



Emergency Medicine Specialists' Vaccination Status and their Views on Vaccines: A Cross-Sectional Study

Acil Tıp Uzmanlarının Aşılama Durumu ve Aşılarla İlişkin Görüşleri: Kesitsel Bir Çalışma

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ABSTRACT

Objective: Health workers may be exposed to some occupational risks due to the nature of their work and one of them is infectious diseases. One of the ways to prevent infectious diseases is vaccination and this study was carried out to evaluate the vaccination status and perspectives of emergency medicine physicians.

Materials and Methods: This descriptive and cross-sectional study was conducted on 311 emergency medicine physicians working in emergency departments.

Results: Of the participants, 22.5% had seasonal flu vaccine, 83.0% had at least one dose of tetanus-diphtheria vaccine, 90.7% had at least one dose of hepatitis b vaccine, and 63.0% had at least one dose of the measles-rubella-mumps vaccine and 43.1% had at least one dose of chickenpox vaccine. 16.5% of those working as research assistants, 22.6% of specialists, and 40.0% of faculty members had the seasonal flu vaccine ($p<0.05$). Among those who had full dose tetanus-diphtheria, hepatitis b, measles-rubella-mumps, and chickenpox vaccines, those who preferred to gain personal immunity against diseases were between 2.90 and 2.96 times higher than those who preferred to gain immunity by passing the disease ($p<0.05$).

Conclusion: Emergency medicine physicians have low rates of vaccinations recommended for healthcare workers. Knowing the vaccination rates of emergency medicine physicians can contribute to the planning of vaccination services for all healthcare professionals, especially physicians

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ÖZET

Amaç: Sağlık çalışanları yaptıkları işi doğası gereği bazı mesleki risklere maruz kalabilir ve bunlardan birisi de enfeksiyon hastalıklarıdır. Enfeksiyon hastalıklarından korunma yollarından biri de aşılamadır ve bu çalışma acil tıp uzmanlarının aşılama durumlarını ve bakış açılarını değerlendirmek amacıyla gerçekleştirilmiştir.

Materyal ve Metot: Tanımlayıcı ve kesitsel tipteki bu çalışma acil servislerde görev yapan 311 acil tıp hekiminde yapılmıştır.

Bulgular: Katılımcıların, %22.5'i mevsimsel grip aşısı, %83.0'ı en az bir doz tetanos-difteri aşısı, %90.7'si en az bir doz hepatit b aşısı, %63.0'ı en az bir doz kızamık-kızamıkçık-kabakulak aşısı ve %43.1'i de en az bir doz suçiçeği aşısı yaptırmıştır. Araştırma görevlisi doktor unvanında görev yapanların %16.5'i, uzman doktor unvanında olanların %22.6'sı ve öğretim üyelerinin de %40.0'ı mevsimsel grip aşısı yaptırmıştır ($p<0.05$). Tam doz tetanos-difteri, hepatit b, kızamık-kızamıkçık-kabakulak ve suçiçeği aşıları yaptıranların tamamında aşı olarak hastalıklara karşı kişisel bağışıklık kazanmayı tercih edenler, hastalığı geçirerek bağışıklık kazanmayı tercih edenlere göre 2.90 ile 2.96 arası kat daha yüksektir ($p<0.05$).

Sonuç: Acil tıp hekimlerinin, sağlık çalışanlarına yapılması önerilen aşıları yaptırma oranları düşüktür. Acil tıp hekimlerin aşı oranlarının bilinmesi, hekimler özelinde tüm sağlık çalışanlarının aşılama hizmetlerinin planlanmasında katkı sağlayabilir.

1. Introduction

There are some important differences that distinguish health services from other services and sectors. One of them is that health services cannot be postponed in most cases, except for routine controls. Especially urgent and acute, painful and endangering health care

demands cannot be postponed. In such a case, the healthcare needs of individuals are usually met by emergency health services. Emergency medicine system/service; in this respect, can be stated that it is in the position of "The Showcase of the Health System" (1). The Anglo-American emergency medicine system model applied by

many countries including Turkey; is based on the principle of transporting the patient to the hospital emergency services quickly to receive more advanced and quality service (2). Emergency services are places where immediate medical interventions are made and monitored for the sick and injured due to reasons such as accidents, trauma, and life-threatening diseases, working on a 24-hour service basis. Emergency services; in this respect, can be stated that it is in the position of "The Showcase of Hospitals".

The first development in the world concerning the hospital dimension of emergency health services started in 1970 with the establishment of the Department of Emergency Medicine at the University of Cincinnati, Ohio State of the United States (USA). The first development in this field in Turkey started when a separate specialty called "First and Emergency Aid" was published in the Official Gazette in 1993 and this development was followed by the establishment and inauguration of the Department of Emergency Medicine at İzmir Dokuz Eylül University in 1994 (3). Those who are successful at the end of the 4-year training period are entitled to serve as emergency medicine specialists (4).

Immunization provides a very important benefit to public health by reducing mortality and morbidity by providing protection against vaccine-preventable diseases both individually and socially. It is one of the most important preventive health services for the individual and its importance has increased, especially with the COVID-19 pandemic. The history of immunization studies in Turkey dates back to the 1930s. However, regular immunization services started in 1981 with vaccination against six diseases (BCG, Diphtheria, Pertussis, Tetanus, Polio, and Measles) carried out in childhood immunization services within the framework of the Extended Immunization Program (EIP) and this number increased to 13 with Chickenpox added in 2013 (5).

There are also immunization services for adults in special groups such as pregnant women, travelers, and health workers. It is very important to vaccinate health workers as a healthcare worker exposed to a vaccine-preventable disease can transmit the disease to patients, other healthcare workers, family members, and people they are in contact with. In addition, the fact that a healthcare worker transmits a contagious disease he has acquired from a patient to other patients due to not being vaccinated means a violation of the principle of "first do no harm / primum non nocere", which is one of the most basic principles of medicine. In addition, not vaccinating the health worker may cause a disruption of work continuity (6,7).

The use of emergency services increases due to factors such as uninterrupted services, having a large patient population, not being able to get an outpatient appointment, using laboratory services, and faster examination and treatment (8,9). According to the published report, while 74.2 million patients received health services in the emergency services of public hospitals in Turkey in 2010, this number reached 101.4 million in 2017 (10).

This study was carried out to evaluate the vaccination status of emergency medicine physicians and their perspectives on vaccines, those working in units with high patient diversity and density, such as the emergency service.

2. Materials and Methods

This descriptive and cross-sectional study was conducted on emergency medicine physicians between June and August 2022. A questionnaire consisting of 20 questions about the socio-demographic characteristics, working conditions, and vaccination of emergency medicine physicians was prepared. This prepared questionnaire form was transferred to the computer environment and an online questionnaire link was created. The created link was published on the official website of the Association of Emergency Medicine Physicians of Turkey and data were collected.

A total of 311 participants' data were evaluated during the study process. Data were evaluated with SPSS 15.0 (Chicago, IL, USA) program. Mean and standard deviation were used in continuous data, and the chi-square test was used to compare groups in categorical data. In addition, binary logistic regression analysis was used to determine the effect on vaccination status. The odds ratio (OR) and 95% confidence interval of (CI) were calculated. In the analyzes performed, cases where the p-value was <0.05 were considered statistically significant.

Ethical approval was obtained from Non-Interventional Clinical Research Ethics Committee (Date: 2022, Decision No: 367) to conduct the study. All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

3. Results

Of the participants, 57.6% had three doses (full dose) of hepatitis B (HBV) vaccine, 38.9% of the participants had three doses (full dose) of tetanus-diphtheria (Td) vaccine, 34.7% of them had two doses (full dose) measles-mumps-rubella (MMR) vaccine, 22.5% of the participants had the seasonal influenza vaccine (SIV), 20.6%

had two doses (full dose) of chickenpox vaccine, and 9.0% had the pneumococcal vaccine. SIV vaccine was the most recommended vaccine by emergency medicine physicians for both their patients (71.7%) and their relatives (70.7%). The vaccination and recommendation status of the participants are shown in Table 1.

Table 1. Vaccine status and vaccination recommendations of participants

Vaccination and Recommendation Status	n	%
Seasonal influenza vaccination status		
No	231	77.5
Yes	70	22.5
Pneumococcal vaccination status		
No	283	91.0
Yes	28	9.0
Tetanus-diphtheria vaccination status		
Had three doses	121	38.9
Had a single dose	80	25.7
Had two doses	57	18.3
Not vaccinated	53	17.1
Hepatitis B virus vaccination status		
Had three doses	179	57.6
Had two doses	77	24.8
Not vaccinated	29	9.3
Had a single dose	26	8.3
Measles-mumps-rubella vaccination status		
Not vaccinated	115	37.0
Had two doses	108	34.7
Had a single dose	88	28.3
Chickenpox vaccination status		
Not vaccinated	177	57.0
Had a single dose	70	22.5
Had two doses	64	20.5
Preference for personal immunity against diseases		
By vaccines	248	69.7
Bypassing the disease	63	20.3
What vaccinations do you recommend your patients receive?*		
Seasonal influenza vaccine	223	71.7
Pneumococcal vaccine	213	68.5
Meningococcal vaccine	160	51.4
Which vaccinations do you recommend to your relatives (your spouse, children, relatives, and close friends)?*		
Seasonal influenza vaccine		
Pneumococcal vaccine	220	70.7
Meningococcal vaccine	207	66.6
	147	47.3

*Participants were able to select more than one option.

The rate of those who had both SIV and pneumococcal vaccines was the lowest among those with the title of research assistant, and the differences in both vaccines according to the title were statistically significant ($p < 0.05$). The rate of SIV and pneumococcal vaccination increases as age and duration of work in the emergency department increase. In the pneumococcal vaccine, the differences according to age and working time in the emergency department were statistically significant ($p < 0.05$). While more SIV and pneumococcal vaccines were used in married people and those with chronic diseases, the differences were not statistically significant. The seasonal flu and pneumococcal vaccination status of the participants according to some characteristics are shown in Table 2.

Table 2. Seasonal influenza and pneumococcal vaccines statuses according to some characteristics of the participants

Characteristics	N	%	Seasonal influenza vaccination status (N=70)				Pneumococcal vaccination status (N=28)			
			n	%	X ²	p	n	%	X ²	p
Gender					3.958	0.047			0.077	0.781
Female	82	26.4	12	25.3			20	8.7		
Male	229	73.6	58	14.6			8	9.8		
Age					1.150	0.563			7.883	0.019
Between 26 – 35	161	51.8	33	20.5			8	5.0		
Between 36 – 45	130	41.8	31	23.1			16	12.3		
46 and over	20	6.4	6	30.0			4	20.0		
Marital status					1.331	0.249			2.346	0.126
Married	242	77.8	58	24.0			25	10.3		
Single/Divorced	69	22.2	12	17.4			3	4.3		
Have children					0.756	0.384			7.605	0.006
No	93	29.9	18	19.4			2	2.2		
Yes	219	70.1	52	23.9			26	11.9		
Title					7.158	0.028			5.278	0.045
Research Assistant	91	29.3	15	16.5			3	3.3		
Specialist Dr.	190	61.1	43	22.6			21	11.1		
Faculty Member	30	9.6	12	40.0			4	13.4		
Total working time in the emergency department					2.848	0.241			9.729	0.008
5 years and below	86	27.7	14	16.3			3	3.5		
Between 6 to 10 years	150	48.2	36	24.0			12	8.0		
11 years and above	75	24.1	20	26.7			13	17.3		
Have chronic disease(s)					0.222	0.637			3.104	0.078
No	259	83.3	57	22.0			20	7.7		
Yes	52	16.7	13	25.0			8	15.4		
Presence of chronic disease in people living together at home					0.010	0.920			0.003	0.953
No	243	78.1	55	22.6			22	9.1		
Yes	68	21.9	15	22.1			6	8.8		
Presence of persons over 65 years of age among those living together at home					0.008	0.928			1.909	0.167
No	279	89.7	63	22.6			23	8.2		
Yes	32	10.3	7	21.9			5	15.6		
Preference for personal immunity against diseases					11.827	0.001			1.735	0.188
Bypassing the disease	63	25.3	4	6.3			3	4.8		
By vaccines	248	72.7	66	26.6			25	10.1		
Chemical, biological, radiation, and nuclear education status					7.237	0.007			1.771	0.183
No education	137	44.0	21	15.3			9	6.6		
Trainee	174	56.0	49	28.2			19	10.9		

Row percentage is given.

In all of those who received full doses of Td, HBV, MMR, and chickenpox vaccine, those who preferred to gain immunity against diseases were 2.90 to 2.96 times more than those who preferred to gain immunity by passing the disease (p<0.05). It was 2.9 times higher in those who received full-dose MMR vaccine than those who did not receive chemical biological radiological nuclear (CBRN) training (p<0.05). The analysis by logistic regression of the characteristics that may affect the full-dose vaccination status of the participants is shown in Table 3.

Table 3. Analysis of the characteristics that may have an effect on the participants' full-dose vaccination by logistic regression

Independent variables	Tetanus-Diphtheria (3 Doses)				Hepatitis B Virus (3 Doses)				Measles-Mumps-Rubella (2 Doses)				Chickenpox (2 Doses)			
	p	OR	%95 CI		p	OR	%95 CI		p	OR	%95 CI		p	OR	%95 CI	
			LL	UL			LL	UL			LL	UL			LL	UL
Title																
Research Assistant		Ref.				Ref.				Ref.						
Specialist Dr.	0.139	1.489	0.879	2.523	0.764	1.080	0.653	1.786	0.310	1.318	0.771	2.264				
Faculty Member	0.145	1.871	0.806	4.342	0.150	1.913	0.791	4.628	0.171	1.813	0.774	4.244				
Total working time in the emergency department																
5 years and below		Ref.				Ref.				Ref.						
Between 6 to 10 years	0.217	1.420	0.814	2.477	0.310	1.318	0.774	2.246	0.310	1.318	0.771	2.264				
11 years and above	0.187	1.542	0.811	2.931	0.102	1.697	0.901	3.197	0.171	1.813	0.774	4.244				
Preference for personal immunity against diseases																
By passing the disease								Ref.								
By vaccines	0.001	2.967	1.534	5.739	0.000	2.949	1.661	5.235	0.000	2.949	1.651	5.235	0.019	2.900	1.190	7.070
Chemical, biological, radiation, and nuclear education status																
No education		Ref.								Ref.						
Trainee	0.000	2.523	1.560	4.078					0.000	2.949	1.651	5.235				

Logistic regression analysis was performed with independent variables "Gender, Age, Marital status, Child status, Title, Length of service in emergency services, Presence of chronic diseases in himself and those living together at home, Presence of persons over 65 years of age in the family (at home), Personal preference for immunization, CBRN-related education status", and only significant values in the analysis are included in the table. CI = confidence interval; LL = lower limit; UL = upper limit; OR= odds ratio; Ref.= reference

4. Discussion

SIV, MMR, Td, HBV, and varicella vaccines are recommended by the Ministry of Health of Turkey (11). Although SIV can be performed at any time of the influenza season, it is recommended to administer one dose of the vaccine each year, with the best time being between October and November. Three doses of the Td vaccine (at 0, 1, and 6 months) are recommended for all healthcare workers (whose vaccination status is not registered before) due to the high probability of contact and injury. For those whose primary series has been completed, the Td vaccine is recommended every 10 years, including Tetanus-diphtheria-acellular pertussis (Tdap). Three doses of the HBV vaccine (at 0, 1, and 6 months) are recommended due to the high risk of percutaneous and mucosal contact with infected blood or body fluids in healthcare workers. For the vaccine to be administered, HBsAg and anti-HBs should be negative as a result of the serological examination performed before the vaccine. Despite measles elimination programs, measles cases are still occurring. Measles has higher morbidity and mortality, especially in the adult group. Due to the high risk of contact among healthcare workers, two doses of MMR vaccine are recommended 1 month apart. However, there is no need to vaccinate those who have a record of having measles, rubella, and mumps diseases, or those who have been shown to be immune by laboratory tests. Since chickenpox is very easily transmitted and is more severe in the adult age group, two doses of vaccine are recommended to all healthcare

professionals at least 1 month apart. There is no need to vaccinate those who have a history of chickenpox (5,7).

Influenza and pneumococcal infections are the most common causes of secondary bacterial infection in acute exacerbations of chronic obstructive pulmonary disease (COPD) patients (12). Healthcare workers can be a vector for the spread of disease, especially in high-risk patients (13). "Infections that develop during and after the provision of health services in patients followed in hospitals and other health care institutions, that are not present at the time of admission to the hospital or are not in the incubation period" are defined as Health Care-Associated Infections (HCAI). Infections that develop after discharge in patients and healthcare workers are also covered by HCAI (14). In our study, 9.0% of the participants had the pneumococcal vaccine and 22.5% had SIV (Table 1). The rate of participants getting both pneumococcal and influenza vaccines is low. Especially, emergency medicine physicians working in emergency departments where patient circulation is high have a high risk of contracting the disease and they have the possibility of transmitting it to their patients if they have an infection. Since hospital-acquired transmission of vaccine-preventable diseases can be prevented by immunization, it is important for all healthcare professionals, especially emergency medicine specialists, to have both the pneumococcal vaccine and the vaccines recommended by the Ministry of Health Turkey.

In a study conducted with family practice, the rate of those who stated that they recommended vaccination to risk groups was 79.8%

(15). In our study, the most recommended vaccine for both patients (71.7%) and their relatives (70.7%) was SIV (Table 1). Influenza is an important cause of mortality and morbidity in HCAI high-risk groups. In addition, SIV may have been the most recommended vaccine for patients and family members, since healthcare professionals are an important resource for HCAI.

The World Health Organization (WHO) estimates that 296 million people lived with chronic hepatitis B in 2019, of whom only 30.4 million knew they had hepatitis B, and 6.6 million people were treated. It is estimated that 820 000 deaths occurred due to hepatitis B infection in 2019 (16). The hepatitis B agent, which is 50-100 times more contagious compared to HIV, is very contagious. Parenteral/ percutaneous, sexual, perinatal (from mother to baby during birth or rarely after birth), fluid contact with organs such as eyes, nose, and mouth, and contact with tissues with impaired skin integrity are among the routes of transmission (5,17,18). In the results of the study on immunization in healthcare workers; In the study conducted by Erken (19) (82.9%) on health workers working at Pamukkale University Faculty of Medicine, Koruk et al. (20) in all health workers (including administrative, technician, auxiliary personnel, etc.) in Şanlıurfa (63.8%), Cılız et al. (21) (71.5%) HBV vaccination was the highest rate among the recommended vaccines (71.5%) in the health personnel working at Manisa Celal Bayar University Hafs Sultan Hospital (including technicians, assistant personnel, etc.). In our study, similar to the results of other studies, the hepatitis B vaccine (57.6%) was the highest rate among the recommended vaccines (Table 1). Due to the prevalence of HBV in the community, the low level of knowing whether individuals have HBV, the diversity of transmission routes, and the easy transmission of health workers in their routine work, emergency medicine physicians are aware and aware of the risk of HBV, and therefore HBV vaccine is more frequently used may have caused them to do so.

In a thesis study in which the attitudes and behaviors of healthcare professionals working at Pamukkale University Faculty of Medicine in 2017 were examined, the attitude score towards vaccination was determined by the faculty members (Dr. Lecturer/Assistant Professor, Associate Professor Dr., Prof. Dr.) attitude score was found to be higher than the attitude score of the research assistants. In the same study, 2.6% of research assistants had SIV each year, while this rate was 23.3% among faculty members (18). In a study conducted in a university hospital in 2015, 5.0% of research assistants had SIV, while this rate was found to be 21.1% among faculty members (22). In a study conducted at Zonguldak Bülent Ecevit University in 2020, it was found that

faculty members (SIV: 18.8% HBV: 81.3%) were vaccinated at higher rates than research assistants (SIV: 14.7% HBV: 74.4%) in SIV and HBV vaccines. found (23). In our study, faculty members vaccinated more than research assistants in the recommended SIV, pneumococcal and full-dose Td, HBV, and MMR vaccines (Tables 2 and 3). The reason for this may be due to the fact that faculty members work in an academic environment and closely follow up-to-date scientific data.

5. Conclusion and Recommendations

Although some vaccination rates in this study are higher than some in previous studies, the vaccination rates for emergency medicine physicians are not at the level recommended for healthcare workers despite their well-known importance. The HBV vaccine is the most commonly administered. Knowing the vaccination rates of emergency medicine physicians can contribute to the planning of vaccination services for all healthcare professionals, especially physicians. It is possible to increase the vaccination rates of health workers with the help of in-service vaccination training programs. Faculty members can take an active role in these training programs for recommended vaccines as role models and by emphasizing their educational features.

Conflict of Interest: There is no conflict of interest in this study.

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Authorship Contribution:

MD: Research design, data analysis, literature review, manuscript writing and final controls.

EB: Data collection, manuscript writing and final controls.

MB: Literature review, manuscript writing and final controls.

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