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Pneumococcal and influenza vaccine awareness in individuals over 65 years

Nurhan Sayaca

Department of Immunology and Allergy, Faculty of Medicine, Manisa Celal Bayar University, Manisa, Turkey

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ABSTRACT

Aims: Vaccination is of great importance due to the increased risk of infection as a result of changes in the immune system with aging and the weak immune response against these infections. In this study, it was aimed to determine the pneumococcal and influenza vaccination awareness and vaccination rates of individuals aged 65 years and over, to direct the unvaccinated individuals to be vaccinated and to protect them from possible infections and complications.

Methods: A questionnaire form was filled in by asking demographic information, awareness of influenza and pneumococcal vaccines and the status of vaccination of individuals aged 65 years and over who applied to the clinic between June and September 2020. Unvaccinated individuals were referred to the vaccination unit.

Results: A total of 553 elderly individuals aged 65 years and over, 338 women and 215 men, were included in the study. Among the study participants, the rate of patients with awareness of influenza/pneumococcal vaccine was 48.5%. Although the vaccination awareness rate was higher in males, non-smokers, those with higher education level, those with at least one of the comorbidities such as hypertension, coronary artery disease, hyperlipidemia, chronic renal failure, vaccination rates were lower in patients with these comorbidities and additionally diabetes mellitus. The majority of individuals with awareness were informed by healthcare workers. The rate of vaccination among the individuals participating in the study was 18.4%. Vaccination was higher in individuals with awareness. While 5.3% of those who were not vaccinated were hospitalized for pneumonia, those who were vaccinated did not have pneumonia severe enough to require hospitalization.

Conclusion: In order to fight with the increasing vaccine hesitancy in our society, healthcare workers should be educated, the media should be supported, and vaccination should be encouraged in every clinic application.

Keywords: Aging, pneumococcus, influenza, vaccine awareness

INTRODUCTION

Aging is a biological process resulting from the accumulation of various molecular and cellular damage over time. As a result, a gradual decrease in physical and mental capacity, an increased risk of disease and finally death occurs. According to the World Health Organization (WHO) 2021 report, individuals over the age of 65 years were considered elderly. As the average life expectancy is prolonged, the population aged 65 years and over is increasing worldwide and in our country. For this reason, it is necessary to manage the health problems that may be encountered in this age group well.[1]

In the 2021 report of the Turkish Statistical Institute (TUIK), the population aged 65 years and over in our country increased by 22.5% compared to 2015 and reached 7 million 953 thousand 555 in 2020. The proportion of the elderly in the total population is increased by 1.3% compared to 2015, and reached 9.5% in 2020. According to the expectations, the proportion of the elderly in the total population is going to reach 11.0% in 2025, 12.9% in 2030, 16.3% in 2040, 22.6% in 2060 and 25.6% in 2080.[2]

Diabetes mellitus (DM), coronary artery diseases (CAD), congestive heart failure (CHF), asthma, chronic obstructive pulmonary disease (COPD), chronic renal failure (CRF), hypertension (HT), cerebrovascular events (CVO) and the risk of infection have been increased due to changes in the immune system that occur with aging.[3]

Changes that occur in the immune system with aging are called immunosense.[4] Aging of the immune system is associated with decreased immune protection, in part due to failed lymphopoiesis (immunosense). Although the changes in the adaptive immune system are more pronounced during the aging process, the innate immune system is also affected. In this process, increased inflammatory responses that occur through the activation of innate immunity (inflammation)

Corresponding Author: Nurhan Sayaca, nurhanyazimci@gmail.com

also play an important role. Acquired immune system changes, on the other hand, can be counted as a decrease in B lymphocyte function with decreased immunoglobulin production and a decrease in T lymphocyte function with weakening of vaccine responses.[3,5]

An increase in autoantibody production may occur as a result of the increase in the number of memory T and B cells with immunosense associated with aging.[4] As a result of these changes, clinically increased risk of autoimmune diseases, malignancies, and infections may be observed.[6] Therefore, vaccination is of great importance due to the increased risk of infection and the weak immune response against these infections in elderly individuals.

Effective vaccination is important in preventing possible complications with infectious diseases and reducing morbidity and mortality. In our country, vaccination against influenza (seasonal flu), tetanus-diphtheria, chickenpox, and herpes zoster is recommended for individuals aged 60 years and over, and vaccination against pneumococcal infections for individuals aged 65 years and over.[7]

Influenza has been reported as the 4th most common cause of death in lower respiratory tract infections according to WHO 2019 data.[8] Influenza-induced respiratory failure is seen 10-30 times more frequently in elderly individuals. Although the mortality rate is less than 1/1000, deaths are mostly seen in individuals aged 65 years and over. Since the incidence and mortality of pneumococcal disease, which is another common vaccine-preventable disease in elderly individuals, increase significantly over 65 years of age, pneumococcal vaccination is recommended especially for this population.[3] Almost 90% of deaths due to influenza and pneumonia occur in individuals aged 65 years and over. The effect of the vaccine in preventing the disease is 40%-60% in all age groups.[9]

Vaccination rates of patients aged 65 years and over, which is a fragile population, may be low due to insufficient knowledge, misconceptions, deficient guidance, or bad experiences about vaccines. In this study, it was aimed to determine the pneumococcal and influenza vaccination awareness and rates of individuals aged 65 years and over, to direct unvaccinated individuals to get vaccinated and to protect them from possible infections and related complications.

METHODS

The study was carried out with the permission of Kartal Dr. Lütfi Kırdar Training and Research Hospital Clinical Researches Ethics Committee (Date: 27.05.2020, Decision No: 2020/514/178/15). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki. Written informed consent was obtained from the patients included in the study.

Study Design

Individuals at aged 65 years and over who applied to the internal medicine clinic for any reason, between June and September 2020, were included in the study. Demographic information, chronic diseases, reasons for applying to the clinic, knowledge of influenza and pneumococcal vaccines of the patients, whether they had been vaccinated before, and if not, the reasons, were filled in a questionnaire. Volunteers over the age of 65 years, without severe neurological or psychiatric disorders, without terminal malignancies, and who could give their consent, were included in the study. Individuals who did not meet these criteria were not included in the study. Elderly individuals who participated in the study and were found to be unvaccinated were directed to the vaccination unit in the hospital.

Statistical Analysis

The data obtained were evaluated by descriptive statistics (number, percentage distribution, mean, median, standard deviation, etc.), continuous numerical variables, t-test in independent groups, one-way analysis of variance. Categorical variables were evaluated using the Pearson chi-square test, and Fisher's exact test. A value of $p<0.05$ was considered statistically significant.

RESULTS

Demographic Data

A total of 553 elderly individuals [338 women (61.1%) and 215 men (38.9%)] were included in the study. The mean age of the individuals participating in the study was 71.2±5.3 years and the mean body mass index (BMI) was 29.3±5.5 kg/m². When the educational status of the patients was examined, 26.6% were illiterate (n:147), 14.5% were literate (n:80), 48.3% were primary school graduates (n:267), 6.7% of them were high school graduates (n:37), 2.5% of them were university graduates (n:14) and 1.4% of them were master graduates (n:8). 75.4% of the patients were married (n:417), 8% of them were smoking (n:44) and 1.6% were using alcohol (n:9). In the study, 90.1% (n:498) of the individuals had at least one comorbidity. When examined in terms of comorbidities, HT (n:352) was the first with 63.7%, followed by DM (n:254) with 45.9%, hyperlipidemia (HL) (n:116) with 21%, CAD (n:101) with 18.3%, thyroid diseases and COPD (n:63) with 11.4%, CRF (n: 37) with 6.7%, CHF, CVO, and rheumatological diseases (n: 20) with 3.6%, depression and malignancies (n: 14) with 2.5%, inflammatory bowel disease (IBD) and cirrhosis (n:4) with 0.7% (**Table 1**).

Table 1. Participant characteristics and the reasons for not having vaccinated

	N
Gender	
Female	338 (61.1%)
Male	215 (38.9%)
Age, year (SD)	71.2 ±5.3
BMI, kg/m² (SD)	29.3 ±5.5
Education	
Illiterate	147 (26.6%)
Literate	80 (14.5%)
Primary School	267 (48.3%)
High School	37 (6.7%)
University	14 (2.5%)
Master	8 (1.4%)
Marrital Status	
Married	417 (75.4%)
Single	136 (24.6%)
Comorbidity	
+	498 (90.1%)
-	55 (9.9%)
Comorbidities	
HT	352 (63.7%)
DM	254 (45.9%)
HL	116 (21%)
CAD	101 (18.3%)
Thyroid disease	63 (11.4%)
COPD	63 (%11.4)
CRF	37 (6.7%)
CHF	20 (3.6%)
CVO	20 (3.6%)
Rheumatological disease	20 (3.6%)
Depression	14 (2.5%)
Malignancy	14 (2.5%)
IBD	4 (0.7%)
Cirrhosis	4 (0.7%)
Reasons for not having vaccinated	
Thinking that it was unnecessary	54 (32.53%)
Out of reach of the vaccine	35 (21.08%)
Lacking physician's recommendation	28 (16.9%)
Thinking that it was harmful	19 (11.44%)
Neglection	18 (10.84%)
Unwillingness	7 (0.42%)
Afraid of needle	4 (0.24%)
History of severe infection after the previous vaccination	1 (0.06%)

CAD: Coronary artery diseases, CHF: Congestive heart failure, DM: Diabetes mellitus, HL: Hyperlipidemia, COPD: Chronic obstructive pulmonary disease, CRF: Chronic renal failure, CVO: Cerebrovascular events, IBD: Inflamatory bowel disease

Individuals applied to the clinic for general examination by 70.4% (n:386), DM control by 12.4% (n:68), pain in various parts of the body by 6.2% (n:34), dyspeptic complaints by 6% (n:33), HT control by 2.6% (n:14), respiratory symptoms by 1.3% (n:7) and complaint of weakness by 1.1% (n:6).

Vaccine Awareness

The rate of patients who were aware of influenza/pneumococcal vaccination was recommended among individuals aged 65 years and over who participated in the study was 48.5% (n:268). The mean age of individuals with vaccine awareness (70.6±4.9 years) was younger than individuals without awareness of vaccination (71.8±5.6 years) (p:0.005).

In the study, the rate of vaccine awareness was higher in males (n: 120) by 55.8% than in females (n: 148) by 43.8% (p:0.006). It was observed that patients with higher education levels had awareness of vaccination (p:0.001). While 50.4% of individuals with comorbidities were aware of the recommendation for vaccination in individuals aged 65 years and over. The vaccination awareness level was 30.9% in individuals without comorbidities (p:0.006). Vaccine awareness was significantly higher in patients with HT (51.98% vs. 48.02%; p:0.028), CAD (60.4% vs. 39.6%; p:0.008), (61.21% vs. 38.79%; p: 0.002), CRF (64.87% 35.13%; p:0.039) comorbidities. On the other hand, there was no difference in vaccine awareness among those with CHF, DM, COPD, IBD, CVO, depression, malignancy, thyroid disease, rheumatological disease, and cirrhosis (p>0.05). Demographic characteristics and comorbidities of individuals aged 65 years and over, participating in the study according to their vaccination awareness were given in **Table 2**.

Table 2. Vaccine awareness in individuals aged 65 years and over.

	Unaware of vaccination (n:285)		Aware of vaccination (n:268)		p
Age, year (SD)	71.8	(±5.6)	70.6	(±4.9)	0.005*
BMI, kg/m² (SD)	29.4	(±5.9)	29.2	(±4.9)	0.778*
Gender					0.006⁺
Female	190	(56.2%)	148	(43.8%)	
Male	95	(44.2%)	120	(55.8%)	
Education					0.001⁺⁺
Illiterate	104	(36.5%)	43	(16.0%)	
Literate	49	(17.2%)	31	(11.6%)	
Primary School	111	(38.9%)	156	(58.2%)	
High School	12	(4.2%)	25	(9.3%)	
University	7	(2.5%)	7	(2.6%)	
Master	2	(0.7%)	6	(2.2%)	
Comorbidity +	247	(86.7%)	251	(93.7%)	0.006⁺
Comorbidities					
HT	169	(48.02%)	183	(51.98%)	0.028⁺
CAD	40	(39.60%)	61	(60.40%)	0.008⁺
CHF	11	(55.00%)	9	(45.00%)	0.752⁺
DM	127	(50.00%)	127	(50.00%)	0.505⁺
HL	45	(38.79%)	71	(61.21%)	0.002⁺
COPD/Asthma	26	(41.26%)	37	(58.74%)	0.083⁺
Cirrhosis	0	(0.0%)	4	(100%)	0.055⁺⁺
CRF	13	(35.13%)	24	(64.87%)	0.039⁺
CVO	9	(45.00%)	11	(55.00%)	0.551⁺
Depression	4	(28.57%)	10	(71.43%)	0.082⁺⁺
Malignancy	6	(42.85%)	8	(57.15%)	0.510⁺
IBD	2	(50%)	2	(50%)	0.665⁺⁺
Rheumatological disease	9	(45.00%)	11	(55.00%)	0.551⁺
Thyroid disease	27	(42.85%)	36	(57.15%)	0.143⁺

*: Student's t-test; +: Pearson Chi-Square; ++: Fisher's Exact Test; p<0.05; HT: Hypertension, CAD: Coronary artery diseases, CHF: Congestive heart failure, DM: Diabetes mellitus, HL: Hyperlipidemia, COPD: Chronic obstructive pulmonary disease, CRF: Chronic renal failure, CVO: Cerebrovascular events, IBD: Inflamatory bowel disease

In the study, 73.1% (n:196) of individuals who had the awareness that vaccination is recommended for elderly individuals stated that they learned this information from healthcare workers, 18.7% from the media (n:50), and 8.2% (n:22) from their friends. While the rate of awareness was 47.4% (n: 93) in individuals who had the information from healthcare workers, 8% (n: 4) in individuals who had the information from the media, and 22.7% (n:5) in individuals who were informed through friends. Healthcare workers were more effective in the vaccine awareness of individuals aged 65 years and over than other referrals (p:0.001).

Vaccination Situations

While the rate of vaccination among individuals participating in the study was 18.4% (n:102), the rate of vaccination among individuals with awareness of vaccination was 38.1% (n:102). All of the individuals who had the vaccine had awareness of the vaccine. Of those who were aware of the vaccine, 16.66% (n: 17) had only the pneumococcal vaccine, 47.07% (n: 48) had only the influenza vaccine, while 36.27% (n: 37) had both pneumococcal and influenza vaccines. Among the individuals participating in the study, the rate of those who were aware of the vaccine but did not get vaccinated was 61.9% (n:166). When the reasons for vaccine refusal were examined; 32.53% (n:54) considered the vaccine unnecessary, 21.08% (n:35) could not reach the vaccine, 16.9% (n:28) were not recommended by the physician, 11.44% (n:19) thought it was harmful, 10.84% (n:18) neglected it, 0.42% (n:7) simply did not want it, 0.24% (n:4) had a fear of needle and 0.06% (n:1) had a history of severe infection after the previous vaccination (**Table 1**).

While the mean age of the vaccinated individuals was 70.67±4.6 years, the mean age of the non-vaccinated individuals was 71.36±5.4 years, and there was no difference between the two groups (p:0.238). When the distribution of vaccinated individuals by gender was examined, the rate of vaccination was 21.86% (n:47) for males, 16.27% (n:55) for females, and there was no difference in terms of gender (p:0.12). When vaccinated individuals were examined in terms of their educational status, 24.5% were illiterate (n:25), 9.80% were literate (n:10), 53.90% were primary school graduates (n:55), 7.80% were high school graduates (n:8), 2.90% were university graduates (n:3), and 1% were master graduates (n:1). There was no significant relationship between education status and vaccination rates (p:0.352) (**Table 3**).

Of the participants with at least one comorbidity, 20.12% were vaccinated (n:100) in the last year, while 79.87% were unvaccinated (n:397). The majority of individuals with at least one comorbidity were unvaccinated (p:0.003). When the status of getting vaccinated in terms of comorbidities was examined, the vaccination rate was low in patients with HT, CAD, DM, HL, and CRF, and there was a difference when compared to those who were not vaccinated (respectively; p:0.011, p:0.001, p:0.002, p:0.001; p:0.007). There was no difference in individuals with CHF, COPD/asthma, cirrhosis, CVO, depression, malignancy, IBD, rheumotologic, and thyroid diseases (p>0.05) (**Table 3**).

Table 3. Results of patients according to vaccination status in the last year.

	Not vaccinated (n:451)		Vaccinated (n:102)		p
Age, year (SD)	71.36	(±5.4)	70.67	(±4.6)	0.238*
BMI, kg/m² (SD)	29.4	(±5.5)	29.0	(±5.4)	0.559*
Gender					0.102+
Female	283	(83.73%)	55	(16.27%)	
Male	168	(78.14%)	47	(21.86%)	
Education					0.352++
Illiterate	122	(27.10%)	25	(24.50%)	
Literate	70	(15.50%)	10	(9.80%)	
Primary School	212	(47.00%)	55	(53.90%)	
High School	29	(6.40%)	8	(7.80%)	
University	11	(2.40%)	3	(2.90%)	
Master	7	(1.60%)	1	(1.00%)	
Comorbidity +	397	(79.87%)	100	(20.12%)	0.003+
Comorbidities					
HT	276	(78.40%)	76	(21.60%)	0.011+
CAD	67	(66.33%)	34	(33.67%)	0.001+
CHF	15	(75.00%)	5	(25.00%)	0.392+
DM	193	(75.98%)	61	(24.02%)	0.002+
HL	49	(77.77%)	14	(22.23%)	0.001+
COPD/Asthma	3	(75.00%)	1	(25.00%)	0.377++
Cirrhosis	24	(64.86%)	13	(35.14%)	0.559+
CRF	17	(85.00%)	3	(15.00%)	0.007++
CVO	12	(85.71%)	2	(14.29%)	0.478++
Depression	13	(92.85%)	1	(7.15%)	0.505++
Malignancy	2	(50.00%)	2	(50.00%)	0.484++
IBD	16	(80.00%)	4	(20.00%)	0.157++
Rheumatological disease	51	(8.95%)	12	(19.05%)	0.774+
Thyroid disease	81	(69.82%)	35	(30.18%)	0.508+

*: Student's t-test; +: Pearson Chi-Square; ++: Fisher's Exact Test; p<0.05; HT: Hypertension, CAD: Coronary artery diseases, CHF: Congestive heart failure, DM: Diabetes mellitus, HL: Hyperlipidemia, COPD: Chronic obstructive pulmonary disease, CRF: Chronic renal failure, CVO: Cerebrovascular events, IBD: Inflamatory bowel disease

In individuals who did not get vaccinated, the rate of influenza/pneumonia disease, severe enough to require consulting a physician in the last year, was 29.6% (n:133), while it was 21.6% (n:80) in individuals who had been vaccinated, and there was no difference between the groups (p:0.105). While 5.3% of the unvaccinated individuals were hospitalized due to pneumonia, the vaccinated individuals did not develop pneumonia severe enough to require hospitalization (p: 0.594).

DISCUSSION

In this study, it was aimed to determine the pneumococcal and influenza vaccination awareness and vaccination rates of elderly individuals aged 65 years and over and to direct the unvaccinated elderly individuals to be vaccinated and to protect them from possible infections and complications. Among the individuals participating in the study, the rate of patients with influenza/pneumonia vaccine awareness was 48.5%. Vaccine awareness rate was higher in males, those with higher education levels, and those with at least one of the comorbidities such as HT, CAD, HL, CRF, compared to those without. It was determined that the majority of individuals with awareness were informed by healthcare workers. While the rate of vaccination among the individuals participating in the study was 18.4%, the rate of vaccination in individuals with awareness of vaccination was 38.1%. In a study conducted with a total of 14308 elderly people, it was seen that 44.7% of the elderly individuals were aware of the vaccines recommended at elderly.[10] In the same study, it was determined that 64.5% of the elderly did not receive information about vaccination, and 45.1% of those who had information obtained the information from doctors, nurses, and other healthcare workers. In another study investigating the source of information about vaccination requirements and the factors affecting vaccination, it was recommended that the source and effective factors were their doctors by 76.93% and 70.41% respectively.[11] In another study, it was shown that individuals learned about the pneumococcal vaccine from social media at a rate of 46.5% and from a family physician at a rate of 54.5%.12 Similar to the information obtained from the literature, 48.5% of the individuals participating in this study stated that they knew that individuals over the age of 65 years were recommended to have the influenza/pneumonia vaccine. In our study, it was determined that the main source of vaccination awareness was healthcare workers. It is visible that healthcare workers have important duties to increase the vaccination rate since they are more effective in patients' decisions in terms of gaining community immunity. Within the scope of preventive medicine practices, adequate information training should be given to individuals in the risk group, especially those aged 65 years and over, about vaccines, the importance of vaccination should be explained, and seminars, meetings, public service announcements, etc. should be held regularly every year. It should also be reminded frequently with activities. In addition, the importance of getting vaccinated should be emphasized through social media and public service announcements, and vaccine hesitancy should be fought. In this study, the vaccination awareness rate of males was 55.8% and females was 43.8%. The mean age of patients with awareness was lower than those without. It was observed that patients with higher education levels had awareness of vaccination. However, it was observed that vaccination rates did not change according to education level. Similar to our study, Akman et al.'s[13] study showed that as the education level of the participants increased, the awareness of vaccination increased, but the rate of vaccination also increased in their study unlike our study. Similarly, in another study, it was found that both influenza and pneumococcal vaccination rates and awareness of the participants were increased with increasing levels of education.[14] As a result of the increase in education level, it can be thought that the increase in the confidence of individuals in positive science by moving away from cultural prejudices and superstitions may be effective in the emergence of this result. While 50.4% of individuals with comorbidities were aware of the recommendation for vaccination in the elderly aged 65 years and over, this awareness level was only 30.9% in those without comorbidities. When the vaccination awareness status of individuals with comorbidities was examined, it was found that vaccination awareness was higher in those with HT (51.98%), CAD (60.4%), HL (61.21%), and CRF (64.87%). While 98% of those who were vaccinated in the last year had at least one comorbidity, 88.2% of those who were not vaccinated had at least one comorbidity. In our study, 20.12% of those with at least one comorbidity were vaccinated with influenza and/or pneumococcal vaccine within the last year, while 79.87% were not. When the status of being vaccinated in terms of comorbidities was examined, the vaccination rate was lower in patients with HT (78.40%), CAD (66.33%), DM (75.98%), HL (77.77%) and CRF (85.00%). There was no difference in individuals with CHF, COPD/asthma, cirrhosis, CVO, depression, malignancy, IBD, rheumatologic and thyroid diseases. In this study, although the vaccination awareness of patients with HT, CAD, HL, and CRF was higher, the vaccination rates were low. False beliefs, vaccine hesitancy, psychological status, and the patient's desire not to wait in line in the vaccination units or difficulty in transportation, etc. thought to be the causes of low vaccination rates. Similarly, in the presence of a comorbidity that requires regular drug use, influenza vaccination had been found to decrease significantly.[13] As a result, it could be expected that individuals with comorbidities have a higher risk of infectious diseases such as pneumonia and influenza compared to the other population, so it could be expected that these individuals would have a higher vaccination rate but, as seen in the literature and this study, although the vaccination awareness rate of individuals with comorbidities was high, vaccination rates were low. There is a need for studies that examine both psychological and social aspects of why patients are not vaccinated despite their awareness of vaccination.

When the vaccination status of the patients in the last year was examined, it was found that 18.4% of all patients and only 38.1% of those who were aware of vaccination were vaccinated. All of the individuals who had the vaccine had awareness of the vaccine. It was determined that 16.66% of those who were aware of the vaccine had only the pneumococcal vaccine, 47.07% had only the influenza vaccine, and 36.27% had both pneumococcal and influenza vaccines together. Among the individuals participating in the study, the rate of those who were aware of the vaccine but did not get vaccinated was 61.9%. In a study conducted with 147 patients aged 65 years and over, it was reported that the rate of getting at least one of influenza, pneumococcal, herpes zoster, and tetanus vaccines was 53.7%.[15] The high rate of vaccination may be due to the small population and the fact that research has been investigated for 4 vaccines. Similar to our study, in the study of Erdoğdu et al.[16] investigating people aged 65 years and over, the percentage of getting at least one of influenza, pneumococcal, and herpes zoster vaccines was 12.5%. According to a study conducted in the USA, the rate of influenza vaccination of people aged 65 years and over was 67% and the rate of pneumococcal vaccination was 60%, and these rates were interpreted as low.[17] According to the results of this study, influenza and pneumococcal vaccination rates in Turkey are lower than the USA data.

Among the individuals participating in the study, the rate of those who had awareness of vaccination but not vaccinated was 61.9%. When the reasons for not having vaccinated were examined; thinking that it was unnecessary (32.53%), out of reach of the vaccine (21.08%), lacking physician's recommendation (16.9%), thinking that it was harmful (11.44%), neglection (10.84%), unwillingness (0.42%), afraid of needle (0.24%), and a severe infection after the previous vaccination (0.06%). When the literature was examined, in a study, the reasons for not having vaccinated for the individuals aged 65 years and over were respectively; lack of knowledge about vaccines, unwillingness, thinking that vaccines are not protective, thinking that vaccines have side effects.[10] Similarly, in another study, 60.3% of the participants reported that they did not get vaccinated because they did not receive information about vaccination from a health institution or doctor.[15] In our study, the rate of influenza/pneumonia infection severe enough to require consulting a physician within the last year was 29.6% (n:133) in individuals who did not get the vaccine, while it was 21.6% (n:80) in individuals who had been vaccinated, and there was no difference between the groups. Pneumonia that required hospitalization did not occur in individuals who were vaccinated while 5.3% of the individuals who did not been vaccinated were hospitalized for pneumonia. It can be thought that vaccination in the elderly population prevents hospitalizations due to these infections. As a result of a study conducted on 2918 patients with an average age of 62.1, the vaccination rates for influenza and pneumococci were found to be very low. In this study, the influenza vaccination rate was 12.3%, while the pneumococcal vaccination rate was 3%. Only 2.8% of the individuals participating in the study had both vaccines together. While 95.3% of the patients declared that they were not aware of both influenza or pneumococcal vaccines, 83.2% of them declared that the doctors did not recommend the influenza vaccine and 96% of them declared that the doctors did not recommend pneumococcal vaccines. Low vaccination rates have been associated with these conditions.[18] Compared to this study, it was observed that the vaccination rates in our study were higher. The reasons for not getting vaccinated were similar in both studies. In a study conducted on 642 people aged 65 years and over in Spain, the rate of influenza vaccination was found to be 68%.[19] In another study evaluating the vaccination status of individuals over the age of 65 years, the rate of influenza vaccine, which was the most administered vaccine, was 26.5%. In the same study, the vaccination rates for influenza and pneumococci in males were 31.3% and 3.7%, respectively, while the rates were 22.3% and 3.7% in females, respectively. Similarly in our study, the rate of males having influenza and/or pneumococcal vaccines was 21.86%; while 16.27% of females were vaccinated. The vaccination rate of males was found to be high in both studies.[13] The reasons for high rates of male vaccination may be associated with that, males were more likely to perceive infectious diseases as very dangerous than females, and they mostly trusted scientists, they had a lesser tendency to believe in conspiracies from vaccines compared to females who relied more on social media platforms.[20,21]

The limitations of this study was single-centered, the small sample size, the research was conducted for only two vaccines, and the psychological aspects of the patients were not examined.

CONCLUSION

In recent years, with the effect of social and visual media, vaccine hesitancy has emerged. People who have insufficient knowledge about vaccines believe that vaccines can be harmful to health due to some chemical substances in their contents. For this reason, vaccine indecision as well as vaccine hesitancy is increasingly taking place in society.

In the fight against these factors, the communication of health professionals and physicians with individuals and the trust they give to them, as well as the Ministry of Health, are of great importance. For this reason, training

programs should be organized to increase the knowledge of healthcare professionals about the vaccination of individuals aged 65 years and over. With the support of social and visual media organizations, vaccine hesitancy and indecision should be combated. In all applications of individuals in the risk group to health institutions, vaccination should be encouraged by informing them.

ETHICAL DECLARATIONS

Ethics Committee Approval: The study was carried out with the permission of Kartal Dr. Lütfi Kırdar Training and Research Hospital Clinical Researches Ethics Committee (Date: 27.05.2020, Decision No: 2020/514/178/15).

Informed Consent: All patients signed the free and informed consent form.

Referee Evaluation Process: Externally peer-reviewed.

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