Original article

CLINICAL AND EXPERIMENTAL VACCINE RESEARCH

Adult vaccine-related knowledge, attitudes, and behaviors in Turkey

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Sinem Aslan Karaoğlu[1], Beray Gelmez Taş[2], Dilek Toprak[2]
[1]23 Nisan Family Health Center, Bursa; [2]Department of Family Medicine, Sisli Hamidiye Etfal Training and Research Hospital, İstanbul, Turkey

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Corresponding author: Sinem Aslan Karaoğlu, MD
23 Nisan Family Health Center, 23 Nisan Mahallesi 252. Sokak No:6 23 Nisan Aile Sagligi Merkezi Nilufer/Bursa, Turkey
Tel: +90-05054813955, Fax: +90-0224-233-5092
E-mail: s.aslankaraoglu@saglik.gov.tr

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Purpose: Adult vaccination, which is among the duties of family physicians, is an important issue that reduces morbidity and mortality. In this study, it was aimed to evaluate knowledge, attitudes, and behaviors of adults about adult vaccines.

Materials and Methods: This study is a descriptive, cross-sectional research; which was performed by a questionnaire including sociodemographic data and questions about adult vaccination to the patients and their relatives who applied to Şişli Hamidiye Etfal Training and Research Hospital Family Medicine Polyclinics for any reason. Mean, standard deviation and chi-square tests were used for the analysis; $p<0.05$ was considered significant.

Results: The study included 182 people, 93 of them were women (51.1%) and 89 (48.9%) were men. The mean age was 32.9±12.8 years; most of them (n=144, 79.1%) were high educated and 38.5% were married. The most known vaccine was tetanus (n=154, 84.6%), the least known was zona vaccine (n=30, 16.5%). Health care professionals and television (n=60, 33%) were the most information sources about vaccines (n=78, 42.9%). Vaccination was mostly (26.9%) recommended by family physicians 144 (79.1%). The students had more knowledge about human papilloma virus (HPV), zoster, and measles, mumps, and rubella vaccines ($p\leq0.05$), and mostly the information was got from internet and school ($p\leq0.05$). As education status increased, knowledge about tetanus, hepatitis A, pneumonia, and HPV vaccines increased significantly, whereas only tetanus vaccination was performed in practice ($p\leq0.05$). As the income increased, knowledge about pneumonia and HPV vaccines increased, but vaccination was not performed as expected.

Conclusion: Age, occupation, education, and income level are directly related to knowledge and attitudes about adult vaccination. Adult vaccines are still not known and performed enough in Turkey. It is important to encourage and increase the number of trainings via media on this subject.

Keywords: Adult, Vaccination, Knowledge, Family physicians

Introduction

Immunization is one of the most effective and reliable preventive health procedures, used to prevent and protect against infectious diseases. Primary care physicians have important responsibilities in this regard.

The World Health Organization (WHO) reported that vaccination prevents approximately 2–3 million deaths each year. WHO considers 2011 to 2020 as the "decade of vaccines" to draw attention to the importance of vaccines, with the goal of immuniz-

ing all people regardless of who they are, where they live, or where they were born [1].

While some vaccines provide lifelong protection against diseases, some of them provide partial protection and need to be re-administered on a regular basis. For this reason, some vaccines perform on both children and adults [2]. The US Centers for Disease Control and Prevention (CDC) has established vaccination schedules within their "proposed adult immunization program" each year [3] (Fig. 1).

The 2016 adult vaccination and immunization guidelines of the Turkey Infectious Diseases and Clinical Microbiology Specialist Association are similar to those of the CDC [4]. In Turkey, common adult vaccines and vaccinations include hepatitis B virus (HBV), hepatitis A virus (HAV), tetanus, measles, mumps, and rubella (MMR), meningococcal, varicella, zoster, pneumococcal, and influenza [5].

Respiratory diseases are the third-ranking cause of death in Turkey. Most respiratory diseases in Turkey are brought about by seasonal flu and pneumonia. This underscores the importance of adult pneumococcal and influenza vaccinations [6].

Unfortunately, in Turkey (and even globally) the rate of adult vaccine performance is low [7]. The aim of this study was to evaluate the knowledge, attitudes, and behaviors of Turkish adults about adult vaccines.

Materials and Methods

This is a descriptive and cross-sectional study. A questionnaire, consisting of 39 questions, was used as a data collection tool. We collected sociodemographic information and responses to questions regarding adult vaccine-related knowledge, attitudes, and behaviors. The research was carried out in accordance with Declaration of Helsinki. Study participants were patients and their relatives who applied to the Şişli Hamidiye Etfal Training and Research Hospital Family Medicine Polyclinics (for any reason) and volunteers between from September 2018 to November 2018. All participants provided in-

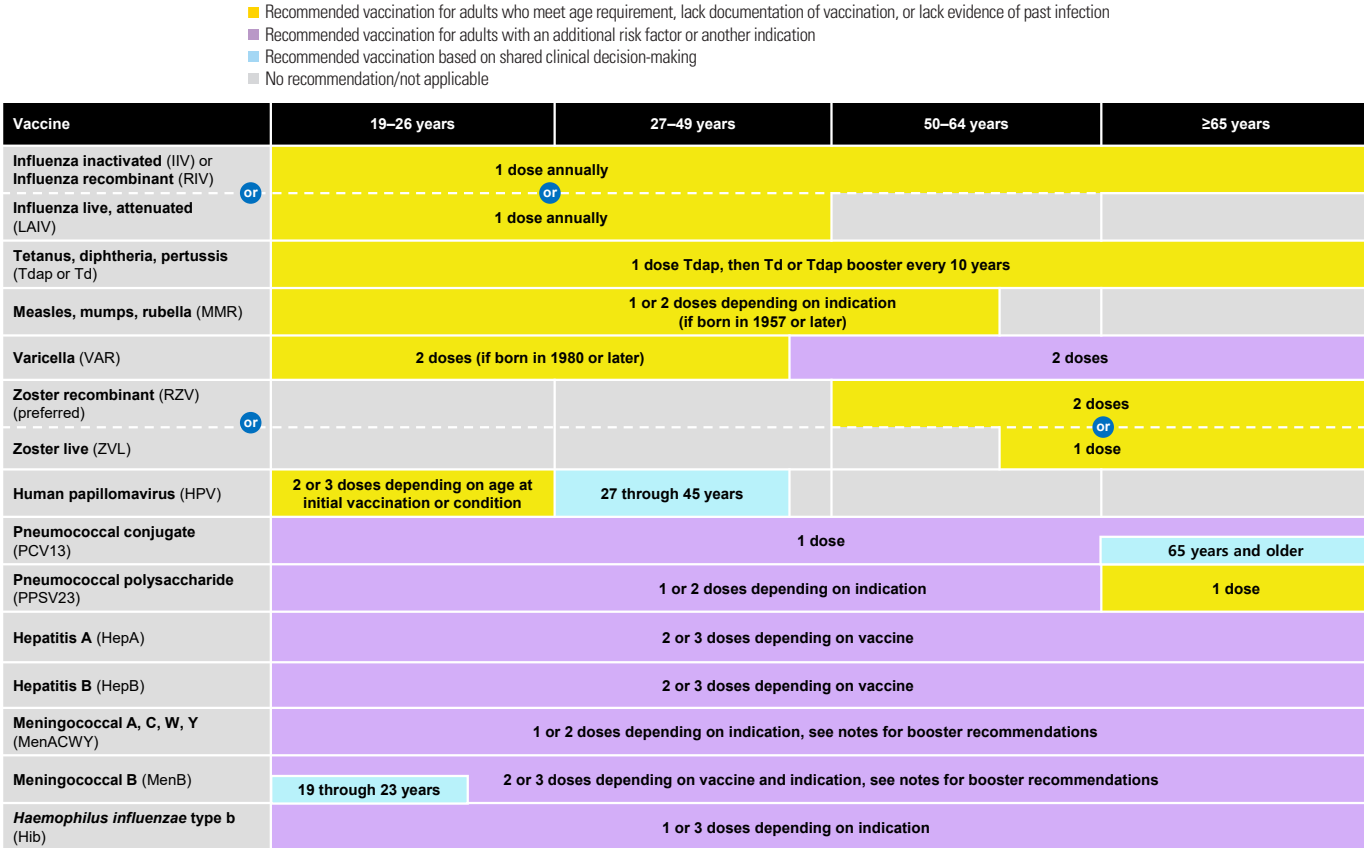

Fig. 1. Adult vaccination schedule by vaccine and age group, United States, 2020. From Centers for Disease Control and Prevention. Adult immunization schedule [Internet]. Atlanta (GA): Centers for Disease Control and Prevention; 2020 [cited 2021 Nov 10]. Available from: https://www.cdc.gov/vaccines/schedules/hcp/imz/adult.html [3].

formed consent, were older than age 18 years, and had no communication barriers. The questionnaires consisted of multiple choice and open-ended covering and on socio-demographic characteristics, income, education levels and knowledge, attitudes, and behaviors towards adult vaccination were administered by researchers during direct one-on-one interviews. Patients under the age of 18 years, with a disease (severe hearing and vision loss, diagnosed dementia, etc.) that could not answer the questionnaire were excluded from the study.

In our study, we classified the income according to the minimum wage in Turkey as follows: low (0–149€ per month), medium (150–450€ per month), and high (more than 450€ per month). The participants grouped, regarding the age, as 18–40 years, 41–64 years, and 65 years and older.

The data was input to PASW SPSS ver. 18.0 (SPSS Inc., Chicago, IL, USA); chi-square and T-tests were used, in addition to descriptive statistical methods; and $p<0.05$ was considered statistically significant.

Results

A total of 182 participants were enrolled in this study, including 93 females (51.1%) and 89 males (48.9%). The mean age was 32.9±12.8 years; mostly (n=144, 79.1%) were highly educated, 38.5% were married, 107 were single (58.8%), and five were widowed (2.7%). While 124 (68.1%) of them have no child, and 58 respondents (31.9%) had children. When we classified according to the level of income; 47 respondents (25.8%) reported a low income, 78 (42.9%) reported a mid-range income, and 57 (31.3%) reported a high income. Additionally, 169 respondents (92.9%) had social security.

Respondents were most aware of the tetanus vaccine (n=154, 84.6%), and least familiar with the zona vaccine (n=30, 16.5%) (Fig. 2). The information sources for vaccines were respectively healthcare workers (n=78, 42.9%), television (n=60, 33%), Internet (n=47, 25.8%), friends (n=45, 24.7%), school (n=52, 28.6%), and from different sources (pharmacist, family members, newspaper, workplace, book, magazine) (n=52, 28.6%).

Vaccines are mostly recommended by healthcare workers to (n=84, 46.2%) of which 58.3% by family physicians (n=49), 13.9% (n=11) by internal medicine specialists, 11.9% (n=10) by other specialties, and 11.9% (n=10) by nurses.

As the education status increased, knowledge about tetanus, HAV, pneumonia, and human papilloma virus (HPV) vaccines increased significantly, but only the tetanus vaccine was performed ($p=0.031$). As education increased, the frequency to get the knowledge from the Internet ($p=0.045$) and school ($p=0.000$) also increased. As the level of income increased, the knowledge of pneumonia ($p=0.38$) and HPV ($p=0.08$) vaccines increased, but these vaccines were not performed much regarding the knowledge. Respondents with higher incomes get the information mostly from the internet ($p=0.048$) (Table 1).

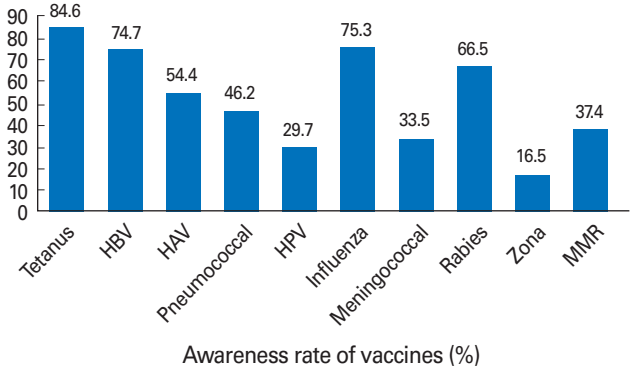

Fig. 2. Rate of knowledge of vaccines by the participants.

Students wanted to get more information about HPV (n=12, 50%), zona (n=9, 37.5%), and MMR vaccines (n=15, 62.5%). They mostly got the information about vaccines from the Internet (n=8, 33.3%) and school (n=13, 54.2%). Retirees, on the other hand, informed more (n=4, 50%) from television.

Of the participants, while 144 respondents (79.1%) believed that vaccinations were necessary, 14 (7.7%) considered vaccinations as unnecessary and 24 respondents (13.2%) did not respond to this question. Even among those who thought that vaccination was necessary, only the tetanus vaccination rate was high ($p=0.004$). The most common vaccine received was tetanus (n=87, 47.8%), followed by HBV vaccine (n=57, 31.3%), seasonal influenza (n=54, 29.7%), HAV vaccine (n=31, 17%), pneumococcal vaccine (n=10, 5.5%), MMR (n=17, 9.3%), meningococcal vaccine (n=6, 3.3%), and HPV vaccine (n=2, 1.1%). There was no relationship between adult vaccination behaviors and age, gender, marital status, or education status.

Only 54 respondents (29.7%) reported being vaccinated against influenza; only 23 (42.5%) received the influenza vaccine every year. Of those who regularly received the influenza vaccine, 32 people (59.2%) believed in the protective properties of the vaccine, 4 (7.4%) of them stated that they had one or more chronic diseases, one respondent (1.8%) said that his/her doctor recommended vaccination, and 1 (1.8%) of them reported being vaccinated because of frequent disease.

Table 1. Relationship between participants' sociodemographic characteristics and vaccination status

Variable	Age (yr)				Gender			Education			Income (€)			
	18–40	41–64	≥65	p-value	Female	Male	p-value	Low[a]	High[b]	p-value	0–149	150–450	>450	p-value
Tetanus				0.219			0.174			0.036				0.422
Known	121	30	3		82	72		28	126		37	68	49	
Unknown	19	7	2		11	17		10	18		10	10	8	
Seasonal influenza				0.232			0.086			0.052				0.316
Known	107	25	5		75	62		24	113		34	56	47	
Unknown	33	12	0		18	27		14	31		13	22	10	
MMR				0.561			0.107			0.114				0.065
Known	55	11	2		40	28		10	58		17	23	28	
Unknown	85	26	3		53	61		28	86		30	55	29	
Pneumococ				0.146			0.537			0.043				0.038
Known	60	20	4		45	39		12	72		17	33	34	
Unknown	80	17	1		48	50		26	72		30	45	23	
HBV				0.555			0.004			0.065				0.989
Known	107	26	3		78	58		24	112		35	58	43	
Unknown	33	11	2		15	31		14	32		12	20	14	
HAV				0.565			0.189			0.045				0.879
Known	79	18	2		55	44		15	84		27	42	30	
Unknown	61	19	3		38	45		23	60		20	36	27	
HPV				0.295			0.002			0.01				0.008
Known	44	10	0		37	17		3	51		14	15	25	
Unknown	96	27	5		56	72		35	93		33	63	32	
Meningococ				0.445			0.374			0.502				0.788
Known	46	12	3		34	27		11	50		17	24	20	
Unknown	94	25	2		59	62		27	94		30	54	37	
Rabies				0.340			0.713			0.247				0.651
Known	97	21	3		63	58		22	99		33	49	39	
Unknown	43	16	2		30	31		16	45		14	29	18	
Zona				0.576			0.322			0.536				0.216
Known	25	4	1		18	12		5	25		11	9	10	
Unknown	115	33	4		75	77		33	119		36	69	47	

MMR, measles, mumps, and rubella; HBV, hepatitis B virus; HAV, hepatitis A virus; HPV, human papilloma virus.
[a]Not literate, literate, primary school. [b]High school and college.

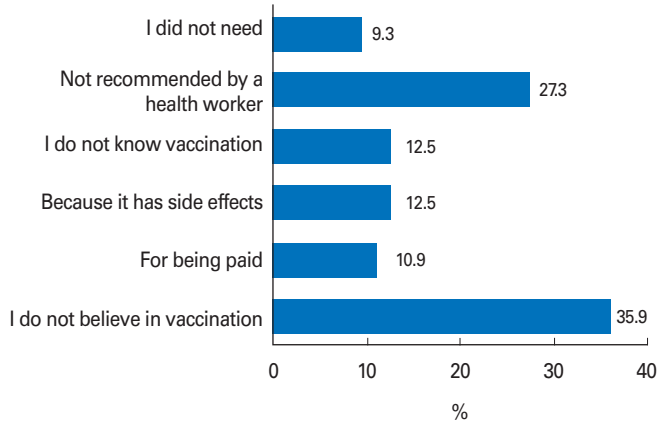

Fig. 3. Distribution of reasons for not receiving the influenza vaccine (%).

Forty-six respondents (35.9%) said that they did not believe that the vaccine protected them from diseases (Fig. 3).

Of the 87 respondents (47.8%) who received the tetanus vaccine, 44 people (50.5%) had it after sustaining a skin incision, 9 (10.3%) of them after animal bite exposure, four people (4.6%) for pregnancy, 5 (5.7%) of them received the vaccine at school, five people (2.7%) received it for business reasons, and 14 people (16.1%) for booster dose every 10 years. Reasons for not receiving vaccinations (n=95, 52.2%) are presented in Fig. 4.

Only 10 (5.5%) of the 84 respondents (46.2%) who knew about pneumococcal vaccine received it. Of these, 5 (50%) believed in the vaccine's protective effects, 1 (10%) received

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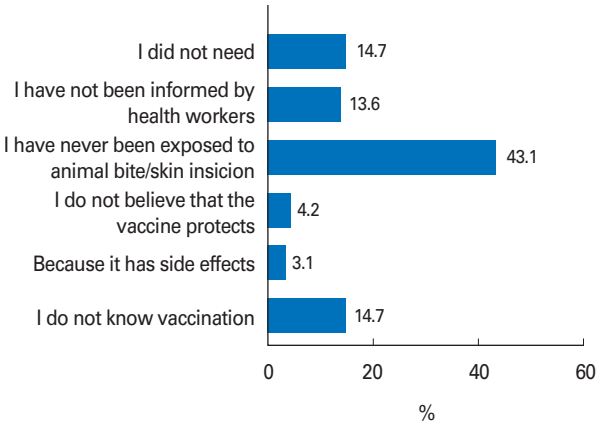

Fig. 4. Distribution of reasons for not receiving the tetanus vaccine (%).

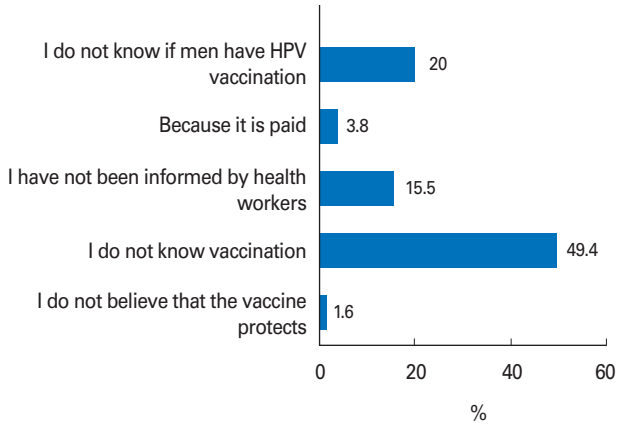

Fig. 6. Distribution of reasons for not receiving the human papilloma virus (HPV) vaccine (%).

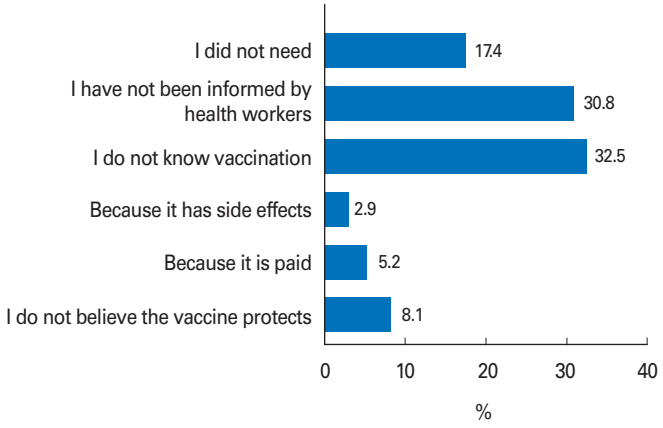

Fig. 5. Distribution of reasons for receiving the pneumococcal vaccine (%).

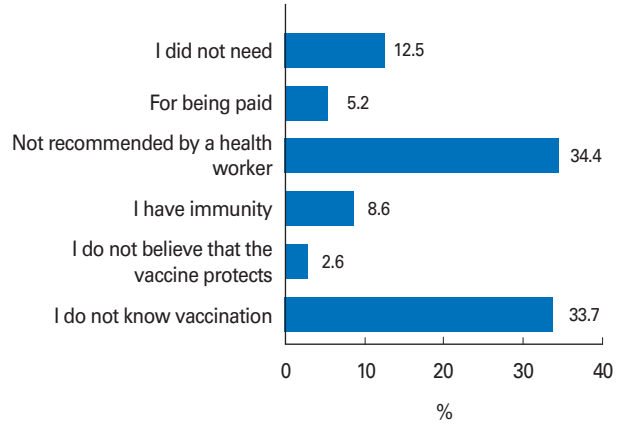

Fig. 7. Distribution of reasons for not receiving the hepatitis A virus vaccine (%).

vaccines because he/she was over 65 years of age, 1 (10%) received vaccinations because of chronic diseases, 1 (10%) was vaccinated because of a previous pneumonia, and two reported receiving vaccines at the hospital, but they did not know why. Out of 172 (94.5%) who did not receive the pneumococcal vaccine, 56 (32.6%) reported they did not know about the vaccine and 53 (30.8%) reported they were not informed of the vaccine by a healthcare worker (Fig. 5).

While there were 54 respondents (29.7%) who were aware of the HPV vaccine, 2 (1.1%) administered the vaccine. Respondents who administered the vaccine stated that they got vaccinated because they believed in its protection. The most common response of those (n=89, 49.4%) who did not receive the vaccine was that they did not know about the vaccine (Fig. 6).

Of those who were aware of the MMR vaccine, 40/68 (37.4%) were females. Eleven of the 40 females (9.3%) ultimately received the MMR vaccine. Of these, 9 (81.8%) received it at the recommendation of a doctor. And 62.5% of women who did not have the MMR vaccine stated that they did not have it because they did not know about the vaccine.

Of those who received the HAV vaccine, 58% did so for protective reasons and 34.4% (n=52) of those who did not receive it because the vaccine was not recommended by a healthcare worker (Fig. 6). Similarly, 48% (n=60) of those who did not receive the HBV vaccine did not have it so because it was not recommended by a healthcare worker (Fig. 7).

Forty percent (n=71) of those who did not receive the meningococcal vaccine stated that they did not receive it because they did not know about the vaccine.

Discussion

In Turkey, until recently, vaccination was perceived as a childhood medical procedure and adult vaccination was generally

ignored, except for some exceptional cases and individual applications. Protection from many diseases is important for mitigating mortality and morbidity and can continue with regular vaccinations in adults.

While 79.1% of the participants believed that vaccines were necessary, 7.7% did not. Further, 13.2% had no opinion regarding the necessity of vaccines. Likewise, Özışık et al. [8] reported that 80.1% of their respondents believed that being vaccinated was necessary, 15.2% believed it to be unnecessary, and 4.7% had no opinion. They also found, like us, that there was no relationship between adult vaccination behaviors and age, gender, marital status, or education status. Regardless of gender or educational level, there was a poor awareness of adult vaccines. Similarly, being married or single, or old or young, had no influence on awareness of adult vaccines. Thus, in Turkey, awareness of adult vaccines is poor and we, as health professionals, have an important task in our responsibility increase awareness of vaccines among the patients we serve.

In our study, tetanus was the most well-known adult vaccine (84.6%), followed by influenza (75.3%) and HBV (74.7%). Özışık et al. [8] reported that the most well-known vaccines were influenza (31.1%), HBV (16.4%), and tetanus (15%). Similarly, in the study conducted by Aşık et al. [9], the most well-known adult vaccine was influenza (n=18, 32%), followed by tetanus (n=17, 30%) and HBV (n=7, 12%). The low rates of knowing and having other adult vaccines indicate that it is necessary to be informed about HPV, meningococcal and pneumococcal vaccines. It was stated that 47.8% of the participants in our study had tetanus vaccine, 31.3% of those had HBV vaccine, 29.7% of those had influenza vaccine and 17% of those had HAV vaccine. Bal and Borekci [10] found that, in individuals over age 65 years, 34.2% received the influenza vaccine, 12.7% received the tetanus vaccine, 4.2% received the yellow fever vaccine, and 1.9% received the typhoid vaccine. Very few respondents reported receiving the HBV or meningitis vaccines [10].

Aşık et al. [9] reported that 45.7% of those who received adult vaccines received the tetanus vaccine, 29.6% received the influenza vaccine, 17% were vaccinated against HBV, 3.4% received the pneumococcal vaccine, and 4.3% received other vaccines. The rate of influenza vaccination is high, possibly due to increased awareness of influenza, in part facilitated by the media. Perhaps similar patterns of dissemination can be applied to other vaccines. In the study by Özışık et al. [8], adult vaccination was mostly recommended by secondary and tertiary care physicians (14.5%); whereas, in our study, most vaccinations were recommended by primary care family physicians (26.9%). Many studies have indicated that physician recommendations are very effective at increasing vaccination rates [11-13].

In the study conducted by Mutlu et al. [13], 76.93% of respondents stated that they were informed of the need for vaccination by a physician, and 70.41% said they were motivated to undergo vaccination because of their doctor's recommendation. Thus, physicians appear to play a key role in increasing vaccination rates, particularly given their access to patients and duty to carry out preventive medicine. Thus, primary care physicians play a major role in increasing vaccination rates [14].

In our study, most of the 68 respondents (37.4%) who were aware of the MMR vaccine were females. Only 11 people (9.3%) received the MMR vaccine, in spite of being aware of its existence. Cases associated with imported and imported cases from abroad have been observed in our country since June 2012. During the first 3 months of 2018, 55 cases of measles were reported and confirmed [15]. Therefore, adult vaccination with the MMR vaccine should be routinely applied. For all adult vaccines, adults should be encouraged to pursue vaccination, and new methods of increasing vaccine uptake should be explored; knowledge of vaccines is not enough, and attitudes and behaviors that affect vaccination rates should be further investigated.

We examined general reasons for not undergoing vaccination, and found that having no information about the vaccines and not being informed by healthcare workers were reasons for failed vaccine uptake. Bal and Borekci [10] found that having no information about vaccines, thinking that vaccines are unnecessary, not having vaccines recommended by a doctor, doubting the safety and effectiveness of vaccines, and the fear of allergy development were among the primary reasons for not receiving vaccinations. We believe that the reasons such as the lack of routine vaccination schedule of adult vaccines as well as childhood vaccines in our country, the vaccines being charged except some indications and having time constraints of healthcare workers due to other healthcare services to be obliged to do may prevent being informed and recommended by healthcare workers about the adult vaccines. For this reason, we believe that providing healthcare workers with advanced training on the importance of adult vaccination by the Health Directorates, and with the support of the Ministry of Health, and providing information about adult

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vaccination to media sources may increase adult vaccination rates. Wheelock et al. [16] stated that healthcare workers should be role models for vaccination and found that vaccine recommendations from healthcare workers motivated individuals to be vaccinated. Özışık et al. [8] found that 71% of those who received vaccination recommendations from healthcare workers who were vaccinated, themselves underwent vaccination. This supports the idea that healthcare workers can serve as behavioral models for adult vaccination [8].

In our study, 54 respondents (29.7%) received the influenza vaccine; however, most who did not receive the influenza vaccine (59.2%) reported that they didn't believe in the protective properties of the vaccine. In a study conducted in five different European countries (Germany, Italy, Spain, England, and France), 55.8% of respondents reported feeling that influenza was a serious disease, 55.2% reported that family physicians and nurses recommended influenza vaccination, and 36.1% reported not wanting to infect other family members [17]. In another study, awareness of the seriousness of influenza, the recommendation of family physicians, and unwillingness to infect other family members increased vaccination rates [18]. Even though influenza vaccination rates are increased secondary to the efforts of family physicians and media outlets, negative societal judgements persist. Thus, accurate information is needed to make to prevent misinformation.

In our study, 54 respondents (29.7%) were aware of the HPV vaccine; yet only 2 (1.1%) of them administered the vaccine. In our country, as there are high rates of cervical cancer, HPV vaccination is critically important. In the meta-analysis conducted in 2014 by Bruni et al. [19], the authors concluded that, while more females were receiving HPV vaccination, there is still not enough vaccination in some areas and in some Asian and African countries with high HPV and cervical cancer risk, a rapid increase in vaccination would be beneficial in prevention. In Turkey, we have to be more careful about HPV because of the high prevalence of cervix cancer and low HPV vaccination. Therefore, we should increase public education and ensure that the HPV vaccine is included in routine vaccination schedules, with the support of healthcare workers and the media.

Age, occupation, education, and income levels are directly related to the knowledge and attitudes about adult vaccines. Awareness of adult vaccines remains low in Turkey. It is therefore important to encourage healthcare providers, especially primary care physicians, to advocate for vaccination and increase the media's role in vaccine training.

ORCID

Sinem Aslan Karaoğlu *https://orcid.org/0000-0002-4456-4209*
Beray Gelmez Taş *https://orcid.org/0000-0002-7126-0024*
Dilek Toprak *https://orcid.org/0000-0001-5119-9089*

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