

RESEARCH PAPER



Beliefs, attitudes, and activities of healthcare personnel about influenza and pneumococcal vaccines

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ABSTRACT

Objectives: Vaccination of healthcare personnel (HCP) is an effective measure for preventing the spread of influenza among at-risk patients. This study was conducted to determine influenza vaccination rates and activities among HCP working at a tertiary healthcare setting. **Methods:** This study included 470 HCP (85 physicians, 134 nurses, 53 healthcare assistants, 44 paramedics, 47 medical secretaries, and 107 auxiliary staff members) working at the emergency, cardiology, chest diseases, and internal medicine departments with the largest volume of patients with vaccination indication of two large university hospitals with similar medical practices and work environment. Each participant completed an anonymous questionnaire form. **Results:** A total of 470 HCP participated in the survey. The compliance rate of the HCP to participate in the survey was 93.6%. Of these, 26.7% had been vaccinated against influenza. Vaccination in the survey year was significantly associated with having regular influenza vaccinations (OR 48.66; 95% CI:[25.09-94.369]; $P < .01$); having an educational level of college or higher (OR 2.07; 95% CI:[1.03-4.15]; $P < .05$); being a physician (OR 4.25; 95% CI:[1.28-14.07]; $P < .05$); and a professional experience of more than 5 years (OR 2.02; 95% CI:[1.13-5.62]; $P < .05$). Physicians recommended and prescribed the influenza vaccine significantly more frequently than the pneumococcal vaccine (37.6% vs 30.6%, $P = .03$, 25.9% vs 17.6%, $P = .001$, respectively). Among all HCP, the reasons for vaccination included having the opinion that the vaccine provides a partial protection against the infection (75.2%), reduces work force loss (48.8%), reduces the rates of death and severe conditions like pneumonia (43.2%), and reduces hospitalization (40.8%). The HCP had been vaccinated to protect family members (81.6%), people around (51.2%), herself/himself (47.2%), and patients (28%) from infection. The reasons of not getting vaccinated against influenza among HCP included fear of vaccine's adverse effects (31.0%), doubts about its efficacy (28.9%) and safety (22.3%), and lack of adequate knowledge about vaccination (16.2%). **Conclusion:** Our results indicated that influenza vaccination rates are low in our whole HCP sample, with physicians having a slightly better rate than other HCP. Getting regularly vaccinated, having an educational level of college or higher, being a physician, and having a professional experience of more than 5 years positively affects the rate of future vaccinations. Physicians significantly more commonly recommended and prescribed the influenza vaccine than the pneumococcal vaccine. The most important reasons for getting vaccinated included having the opinion that the vaccine provided partial protection and intending to protect family members from infection. In our whole HCP sample, the reasons of not getting vaccinated against influenza included fear of vaccine's adverse effects and doubts about its efficacy and safety. Training meetings should be held for HCPs to underscore the importance of the influenza vaccine for protection of patients against the influenza.

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Introduction

Influenza causes more than 200,000 hospitalizations and 3000–49,000 deaths annually in the US^{1,2}. It particularly leads to severe illness and serious complications or death, particularly in those with chronic disorders, children, and pregnant women³. The primary aim of the prevention strategies is to reduce the risk of influenza infection in patients at high risk for complications. The risk of contacting influenza infection is high at working places of HCP. Therefore, the risk of transmitting occupationally acquired influenza to patients, other HCP, and family members is also similarly higher. It is therefore

recommended to vaccinate all HCP against influenza on a routine annual basis.³

During the influenza A(H1N1) pandemic in 2009–2010, many HCP accumulated knowledge about the influenza vaccine and its importance, while worldwide concerns were expressed about the safety of the monovalent pandemic vaccine and many people refused to receive it because it was a 'new' vaccine, 'untested,' and 'rushed to the market'.^{4,5}

Streptococcus pneumoniae is one of the most commonly isolated microorganism from adult patients with pneumonia, otitis media, meningitis and sepsis.⁶

Two different types of pneumococcal vaccine are used in adults. The polyvalent pneumococcal polysaccharide vaccine (PPSV23), which is prepared against the 23 most common pneumococcal serotypes that cause pneumonia, induces an antibody response that develops within 2 to 3 weeks of vaccination and returns to the pre-vaccination level by about 4 to 7 years.^{7,8}

It is recommended for all people older than 65 years and immunocompromised patients 2 through 64 years, either in the presence of certain disease states (Hodgkin's disease, lymphoma, leukemia, kidney failure, multiple myeloma, nephrotic syndrome, HIV infection, splenic injury or asplenia, organ transplant) or treatments (long-term steroids, certain cancer drugs, radiation therapy). In addition, smokers aged 19 to 64 years or patients with COPD or asthma should also be vaccinated. The 13-valent conjugated pneumococcal vaccine (PCV-13) is indicated for persons at high risk for severe infection.⁹ The 13-valent conjugated pneumococcal vaccine, (PCV-13), is intramuscularly administered in a single dose in subjects aged over 65 year and people 2 through 64 years old with certain medical conditions. PCV13 is also recommended for use in infants and children younger than 2 years old. It is indicated for active immunization for the prevention of pneumonia and invasive disease caused by *Streptococcus pneumoniae* serotypes. Both vaccines are quite safe, with serious adverse effects being seldom encountered.¹⁰ Recently, the Centers for Disease Control and Prevention's Advisory Committee on Immunization Practices (ACIP) recommended 13-valent PCV13 followed by PPSV23 vaccines for routine use in pneumococcal vaccine-naïve adults aged ≥ 65 years in the USA.¹¹

Although it has long been reported that vaccination of HCP against influenza once a year is of utmost importance to reduce morbidity, the rates of vaccination have been constantly low.⁴

There are two studies that have resulted very low vaccination rates of health professionals in Turkey.^{12,13}

Vaccination of HCP may prevent influenza from spreading to patients. The objectives of this cross-sectional survey among HCP working in two university hospitals were to determine influenza vaccination rates in this sample population and the factors that influence it including HCP beliefs and attitudes toward the vaccines. Additionally, the rate of physicians recommending and prescribing their patients pneumococcal vaccine.

Results

Distributed questionnaire forms were collected with a 93.6% participation rate. A total of 470 HCPs with a mean age of 33.3 ± 7.6 years (range, 20 to 59 years) participated in the survey, of whom 232 (49.4%) were women. The study included 85 (18.1%) physicians, 134 (28.5%) nurses, 53 (11.3%) healthcare assistants, 44 (9.4%) paramedics, 47 (10.0%) medical secretaries, and 107 (22.8%) auxiliary staff members (Table 1). Among the study participants, 125 (26.7%) were vaccinated against influenza in the years of the survey, with 26 (16.0%) having been vaccinated in the years of the survey. Influenza vaccination rate increased with age ($r = 0.463$, $P < .01$). Women had a significantly greater vaccination rate than men (31.9% vs. 21.4%, respectively; $r = 0.172$, $P < .001$). HCP were categorized into 3 groups: the "regularly vaccinated" group, which consisted of

Table 1. General characteristics of the subjects.

Subjects	n(%) or mean \pm SD
Total number of subjects	470
Female/Male	232/238
Age, y	33.3 \pm 7.6
Job description	
Physicians	85 (18.1)
Nurses	134 (28.5)
Healthcare assistants	53 (11.3)
Paramedics	44 (9.4)
Medical secretaries	47 (10.0)
Auxillary staff members	107 (22.8)
Field of work	
Emergency department	90 (19.1)
Cardiology	103 (21.9)
Chest disease	178 (37.9)
Internal medicine	99 (21.1)

HCP who had been vaccinated more than 3 consecutive times in the previous 5 years; the "irregularly vaccinated" group, which comprised those who had been vaccinated 1–3 times in the previous 5 years; and the "never vaccinated," whose constituent members had never been vaccinated. A total of 121 (25.7%) of subjects responded that they were "regularly vaccinated," 182 (38.7%) had been vaccinated irregularly, and 167 (35.5%) had never been vaccinated (Table 2).

The comparison of the characteristics of the groups formed on the basis of influenza vaccination were given in Table 3. The mean age of influenza-vaccinated group (37.9 ± 6.6) was significantly greater than influenza non-vaccinated group (31.6 ± 7.2) ($t: 8.52$; $P < .001$). Women had a significantly greater vaccination rate than men (31.9% vs. 21.4%, respectively; $P < .001$).

The influenza vaccination rate (33.9%) of those with an educational level of college or higher ($n = 228$) was significantly greater than that (19.8%) of those with a lower educational level ($n = 242$) ($P < .001$). The vaccination rate of HCP working for longer than 5 years at their current position (62.6%) was

Table 2. Influenza vaccination practices by profession, educational status, and professional experience in the 2015 season.

	Regularly vaccinated n = 121	Irregularly vaccinated n = 182	Never vaccinated n = 167
Job description			
Physicians (n = 85)	35 (41.2)	33 (38.8)	17 (20)
Nurses (n = 134)	34 (25.3)	61 (45.5)	39 (29.1)
Healthcare assistants (n = 53)	13 (24.5)	26 (49.1)	14 (26.4)
Paramedics (n = 44)	8 (18.2)	14 (31.8)	22 (50)
Medical secretaries (n = 47)	9 (19.2)	21 (44.6)	17 (36.2)
Auxillary staff members (n = 107)	22 (20.5)	27 (25.3)	58 (54.2)
Educational qualification			
Elementary (n = 7)	—	3 (42.9)	4 (57.1)
Middle school (n = 76)	15 (19.7)	18 (23.7)	43 (56.6)
High school (n = 159)	35 (22)	57 (35.8)	67 (42.1)
University degree (n = 143)	36 (25.2)	73 (51.0)	34 (23.8)
Postgraduate (n = 85)	35 (41.2)	33 (38.8)	17 (20)
Medical experiences			
≤ 5 years (n = 112)	7 (6.3)	32 (28.6)	73 (65.2)
> 5 years (n = 358)	114 (31.8)	150 (41.9)	94 (26.3)

Table 3. Comparison of characteristics of influenza vaccinated and non-vaccinated groups.

		n	IV n = 125	INV n = 345	P
Age		470	37.9 ± 6.6	31.6 ± 7.2	<.001
Sex	Female	232	74 (31.9)	158 (68.1)	<.001
	Male	238	51 (21.4)	187 (78.6)	
Educational qualification	Lower degree than college	242	48 (19.8)	194 (80.2)	<.001
	College or higher	228	77 (33.8)	151 (66.2)	
Medical experiences	≤ 5 years	112	28 (25)	84 (75)	<.001
	> 5 years	358	224 (62.6)	134 (37.4)	
Job description	Physicians	85	35 (41.2)	50 (58.8)	<.001
	Nurses	134	33 (24.6)	101 (75.4)	
	Healthcare assistants	53	15 (28.3)	38 (71.7)	
	Paramedics	44	9 (20.5)	35 (79.5)	
	Medical secretaries	47	10 (21.3)	37 (78.7)	
	Auxillary staff members	107	23 (21.5)	84 (78.5)	
	Emergency department	9	3 (33.3)	6 (66.7)	
	Cardiology	17	5 (29.4)	12 (70.6)	
	Internal medicine	13	5 (38.5)	8 (61.5)	

significantly greater than that of HCP working for shorter than 5 years at their current position (25%) ($P < .001$).

Physicians had the highest regular vaccination rate (41.2%) among all professional groups ($P < .001$). Among physicians, 57 (67%) recommended influenza vaccination to their patients.

The rates of influenza vaccination (47.8%) and vaccine recommendation (78.3%) of the chest diseases physicians were higher than those of other specialties ($P = .032$, $P = .002$, respectively). There were no significant differences between the vaccination rates of internal medicine (38.4%), emergency (33.3%), and cardiology (29.4%) specialties. Eighteen (23.1%) of the vaccinated subjects had been working at their current position for longer than 5 years. A working duration of longer than 5 years was also significantly correlated to a higher rate of vaccination among physician ($P < .001$).

Determinants of influenza vaccination among all HCP

A univariate analysis revealed that age, sex, being a physician, working for longer than 5 years, regularly vaccination, and higher educational level were significantly correlated to a high vaccination rate in the years of the questionnaire. A multivariate analysis of these parameters showed that the vaccination rate in the survey year was significantly correlated to having regular influenza vaccinations in the previous five years (OR 48.66; 95% CI:[25.09-94.36]; $P < .01$), educational level of college or higher (OR 2.07; 95% CI:[1.03-4.15]; $P < .05$), being a physician (OR 4.25; 95% CI:[1.28-14.07], $P < .05$), and having

worked for more than 5 years (OR 2.02; 95% CI:[1.13-5.62], $P < .05$) (Table 4).

Ninety-four (75.2%) of those who had been vaccinated stated that the vaccine provided partial protection, 61 (48.8%) said that it reduced work force loss, 54 (43.2%) thought that it reduced the rates of severe conditions such as pneumonia, and death, and 51 (40.8%) believed it reduced hospitalization. Among the vaccinated participants, 27 (21.6%) benefited from a free vaccination campaign of the institution where they worked, 17 (13.6%) had been vaccinated because their physician had recommended to do so; and 2 (1.6%) were vaccinated because people around had recommended it.

Among those who had been vaccinated, 102 (81.6%) had done so to protect family members from being infected; 64 (51.2%) to protect people around; 59 (47.2%) to protect her/himself; and 35 (28%) to protect patients.

Recommendation rate of physician for influenza and pneumococcal vaccination

The rates at which physicians recommended their patients to receive influenza and pneumococcal vaccines were also analyzed. Seventeen (20.0%) physicians never recommended influenza vaccine, 35 (41.2%) physicians sometimes recommended it, and 32 (37.6%) physicians always recommended it. Twenty-eight (32.9%) physicians never prescribed influenza vaccine, 36 (42.3%) sometimes did, and 22 (25.9%) always prescribed it. Sixteen (18.8%) physicians never recommended pneumococcal vaccine, 43 (50.6%) sometimes did, and 26 (30.6%) always recommended them. Thirty-four (40%) physicians never

Table 4. Factors affecting influenza vaccination rates during the survey period.

Variable	Univariate Analysis			Multivariate Analysis		
	OR	95% CI	P	OR	95% CI	P
Age	1.12	1.09–1.15	<0.01	—	—	NS
Sex	0.58	0.38–0.88	<0.05	—	—	NS
Educational level of college or higher	2.08	1.37–3.15	<0.05	2.07	1.03–4.15	<0.05
Being physician	8.83	3.77–20.70	<0.01	4.25	1.28–14.07	<0.05
Regularly vaccination	61.52	33.03–114.60	<0.01	48.66	25.09–94.36	<0.01
Professional experience >5 years	3.25	2.1–5.01	<0.01	2.02	1.13–5.62	<0.05

prescribed pneumococcal vaccine, 35 (41.2%) sometimes did, and 15 (17.6%) always prescribed it. When the rate of administering pneumococcal vaccine before patient discharge was analyzed, it was found that 55 (64.7%) physicians never administered it before discharge, 22 (25.9%) sometimes administered it, and 8 (9.4%) always administered it. Among physicians, the rate of recommending and administering influenza vaccine in the survey year was significantly greater than that for the pneumococcal vaccine (67% vs 44.7%, $P = .03$; 58.8% vs 29.4, $P = .001$, respectively).

The physicians who had been vaccinated against influenza in that year recommended pneumococcal vaccination at a significantly greater rate than those who had not been vaccinated against influenza (57.5% vs. 43.8%, $P < .001$).

The reasons for having not been vaccinated and not recommending the vaccines

Among the whole HCP sample, the reasons for not getting vaccinated against influenza included fear of its acute adverse effects (31.0%), doubts about its efficacy (28.9%), and safety (22.3%), and the lack of adequate knowledge about vaccination (16.2%).

Among physicians, the most frequent reasons for not recommending pneumococcal vaccine were fear of its acute adverse effects (28.8%), doubts about its efficacy (25.4%), lack of knowledge about the vaccine (22.0%), doubts about its safety (20.3%), lack of knowledge about its benefits (20.3%), and its high price (5.1%).

Discussion

Among the HCP interrogated in the present study, 26.7% had been vaccinated against influenza. The present study demonstrated low seasonal influenza vaccination rates among all HCP. Unlike other studies reported from our country, we sampled and assessed all types of healthcare personnels. Moreover, in addition to determining the physicians' vaccination rates, their rate of recommending vaccination to their patients was also questioned and compared between the groups.^{12,13}

Influenza may cause severe respiratory disease outbreaks in hospitalized patients. Vaccination of HCPs is currently the most effective measure to prevent the transmission of influenza virus to high-risk patient groups. Vaccination of HCP can reduce influenza-related morbidity and mortality among both HCP and their patients.^{14–16} Influenza outbreaks in hospitals are associated with low vaccination rates among HCPs.¹⁷ Despite the recommendation of the Advisory Committee on Immunization Practices that all HCP be vaccinated annually against influenza, the vaccination rate among HCP remains low in Europe.¹⁸ Ryser AJ et al. reported a rate of 33% for accepting influenza vaccination in HCPs.¹⁹ In a study by Bonaccorsi G et al., 12.3% of HCPs responded that they were “always vaccinated” in both two seasonal vaccination campaigns studied, and another 13.1% had been vaccinated once or twice.²⁰ According to recent reports, influenza vaccination rates among HCP differ by influenza seasons and country, ranging between 5.8% (Greece 2006–2007) and 35% (Germany 2010–2011).^{19,20} Similarly, Maltezou et al. reported a low coverage for

influenza vaccination in all categories, with the highest rate among physicians (44%) in their survey.²¹

In the United States the rate of vaccination against influenza is higher among HCP (>70%). In 2013, the New York State Department of Health mandated that, during the influenza season, HCP with direct patient contact either receive influenza vaccination or wear a surgical mask in areas where patients are typically present.²² From 2006 to 2016, the influenza vaccination rate increased from 47% to 96% where influenza vaccination is legally obligatory.²²

Regularly vaccinated subjects had the highest vaccination rate in the present study. In parallel with the results of previous studies, previous vaccination appeared as a positive predictor for repeated vaccination.^{23–25} In the present study and similar studies, that group was considered to have a greater awareness about the vaccine due to its higher educational level.^{26,27}

It is not surprising that physicians were among the subjects who were most commonly vaccinated (41.2%). Their rate of recommending influenza vaccine was 67%. The rate of recommending vaccine was not studied among other HCP. This is probably because they are in close contact with patients and observe influenza-associated illnesses more closely. They believe that they should serve as a model for their patients, and feel more responsibility than other healthcare staff. Physicians believed that by being vaccinated they could provide a reassuring example to patients, particularly for those who have concerns about influenza vaccination.

As has been previously demonstrated,^{28,29} physicians exhibit a stronger tendency to receive vaccines. This finding supports the need for professional-sensitive programs to increase vaccination coverage, taking into account different levels of knowledge and attitudes towards influenza and influenza vaccination among various occupational categories.³⁰

The reason for the greater vaccination rate (47.8%) and vaccine prescription rates (78.3%) in chest physicians among other specialties may be due to their greater level of knowledge, which they acquire during their training, and the higher rate of complications such as pneumonia and sepsis that they encounter among non-vaccinated patients in their practice.

In the current study, the vaccination rate was increased with increased working duration. This can be explained by the increased awareness of the workers. In-house training activities will certainly boost that increase.

The main reasons of refusing vaccination were the fear of adverse effects and doubts around the vaccine's efficacy and protective properties. However, many studies performed to date have shown that influenza vaccine has no serious adverse effects, with the most common complication being a mild soreness (10–64%) at the vaccination site that lasts for 2 days. The main precaution of influenza vaccine is anaphylactic reaction to egg protein. Another complication is previous Guillain Barré syndrome that developed within 6 weeks after vaccination.

Preventing influenza among HCP who might serve as a source for influenza virus transmission provides additional protection to patients at risk for influenza complications. However as with other vaccines, influenza vaccine is administered for self-protection. Vaccination rates remain low, possibly due to the need for annually repeating vaccination, the belief that vaccine protection against influenza remains low, and considering

influenza not a severe threat to one's health. Using hepatitis B and influenza vaccines as examples, Betsch noted there appeared to be less resistance to hepatitis B than to influenza vaccination, quoting a study of German medical students that show 87% vaccination coverage against hepatitis B compared with 35% against influenza.³¹

In this study, the behaviors of recommending and prescribing influenza and pneumococcal vaccines were compared to evaluate physicians attitudes toward these vaccines. We expected that HCP working in these departments would also be familiar with pneumococcal vaccine.

The vaccination coverage rates were also lower for the pneumococcal vaccine. This was primarily due to a lack of awareness and knowledge about this vaccine, because almost a quarter of the physicians were unaware of it, and a quarter had limited knowledge about it. It was noted that the awareness of the physicians for the influenza vaccine was greater than that for the pneumococcal vaccine. During the 2009–2010 pandemic, influenza A (H1N1) virus caused a less severe clinical picture than initially thought. Nevertheless, serious clinical presentations and even deaths occurred, which affected traditional risk groups and did not spare healthy young people and pregnant women.^{10,11} Fortunately, the virus had not been strongly pathogenic and virulent, which largely limited the impact of the pandemic. There are many missed opportunities for vaccination, and HCP think vaccines are important but are often not aware that they need vaccines.

Our study has some limitations. First, it was conducted only among HCP working at two university hospitals. Since there are many other healthcare facilities with unique practice properties and work environments, our results cannot be generalized at a national scale. Second, it only provides information from departments that make most of the contact with patients with any indication for vaccination. Unfortunately, vaccination coverage rates remain limited even for those departments, suggesting that global measures need to be taken to boost vaccination rates.

Each healthcare facility should develop its own specific influenza vaccination program. Training meetings should be held every year, centers should be established where facilitated access to vaccines is available, such places and a vaccination calendar should be announced to HCP, and vaccination should be free of charge for HCP.

In conclusion, the risk of contacting influenza infection is high at working places of HCP. Vaccination of health-care workers has been suggested the best way to protect the patients at high risk groups at presently.

The rates of influenza vaccination are low among HCP. Annual vaccination rates among physicians are higher than other HCP. Regular vaccination, higher educational level and professional experience of more than 5 years are the most important factors for vaccination.

The major reason for getting vaccinated was the belief that the vaccine provided partial personal protection as well as protection for family members against infection. Considering the totality of HCP sample, the reasons of not getting vaccinated against influenza included fear of the vaccine's adverse effects and doubts about its efficacy and safety.

Methods

Participants and procedures

The questionnaire forms were distributed to 502 HCP. A total of 470 HCP (238 males, 232 females) working in chest diseases, emergency medicine, internal medicine, and cardiology departments of two university hospitals (Ankara University School of Medicine and Ankara Baskent University Hospital) were included. In order to attain an adequate number of HCP, this study was conducted at two tertiary university hospitals with similar medical practices and work environment. The departments that make the most frequent contact with adult patients with any indication for vaccination were included in the study. All HCP working at these departments were requested to complete the study questionnaire.

The participants consisted of 85 (18.1%) physicians, 134 (28.5%) nurses, 53 (11.3%) healthcare assistants, 44 (9.4%) paramedics, 47 (10%) medical secretaries, and 107 (22.8%) auxiliary staff members who were questioned between September and December 2015 (Table 1). Healthcare assistants work at hospitals under the guidance of a qualified healthcare professional, usually a nurse. Ninety (19.1%) HCP participated from emergency departments, 103 (21.9%) HCP from cardiology departments, 178 (37.9%) HCP from chest diseases, and 99 (21.1%) HCP from internal medicine departments. Among the physician participants, 46 (54.1%) were working in the department of chest diseases, 17 (20%) in cardiology, 13 (15.3%) in internal medicine, and 9 (10.6%) in emergency.

The questionnaire

We used an anonymous survey consisting of a demographic section, professional category, and multiple-choice questions exploring beliefs and attitudes to influenza and pneumococcal vaccination. Demographic measures included age, sex, profession, working duration, and educational status.

The questionnaire was composed of multiple-choice questions where multiple answers were possible. Some questions required a yes/no response. With regard to influenza vaccination, the participants were asked whether they were vaccinated against influenza that year, how many times they had been vaccinated, the reason why they had (vaccine provides partial protection, reduces hospitalization, reduces the rates of serious conditions, reduces workforce loss; vaccinated to protect myself, to protect my family, to protect people around, to protect my patients; vaccinated because my physician recommends to do so, vaccinated because people around recommend to do so, vaccinated because my institution recommends to do so or holds vaccination campaigns) or had not been vaccinated (concerns about the vaccine's acute adverse effects, doubts about its efficacy and long-term safety, its high cost, and inadequate knowledge about vaccines), how they had obtained information about the vaccine, for physicians whether they recommended vaccination to their patients, and the reason why they did or did not recommend vaccination to their patients. With regard to pneumococcal vaccination, only the physicians were asked whether they recommended vaccination to their patients. The term 'Adverse effects' referred to and was

used to question about vaccine-induced local or systemic acute adverse effects whereas the term 'safety' referred to and was used to question about general, long-term vaccine safety in terms of overall long-term health.

This questionnaire was prepared by authors FC and ES. The participants were asked to complete the questionnaire anonymously.

This observational study was designed and performed in accordance with the Declaration of Helsinki. Ankara University ethics committee approved the study (Registration number: 02-48-11).

Statistical analysis

All statistical analyses were performed using IBM SPSS Statistics 20 (SPSS Inc., Chicago, IL, USA, 2011). Data are expressed as number and percentage or mean \pm standard deviation (SD), as appropriate. Comparisons for the categorical and continuous variables were performed using the Chi-squared test and Student's t-test, respectively.

The comparison of continuous variables was performed using one-sided analysis of variance (ANOVA) when the parametric test assumptions were met, or the Kruskal-Wallis test if not. Categorical variables were compared using the Chi-squared test or Fisher's exact test across the study groups. Several candidate variables identified with univariate analysis and examined using the multivariate logistic regression analysis to determine independent predictors of vaccination. An alpha level of 0.05 was considered significant.

Ethics approval

Ankara University ethics committee approved the study (Registration number: 02-48-11).

Disclosure of potential conflicts of interest

No potential conflicts of interest were disclosed.

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