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RESEARCH

INFLUENZA, PNEUMOCOCCAL AND HERPES ZOSTER VACCINATION RATES AMONGST PEOPLE AGED 65 YEARS AND OLDER AND RELATED FACTORS

Abstract

Introduction: We determined influenza, pneumococcal and herpes zoster vaccination rates amongst people aged ≥65 years and evaluated factors affecting the vaccination rates.

Materials and Method: The vaccination rates were investigated using face-to-face interview in 543 patients aged ≥65 years who were admitted to the internal medicine outpatient clinics of Kafkas University School of Medicine and public hospitals in the 30th health service area. Subjects were divided into two groups: vaccinated and unvaccinated. Vaccination status was the dependent variable; knowledge of vaccination and socioeconomic and sociodemographic characteristics were the independent variables.

Results: The number of unvaccinated subjects was 6.6 times higher amongst participants with no knowledge of vaccination than amongst those with knowledge of vaccination (95% confidence interval, 2.9–14.9, p=0.001), 2.6 times higher amongst participants with no primary education than amongst those with primary education (confidence interval, 1.5–4.5, p=0.001), 2.7 times higher in participants with insufficient income than amongst those with sufficient income (confidence interval, 1.2–5.9, p=0.006) and 2.2 times higher amongst participants living in rural areas than amongst those living in urban areas (confidence interval, 1.2–3.7, p=0.006). These were the factors affecting the vaccination status in the elderly.

Conclusion: Additional solutions are required to encourage physicians and other healthcare providers to provide the elderly with information and encourage them to be vaccinated as recommended by the 'Centre for Disease Control and Prevention', increasing the vaccination rates amongst those living in villages and rural areas and with low income.

Keywords: Aged; Influenza vaccines; Pneumococcal vaccines; Herpes Zoster vaccine

ARAŞTIRMA

ALTMIŞ BEŞ YAŞ VE ÜZERİ KİŞİLERİN İNFLUENZA, PNÖMOKOK VE HERPES ZOSTER AŞILARINI YAPTIRMA DÜZEYİ VE İLİŞKİLİ FAKTÖRLER

Öz

Giriş: Bu araştırmada 65 yaş ve üzeri kişilerde influenza, pnömokok ve herpes zoster aşılarını yaptırma düzeyi ile bu düzeyi etkileyen faktörlerin belirlenmesi amaçlanmıştır.

Gereç ve Yöntem: Araştırmanın verileri Kafkas Üniversitesi Tıp Fakültesi ve kamu hastaneleri iç hastalıkları polikliniğine başvuran 65 ve üzeri yaş 543 kişi ile yüz yüze görüşme tekniği ile toplandı. Kişiler aşı yaptıranlar ve yaptırmayanlar olarak iki guruba ayrıldı. Aşılanma durumu araştırmanın bağımlı değişkeni iken, aşı bilgisi, sosyoekonomik ve sosyodemografik özellikler ise bağımsız değişkenleri olarak belirlendi.

Bulgular: Aşı bilgisi olanlar referans alındığında olmayanlarda 6.6 (CI, 2.9–14.9; p=0.001), temel eğitimi olanlar referans alındığında olmayanlarda 2.6 (CI, 1.5–4.5; p=0.001), gelir düzeyi yeterli olanlar referans alındığında yetersiz olanlarda 2.7 (CI, 1.2–5.9; p=0.006), il ve ilçe merkezinde yaşayanlar referans alındığında köy ve beldelerde yaşayanlarda aşılanmama 2.2 kere (CI, 1.2–3.7; p=0.006) daha yüksek olup yaşlılarda aşılanmayı etkileyen faktörler olarak belirlendi.

Sonuç: Yaşlı nüfusun "Hastalık Kontrol ve Önleme Merkezi" tarafından önerilen aşıları yaptırmasında hekimlerin aşılar hakkında yaşlıları bilgilendirmesi, köy ve beldelerde yaşayanlar ve gelir düzeyi düşük olanların aşılanma oranlarının arttırılması için doktorlar ve diğer sağlık sunucularının yaşlıları aşılanma konusunda bilgilendirmeleri ve yönlendirmeleri gibi ilave çözümler gerekmektedir.

Anahtar sözcükler: Yaşlı; İnfluenza aşısı; Pnömokok aşısı; Herpes Zoster aşısı

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INTRODUCTION

Elderly population aged 65 years and older is growing worldwide with increasing average life expectancy. As of 2015, there are 900 million people in the world who are 60 years and older, and it is estimated to reach 2 billion by 2050 (1). According to the Turkish Statistical Institute, the percentage of people aged 65 years and older was 8.5% in 2017 (2).

Changes occur with ageing in innate and acquired immunities. Thymic involution results in the reduction of the number of T cells and low CD4/CD8 ratio, affects B-cells that provide antibody response, affects dendritic cells responsible for antigen uptake and presentation, decreases the diversity of the T cell repertoire, negatively affects natural killer cells that eliminate infected cells and affects monocytes and macrophages that govern chemotaxis. These changes, termed as 'immunosenescence', increase the risk of exposure to infections in the elderly (3–5).

It is estimated that approximately 3.5 million serious cases of influenza infection are observed every year worldwide, and approximately 250,000–300,000 of these infections are fatal (6). Influenza, which increases and peaks especially in autumn and winter, causes complications and deaths, making the elderly susceptible to pneumococcal infections (7).

Pneumococcal infections occur in a spectrum comprising acute otitis media, sinusitis, meningitis and invasive pneumococcal disease, and the effectiveness of vaccination in protecting against these conditions has been demonstrated (8). If the vaccination status of an elderly patient is unknown or the patient has not been vaccinated, one dose of pneumococcal conjugate vaccine (PCV13) is initially administered followed by one dose of pneumococcal polysaccharide vaccine 23 (PPSV23) after 6–12 months (9); the interval between the two vaccinations should be 2 months at a minimum.

Most people become infected with varicella during childhood, and varicella remains dormant in cranial nerve ganglia. Post-herpetic neuralgia, which is a common complication caused by the spread of the virus to the sensory nerve dermatoma, can be observed in up to 18% of adults and 33% of the elderly (10,11). This leads to pain that lasts for months and patients show poor response to analgesics, disrupting their social activity (12).

Owing to these reasons, vaccination strategies for the prevention of diseases, such as influenza, pneumococcal infections, herpes zoster (HZ), as suggested by the Centre for Disease Control and Prevention (CDC) are important in terms of preventive health services in the elderly (9).

The aim of this study was to determine the level of knowledge of individuals aged 65 years and older on influenza, pneumococcal and HZ vaccines, and evaluate the factors that may affect vaccination status.

MATERIALS AND METHOD

The population of this descriptive study comprised individuals aged 65 years and older who were admitted to internal medicine outpatient clinics of Kafkas University School of Medicine and public hospitals located in Kars, Kağızman, Sarıkamış, Ardahan, Göle, Iğdır and Doğubayazit. Approximately 167,760 people aged 18 years and older were admitted to the internal medicine outpatient clinics of these hospitals within 1 year, and the number of patients aged 65 years and older was approximately 33,552 (approximately 20% of the applicants were 65 years and older). In addition, the average number of repeated admissions to university and public hospitals was 6.6 in the cities where this study was conducted (13). When the number of the elderly admitted to the hospitals (33.552) was divided by the number of repeated admissions (6.6), the population of the study was determined to be approximately 5,089 people. Accordingly, sample size was calculated

as 537 considering 50% prevalence rate, 4% error margin and 95% CI.

Data collection form

The form consisted of questions inquiring sociodemographic and socioeconomic levels of the elderly, information regarding vaccinations and vaccination status.

Data collection

Data was collected using face-to-face interview. After establishing preliminary diagnosis and planning investigations and treatments on the basis of the reason of admission, participants were taken to a quiet room and the questions were read by the investigator at a sound level wherein his/her voice could be clearly heard by the participants. Verbal answers of the participants who heard and understood the questions were recorded on the forms. Seven people who had communication problems were not included in the study and 27 people did not consent to participate in the study; therefore, the study was completed with 543 participants.

The dependent variable of the study was the vaccination status of the elderly, whereas the independent variables were the socioeconomic and sociodemographic characteristics of the elderly and the level of knowledge on vaccination.

The study protocol was approved by the Clinical Trials Ethics Committee of Kafkas University Faculty of Medicine, Kars, Turkey. The study was conducted in accordance with the declaration of Helsinki, and verbal informed consent was obtained from each patient.

Statistical analysis

SPSS Statistics of Windows v.21.0 (SPSS; IBM Corporation, New York, USA) was used. Chi-square test was used in the analysis of numeric variables; $p<0.05$ was considered statistically significant. Logistic regression analysis was used for independent variables that were found to be statistically significant in the chi-square test.

RESULTS

In total, 63 subjects received influenza vaccination only, three received both influenza and pneumococcal vaccinations, one received pneumococcal vaccination and one received all three vaccinations. Consequently, 68 subjects received at least one vaccination.

Table 1 shows the association between influenza, pneumococcal and HZ vaccination rates and demographic and socioeconomic characteristics, level of knowledge on vaccination and the participants' personal characteristics.

Table 2 shows the percentages of patients who have previously heard of influenza, pneumococcal and HZ vaccines. The percentages of participants who have heard of these vaccines were 52.7%, 26.9% and 6.6%, respectively.

Independent variables with statistically significant differences in Table 1 were included in the logistic regression analysis. The following were the parameters affecting the vaccination rate of the participants.

As shown in Table 3, the number of unvaccinated subjects was 6.6 times higher amongst participants with no knowledge of vaccination than amongst those with knowledge on vaccination (CI, 2.9–14.9, p=0.001), 2.6 times higher amongst participants with no primary education than amongst those with primary education (CI, 1.5–4.5, p=0.001), 2.7 times higher in participants with insufficient income than amongst those with sufficient income (CI, 1.2–5.9, p=0.006) and 2.2 times higher amongst participants living in rural areas than amongst those living in urban areas (CI, 1.2–3.7, p=0.006) (Table 3).

Table 1. The association between influenza, pneumococcal and HZ vaccination rates and demographic and socioeconomic characteristics, level of knowledge on vaccination and the participants' personal characteristics. (Kars, Turkey; 2017).

Independent Variables		*Vaccinated	Unvaccinated	Number (%)	p
		Number (%)	Number (%)		
Place of residence	Village/suburb	25 (8.2)	281 (91.8)	306 (56.4)	0.001
	City/town	43 (18.1)	194 (81.9)	237 (43.6)	
Age	65–74	45 (13.2)	295 (86.8)	340 (62.6)	0.516
	≥75	23 (11.3)	180 (88.7)	203 (37.4)	
Sex	Female	26 (9.3)	253 (90.7)	279 (51.4)	0.020
	Male	42 (15.9)	222 (84.1)	264 (48.6)	
Vaccination information provided[a]	Yes	14 (46.7)	16 (53.3)	30 (5.5)	0.001
	No	54 (10.5)	459 (89.5)	513 (94.5)	
Marital Status	Widowed	12 (7.8)	142 (92.2)	154 (28.4)	0.036
	Married	56 (14.4)	333 (85.6)	389 (71.6)	
Elementary school and higher	No	29 (8.3)	321 (91.7)	350 (64.5)	0.001
	Yes	39 (20.2)	154 (79.8)	193 (35.5)	
Mode of residence	Rental	4 (22.2)	14 (77.8)	18 (3.3)	0.206
	Family's property	64 (12.2)	461 (87.8)	525 (96.7)	
Living with	Alone	2 (5.9)	32 (94.1)	34 (6.3)	0.227
	Spouse/children	66 (13.0)	443 (87.0)	509 (93.7)	
Number of people in the family	≤4	51 (14.0)	314 (86.0)	365 (67.2)	0.144
	>4	17 (9.6)	161 (90.4)	178 (32.8)	
Health insurance	Green card	12 (7.3)	153 (92.7)	165 (30.4)	0.015
	SSI	56 (14.8)	322 (85.2)	378 (69.6)	
Family[b] **income**	Insufficient	8 (5.2)	147 (94.8)	155 (28.5)	0.001
	Sufficient	60 (15.5)	328 (84.5)	388 (71.5)	
Smoking[c]	Smoker	6(11.5)	46 (88.5)	52 (9.6)	0.822
	Non-smoker	62 (12.6)	429 (87.4)	491 (90.4)	
Alcohol Consumption[c]	Yes	7 (31.8)	15 (68.2)	22 (4.1)	0.005
	No	61 (11.7)	460 (88.3)	521 (95.9)	
Chronic disease	Yes	60 (12.8)	409 (87.2)	469 (86.4)	0.632
	No	8 (10.8)	66 (89.2)	74 (13.6)	
Total	68[d] (12.5)	475 (87.5)	543 (100.0)		

(Age range of participants: 65–95 years; average age: 72.9±6.5 years)

* having received one, two or all three of the mentioned vaccinations; a, whether subjects received information about vaccination by a healthcare provider or a doctor; SSI, Social Security Institution; b, income perceived by subject; c, whether or not smoking or alcohol habits continue, regardless of the previous situation ; d, In total, 63 subjects received influenza vaccination only, 3 received both influenza and pneumococcal vaccinations, 1 received pneumococcal vaccination and 1 received all three vaccinations. As a result, 68 subjects received at least one vaccination.

Table 2. Subjects indicating that they have only heard about a particular vaccination before.

Vaccination	Have heard about vaccination	Have not heard about vaccination	Total
	Number (%)	Number (%)	
Influenza	286 (52.7)	257 (47.3)	543 (100.0)
Pneumococcal	146 (26.9)	397 (73.1)	543 (100.0)
Herpes zoster	36 (6.6)	507 (93.4)	543 (100.0)

Table 3. The results of binary logistic regression analysis containing factors affecting influenza, pneumococcal and herpes zoster vaccination among people aged 65 years and older.

Independent variables		B	S.E	Wald	Odds Ratio	95% Confidence Interval	p
Vaccination information provided	No	1.888	0.414	20.787	6.6	2.9–14.9	0.001
	Yes				Reference		
Elementary school and higher	No	0.963	0.278	11.966	2.6	1.5–4.5	0.001
	Yes				Reference		
Family income*	Insufficient	0.987	0.400	6.083	2.7	1.2–5.9	0.006
	Sufficient				Reference		
Place of residence	Village/suburb	0.770	0.283	7.424	2.2	1.2–3.7	0.006
	City/town				Reference		

***** income perceived by individual

Table 4. Percentage and reasons of subjects indicating that they will not undergo vaccination when their doctor advises influenza, pneumococcal and herpes zoster vaccinations.

I will not get vaccinated	
Response	**Number (%)**
Fear of side effects	34/543 (6.3)
I do not think it is necessary because I am healthy	30/543 (5.5)
I do not think it is necessary because I am old	13/543 (2.4)
No idea	5/543 (0.9)
Total number (%)	**82/543 (15.1)**

DISCUSSION

Similar to that reported in previous studies, the vaccination rates amongst the elderly for the three vaccines investigated in the present study in the study area was 12.5%, and this rate is insufficient (14–16). The lack of knowledge regarding the vaccine, lack of primary education, low income level and living in villages and rural areas were determined as factors affecting this situation.

In Europe, the highest rate of influenza vaccination in the elderly was achieved in the Netherlands with a percentage of 77%, and the lowest rate was in Estonia with a percentage of 1% (10). In the western part of Turkey, the influenza vaccination rate in the population was 15% (14), whereas that in the present study was 12.3%. Influenza is one of the leading causes of vaccine-preventable infections. A recent study in Taiwan found that the rates of pneumonia and acute coronary syndromes were lower in individuals immunised for influenza in locations with high air pollution during the winter season, and patients who were vaccinated against influenza were less affected on days when the air temperature decreased (17). In an extensive study, it was found that influenza vaccination during influenza seasons between 2000 and 2009 not only reduced mortality rates but also reduced hospitalisation rates (18). In the present study, when participants (patients aged ≥65 years) were asked about pneumococcal vaccine, 26.9% of the participants stated that they had previously heard of this vaccine.

The Community-Acquired Pneumonia Immunization Trial in Adults study demonstrated the efficacy of PCV13, and another study found that 38% of invasive pneumococcal diseases was caused by the serotypes that could be prevented by PPSV23 administration (19,20). In Scotland during the 2003/2004 winter season, PPSV23 was found to reduce the risk of invasive pneumococcal disease in the elderly by one-third, and similarly, a study investigating a large number of the elderly in Sweden found that influenza and 23-valent pneumococcal vaccination significantly reduced both influenza infection and invasive pneumococcal disease (8,21).

Furthermore, 68% of patients suffering from HZ and its complications are aged 50 years and older. When postherpetic neuralgia develops, it may impair social activity and sleep patterns of the person by causing pain that lasts for months or even years that does not respond well to analgesics. In addition, it may cause various ophthalmologic complications and zoster meningitis (6,11).

Oxman et al. found that the efficacy of HZ vaccine is 51% against HZ infection and 67% against postherpetic neuralgia (22). In the present study, the percentage of participants who were aware of HZ vaccination was 6.6% (36/543), and the vaccination rate was only 0.2% (1/543). In a large-scale cohort study conducted by Langan et al., the rates of HZ vaccination were 2.5% and 1.5% in the age groups of 65–79 years and ≥80 years, respectively, and this rate was 0.3% in African Americans (12). In this study, it was found that 5.5% of participants (30/543) were previously provided with information on any of the vaccines, and 46.7% of previously informed participants received at least one vaccine of influenza, pneumococcal or HZ vaccines.

A study conducted in the United States found that family physicians and internists remain unclear regarding the importance of vaccination (16). Similar to our results, Schneeberg et al. in Canada found that 16.7% of those who were not informed of pneumococcal vaccination by a physician or healthcare provider were vaccinated, whereas 79.8% of informed patients were vaccinated (23).

These findings indicate that the knowledge of vaccination affects vaccination rates. In immunisation of the elderly, healthcare providers must initially insist on emphasising the importance of each of these vaccinations. In our study, 84.9% of the participants indicated that they would

receive vaccination if the doctor advises (Table 4), demonstrating the power of healthcare providers in persuading them for vaccination (14,23).

In the logistic regression analysis of the data, the number of unvaccinated subjects was 2.6 times higher in those with low educational level. In this study, the vaccination rate amongst participants with 'primary and higher education' was 20.2%, whereas this rate was 8.3% amongst participants with insufficient education (p=0.001). In the aforementioned study, influenza vaccination rate was found to be 3.2 times lower amongst those without primary education (14). In the above-mentioned Canadian study, the rate of people who did not receive pneumococcal vaccine was 1.6 times higher in elderly with primary/secondary education compared with those with university education (23).

When the effect of income level on vaccination status was analysed, it was found that the rate of subjects who did not receive influenza, pneuomococcal or HZ vaccines was 2.7 times higher in participants with insufficient income compared with those with sufficient income (Table 3).

In a study conducted on 2,000 people in Pakistan, pneumococcal vaccination rate amongst people in lower socioeconomic classes was 2.3%, whereas this rate was 16.5% amongst people in higher socioeconomic classes (24). In the above-mentioned cohort study, HZ vaccination rate in individuals with low income was 0.6%, whereas it was 2.6% in those with high income (12).

In this study, the rate of unvaccinated participants living in villages and suburbs was 2.2 times higher than the rate in participants living in cities and town centres (Table 3). This finding may indicate that people living in the villages are in higher need of education. In this study, the rate of participants indicating that they 'would not get vaccinated' for all three vaccinations on the doctor's recommendation vaccination was 15.1%. When we looked at the distribution, we found that the proportion of participants who would not get vaccinated due to the fear of side effects was 34/82, and they had concerns regarding vaccination. In one of the previous studies, it was found that 58% of people believed that pneumococcal vaccination would protect against the disease, but they were concerned about the side effects of vaccination (25).

Although awareness of influenza vaccine has increased due to outbreaks in recent years, awareness of the other vaccines is low, and the level of awareness appears to be related to the socioeconomic levels of individuals (24). Low level of awareness of HZ vaccine compared with influenza and pneumococcal vaccines may be due to insufficient information by doctors, relatively high price of HZ vaccine and less appearance on social media platforms such as television and the Internet.

In conclusion, the rate of vaccination against influenza, pneumococcal disease and HZ in elderly was found to be low. The level of pneumococcal and especially HZ vaccination is very low compared with that of influenza. The lacks of knowledge in the elderly, low educational level, insufficient income and living in villages and suburbs have an impact on the low vaccination rate for all three diseases. Independent of these factors, the majority of participants have stated that they would get vaccinated if the physician advises. In light of this information, healthcare providers and physicians should inform the elderly about vaccinations and recommend vaccination. In addition, although HZ is not as common as other diseases, the importance of HZ vaccination should not be overlooked because it may cause neurological pain and other serious complications in the elderly.

Conflicts of interest

The authors declare that there are no conflicts of interest.

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ERRATUM

The authors and institutions of the article titled "DEATH ANXIETY IN THE ELDERLY: RELATION TO PARTICIPATION IN DAILY LIFE" (TJG 2018;21(3):383-93. DOI:10.31086/tjgeri.2018344053) should be as follows:

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