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■ Original Article

Seasonal influenza vaccination coverage: a multicenter cross-sectional study among healthcare workers

Mevsimsel grip aşısı kapsama oranları: sağlık çalışanları arasında çok merkezli kesitsel bir çalışma

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ABSTRACT

Aim: The aim of this study is to evaluate the attitudes of healthcare workers against seasonal influenza vaccine and the reasons for vaccine avoidance.

Materials and Methods: This national survey was conducted from April 1st to June 30th in 2017. The study was carried out among health care workers working in primary, secondary and tertiary care settings. A total of 12 questions were sent to 5046 health care professionals from 55 different cities who agreed to participate in the survey.

Results: 7% of the participants stated that they get vaccinated regularly every year. 65.8% of the participants stated that they don't get vaccinated at all. The most important reason for those who did not receive influenza vaccination was their disbelief in the necessity of the vaccination (51.9%). The most common reason for the seasonal influenza vaccination was the prevention of influenza infection (56.7%).

Conclusion: The results of the study showed that HCWs influenza vaccination rates are very low. Doctors have been found to have slightly better rates than other HCWs. The high level of education and the increase in professional experience had a positive effect on the vaccination rate. It is important to know the HCWs attitudes and behaviors towards the vaccination to increase the rates.

Keywords: seasonal influenza vaccination, healthcare workers, attitudes

ÖZ

Amaç: İnfluenza tüm dünyada önemli ölçüde morbidite, mortalite ve maliyet yükünden sorumludur. Sağlık çalışanları (HCP) mesleki bulaş açısından risk altındadırlar. Bu çalışmada sağlık çalışanlarının mevsimsel influenza aşısına karşı tutumlarının ve aşılardan kaçınma nedenlerinin değerlendirilmesi amaçlanmıştır.

Gereç ve Yöntem: Bu çok merkezli ulusal anket çalışması 1 Nisan-30 Haziran 2017 tarihleri arasında gerçekleştirildi. Ankete katılmayı kabul eden 55 şehirden toplam 5046 HCP uzaktan katılım yoluyla cevaplamaları için toplam 12 sorudan oluşan bir anket gönderildi.

Bulgular: Çalışmaya katılanların %7'si her yıl düzenli olarak aşı yaptırdığını belirtti. Hiç yaptırmıyorum diyenlerin oranı %65,8 idi. İnfluenza aşısını yaptırmayanların en önemli nedeni grip aşısının gerekliliğine inanmama idi (%51,9). Mevsimsel grip aşısı yaptıranların en önemli gerekçesi grip enfeksiyonundan korunma (%56,7) idi.

Sonuç: Sonuçlarımız, tüm HCP influenza aşılama oranlarının çok düşük olduğunu göstermiştir. Doktorların diğer HCP'lerden biraz daha iyi oranlara sahip olduğunu görülmüştür. Eğitim düzeyinin yüksek olması ve mesleki tecrübenin artması aşılama oranını olumlu yönde etkilemiştir. Sağlık çalışanlarının aşılama oranlarının artırılabilmesi için öncelikle aşı konusundaki tutum ve davranışlarının bilinmesi gerekir.

Anahtar kelimeler: mevsimsel influenza aşısı, sağlık çalışanları, tutumlar

INTRODUCTION

Influenza is a contagious viral infection with short-term incubation time, mostly transmitted via droplets and causing systematic symptoms such as fever, muscle pain, body aches, headache and fatigue [1]. Seasonal influenza causes an estimated 3 to 5 million cases of severe illness worldwide, with approximately 250,000 to 500,000 casualties each year [2]. The Center for Disease Control and Prevention (CDC) has been recommending that all healthcare workers have received influenza vaccines since 1981 [3]. European guidelines also recommend vaccination of all patient care staff, including health workers, to protect high-risk patients [4]. In the USA, influenza vaccination rates reached 75.2% in 2013–14 season due to the determination of influenza vaccine coverage as a performance criterion and mandatory vaccination policies, while this rate is still around 30% in Europe [5]. Although free influenza vaccination has been provided to healthcare workers in Turkey since 2002, vaccination rates are not yet at the desired level [6-8].

This national multicenter study was conducted to determine the influenza vaccination rates and HCWs beliefs and attitudes towards influenza vaccine. Our study was conducted among HCWs working in primary, secondary and tertiary health care facilities in 55 different cities. Therefore, it is important to give an idea about attitudes toward influenza vaccination at a national scale, due to the high number of samples.

MATERIALS AND METHODS

This national multicenter survey was conducted from April 1st to June 30th in 2017. A total of 12 questions were sent to 5046 health care professionals from 55 different cities who agreed to participate in the survey. Each participant filled out the questionnaire anonymously. The health personnel who wanted to participate in the study were asked to complete the questionnaire to determine their demographic characteristics and attitudes towards seasonal influenza vaccine.

Ethics Committee Approval

This study was done with the approval of the Ethics Committee (Izmir Bozyaka Training and Research Hospital, approval number: 08.29.2016/431) along with Turkey Public Health Institution (approval number: 05.03.2016/45202601).

Statistical Analysis

After all the data were collected, Kolmogorov Smirnov test was used to determine whether the data showed normal distribution. Since normal distribution was not observed

Table 1. Demographic characteristics of health personnel participating in the research

Characteristics	Number (n)	(%)
Age		
17-29	1762	34.9
30-39	1694	33.6
40-49	1316	26.1
>50	274	5.4
Sex		
Female	3419	67.8
Male	1627	32.2
Profession		
Doctor	1157	22.9
Nurse	1882	37.3
Intern Student	572	11.3
Allied Health Staff	396	7.8
Support and Service Staff	1039	20.6
Education		
Ph.D	3612	71.6
College	1130	22.4
Other	304	6.0
Work Experience		
0-10 years	2973	58.9
11-20 years	1224	24.3
>20 years	849	16.8

after this evaluation, it was considered appropriate to use nonparametric tests. All statistical evaluations were performed using SPSS 20 program. Continuous variables mean +/- standard deviation (SD) and categorical variables were expressed as frequency and percentage. The study population was categorized to 3 different groups after their answers to the influenza vaccination questionnaire. Those 3 groups are, "regularly vaccinated", "occasionally vaccinated", and "never vaccinated". Variables and the relationship between these groups were evaluated using Kruskal Wallis test and spearman rho test as appropriate. 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.

RESULTS

A total of 5046 individuals, 1627 men (32.2%) and 3419 women (67.8%), participated in the study. The age of the participants varied from 17-67. The mean age of the participants was 34.2 (SD=9.6) and the median age was 34 years. This study had 1157 doctors (22.9%), 1882 nurses (37.3), 572 intern students (11.3%), 396 allied health staff (7.8%), and 1039 support and service staff (this includes cleaning staff, patient transport staff, data record staff, office worker, food staff, and security) attended. The demographic characteristics of the health personnel participating in the study are given in **Table 1**. The mean experience of working

Table 2. Distribution of the participants who got vaccinated at least once according to the reasons for vaccination

Reason for Vaccination*	Number (n)	(%)
Being in the Risk Group	153	8.9
Protection from Influenza Infection	980	56.7
To Protect Their Families	286	16.5
To Protect the Patients	197	11.4
Avoiding the Pandemic	168	9.7
When a Serious Outbreak Occurs	252	14.6

* Percentages were taken from n = 1728 people. More than one option can be marked

Table 3. Distribution of people who have never received flu vaccines according to the reasons for not being vaccinated

Reasons for Not Being Vaccinated*	Number (n)	(%)
Not Seeing Flu Vaccination as Necessary	1699	51.2
Being Against Flu Vaccination	249	7.5
Afraid from Side Effects of the Vaccine	330	9.9
Due to Getting the Flu After the Vaccination	259	7.8
Not Getting the Flu Without the Vaccination	153	4.6
Vaccination is not Mandatory	415	12.5
My Immune System is Strong	522	15.7

*Percentages were taken from n=3318 participants

between the participants was 10.7 years (SD=8.6), and the median was 9 years (maximum: 45 years, minimum: 1 year). 7% (n = 351) of the participants stated that they get vaccinated regularly every year. 65.8% (n=3318) participants stated that they don't get vaccinated at all. The rate of those who reported having it done occasionally was 27.3% (n = 1377). The rate of influenza vaccination increased with age

(p <0.001). Men had a significantly higher vaccination rate than women (p <0.001). The most common cause of seasonal influenza vaccination was to be protected from influenza infection. The rate of those who stated that they get vaccinated to protect their patients was 11.4% (Table 2). The most common reason for those who did not receive seasonal influenza vaccination was that they did not consider the flu vaccine necessary with 51.2%. Table 3 shows the distribution of those who have never received the flu vaccine throughout their lives according to the reasons for not being vaccinated. The rate of people who stated that they don't get vaccinated was higher in women than in men (p <0.01). Again, the rate of the nurses who stated that they don't get vaccinated was higher than any other occupational groups (p <0.001). 49.9% of those who stated that they had regular vaccination every year were doctors (p <0.001). The rate of those who stated that they had no vaccination done was found to be significantly lower as the occupational year increased (> 20 years). Table 4 shows the distribution of health personnel by influenza vaccination frequency according to demographic characteristics. 15.1% of the doctors participating in the study stated that they got vaccinated regularly every year (n = 175). Doctors had the highest regular vaccination rate among all occupational groups (p <0.001). The doctors had 52.2% (n=604) participants who did not receive any vaccination. 3.9%

Table 4. Distribution of health personnel according to demographic characteristics of influenza vaccination

	Regularly vaccinated n= 351 (%)	Irregularly vaccinated n=1377 (%)	Never vaccinated n=3318 (%)	p
Age				<0.001
17-29	83 (23.6)	358 (26.0)	1321 (39.8)	
30-39	121 (34.5)	471 (34.2)	1102 (32.2)	
40-49	110 (31.3)	461 (33.5)	745 (22.5)	
50	37 (10.5)	87 (6.3)	150 (4.5)	
Age (mean±<.001 – Standart Deviation)	37.2 ±9.8	36.2 ± 9.1	33.09 ±9.6	
Sex				<0.001
Female	186 (53.0)	910 (66.1)	2323 (70.0)	
Male	165 (47.0)	467 (33.9)	995 (30.0)	
Job				<0.001
Doctor	175 (49.9)	378 (27.5)	604 (18.2)	
Nurse	74 (21.1)	535 (38.9)	1273 (38.4)	
Intern Student	23 (6.6)	93 (6.8)	456 (13.7)	
Allied Health Staff	16 (4.6)	116 (8.4)	264 (8.0)	
Support and Service Staff*	63 (17.9)	255 (18.5)	721 (21.7)	
Education				<0.001
Ph.D	267 (67.1)	1037 (75.3)	2308 (69.6)	
College	68 (19.4)	257 (18.7)	805 (24.3)	
High School	6 (1.7)	35 (2.5)	113 (3.4)	
Primary-Middle School	10 (2.8)	48 (3.5)	92 (2.8)	
Experience from Work				<0.001
0-10 years	160 (45.6)	675 (49.0)	2138 (64.4)	
11-20 years	115 (32.8)	382 (27.7)	727 (21.9)	
20 years	76 (21.7)	320 (23.2)	453 (13.7)	

* Cleaning personnel, patient transport staff, data record staff, office worker, food staff, security

Table 5. Factors affecting influenza vaccination rates during the survey period

Variable	Univariate analysis			Multivariate analysis		
	OR	95% CI	p	OR	95% CI	p
Age	1.03	1.03-1.04	<0.001	1.02	1.02-1.03	<0.001
Sex	1.34	1.19-1.52	<0.001	0.95	0.82-1.09	0.4893
Doctor	0.47	0.41-0.54	<0.001	1.47	1.25-1.72	<0.0001
Professional experience>10	0.49	0.39-0.61	<0.001	1.37	1.07-1.77	0.0128
Educational level of college or higher	0.91	0.71-1.17	0.4719	1.17	0.88-1.54	0.2624
Regular vaccination	0.0005905	0.00003683 to 0.009466	< 0.0001	174E+009	–	0.9978

(n=74) of the nurses got vaccinated regularly while the rate of the nurses who didn't get vaccinated was 67.6% (n=1273). The rate of regular influenza vaccination was significantly higher in people with education level of college or above (n=4742), than people with lower education level (high school or lower) (n=154) (p < 0.001).

Univariate analysis of the data revealed that high vaccination rates were significantly associated with age, gender, being a doctor, working year longer than 10 years, and regular vaccination history. A multivariate analysis of these parameters showed that the vaccination rate was significantly correlated to age (OR 1.02; 95%CI: [1.02-1.03]; p < 0.001) and being a doctor (OR 1.47; 95% CI: [1.25-1.72]; p < 0.0001) (**Table 5**).

DISCUSSION

Flu vaccine has been approved in mid-1940s and it is a safe vaccination. HCW influenza vaccination rates has been unacceptably low (45%), despite the continuous efforts by the government agencies and professional organizations to encourage the use of vaccination [10]. In health institutions, the direct effect of vaccination is to reduce influenza rates in health care workers. The indirect effect is to prevent the transmission of influenza virus to high-risk patient groups by vaccination of HCWs. HCW vaccination can reduce influenza-related morbidity and mortality among both HCWs and patients [9-11,13]. Although vaccination is widely accepted as an effective and low-cost health technology, the phenomenon known as "vaccination hesitation" is spread not only among citizens, but also among healthcare workers, and as a result vaccination rates are continuously decreasing [11]. Unfortunately, working among HCWs while sick is common and plays a key role in transmission of pathogens in health care settings [9]. In a study conducted by Chiu et al. during the influenza season, they found the rate of health workers working as sick to be 40% and reported that this rate was 63% among doctors, reaching its highest level [12]. Ahmed et al. found a significant reduction in all-cause mortality (-44 per 1000 patients) in facilities where influenza vaccines were given to healthcare workers

[13]. For all these reasons, health workers are a priority target group in vaccination.

In our study, 7% of HCWs (n = 351) stated that they get vaccinated regularly every year. The participants who stated to not get vaccinated were at a high amount of 65.8% (n=3318). The rate of those who reported having it done occasionally was 27.3% (n = 1377). This study showed low rates of seasonal influenza vaccination among all HCWs. HCW vaccination rate varies according to different influenza seasons and countries [14]. In a study conducted by Petek et al., the rate of vaccination of health workers with seasonal influenza vaccine was reported as 12% [15]. Similarly, in a study conducted by Bonaccorsi et al., it was reported that the rate of HCWs stating they were regularly vaccinated was 12.3% [16]. In another study conducted in Europe, the vaccination rate was reported as 20% [17]. In a multicentric study of 3454 health workers in Italy, influenza vaccination rate was reported as 14%. Although the vaccination coverage rate was lower than the recommended minimum level, the research found higher vaccination rates among people over 61 years old (p < 0.01) [11]. In our study, we found that the rate of those who stated that they do not get vaccinated was significantly lower as the working year in the profession increased (> 20 years) (p < 0.001).

The main reasons for vaccine coverage are awareness of the high risk of infection in the workplace and the desire to protect family members and colleagues. The main barriers to vaccination are the suspicion of vaccine efficacy, fear of side effects, and the belief that healthcare workers are not at high risk of influenza infection [15]. In our study, we found that the reasons for not being vaccinated were: Not thinking it's necessary (51.2%), thinking their body resistance is strong enough (15.7%), and because the vaccine is not mandatory (12.5%). 9.9% of the participants stated that they were afraid of the side effects of the vaccine and 7.5% were against vaccination. In a study conducted by Esposito et al. among health workers related to seasonal influenza vaccine in Italy and the reasons for not getting vaccinated; 45.3% stated that they were not intimidated by influenza, 29.9% due to their doubts on the effectiveness of the vaccination, 14% due to fear of side-effects of the vaccine, and 2% stated

that they were against vaccination [17]. The most common reason for vaccination throughout all the studies was reported as self-protection. In our study, the most common reason for having seasonal influenza vaccine was answered as protection from the influenza infection with 56.7%, protecting family and close contacts with 16.5%, and in case of a serious epidemic with 14.6%. The rate of those who stated that they get vaccinated to protect their patients was as low as 11.4%. In a study conducted by Esposito et al., focusing on reasons to get vaccinated, it was reported that 35.2% were afraid of passing the disease to the patients, 34% due to the fear of passing the disease to family or close contacts, and 21.5% due to having elderly or chronic disease [17]. In a study conducted by Gramegna et al., focusing on reasons to get vaccinated, 63% stated to protect oneself from influenza, 31% stated to protect their patients, and 6% stated to protect their household members. Main reasons for vaccine denial were not having enough time (45%), concerns about side-effects (22%), not getting sick often and/or not being afraid of influenza infection (22%), and not believing the need for vaccination (9%) [18].

Although vaccination rates were very low in all occupational groups, there was a greater tendency to be vaccinated in the doctor group. In our study, seasonal influenza vaccination rate was 15.1% among doctors and 3.9% among nurses. The rate of those who stated that they had no vaccination done was 52.2% among doctors and 67.6% among nurses. This finding supports us in preparing special programs suitable for different occupational categories in order to increase vaccine coverage [19]. In the study reported from Turkey, found the rate of regular vaccination to be 15.2% in the doctor group and reported that the rate of vaccination was low especially among the nurses who are regularly vaccinated [8]. In a study by Wong et al. reported the vaccination rate as 38% among clinical nurses [20]. In a study reported from Slovenia, the rate of doctors never getting the flu vaccine was reported as 24% [21].

The present study has strengths and limitations. A major strength of the present study is that it was a multicenter study involving several centers. By contrast, the fact that the data were self-reported constitutes a limitation. Like all interview studies, this research relied on consenting participants, increasing the chance of a biased sample; HCWs who came forward may have been more likely to be unvaccinated HCWs with a more pronounced opinion on this topic.

CONCLUSION

Healthcare workers (HCWs) are at risk for occupational infection and subsequent disease development for influenza. They may also transfer the disease to patients and close contacts. In this national study, our seasonal influenza vaccine rates were low among all HCWs. In order to increase the vaccination levels of health personnel, it is necessary to increase the information activities before the flu season, and to monitor the vaccination rates annually and to give feedback to the health facilities. In addition, providing easy access to vaccination services, establishing vaccination days and informing health personnel about these days will contribute to the increase in vaccination rates. Since our study includes many health facilities with dissimilar application characteristics and working environments, our results are important for providing an idea on a national scale. Knowing the reservations of health personnel about vaccination will guide the preparation of appropriate strategies and training programs.

DECLARATION OF CONFLICT OF INTEREST

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