection to patients.

The main reasons for refusing pandemic vaccine were fear of adverse reactions (52.5%), doubts regarding the credibility of policies of the Ministry of Health (34.5%), doubts on vaccine efficacy (25.3%), thinking that the vaccine is not necessary for protection against influenza (19.1%), perception of not being at risk (16.2%), doubts the credibility of scientists'

recommendations (18.5%), consideration of the pandemic influenza as a mild disease (14.9%) and lack of concern (4.3%). Fear of serious adverse reactions is the main reason for vaccine refusal in studies regarding both pandemic and seasonal influenza vaccination.²⁻⁵ Influenza vaccines have been in use for more than 50 years, and they are accepted as safe and effective by health authorities. Thus, "fear from serious adverse events" apparently has no scientific ground. Likewise no serious adverse events such as Guillain-Barre Syndrome, or anaphylaxis had been reported after the vaccination campaign in Turkey. In our study group, 20 (9.4%) participants reported mild systemic reactions (fever, headache and myalgia) in the first 48 hours after being vaccinated. The misconception of the adverse reactions of vaccines among HCWs might be fed by mass media. In our study, pandemic vaccine uptake rate was significantly lower among HCWs who gained information via mass media (TV, internet and newspapers). Using internet as the main information source was found to be an independent factor for vaccine refusal. On the other hand attending informative meetings held at the hospital was an independent factor facilitating pandemic vaccine uptake. These findings underline the importance of

giving scientific information at institutional level. Neither scientists' talks on TV (OR:1.8; 95% CI:0.36-9.00; $p=0.473$) nor scientific publications (OR:0.23; 95% CI:0.03-1.57; $p=0.136$) were more effective than hospital meetings on vaccine acceptance.

Our study has some limitations. First, it was conducted in a tertiary care university hospital and although our findings are consistent with the literature they may not be generalized to all HCWs in Turkey. Second, we conducted random sampling and participation rates were similar in both groups. But non-responder bias can not be fully eliminated. Third, we collected data by the help of a survey. Although all the interviewers were trained the manner of the interviewers might affect the outcome of the interviews (interviewer bias). Our study shows that interactive informational meetings at institutional level and high credibility of the policies of national health authorities are essential factors for promoting vaccination against influenza. These findings would be helpful for health policy makers in confronting possible future pandemics.

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