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The Assessment of the Knowledge About Adult Vaccine, And Vaccination Coverage in Adults Aged 18 and Older In Turkey

Bekir Uragan Ineli
Department of Family Medicine, Akdeniz University Hospital, Akdeniz University, Faculty of Medicine, Antalya, Turkey
Email. bekirineli@yahoo.com

Melahat Akdeniz
Department of Family Medicine, Akdeniz University Hospital, Akdeniz University, Faculty of Medicine, Antalya, Turkey
Email: melahatakdeniz@gmail.com

Ethem Kavukcu (Corresponding author)
Department of Sports Medicine, Akdeniz University Hospital, Akdeniz University, Faculty of Medicine, Antalya, Turkey
Email:ethemkavukcu@gmail.com

These authors contributed equally to this work. The research is financed by the authors

Abstract
Objectives: Vaccinations are accepted as being one of the most effective methods for protecting health and preventing illness. The purpose of this study is to assess the vaccination coverage of the adults aged 18 and older, who have made an application to the Family Medicine polyclinics in Antalya, Turkey, as well as their knowledge and desire to obtain knowledge concerning vaccinations.

Materials and Methods: This cross-sectional and descriptive study has been conducted by way of face-to-face questioning. The statistical analyses have been performed using SPSS ver. 22.0. The sample size has been calculated as 400, with the "OpenEpi.Version 3 Open Source Calculator". The Chi-Square, Kruksal-Wallis test and Spearman correlation analysis were used.

Results: A total of 445 people participated in the study. Vaccination coverage for the participants was 10.8 for influenza on a regularly every year, 24,3% for tetanus and diphtheria (Td) on regularly every ten years, 30.3% for hepatitis B, 6.0% for pneumococcal vaccine. The most frequent reason cited for not getting vaccinations was a lack of knowledge. About 65% of the participants stated that they wished to be informed about adult vaccinations by their family practitioners.

Conclusion: Vaccinations are the cornerstone of being protected against infectious diseases. In our region adults do not have sufficient information concerning the vaccinations which are necessary during adulthood, and their vaccination coverage are lower than the desired targets.

Key words: Vaccination coverage, adult immunization, knowledge.

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Introduction

The discovery of vaccines is a turning point in the fight against infectious diseases. The prevalence of numerous infectious diseases, which were at the top of the list of fatal diseases, is quickly reduced with the start of vaccinations [1]. While being performed with success during the childhood years, vaccinations which are of vital importance for protecting the health of the community, are far from the desired level during adulthood. Vaccinations are accepted as one of the most effective methods for protecting health and preventing illness, but in many countries around the world, including Turkey, the coverage of adult vaccinations are not at the desired level [2-4].

Today, the majority of the vaccine preventable disease appears in adults [4]. Adults are sensitive to certain infectious diseases which can be prevented through vaccinations. This is due to fact certain people were not vaccinated during childhood, and some vaccines not provide life-long immunity. Moreover, the fact that certain illnesses such as measles, varicella and hepatitis, which are less serious during childhood, may be more severe in adulthood and the co-morbid status of the aged. Adults can be affected more than the complications of infectious diseases [1,5].

Infectious diseases not only affect the people who have been infected, but can also affect the whole family, the individuals working in the same environment and the community, both directly and indirectly. Vaccinations during adulthood do not only provide protection from infectious diseases, but at the same time, they help to control of co-morbid illnesses easier, and to prevent the transmission of infections to other people who are at risk, and in particular to small children [1,3]. Therefore, it is recommended that vaccinations are implemented throughout the whole life of individuals, in order to prevent diseases which can be prevented through vaccinations [3,5,6].

The Advisory Committee on Immunization Practices (ACIP) of the USA recommends vaccinations against 13 infectious diseases – based on different risk factors and age – including influenza, diphtheria, tetanus, pertussis, varicella, human papillomavirus, measles, mumps, rubella, pneumococcal diseases, meningococcal diseases, hepatitis A and B, haemophilus and herpes zoster. In Turkey, the Ministry of Health recommends the vaccines against influenza, tetanus, hepatitis B, pneumococcal diseases and meningococcal diseases based on different risk factors and age. The other vaccines are not within the scope of reimbursement [7]. However, adult vaccinations have been a subject which attention has been paid to in recent years in Turkey. The Adult Immunisation Guide Working Group, led by the Association of Clinical Microbiology for Infectious Diseases established the Adult Immunisation Guide in 2016. The recommendations for adult vaccinations contained in this guide, are similar to those of the ACIP [7].

Studies for determining the adult vaccination coverage have been conducted in the USA, Canada and numerous other countries [2,3,7-11]. There is no countrywide study in Turkey related to adult vaccination coverage. Studies have been small scale and included only at certain vaccines [12-16]. The aim of our study is to assess vaccination status of the adults aged 18 and older in our region, with the recommended vaccines during adulthood, and their knowledge and desire to acquire information on adult vaccinations.

Materials and methods

The vaccination status, level of knowledge about adult vaccinations and the reasons for not getting vaccinated were researched with a face-to-face survey conducted with adults over the age of 18, who had applied to the two outpatient clinics of the Akdeniz University, Faculty of Medicine, Department of Family Medicine. The size of the sample for this study which we designed as cross-sectional and descriptive was calculated as 400 with the "OpenEpi.Version 3. open source calculator", with the reliability level taken as 99%, the frequency percentage as 50%, the confidence interval as 5% and the sample error as 0.05.

A 25-question questionnaire was implemented on 445 volunteers, who had agreed to take part in the study and given their consent between the months of April – July 2015.

In Turkey, although the childhood immunization records are kept scrupulously, records for adult immunizations are not kept properly. For this reason, immunization status of the participants has been learned from themselves during the one-to-one interview.

The statistical analyses were performed using SPSS ver. 22.0. Mean and standard deviation was used in the descriptive analyses, while the Chi-Square and Kruskal-Wallis tests and spearman correlation analysis were used for the analysis of categorical data. The $P<0.05$ value was deemed to be significant.

Ethical approval was obtained for the study from the Akdeniz University Clinical Research Ethics Committee (date and number: 29.04.2015/205).

Results

A total of 445 individuals – 318 females (71.5%) and 127 males (28.5%) - participated in the study. The mean age of the participants was 38±2 years. About fifty-two percent of participants declared that they had no knowledge about adult vaccinations. The most frequent reasons for not having any knowledge were "not being informed by any source" (84.1%) and "not think to be necessary to have knowledge" (10.6%). **Table 1** shows that percentage of aware among participants who declared they had knowledge concerning vaccinations, based on different vaccines and vaccination coverage of participants.

Approximately 30% participants stated that they did not get any vaccines during adulthood. From those participants who stated that they had got any vaccine, 52.3% stated that they had got at least one dose of tetanus vaccine (Td), 31.9% at least one dose of influenza vaccine. Vaccination coverage of other vaccines for all participants throughout the whole period of adulthood are shown in **Table 1.** The

vaccination coverage for people with chronic diseases was not at the desired level. **Table 2** shows the rates at which patients with chronic diseases had vaccinations.

Table 1. Percentage of aware among participants who declared they had knowledge concerning vaccinations, based on different vaccines and vaccination coverage of participants

Vaccines	Participant familiar with vaccination (%)	Vaccination coverage of for participants aged 18 years and older (%)*
Influenza	75.1	52.4
Tetanus, diphtheria (dT)	69.4	31.9
Hepatitis B	55.3	30.3
Hepatitis A	38.9	9.0
Human Papillomavirus (HPV)	33.5	5.4
Pneumococcal	30.1	2.2
Measles, mumps, rubella (MMR)	28.8	1.8
Varicella	24.3	1.3
Meningococcal	19.8	0.9
Zoster	13.7	0.9
Haemophilus influenzae type b (Hib)	11.2	0.2
*There is no legally compulsory vaccination program for healthy adults in Turkey.		

Table 2. Vaccination rates of participants with chronic disease

DISEASES / VACCINES	DM (n=40) (%)	Heart Disease (n=16) (%)	Lung Disease (n=13) (%)	Liver Disease (n=7) (%)	Kidney Disease (n=3) (%)	Organ Transplant (n=1) (%)	Immune deficiency (n=2) (%)	HIV (n=1) (%)	Blood Diseases (n=1) (%)
Influenza vaccine	42.5	43.8	30.8	42.9	33.3	0	0	0	0
Tetanus-diphtheria vaccine /Td)	40.0	35	53.8	14.3	33.3	100	50.0	100	100
Pneumococcal vaccine	7.5	12.5	0	0	0	0	0	0	0
Meningococcal vaccine	2.5	0	0	0	0	0	0	0	0
HAV vaccine	0	0	15.4	0	33.3	0	0	100	0
HBV vaccine	12.5	25.0	23.1	14.3	33.3	0	0	100	0
Hib vaccine	0	0	0	0	0	0	0	0	0
Abbreviations: Hib; Haemophilus influenzae type b, HBV; hepatitis B virus. HAV; hepatitis A virus, DM; Diabetes mellitus									

In response to the question of "would you have get the vaccination if you had knowledge about vaccines", 27.7% of participants in the 19-26 age group stated that they may have get the HPV vaccination. The other details concerning attitudes in respect of influenza, pneumococcal, tetanus and HPV vaccinations are given in **Table 3.**

The most frequently stated reasons for not get vaccinations are "insufficient information" and "no particular reason" (34.4% and 27.2% respectively). The rates related to the reasons why adults did not get vaccinations are given in **Table 4.**

In respect of the source from which they wished to obtain information, about percent sixty-five of the participants pointed the family practitioner, 32.6% pointed public announcement spots, 21.1% pointed printed materials and 18.0% pointed the vaccination campaigns.

Table 3. The attitudes of the participants concerning certain vaccinations

VACCINES	ATTITUDE	Number (n)	Percentage (%)
Influenza vaccine (Participants from every age group and every year)	Regularly every year	48	10,8
	Not regularly	304	68,3
	May do if he/she had knowledge	93	20,9
	TOTAL	445	100,0
Pneumococcus vaccine (participants who are under risk* and over the age of 65, every 5 years)	Every 5 years	6	6,0
	Not regularly	75	73,5
	May do if he/she had knowledge	21	20,5
	TOTAL	102	100,0
Tetanus vaccine (participants from every age group, booster every 10 years)	Booster dose every 10 years	108	24,3
	Not regularly	263	59,1
	May do if he/she had knowledge	74	16,6
	TOTAL	445	100,0
HPV vaccine (Participants between the ages of 19-26)	Had it as three doses	2	2,5
	Not had it	58	71,6
	May do if he/she had knowledge	20	24,7
	No response	1	1,2
	TOTAL	81	100,0
*People who are under risk: Age 19 through 64 years with chronic medical conditions (chronic heart, lung, or liver disease; diabetes).			

Table 4. The reasons why the participants do not get vaccinations

Reason for not having vaccinations	Rate (%)
Insufficient Information about vaccines	34.4
No Particular Reason	27.2
Fear of the Side Effects	9.0
Believing the Vaccines not to be Protective	8.8
Not Being within the scope of Reimbursement	5.8
High Costs	4.7
Fear of Injections	2.5
Presence of Allergies	1.1
Other	8.1

Analysis of the Categorical Data

There was a significant difference between health workers and other occupational groups in terms of having influenza, tetanus, HAV and HBV vaccinations ($p<0.05$). Participants who are healthcare workers have had these vaccinations at higher rates. However, there is no significant difference between health workers and other occupational groups in respect of having other vaccinations ($p>0.05$).

Although the rate of those having the influenza vaccination among those with chronic diseases was higher (39.7% as against 28.8% respectively), the difference was statistically significant ($p<0.05$). The pneumococcal vaccination was also more prevalent among those with chronic diseases (4.8% as against 1.3% respectively).

There was a significant difference between the male and female participants in terms of their attitudes to the influenza vaccine, with regular annual influenza vaccinations being more prevalent amongst males than amongst females (16.5% as against 8.5% respectively) ($p<0.05$).

There was a significant difference between the male and female participants in terms of receiving the pneumococcal vaccination ($p<0.05$). Pneumococcal vaccination rate is higher in males than in females (6.3% as against 2.2% respectively). There is no difference between those with chronic illnesses and those without, in respect of receiving pneumococcal vaccinations ($p>0.05$).

Discussion

Adult vaccination programmes display significant differences in various countries throughout the world. While there are up to 16 vaccines in the adult vaccination programmes in certain countries, this number is lower in others. In Turkey, reimbursement is made to certain risk groups among adults for the influenza, pneumococcal, meningococcal and hepatitis A and B vaccines. The risk groups include pregnant women, patients with HIV infections, cancer patients, patients who have received solid organ and bone marrow transplants, patients with asplenia, health workers, patients with chronic liver, heart and lung disease, diabetes mellitus, and terminally ill patients with chronic kidney disease. The HPV and zoster vaccines are not currently within the scope of the reimbursement [17].

There have been studies into the reasons why vaccinations are not carried out during the adulthood period [18,19]. In the study by Johnson et al, 60% of the adults participating in the study stated that they were "healthy and did not need vaccinations", 58% stated that their "doctor had not provided any information" and 40% stated that that they were "afraid of side effects of vaccines." [18]. The most frequent (34.4%) reason for not getting vaccine in our study was "lack of or insufficient knowledge about vaccines". The other reasons which were stated were "no particular reason but I don't want to get a vaccine" (27.2%), "fear of the side effects" (9.0%), "the belief that vaccinations do not protect against disease" (8.8%), "the fact that they are not in the scope of reimbursement" (5.8%) and "the fact that their costs are high" (4.7%). Participants stated that if they had had knowledge on vaccines, they would have get vaccinations. Sixty five percent of participants requested that their family practitioners give them information concerning the required vaccinations.

There are numerous studies which have shown that strategies for the improvement of vaccination rates among adults have been successful [20]. In a study carried out by the National Infectious Diseases Foundation in the USA, patients stated that the recommendation of their physician was important in their decision to get vaccinations. The rate of vaccinations among adults increases where physicians strongly recommend getting vaccination [20-23]. Vaccination coverage during the adulthood period are far from the desired targets in many countries. In a study conducted in the USA, adult vaccination coverage were found to be as follows: influenza – 44.8%; pneumococcal in risk groups under 65 age – 24.65%, and 65 years and over – 63.6%; hepatitis B – 24.6%; herpes zoster 65 years and over – 34.2%; a minimum of one dose of HPV in females ages 19-26 – 41.6% and in males – 10.1% [2]. In Canada, where health services are completely free of charge, adult vaccination coverage are as follows: influenza in adults 18 years and over – 40.3%; tetanus – 49.5%; and pneumococcal vaccination in adults 65 years and over – 36.5% [8]. In a study conducted by Wu et al, the adult vaccination coverage in European countries were also found to be far from desired targets [3]. In our study, regular vaccination coverage for tetanus were found to be 24.3%, regular vaccination coverage for influenza were found to be 10.8%, vaccination coverage for pneumococcal (for those aged over 65) was 11.1%, hepatitis B was 30.3%, herpes zoster (65 years and over) was 0.2%, and at least one dose of HPV in females aged 19-26 was 2.5%. This vaccination coverage are too far from the desired targets.

WHO, ACIP, and CDC recommend the influenza vaccine to everyone from the age of 6 months and older, before the influenza season [4,8]. The influenza vaccine was placed within the scope of reimbursement for targeted risk groups in Turkey, in 2004. The vaccination has been offered to all health workers free of charge since 2010. In our study, the seasonal influenza vaccination coverage (in any influenza season) are 39.8% in aged 18 and older, 26.2% in the 18-49 age group, 37.7% in the 50-64 age group, 55.6% in the 65 and older, and 45.9% among health workers. These rates are lower than those present in the USA, and Canada [2,4,8]. However, in certain studies conducted with professional athletes in Turkey, it has been seen that the rate of influenza vaccinations are higher than that of the normal population. In the study carried out by Kavukcu et al, with professional footballers, the rate of regular influenza vaccinations among the participants, on a yearly basis, throughout the whole 5-year term of the study, was 75% [24]. This group is the equivalent of the 18-49 age group in our study, where the rate of influenza vaccinations was 26.2%. It can be seen from here that the rate of vaccinations among the professional footballers is almost three times the rate we found in our study.

Infants under the age of six months and children are faced with a high risk of death and admittance to hospital in related influenza. The risks of admittance to hospital, premature birth and babies with low birth weight in related influenza, increase in pregnant women. The rates of influenza suffered by infants, whose mothers had influenza vaccinations during pregnancy, are lower [25-27]. The ACIP and the WHO recommend influenza vaccinations during pregnancy [6]. In our study, it was determined that only 16.7% of pregnant participants had influenza vaccination.

In Turkey and most countries, a booster dose of the tetanus vaccine is recommended routinely every 10 years, The rate of the tetanus toxoid (Td) vaccination among individuals aged 19 and older in the last 10 years is 62.1% in the USA (according to 2015 data), 49.5% in Canada (according to 2014 data) and

71.4% in Germany (according to 2013 data) [2,8,11]. In our study, the rate of regular Td vaccination every 10 years was 24.3%, which is much lower than the data of other countries.
Pertussis is an illness which is characterised by paroxysmal coughing. Infants are under the risk of severe pertussis [27]. The effect of the pertussis vaccine decreases over time, while the antibodies which pass from mother to baby are not able to sufficiently protect the infant in the first 6 months. Therefore, ACIP recommends one dose of Tetanus diphtheria and acellular pertussis vaccine (Tdap) to pregnant women and adults over the age of 19 who have not previously been vaccinated [6]. In Turkey, Tdap is not within the scope of reimbursement in adults and pregnant women, and is not routinely getting. There are no participants who had Tdap vaccinations in our study.
Pneumococcus is an encapsulated bacterium which causes a wide range of infections from otitis to septicaemia. The pneumonia, meningitis and septicaemia caused by pneumococcus is a threat to life, especially in children, in elderly, in people with immune deficiency, and those with splenectomy. Therefore, pneumococcal vaccination is crucial for people in the risk group for pneumococcal diseases [20,28]. Pneumococcal vaccination coverage are as follows: the USA (according to 2015 data) – 21.2% among the 19-64 age group and 59.7% among the 65 and over age group; Canada (according to 2014 data) – 17.3% among the 19-64 age group and 36.5% among the 65 and over age group; Germany (according to 2013 data) – 31.4% among the 65 and over age group [2,8,11]. In our study, the rates of pneumococcal vaccinations amongst participants were found to be as follows: 20.5% in the 18-64 age group and 11.1% in the 65 and older age group. In our study, the pneumococcal vaccination rates were lower than those in the USA and Canada [2,4,8].
Zona is a considerably painful disease caused by herpes zoster. The Herpes Zoster vaccine (HZV) reduces the frequency with which zoster is seen as well as post-herpetic neuralgia, in individuals aged 60 and older [20,29,30]. HZV is not within the scope of reimbursement in Turkey. According to the 2015 data of the USA, the rate of HZV in individuals aged 60 and over is 30.6% [2]. In our study, the rate of HZV is just 3.2%.
The human papillomavirus (HPV) is responsible for 70% of cervical cancers among women. It also causes anal, vulvar, vaginal, penile and oropharyngeal cancers and warts in both men and women. It is known that the effect of the HPV vaccine on cervical and anal cancers and genital warts is over 90% [20,31,32]. The HPV vaccine has not included in the national vaccination schedule in Turkey, and it has not within the scope of reimbursement. Therefore, HPV vaccination coverage is extremely low – 0% in males and 2.5% in females aged 19-26. This rate is much higher in the USA and Canada, where the HPV vaccine is included in the national vaccination schedule (41.6% in the USA, 44.7% in Canada) [2,8].
Health workers are an important target group of adult vaccinations for the purposes of protecting both themselves and their patients they come into contact with. Seventy five percent of health workers receive the seasonal influenza vaccination in the USA [33]. According to the CDC, the highest vaccination coverage in 2014-2015 were among pharmacists, with 95%. Pharmacists were followed by physicians and nurses, with 89% [34]. In a study covering 441 health workers in Greece, the rate of those getting the seasonal influenza vaccination was found to be 28.7% [35]. In our study, the rates of regular seasonal influenza vaccinations among health workers were as follows: pharmacists – 80.0%, emergency medical technicians – 66.7%, midwives – 53.8% and physicians – 52.0%. These rates of vaccination are lower than those of the USA, but higher than those of Greece.
The WHO and the ACIP recommend that health workers have the hepatitis B vaccination. The rates at which health workers have the hepatitis B vaccination are 64.7% in the USA, 72.2% in Canada, 87% in France and 70.1% in Italy [2,8,37]. In our study, this rate was found to be close to the rate in the USA – at 60.4%.

Conclusion

Vaccinations are the cornerstone of being protected against infectious diseases. Adult vaccinations are a protective health measure, the importance of which continues to increase throughout the world as well as in our country. They reduce the burden of illness and protect life. However, despite targets having been set, adult vaccination targets have not yet been reached, even in developed countries. In our study, the vaccination rates for influenza, pneumococcal, HPV, tetanus, pertussis and zoster are very much below the desired targets. The vast majority of patients cited lack of knowledge as the reason why they were not vaccinated, and wanted family practitioners to inform them concerning the required vaccinations. Family practitioners should assess the vaccination status of the patient in all clinical encounters and strongly recommend the required vaccinations.
The strength of the study is its research into the beliefs which prevent vaccinations and the factors which will increase the rate of vaccinations, alongside the present rate of vaccinations. The weakness of the study is that it is restricted to a certain region and has not been adapted to the whole country.

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