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RESEARCH

INFLUENZA VACCINATION FREQUENCY AND ASSOCIATED FACTORS AMONG ELDERLY POPULATION, A DESCRIPTIVE STUDY

ABSTRACT

Introduction: Influenza vaccination is the most effective method of preventing influenza infection in elderly, reducing complications, hospitalizations and mortality rates due to influenza. This study aimed to assess the frequency of influenza vaccination, attitude about the vaccine, and reasons why not getting vaccinated in individuals aged >65 years.

Materials and Method: In total, 598 participants aged >65 years were enrolled in this descriptive study, and data were collected via a face-to-face survey.

Results: In total, 22% of the 598 participants received the influenza vaccine. The top three reasons for not seeking vaccination were not knowing about the influenza vaccine (45.2%), feeling of no need to get vaccinated (21.2%), and not believing in the influenza vaccine's effectiveness (10.9%). Participants who had chronic obstructive pulmonary disorder, heart failure, and ischemic heart disease were vaccinated more than participants who had other comorbidities. Among participants, advice from their physician was noted as an effective means for prompting vaccination (OR, 20.34; 95% CI, 10.17–40.70).

Conclusion: We evaluated the reasons associated with the low influenza vaccination frequency among the elderly. Informing the elderly of the benefits of receiving the influenza vaccine should be encouraged. Communication between healthcare providers and people aged >65 years is essential for improving vaccination frequency.

Keywords: Aged; Comorbidity; Hospitalization; Influenza vaccines; Surveys and questionnaires; Vaccine refusal

ARAŞTIRMA

YAŞLILARDA GRİP AŞISI SIKLIĞI VE İLİŞKİLİ FAKTÖRLER, TANIMLAYICI BİR ÇALIŞMA

ÖZ

Giriş: Yaşlı bireylerde influenza aşısı, influenza hastalığının önlenmesinde en etkili yöntem olup influenzanın komplikasyonlarını, hastane yatışlarını ve ölüm oranlarını azaltmaktadır. Bu çalışmada 65 yaş üzeri bireylerde, influenza aşısı yaptırma sıklığı, bireylerin aşı hakkındaki tutumları ve aşılanmama nedenleri değerlendirilmiştir.

Gereç ve Yöntem: Bu tanımlayıcı çalışmaya 65 ve yaş üzeri toplamda 598 kişi katılmıştır ve veriler yüz yüze anket yoluyla toplanmıştır.

Bulgular: Toplamda 598 katılımcıdan %22'si influenza aşısı olmuştur. Aşı yaptırmamak için ilk üç neden, grip aşısı hakkında bilgi sahibi olmama (%45.2), aşılanmaya ihtiyaç duymama (%21.2) ve grip aşısının etkinliğine inanmama (%10.9) idi. Kronik obstrüktif akciğer hastalığı, kalp yetmezliği ve iskemik kalp hastalığı olan katılımcılar, diğer komorbiditelere sahip olanlardan daha fazla aşılanmış idi. Katılımcılar arasında doktorlarından aldıkları tavsiye, aşılamanın yapılmasında etkili bir araç olarak görülmüştür (OR, 20.34; %95 GA, 10.17–40.70).

Sonuç: Bu bulgular ile yaşlılarda düşük influenza aşılama oranları ile ilişkili nedenler değerlendirilmiştir. İnfluenza aşısının yapılmasının yararları hakkında bilgilendirmeler teşvik edilmelidir. Sağlık hizmeti sağlayıcıları ile 65 yaş üstü kişiler arasındaki iletişim, aşı oranlarının iyileştirilmesi için şarttır.

Anahtar sözcükler: Anket; Aşı reddi; Grip aşısı; Hastane yatışları; Komorbidite; Yaşlı

INTRODUCTION

Influenza is a seasonal viral infection that typically occurs during the winter months and is capable of spreading easily. The influenza viruses can cause pandemics and severe illnesses, leading to hospitalizations, and even death in children and the elderly. A report from the Centers for Disease Control and Prevention in 2015 indicated that 3%–5% of residents of the USA were affected by influenza. Hospitalizations were reported in over 200,000 patients because of influenza-associated complications. These annual epidemics are estimated to result in about 3–5 million cases of severe illness worldwide, and approximately 250,000–500,000 deaths, with most deaths in industrialized countries occurring among people aged ≥65 years (1). Influenza infections usually cause milder symptoms lasting for 5–7 days in healthy adults, whereas it can cause severe pulmonary symptoms such as primary influenza, pneumonia, and secondary bacterial infections that contribute to morbidity and mortality, especially among individuals aged ≥65 years (2).

A simple and effective way to prevent influenza infections is annual vaccination. The United States Advisory Committee on Immunization Practices recommends universal annual influenza vaccinations for all individuals aged ≥6 months (3). The influenza vaccination not only reduces the risk of influenza infection but also reduces the severity of the illness in those who are infected (4,5). The Turkish Ministry of Health recommends and supplies free influenza vaccines to a wide range of individuals, including pregnant women; individuals aged ≥65 years; children aged 6 months to 2 years; residents of nursing homes and other chronic-care facilities; individuals who suffer from chronic pulmonary (including asthma), cardiovascular, renal, hepatic, neurologic, hematologic, or metabolic disorders [including diabetes mellitus (DM)]; individuals with obesity; health care personnel; and individuals aged 6 months to 18 years and receiving long-term aspirin therapy. Annual immunization is necessary even if the previous year's vaccine contains one or more of the antigens to be administered because the immunity declines during the year following vaccination (4,6).

This investigation assesses the influenza vaccination frequency and the associated factors that influence the vaccination of those aged ≥65 years attending outpatient clinics in Yedikule Research and Training Hospital for Chest Diseases and Chest Surgery.

MATERIALS AND METHOD

Participants

This descriptive study was conducted between October 2015 and June 2016 in a tertiary hospital, Yedikule Research and Training Hospital for Chest Diseases and Chest Surgery, Istanbul, Turkey. Participants were randomly selected from patients who were aged ≥65 years and who had an appointment at the hospital's outpatient clinic. Initially, selected patients were given a mini-mental test (7). The most commonly used test for dementia scanning is the mini mental test. It is evaluated over 30 points and it is determined that the ideal threshold value is 24 in the Turkish society for mild dementia.

The participants of the test were asked whether they had any allergic reactions to the influenza vaccine and were excluded from the investigation if they had experienced any allergic reaction.

Sample size

The prevalence of influenza vaccination was assumed to be 20%, and the sample size was calculated with a significance level of 0.05 and a power level of 0.80. Dementia patients and non-responders were assumed to represent 5% of the population. A minimum sample size of 660 participants was required.

Data collection

Data was collected via a face-to-face survey that was developed through a comprehensive literature search and was finalized after the pilot study with 15 participants. Sociodemographic features, comorbidities, vaccination status, knowledge about the influenza vaccine, and reasons for not being vaccinated were assessed in the questionnaire.

The research was approved by Yedikule Research and Training Hospital for Chest Diseases and Chest Surgery Ethics Committee (2015/04). Oral informed consent was obtained from every participant before starting the questionnaire.

Statistical analysis

Continuous variables are expressed as mean±standard deviation (SD). Statistics were calculated using the Student's *t*-test. Descriptive statistics were created for questions with responses expressing frequencies and percentages. The chi-square and Fisher's exact tests were used as appropriate. Univariate and multivariable logistic regression analyses were conducted to evaluate associations between vaccination and demographic features and patients' knowledge. Odds ratios (OR) and 95% confidence intervals (CI) were calculated. A p-value <0.05 was considered statistically significant.

RESULTS

Thirty-two out of 660 participants with a mini-mental score <24 (4.6%) and 9 (4.5%) non-responders were excluded from the study. In total, 598 participants completed the questionnaire. All participants were aged 65–93 years (median, 71 years; interquartile range, 9 years). The majority of participants were males (M: F=1.56). Among participants, 74.75% were graduated from at least elementary school, 11.2% were active smokers, 46.5% had quit smoking, and 42.3% never smoked. Chronic obstructive pulmonary disorder (COPD) was found in 39.0%, asthma in 14.9%, diabetes mellitus (DM) in 13%, heart failure (HF) in 23.9%, hypertension (HT) in 9.5%, ischemic heart disease (IHD) in 3.5%, and miscellaneous comorbidities in 11.6% of the population. 11.2 % of the participants were healthy. Table 1 shows the characteristics of participants according to vaccination status. In total, 131 out of 598 participants received the influenza vaccine (22.0%; 95% CI, 21.87–21.93). The three most common reasons for not getting vaccinated (Figure 1) were as follows: (1) didn't know much about influenza vaccine (45.2%), (2) didn't need to get vaccinated (21.2%), and (3) didn't believe the influenza vaccine was effective (10.9%). Other reasons included forgetting about the vaccination period, prior adverse reactions (other than allergic reactions), pain, being ill at the time, costs, and other miscellaneous reasons.

Among vaccinated participants, there was a greater percentage of educated (graduated from at least elementary school) individuals compared to uneducated (illiterate) individuals (15.9% vs 23.9%, p=0.039). Among comorbidities, participants with COPD (28.3%, p=0.02), HF (15.4%, p=0.031), and IHD (33.3%, p=0.001) had significantly higher vaccination frequency.

The majority of the respondents (67.4%) were aware of the influenza vaccine. However, vaccination frequency was only 32.5% among these individuals. Knowledge and perception of the influenza vaccine of the participants are shown in Table 2. Participants who had heard of the vaccine from doctors were more vaccinated than other participants (OR, 20.34; 95% CI, 10.17–40.70; p=0.001). Recommended by any healthcare worker was the most influential factor to get vaccinated with an OR, 73.26 (95% CI, 34.46–155.76; p=0.001). Participants were more likely to get vaccinated when they were recommended by a chest physician (OR, 4.82; 95% CI, 2.02–11.46; p=0.016). Knowing that the influenza vaccine is free of charge for individuals aged 65 years was a promoter of vaccine (OR, 36.35; 95% CI, 16.257–79.74; p=0.001).

Table 1. Characteristics of participants according to vaccination status.

	Not vaccinated n (%)	Vaccinated n (%)	p	OR (95% CI)
	467 (78.0)	131 (22.0)		
Age (median, IQR)	71 (9)	70 (9)	0.515	
Gender				
Male	267 (77.0)	80 (23.0)	0.485	
Female	200 (79.7)	51 (20.3)		
Education				
Non-Educated	127 (84.1)	24 (15.9)		Ref
Educated	340 (76.1)	107 (23.9)	**0.039**	**1.66 (1.02–2.71)**
Smoking habit				
Nonsmoker	206 (81.4)	47 (18.6)	0.092	Ref
Smoker	54 (80.6)	13 (19.4)	0.599	1.05 (0.53–2.09)
Exsmoker	207 (74.5)	71 (25.5)	**0.045**	**1.50 (0.99–2.28)**
Comorbidities				
COPD doesn't exist	300 (82.2)	65 (17.8)		Ref
COPD exists	167 (71.7)	66 (28.3)	**0.02**	**2.03 (1.25–3.26)**
Asthma doesn't exist	399 (78.4)	110 (21.6)		Ref
Asthma exists	68 (76.4)	21 (23.6)	0.676	1.61 (0.86–3.00)
DM doesn't exist	408 (78.5)	112 (21.5)		Ref
DM exists	59 (75.6)	19 (24.4)	0.574	1.50 (0.81–2.78)
HF doesn't exist	346 (76.0)	109 (24.0)		Ref
HF exists	121 (84.6)	22 (15.4)	**0.031**	**0.73 (0.41–1.28)**
HT doesn't exist	422 (78.0)	119 (22.0)		Ref
HT exists	45 (78.9)	12 (21.1)	0.870	0.78 (0.36–1.65)
IHD doesn't exist	453 (78.5)	124 (21.5)		Ref
IHD exists	14 (66.7)	7 (33.3)	**0.001**	**2.28 (0.82–6.31)**

Bold characters indicate statistical significance p<0.05; IQR: interquartile range, COPD: Chronic obstructive pulmonary, DM: Diabetes mellitus, HF: Heart Failure, HT: Hypertension, IHD: İschemic Heart Disease.
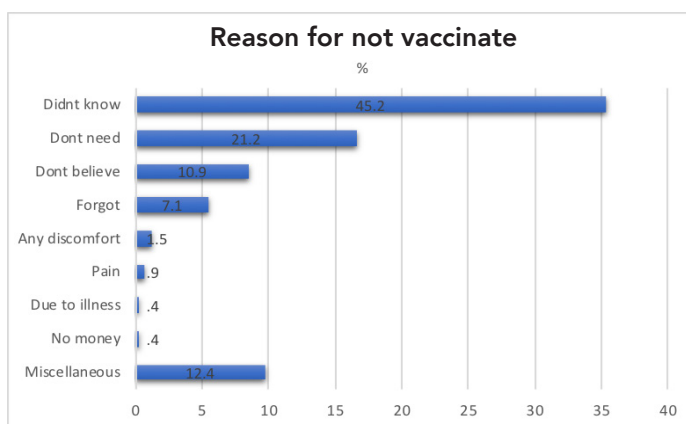
Miscellaneous: Concerns about getting flu, laziness, residence in another city at the vaccine interval

Figure 1. Reasons for receiving the influenza vaccine.

Table 2. Participants' knowledge and perception of influenza vaccine.

	Not vaccinated n (%)	Vaccinated n (%)	Univariate analysis p	Multivariate analysis OR, 95% CI
Heard of influenza vaccine before?				
No	195 (100)	0 (0)	**0.001**	
Yes	272 (67.5)	131 (32.5)		
If yes from whom?				
Media	109 (88.6)	14 (11.4)	**<0.001**	Ref
Pharmacist	49 (68.1)	23 (31.9)	**0.001**	3.65 (1.73–7.70)
Doctors	31 (27.7)	81 (72.3)	**<0.001**	20.34 (10.17–40.70)
Miscellaneous†	83 (86.5)	13 (13.5)	0.630	1.21 (0.54–2.73)
Ever been recommended				
No	386 (98.0)	8 (2.0)		Ref
Yes	81 (39.7)	123 (60.3)	**<0.001**	73.26 (34.46–155.76)
If yes from whom?				
Pharmacist	24 (65.0)	13 (35.0)	**0.005**	Ref
Family doctor	31 (37.3)	52 (62.7)	0.006	3.10 (1.38–6.94)
Chest Phys.	18 (27.7)	47 (72.3)	**0.001**	4.82 (2.02–11.46)
Miscellaneous‡	8 (42.0)	11 (58.0)	0.107	2.53 (0.81–7.88)
Did you know the vaccine is free >65				
No	264 (97.4)	7 (2.6)		Ref
Yes	153 (55.2)	124 (44.8)	**0.001**	36.35 (16.57–79.74)

Bold indicates statistical significance $p<0.05$. χ^2 test was used for univariate analyses, logistic regression was used for multivariate analysis. Ref for reference. †miscellaneous: friends, relatives, neighbors, colleagues, other patients, ‡ miscellaneous: Physicians other than pulmonary medicine, nurses.

DISCUSSION

This investigation was the first to present the frequency of vaccination, knowledge, and behaviors of the influenza vaccination of Turkish residents aged ≥65 years. The findings suggest that the frequency of influenza vaccination, knowledge, and recommendation is quite low among participants. Former studies in Turkey showed similar results. In particular, Ciblak et al. in 2012 searched two national medical databases and PubMed using terms associated with relevant diseases and vaccination frequency and reported a vaccination coverage frequency for individuals aged ≥65 at 5.9% and for patients with COPD at 14.9% (8). Another recent study from Turkey by Akturk et al. included COPD patients from six different centers, which included a total of 296 patients and concluded that the frequency of influenza vaccination is 36.5% (9). Ciftci et al reported 33.4 % vaccination frequency among patients admitted to outpatient clinic with a mean age of 47.7 years (10). Present study showed that the vaccination frequency is 22.0% (95% CI, 21.87–21.93) for people who aged ≥65 years and 28.3% vaccination frequency (95% CI, 0.226–0.346)

in COPD patients. However, the results reported herein are still lower than those reported in European countries and other countries of the world. Sevin et al. conducted a survey-based study in an urban environment using a multicultural population in Central Ohio, USA, reported a 51.5% immunization frequency (11). Likewise, a different study from Kansas, USA, Santaularia et al, showed a 64.8% vaccination frequency within people aged ≥65 years (12). According to an Australian study conducted by Dyda et al., 57.3% of individuals aged ≥65 years were vaccinated in the previous year (13), whereas Bödeker et al. reported 49% in those older than 60 years in Germany (14). According to GP reports, Mangtani demonstrated that 85% of men and 75% of women aged ≥74 years were vaccinated against influenza in London (15).

Present study showed no differences in vaccination prevalence between age and gender. However, in our study educated participants were more often vaccinated than noneducated ones (OR, 1.665; 95% CI, 1.023–2.711; p=0.039). Responders who had quit smoking tended to get the flu vaccine more than active smokers and nonsmokers (OR, 1.50; 95% CI, 0.992–2.279; p=0.045). Akturk et al reported that gender, marital status, and smoking habits had no effect on the pneumococcal or influenza vaccination frequency (9). In Ciftci's study Among the vaccinated patients, the ratio of patients with an educational level of high-school or above (60.6%) was greater than that of patients with a lower educational level (39.4%) (10).

In the present study participants who had COPD, HF, and IHD (1) were vaccinated more often than participants who had other comorbidities (OR, 2.03; OR, 0.73; OR, 2.28; respectively). Bödeker et al. mentioned if an underlying chronic disease exists and not specified, stated that 56.3%

of participants aged 60 years and older who had an underlying chronic disease got vaccinated (OR, 2.07) (14). In addition, Ciftci et al showed that vaccination frequency were greater among those with chronic lung disease (43.6%), heart disease (21.2%), and diabetes mellitus (19.3%) (10).

Results from the present study highlight popular reasons why individuals do not get vaccinated. The majority of the patients (45.2%) did not have information about the influenza vaccine. The second main reason was the belief that they did not need the vaccine (21.2%). Participants made comments such as "I don't get flu, so I don't need the vaccine." 10.9% of participants mentioned that they did not believe the vaccine was effective, so they did not get vaccinated. Yeung et al. showed that the majority of the cases (80.8%) were not aware that they were recommended the influenza vaccine and among the controls (71%), a high percentage of participants deemed vaccination to be unnecessary. Similar to our study, the authors mentioned that this finding showed a failure in communicating the importance of the vaccination to this age group (16). Sevin et al. reported ethnic disparities in the knowledge of the influenza vaccine indication, including concern for getting sick from the following treatment (11). Another study by Santalauria et al. reported a 64.8% vaccination frequency and stated that adults aged ≥65 years had Medicare coverage and might likely have other medical conditions that could steer them toward receiving the vaccination (12). In Cıblak's study, the most common reported reason for not becoming vaccinated was that the "vaccine is not effective," which was reported in 46% of participants. The second most reported reason was that the "vaccine causes influenza," which was reported by 26% of participants (8). Ciftci et al reported the reasons of not getting vaccinated were considering the vaccine useless (OR, 2.46), having concerns about side-effects

(OR, 2.14) and having inadequate knowledge (OR, 7.12) (10). Akturk et al. had similar results, the most notable reason for not being vaccinated for influenza or pneumococcus was 'my doctor didn't advise me to' (57.2% for influenza and 46.8% for pneumococcus vaccine) (9). Dyda et al. mentioned that in all unvaccinated participants, the most frequent reason for not obtaining the vaccine was a perception of being at low-risk of contracting influenza (26.7%), not having thought about the influenza vaccination (21.5%) and a mistrust of the vaccination (18.3%). Among those opposed to the vaccine, older people rejected vaccination more frequently than younger individuals (<60 years, 7.8%;>60 years, 15.9%) (13).

In present study 67.5% of nonvaccinated and 32.5% of vaccinated participants had heard of the influenza vaccine before. In contrast to the vaccinated group, individuals have heard of the vaccine mostly from doctors, pharmacies, and media. Getting information about the flu vaccine from doctors could improve the likelihood of the individual becoming vaccinated (OR, 20.34, p< 0.001) (Table 2). Among participants recommended to receive the vaccine, 60% are ultimately vaccinated (OR, 73.26, p=0.001). Ciftci's study showed men, as compared to women, had a significantly greater frequency of considering the vaccine useful (p< 0.001), getting vaccinated during campaigns held by workplaces (p=0.002), and obtaining information through bills, brochures, or bulletins (p=0.003) (10).

This study suggests that recommendation by chest physicians was associated with vaccination (OR, 4.82, p=0.016). This finding is similar to those being recommended by the family doctor and was associated with vaccination. Knowing that the vaccine is free of charge in those aged ≥65 years impacts the vaccination frequency (OR, 36.35, p=0.001). Ciftci et al reported similar results

among participants who had been informed by doctors had more vaccination frequency (10).

One of the limitations of present study is that it cannot be generalized due to a single centered study; therefore, results should be interpreted in this way. Secondly, the study was conducted using a nonvalidated survey and the participants' knowledge, awareness of influenza disease, and associated complications were not questioned.

In conclusion, despite the intense efforts of the Ministry of Health, including free vaccination, extensive recommendations to those aged >65 years, and improved accessibility throughout the country, the current vaccination frequency was determined low. This study's objective was to investigate vaccination frequency and related factors among those aged ≥65 years. These findings suggest that participants rely on family doctors and specialists that they are familiar with to make a recommendation, which they will value. However, if general practitioners emphasize the value of the influenza vaccine to the patient's life and insist on vaccination, a higher frequency of influenza vaccination could be seen. This study's findings are practical and will likely lead to increased awareness among the society in both patients and doctors. The communication between doctors and individuals must be improved with regard to developing novel and efficient influenza vaccination policies. Participant responses to the questionnaire may suggest that responders use media so that it can be empowered more efficiently.

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