

# Prevalence of influenza vaccination among health care workers and adverse effects after vaccination: A cross-sectional study

## Sağlık personelinin grip aşısı yaptırma sıklığı ve aşı sonrası istenmeyen etkiler: Kesitsel bir çalışma

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### Abstract

**Aim:** Influenza is an important public health problem for the whole world and the prevalence of influenza vaccination is low. The aim was to determine the prevalence of influenza vaccination and adverse effect after seasonal influenza and/or pandemic A (H1N1) influenza vaccination in health care workers (HCW) working in Ankara.

**Methods:** It is a cross-sectional study. In March-April 2010, 1611 HCW from Atatürk Hospital, Sami Ulus Hospital and 13 Primary Health Care centers have been reached and survey was conducted.

**Results:** 41.1% of HCW have had seasonal influenza vaccination and 26.1% of them had side effects. Most of HCW, who have not been vaccinated; reported the needlessness of vaccination and fear of side effect as explanation of reason for being not vaccinated. 46.6% of examined HCW had pandemic influenza vaccination. After pandemic influenza vaccination, any of side effects was seen in 66.4% of vaccinated HCW. Most of HCW, reported the needlessness of vaccination, fear of side effect, inability to vaccinate, debates and contradictions on the views, as explanation of reason for being not vaccinated.

**Conclusion:** As a result, vaccination percent are under expected. HCW, like every part of public, are affected from actual discussions. For health services being not affected from these conditions, HCW's knowledge should be renewed and updated.

**Keywords:** Health care workers, Influenza vaccine, Adverse event

### Öz

**Amaç:** Grip tüm dünya için önemli bir halk sağlığı sorunudur ve grip aşısı yaptırma sıklığı her yerde düşüktür. Araştırmada, Ankara'da görev yapan bazı sağlık personeline mevsimsel ve/veya pandemik A (H1N1) grip aşısı yaptırma ve aşı sonrası istenmeyen etkilerin görülme sıklıklarını saptamak amaçlanmıştır.

**Yöntemler:** Araştırma kesitsel bir çalışmadır. Mart-Nisan 2010 yılında, Ankara Atatürk Eğitim Araştırma Hastanesi, Sami Ulus Eğitim Araştırma Hastanesi ve Etimesgut Sağlık Grup Başkanlığı'na bağlı 13 sağlık ocağında yapılan çalışmada 1611 sağlık çalışanına ulaşılmış ve anket uygulanmıştır.

**Bulgular:** İncelenenlerin %41,1'i daha önce mevsimsel grip aşısı yaptırmış ve yaptırınların %26,1'inde yan etki görülmüştür. Aşısı yaptırmayanların büyük çoğunluğu, gerek duymadığı ve aşının yan etkilerinden korktuğu için aşı yaptırmadığını ifade etmiştir. İncelenenlerin %46,6'sı pandemik grip aşısı yaptırmıştır. Pandemik grip aşısı sonrası, %66,4'ünde bir yan etki saptanmıştır. Pandemik grip aşısı yaptırmayanlar gerek duymadığı için, yan etki sebebiyle, aşıya güvenmediği için, gündemdeki tartışmalar ve çelişkiler yüzünden aşısı yaptırmadıklarını belirtmişlerdir.

**Sonuç:** Sonuç olarak, aşılama yüzdeleri beklenenin altındadır. Sağlık çalışanları da toplumun tüm kesimleri gibi gündemdeki tartışmalardan etkilenmektedir. Sağlık hizmetlerinin bu durumdan etkilenmemesi için sağlık çalışanlarının bilgileri eğitimlerle yenilenmeli ve güncellenmelidir.

**Anahtar kelimeler:** Sağlık çalışanları, Grip aşısı, Yan etki

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## Introduction

Infectious diseases have been, and continue to be, the greatest public health problem for centuries in all countries of the world [1]. Influenza, a disease caused by influenza virus, which has an important place among infectious diseases, is an infection that has existed on Earth for more than 2000 years and is characterized by causing outbreaks rather than its clinical presentation [2].

Every year, 10-20% of the world's population is known to be infected with the influenza virus [2]. Its mortality rate is approximately 6-8% annually [3]. The annual costs of these patients range from 1-3 billion dollars [4]. Considering the population of Turkey, it is estimated that there are approximately 50,000 hospitalizations and 9,000 deaths in our country [5]. Today, more frequent but less effective pandemics are observed [6]. Pandemics have been observed every 10-50 years since the 16th century, causing millions of deaths, social detachment and economic losses [7].

2009 pandemic H1N1 influenza A virus is not the same as pandemic influenza viruses seen in 1918 and 1976 [8]. While it is more contagious and lethal compared to seasonal influenza, it is less lethal than previous pandemic influenza viruses [9]. The first case was observed in Mexico in April 2009 [10]. The disease began to spread rapidly, and the World Health Organization (WHO) announced in June 2009 that it was the Phase 6 pandemic [11].

As of April 2010, there have been reported cases of confirmed pandemic influenza H1N1 causing more than 17,853 deaths in more than 214 countries worldwide [12]. In our country, 627 deaths have been reported since April 2010 [13]. The first death in our country has been reported in a health worker. In our country, the outbreak occurred late, but there were more deaths than in European countries [14].

Influenza vaccines, which are among the strategies for prevention and control of influenza outbreak during the pandemic process, started to be used in the mid-20th century and are being developed every year [15,16]. There are limited studies on the frequency of influenza vaccination in societies, and the frequency is not known [15]. There is also no clear data on the percentage of seasonal influenza vaccination in our country. In limited studies, the most common cause of non-vaccination is reported to be the possible side effects [17]. In September 2009, the Pandemic H1N1 vaccine was introduced [18]. Effectiveness of the live attenuated vaccine is 85%, while effectiveness of the inactivated vaccine is 76%. Vaccination rates in both Turkey and some European countries are far below the desired level [17].

The H1N1 vaccine caused 25 vaccine-related deaths due to Guillain-Barre Syndrome in 1976 [19]. In October-November 2009 period, 82 adverse effects were reported in 1 million people who received H1N1 vaccine in the USA, while this figure was determined to be 47 in those who received seasonal flu vaccine with the same frequency [20].

In the period in which this study was conducted, a limited number of studies were published about the percentage of people receiving the pandemic flu vaccine and the side effects observed in healthcare personnel in Turkey and in other countries. Extensive studies are needed to respond to vaccine

safety concerns, to prevent these concerns from affecting other vaccines within immunization programs, and to respond effectively to future outbreaks. The present study is one of the first comprehensive studies on these subjects.

The aim of this study was to determine the frequency of seasonal and/or pandemic A (H1N1) influenza vaccination among healthcare personnel in Ankara and the frequency of some adverse effects that may be seen after administration.

## Materials and methods

This research is a cross-sectional study. A questionnaire was prepared for influenza / seasonal influenza vaccine and its side effects. In order to carry out the research, permission was obtained from the Ethics Committee of Atatürk Training and Research Hospital, Ankara Provincial Health Directorate and all three institutions where the research was conducted. The sample of the study consist 2034 health care workers working in Ankara Atatürk Training and Research Hospital (AEAH), Ankara Dr. Sami Ulus Maternity and Children's Health / Diseases Training and Research Hospital (SUEAH) and Ankara Etimesgut Health Group Presidency (Primary Health Centers). It was aimed to reach the entire health care workers. A total of 1611 people were reached, which corresponds to 79.2% of the health care workers. The percentage of transportation is 75.4% for AEAH, 85.8% for SUEAH and 77.2% for primary health centers, respectively. Physicians, dentists, nurses, midwives, medical assistants, emergency medical technicians (EMT), x-ray technicians, lab technicians, medical technologists, dieticians and medical secretaries were included in the research.

### Statistical analysis

For statistical analysis, descriptive statistics, Chi-Square, Fisher exact test and McNemar Test were used. In all analyses, the statistical significance level was accepted as 0.05. Odds Ratio (OR) and 95% Confidence Interval (CI) calculations were made in Epi Info Version 3.5.1. computer software.

## Results

Table 1 shows the descriptive characteristics of the participants. The vast majority of those surveyed were female in the 25-34 age group and doctors.

Table 1: Distribution of descriptive properties of the investigations, Ankara, 2010

Descriptive properties (n=1611)	AEAH		SUEAH		Primary health centers		Total	
	n	%*	n	%*	n	%*	n	%*
Age								
≤24	169	20.2	93	15.6	32	18.1	294	18.2
25-29	200	23.9	163	27.3	26	14.7	389	24.1
30-34	215	25.7	133	22.3	21	11.9	369	22.9
35-39	108	12.9	64	10.7	46	26.0	218	13.5
40-44	89	10.6	80	13.4	29	16.4	198	12.3
≥45	56	6.7	64	10.7	23	13.0	143	8.9
Gender								
Female	527	63.0	446	74.7	136	76.8	1109	68.8
Male	310	37.0	151	25.3	41	23.2	502	31.2
Job								
Doctor	527	63.0	234	39.2	51	28.8	812	50.4
Dentist	9	1.1	4	0.7	6	3.4	19	1.2
Nurse	198	23.7	249	41.7	58	32.8	505	31.3
Midwife	29	3.5	50	8.4	42	23.7	121	7.5
Health officer	13	1.6	10	1.7	5	2.8	28	1.7
Laboratory assistant	15	1.8	11	1.8	9	5.1	35	2.2
Emergency medical technician	13	1.6	15	2.5	2	1.1	30	1.9
Other#	33	3.9	24	4.0	4	2.3	61	3.8
Chronic disease								
No	738	88.2	524	87.8	134	75.7	1396	86.7
Yes	99	11.8	73	12.2	43	24.3	215	13.3
Food / Drug allergies								
No	785	93.8	543	91.0	164	92.7	1492	92.6
Yes	52	6.2	54	9.0	13	7.3	119	7.4

\* Column percentage. # Other: Radiology technician, medical technologist, dietitian, AEAH: Atatürk Training and Research Hospital, SUEAH: Sami Ulus Training and Research Hospital

Table 2 shows the status of receiving seasonal / pandemic influenza vaccines of the participants. 36.0% (238 people) of the health care workers who had previously received the seasonal flu vaccine do not intend to receive the vaccine next year.

69.9% of all health personnel in the study stated that they did not consider getting the pandemic influenza vaccine from the first moment, while 53.4% stated that they did not get it. The majority of those who received the pandemic influenza vaccine got the vaccine in the first weeks of November, when the campaign began.

Of 949 health care workers who did not get the seasonal influenza vaccination previously, 29.7% stated that they did not need vaccination, 8.1% feared side effects, 6.6% did not experience flu disease frequently and 6.4% did not trust in the vaccine. 26.2% stated that there was no reason for not receiving vaccination.

Table 3 shows distribution of the reasons for not receiving vaccination. The participants did not receive the pandemic influenza vaccine mostly because they did not need it and were afraid of the side effects. One in every ten people do not trust the vaccine.

According to table 4; young people, primary care physicians, laborants/medical assistants, and those who had previously received seasonal influenza vaccination and had no side effects received pandemic influenza vaccine more than others.

According to table 5, 26.1% of participants had some side effects after the seasonal influenza vaccine and 66.4% had some side effects after the pandemic influenza vaccine. Side effects are non-serious side effects.

Table 2: The status of receiving seasonal influenza and pandemic influenza vaccines of the participants, Ankara, 2010

(n=1611)	n	% *
The status of participants' receiving seasonal influenza vaccine previously		
Not vaccinated	949	58.9
Vaccinated	662	41.1
The status of participants' receiving seasonal influenza vaccine this season		
Not vaccinated	1024	63.6
Vaccinated	587	36.4
The status of participants' consideration of receiving seasonal influenza vaccine next year		
Does not intend to get vaccinated	1047	65.0
Considers getting vaccinated	564	35.0
Participants' consideration of receiving pandemic influenza vaccine from the first time		
Did not consider (getting influenza vaccination)	1126	69.9
Considered (getting influenza vaccination)	485	30.1
The status of participants' receiving pandemic influenza vaccine		
Not vaccinated	861	53.4
Vaccinated	750	46.6

\* column percentage

Table 3: Distribution of the reasons for not receiving vaccination of those who did not get pandemic influenza vaccine among the surveyed, Ankara, 2010

Reasons for not receiving pandemic influenza vaccine (n=861)	n	%*
Does not need to get vaccinated	18	22.5
Afraid of side effects	8	11.8
Does not trust in the vaccine	98	10.5
Thinks that there is not enough information about the vaccine	88	7.4
Thinks that it can be protected by natural methods	62	5.7
Does not believe that the vaccine is effective	48	3.6
Because of receiving negative feedback from those who have been vaccinated	30	4.2
Because of having the disease already	35	2.5
Because the vaccine is used for the first time	22	2.1
Does not believe in the H1N1 virus	18	2.0
Thinks that there is a commercial purpose	11	1.3
Does not want to be a subject	10	1.2

\* Percentage of columns taken based on the number of people

Table 4: The status of participants' receiving pandemic influenza vaccine according to some of their descriptive characteristics, Ankara, 2010

Descriptive properties (n=1611)	The status of participants' receiving Pandemic influenza vaccine				OR	CI 95%
	Not vaccinated		Vaccinated			
	n	%	n	%		
<b>Age</b>						
≤24	232	78.9	62	21.1	1	-
25-29	183	47.0	206	53.0	4.2	2.9-6.0
30-34	192	52.0	177	48.0	3.4	2.4-4.9
35-39	85	39.0	133	61.0	5.8	3.8-8.8
40-44	94	47.5	104	52.5	4.1	2.7-6.2
≥45	75	52.4	68	47.6	3.3	2.1-5.3
$\chi^2=105.5$	$P=0.001$					
<b>Job</b>						
Doctor	419	51.6	393	48.4	1	-
Dentist	11	57.9	8	42.1	0.7	0.2-2.1
Nurse	298	59.0	207	41.0	0.7	0.5-0.9
Midwife	60	49.6	61	50.4	1.0	0.7-1.6
Health officer	6	21.4	22	78.6	3.9	1.4-10.8
Laboratory assistant	3	8.6	32	91.4	11.3	3.3-46.9
Emergency medical Technician	24	80.0	6	20.0	0.2	0.2-0.7
Other#	40	65.6	21	34.4	0.5	0.3-1.0
$\chi^2=59.19$	$P=0.001$					
<b>Departments</b>						
Internal Sciences	436	48.9	455	51.1	2.0	1.6-2.6
Surgical Sciences	352	66.4	178	33.6	1	-
Dental Clinic	7	53.8	6	46.2	1.7	0.5-5.7
Primary health centers	66	37.3	111	62.7	3.3	2.3-4.8
$\chi^2=61.6$	$P=0.001$					
<b>The status of participants' receiving seasonal influenza vaccine previously</b>						
Not vaccinated	623	65.6	326	34.4	1	-
Vaccinated	238	36.0	424	64.0	3.4	2.7-4.2
$\chi^2=*$	$P=0.001$					
<b>Side effect occurrence after seasonal influenza vaccine (n=662)</b>						
No	188	38.4	301	61.6	1.5	1.4-2.9
Yes	50	28.9	123	71.1	1	-
$\chi^2=*$	$P=0.012$					

\* Fisher exact test

Table 5: Occurrence of side effects after seasonal/pandemic influenza vaccine, Ankara, 2010

	n	% *
Occurrence of side effects after receiving seasonal influenza vaccine previously, Ankara, 2010 (n=662)		
Observed	489	73.9
Not observed	173	26.1
Occurrence of side effects after seasonal influenza vaccination this season (n=587)		
Observed	419	71.3
Not observed	168	28.7
Occurrence of side effects after pandemic influenza vaccination (n=750)		
Observed	252	33.6
Not observed	498	66.4

\* column percentage

Figure 1 and 2 show side effects of vaccines. After the seasonal and pandemic influenza vaccine, influenza-like diseases were the most common. Additionally, non-severe side effects such as local pain, fever, muscle pain and headache were observed. Only the presence of food/drug allergy and gender affected the occurrence of side effects after the pandemic influenza vaccine. More side effects were observed in females and those with food/drug allergies as expected.

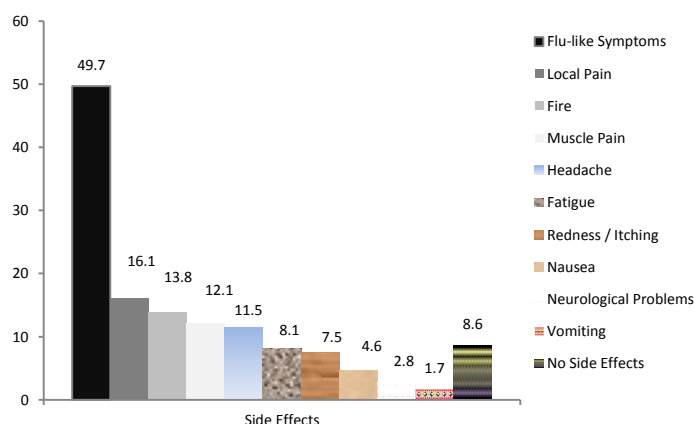


Figure 1: Distribution of side effects after pandemic influenza vaccine in the participants, Ankara, 2010

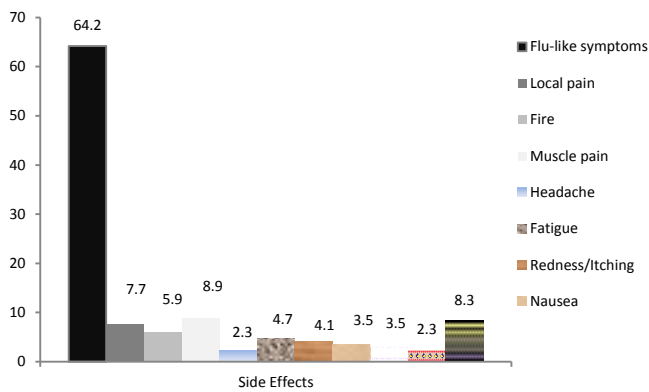


Figure 2: Distribution of side effects of seasonal influenza vaccine previously received by the participants, Ankara, 2010

## Discussion

The prevalence of vaccination in health workers was reported to be 14-48% in different studies conducted in different countries [21,22]. In our country, on the other hand, the prevalence of seasonal influenza vaccination among health personnel varies between 1.1-48.6% [23,24]. Higher rate of vaccination found in the present study may be due to the fact that influenza vaccine has been on the agenda for the last few years and that institutions have started to provide free vaccination for their staff. The reasons for not getting vaccinated are consistent with many studies in the literature. As expected, those with chronic diseases received seasonal influenza vaccines more than those without chronic diseases. In the present study, it was determined that the least vaccinated group in the 2010 season was the group working in surgical units. 58.2% of primary health care workers received the seasonal influenza vaccine, which is 3.2 times higher than those working in surgical units. Primary care workers are more sensitive to preventive services, and preventive services are better provided in these organizations.

In the study, only 30.1% of health workers considered getting the pandemic influenza vaccine from the first moment. This percentage is expected as the frequency of seasonal influenza vaccination is low among health workers. On the other hand, the controversial claims about vaccines and the fact that there has been an ongoing debate about them for a long time may have influenced health workers to get a pandemic influenza vaccine. Danielle Ofri's article describes how lots of people who asked when the vaccine would be available in the early days of the pandemic later refused to receive it because of the current debate [25]. The highest percentage of people getting the pandemic influenza vaccine in all studies is in Mexico. As this was the starting point of the pandemic, it was an expected finding that health workers wanted to take precautions and approved the vaccine.

When asked about the reason for not getting the pandemic influenza vaccine, about one-fifth (22.5%) said they did not get the vaccine because they did not need it, 11.8% said they did not get the vaccine because of the side effect, 10.5% said they did not trust in the vaccine, and 3.3% said they did not get the vaccine because the prime minister did not. 22.2 percent did not specify the reason for not receiving it. The media may also be considered to be effective again in not getting the pandemic flu vaccine, as the controversial debates on the agenda raised doubts about the vaccine. The reason why 185 people did

not specify a reason may be due to the fact they were hesitant because the issue was mediatic and political and because they did not tell the actual reasons for not receiving the vaccination.

It was found that gender did not affect the status of receiving the pandemic influenza vaccine. In studies conducted in the Netherlands, Frankfurt and Istanbul, unlike this study, it was found that male health care workers received a significantly higher rate of pandemic influenza vaccine than female health care workers [21].

As expected, those who had previously received a seasonal influenza vaccine received a pandemic influenza vaccine 3.4 times more than those who did not; those who intended to be vaccinated next year received a pandemic influenza vaccine 5.1 times more than those who did not; and those who received a seasonal influenza vaccine this season received a pandemic influenza vaccine 6.3 times more than those who did not. Similarly, those who received seasonal influenza vaccines in Canada in the previous year received pandemic influenza vaccines 6 times more [26]. In studies conducted in Istanbul, Greece and the Netherlands, similarly, the percentage of pandemic influenza vaccination was significantly higher among those who had previously received seasonal influenza vaccination [21]. In another study conducted by general practitioners in France, previous seasonal influenza vaccination was found to be the most important independent predictive factor for receiving pandemic influenza vaccines [27].

In this study, one out of every five people who had previously received a seasonal influenza vaccine had side effects. Side effects are the expected mild side effects. In the US, the incidence of side effects after the 2010 seasonal influenza vaccine was estimated as 47 per 1 million [20]. In this study, when asked what the side effects were, approximately two-thirds said that they had flu-like symptoms.

According to our study, one out of every three people who received a pandemic flu vaccine had side effects. Side effects were mild side effects that could disappear in a few days. In the study conducted in China, no serious side effects were detected, and 12-50% local side effects and 16-49% systemic side effects (fever, etc.) were detected [28]. In a study conducted in Australia, 56.3% of the vaccinated individuals had local side effects and 53.8% had systemic side effects after the vaccination. Most commonly, pain at the injection site, headache and listlessness were observed [29]. In an article published in the USA, it was reported that 21.5 cases of GBS, 5.75 sudden deaths, 86.3 optic neuritis in women and spontaneous miscarriage in 397 million women would be detected if 10 million people were examined to identify the side effects of the pandemic influenza vaccine [30].

There was a great difficulty experienced in persuading the health personnel to complete the questionnaire during the research. Limitations of the study are not to reach all health care workers and not to observe long-term side effects of vaccination.

## Conclusion

Based on these results, it was concluded that health personnel approached the seasonal/pandemic influenza vaccines with suspicion, that they were not sure whether vaccines were safe and were affected by the debates in the media. In order to be more cautious and conscious, and to ensure that this

contradictory situation does not affect other routine vaccinations in the event of an outbreak in the following years.

Health personnel can be trained according to their level on influenza virus transmission, diagnosis, treatment and strategies to be implemented in unvaccinated individuals and their consequences and responsibilities for patients and themselves. The state should have sanctions on mass-media and prevent the making of news that will lead to panic. In order to have more confidence in vaccines, the production of vaccines can be initiated in our country under the full public assurance. In the interventions aimed at the community such as prevention of epidemic and protection by vaccination, primary health care institutions that are within the society and which are the easiest to access should be given importance.

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