



Investigation of the Adult Vaccination Status and Influencing Factors in People Aged 65 Years and Over Registered in A Family Health Center in Mersin City

Hatice Bal¹, Gülay Börekçi²

Abstract

Objective: The purpose of this study was to determine the adult immunization status and influencing factors in people aged 65 years and over registered in a family health center in Mersin.

Methods: The research was conducted in a total of 260 people aged 65 years and over who were treated in a family health center in Mersin. A questionnaire consisting of 28 items was administered by conducting a face-to-face interview with the participants. Obtained data were analyzed using the SPSS package program.

Results: It was determined that 72.3% of the participants were in the age range of 65–74 years, 55.4% were females, 65.7% were primary school graduates, 65% were married, 95% were unemployed, 48.8% were retired, 20.8% lived alone, 49.2% had an income of 1.000 TL or less, 77.3% had a chronic disease, 83.1% continuously used medications, and 82.6% had a cardiovascular disease. Among the participants, 30.4% were vaccinated, and among those, 28.1% were administered the flu vaccine, 4.2% the pneumococcal vaccine, and 3.1% the tetanus vaccine. The reasons for vaccination and their rates are as follows: having penetrating injuries (46.8%), medical advice (39.2%), obligation before a pilgrimage (10.1%), a pharmacist's recommendation, and a wound from animal bites or a recommendation from their relatives (1.3%). Majority of those with a chronic disease and continuous use of medication had a high rate of vaccination ($p>0.05$). Further, 54.4% of male participants aged 65 years and over were administered vaccines. In total, 59.7% of the female participants, 79% of who were in the age range of 65–74 years, 49.7% of who were housewives, and 52.5% of who had an income of 1.000 TL or less were not administered any vaccine.

Conclusion: The rate of adult immunization was low in people aged 65 years and over, and the adult immunization rate was affected by variables such as age, sex, educational background, and occupation.

Keywords: Aging, adult immunization, influencing factors

Introduction

Today, modernization of life has increased the life span of people, consequently increasing the elderly population in the world. The World Health Organization (WHO) estimates that between the years 2015 and 2050, the world's population aged more than 60 years will almost double from 12% to 22%; in other words, the 60-year-old population that was 900 million in 2015 would have reached 2 billion by the year 2050 and 80% of the elderly population will be living in low- or average-income countries (1). The aging phenomenon, which is more evident in developed countries, is now gaining importance also in developing countries, and the elderly population is gradually increasing in Turkey as well (2).

The resistance of the body against infectious diseases decreases due to physiological changes caused by aging, thereby leading to diseases and death. In particular, diabetes mellitus (DM), atherosclerosis, prostate hypertrophy, degenerative joint diseases, dementia, and chronic lung and heart diseases that occur in older ages allow easy entry of microorganisms into the body to cause diseases. Prostheses placed in areas such as the heart and joints can become sources of infections in the elderly. Fecal and urinary incontinence and pressure ulcers that develop in bed-dependent patients accelerate the development of infections in the elderly. Especially, lung infections threaten life of people aged more than 65 years. Diseases such as respiratory tract diseases, chronic lung and heart diseases, and dementia increase the risk of pneumonia with age. The risk of pneumonia in elderly people can be eliminated by pneumococcal and influenza vaccinations in addition to contraceptive measures (3). Adult vaccinations result in a prolonged life span compared to that in the past by preventing infectious diseases and related complications during old ages, which contributes to an increased quality life and the reduction in the morbidity and mortality due to infectious diseases. Thus, diseases and deaths can be significantly prevented with vaccination, which is an important part of preventive health services. In our country, vaccinations are often given in childhood, while adult vaccinations are neglected and often considered as not essential in advanced ages. Nevertheless, it is especially important to protect the elderly population with vaccination against life-threatening diseases (4-6).

This study was presented at the 6th National Vaccine Symposium, 21-25 October 2015, Ankara, Türkiye.

¹Mediranean Region Command, Primary Health Centre, Mersin, Türkiye

²Mersin University, Health School, Mersin, Türkiye

Address for Correspondence:
Gülay Börekçi
E-mail: gulay_borekci@yahoo.com

Received:
25.07.2016

Accepted:
22.08.2016

© Copyright 2016 by Available online at
www.istanbulmedicaljournal.org

The WHO states that several infectious diseases can be prevented by vaccination. There are vaccines against more than 20 diseases and several of them are included in the vaccination program in our country and in other countries of the world. Vaccines can possibly protect against diseases such as tuberculosis, measles, mumps, tetanus, pneumonia, flu, poliomyelitis, rubella, hepatitis A and B as well as human papilloma virus (HPV), and rotavirus infections (7). While some of the immunogenic vaccines may provide lifetime protection against the disease, some provide partial protection and some vaccines need to be readministered on a regular basis. Therefore, it is necessary to administer adult vaccinations to individuals who have been vaccinated in childhood (8).

As in other countries of the world, adult vaccination is not given the same importance in our country as that given to childhood vaccination and an adequate progress has not been achieved in terms of adult vaccination. While there are baby/child and school vaccination cards for children in our country, the adult population has only the diphtheria tetanus vaccination card. There is no vaccination card covering all the vaccinations that are recommended for the adulthood period (8). Problems related to adult vaccination, such as the lack of a national program and inadequately informing the community about adult vaccination, prevent successful adult vaccination. Tetanus with a high mortality (>50%) can still be encountered in our country because of the problems in vaccination during adulthood. However, the fact that measles that has been intended to be eradicated in our country was seen in adults and children in Istanbul between the years 2010 and 2011 necessitate that adult vaccination should also be routinely implemented (5, 9). The vaccine coverage that is wider in childhood is generally less in adulthood. The vaccine coverage varies during adulthood due to both the vaccination of healthy adults and the risks occurring in different conditions such as travel, certain occupations (health workers, veterinarians), old age, and immune deficiencies. (10). To protect and maintain health, a vaccine schedule prepared by organizations such as the WHO and the Centers for Disease Control and Prevention (CDC) is updated each year for the fight against vaccine-preventable diseases worldwide, and each country establishes its own vaccination program. The vaccination programs implemented in our country are planned and carried out by the Ministry of Health (8, 11, 12).

Vaccination in adults includes different vaccination applications as in healthy adults and in special cases (pregnancy, immunosuppression or immune insufficiency, chronic diseases [DM, heart disease, chronic lung disease, chronic liver disease, chronic renal failure], travel, military service, and being a health worker). Immunization should be provided with certain vaccines depending on the age group of adults (19–21, 22–26, 27–49, 50–59, 60–64, and 65 years and above) (5, 8, 11, 12).

The CDC's 2016 adult vaccination recommendations are as follows: in all adults aged 19–65 years and over, influenza vaccine one dose per year, Td/Tdap (tetanus, diphtheria, pertussis) one time, instead of Td/Tdap booster, followed by Td booster every 10 years; HPV in women; three doses for all adults aged 19–26 years, three doses for all adults aged 19–21 years in males, three doses for 22- to 26-year-old risk groups, Zoster one

dose for all adults aged 60–65 years and older, MMR (measles, mumps, rubella) one or two doses according to indication to all adults aged 19–49 years, PPSV23 (23-valent polysaccharide pneumococcal) vaccine one or two doses to 19- to 64-year-old risk groups, one dose for all adults over 65 years of age, PCV13 (13-valent polysaccharide pneumococcal) vaccine one or two doses for 19- to 64-year-old risk groups, one dose for all adults over 65 years of age, Meningococcal (meningococcal 4-valent conjugate (MenACWY) or polysaccharide (MPSV4) one or more doses to risk groups aged 19–65 years and over 65 years, Meningococcal B (MenB) two or more doses depending on the vaccination, two doses of hepatitis A, three doses of hepatitis B, *Haemophilus influenzae* type b (Hib) one or three doses according to indication (12).

Within the framework of the Ministry of Health adult vaccination program in our country, the recommended vaccinations for adults aged 18–49, 50–64, and 65 years or older are Tetanus, diphtheria (td) vaccine; a booster dose vaccination every 10 years for all individuals who do not have immunization history and contraindications, measles (M)/measles, mumps, rubella (MMR) vaccine; one or two doses of vaccine for individuals who have risk factors and are non-contraindicated, Hepatitis B vaccine; three doses of vaccine (0, 1, 6 months) for individuals with risk factors and without contraindications, Hepatitis A vaccine; two doses of vaccine (0, 6, 18 months) for individuals with risk factors and without contraindications, Varicella vaccine; two doses of vaccine (0, 1, or 2 months) for individuals with risk factors and without contraindications, meningococcal vaccine; one or more doses of vaccine for individuals who have risk factors and who are not contraindicated, Influenza vaccine; one dose per year for people aged 18–49 years who have risk factors and no contraindications and for people aged 65 years or older who are not immunized and contraindicated; Pneumococcal vaccination for those aged 18–49 years who have risk factors and are non-contraindicated, and one to two doses of vaccine per year for people aged 65 years and over who are not immunized and contraindicated (4).

Vaccination applications for adults in our country are Hep-B vaccination, tetanus vaccination in women in the reproductive age group, adult tetanus vaccination, health worker vaccination, travel vaccination, hajj and umra vaccination, military vaccination, and pneumococcal and influenza vaccination (13).

The status of adult vaccination is very low in our country as in the world (14-19). Although vaccination is one of the key applications of preventive health care, little attention is paid to adult vaccination, especially to the vaccination of older individuals. Several individuals have not been vaccinated according to vaccination programs. Inadequate understanding of the importance of vaccine-preventable diseases, suspicion about adult vaccines being reliable and effective, lack of knowledge about vaccines, costs of vaccinations and not being reimbursed by the health insurance, and the inability to implement children vaccination programs in adult vaccination can be considered among the reasons for the inadequate application of vaccinations in adults (20-23). However, raising the awareness and informing about adult vaccination in our country, especially in elderly individuals, are important in terms of increasing adult vaccination rates.

Table 1. The distribution of descriptive characteristics and health-related statuses of individuals aged 65 years and above who participated in the survey

| Descriptive Characteristics | Number | % |
|--|--------|------|
| Average age: 70.94 ± 7.2 | | |
| Age range: 65-95 | | |
| Age | | |
| 65-74 years | 188 | 72.3 |
| 75- 84 years | 55 | 21.2 |
| 85 years and over | 17 | 6.5 |
| Gender | | |
| Female | 144 | 55.4 |
| Male | 116 | 44.6 |
| Marital status | | |
| Married | 169 | 65.0 |
| Single | 91 | 35.0 |
| The place where he/she lived for the longest period of time | | |
| Province | 238 | 91.5 |
| District | 22 | 8.5 |
| Number of People Living in Family | | |
| One person | 54 | 20.8 |
| Two persons | 103 | 39.6 |
| Three and over | 103 | 39.6 |
| Working status | | |
| Not working | 247 | 95.0 |
| Working | 13 | 5.0 |
| Occupation | | |
| Retired | 127 | 48.8 |
| Housewife | 120 | 46.1 |
| Self-employment | 8 | 3.1 |
| Farmer | 2 | 0.8 |
| Doctor | 2 | 0.8 |
| Unemployed | 1 | 0.4 |
| Educational Background | | |
| Primary school graduate | 143 | 55.0 |
| Illiterate | 69 | 26.5 |
| High school graduate | 26 | 10.0 |
| University Graduate | 22 | 8.5 |
| Income | | |
| 0-1000 TL | 128 | 49.2 |
| 1001- 2000 TL | 98 | 37.7 |
| Above 2001 TL | 34 | 13.1 |
| Presence of Chronic Diseases | | |
| Yes | 201 | 77.3 |
| No | 59 | 22.7 |

The Number of Chronic Diseases (n=201)

| | | |
|---------------|-----|------|
| One | 87 | 43.3 |
| More than one | 114 | 56.7 |

The Type of Chronic Disease (n=324)*

| | | |
|-------------------------------|-----|------|
| Cardiovascular system disease | 166 | 82.6 |
| Endocrine system disease | 93 | 46.3 |
| Respiratory system disease | 22 | 10.9 |
| Joint/bone system disease | 20 | 10.0 |
| Nervous system disease | 10 | 5.0 |
| Urogenital system disease | 8 | 4.0 |
| Digestive system disease | 5 | 2.5 |

The Drugs Used Continuously

| | | |
|-----|-----|------|
| Yes | 216 | 83.1 |
| No | 44 | 16.9 |

The Number of Drugs Used (n=216)

| | | |
|--------------------------------|-----|------|
| Single drug users | 102 | 47.2 |
| Those using more than one drug | 114 | 52.8 |

Smoking Status

| | | |
|-----|-----|------|
| No | 230 | 88.5 |
| Yes | 30 | 11.5 |

*More than one option is marked.

This study was aimed to determine the status of adult vaccination and the factors affecting it in individuals aged 65 years and above who are registered with a family health center in Mersin University.

Methods

A cross-sectional study was conducted with 260 people aged 65 years and above who were registered with a family health center in Mersin. A personal information form to determine the descriptive characteristics of the individuals participating in the research and a questionnaire consisting of 28 questions to determine the adult vaccination status and the influencing factors were created by the researchers by reviewing the literature. After the formal approval from the Ethics Committee of Clinical Investigations (No: 78017789/050.01.04/450) of the University of Mersin and from the institutions in which the research would be conducted, the purpose and the method of the research were explained to the participants aged 65 years and above, their written and verbal consents were received, and the questionnaires were applied through a face-to-face interview technique. The obtained data were transferred to Statistical Package for the Social Sciences (SPSS) for Windows package program and interpreted using descriptive statistics and chi-square test. Statistical significance was accepted as $p \leq 0.05$.

Results

The average age of the individuals aged 65 years and above who participated in the research was 70.94 ± 7.2 years and 72.3% of

| Table 2. The status of childhood and adult vaccinations of individuals aged 65 years and above who participated in the survey | | |
|--|---------------|----------|
| Vaccination Status | Number | % |
| Childhood Vaccinations | | |
| S/he does not know | 119 | 45.8 |
| Completed | 95 | 36.5 |
| Didn't complete | 46 | 17.7 |
| Over-18 Adult Vaccinations | | |
| Those who didn't | 136 | 52.3 |
| Those who did | 124 | 47.7 |
| The Vaccinations Made (n=146)* | | |
| Influenza vaccine | 89 | 34.2 |
| Tetanus vaccine | 33 | 12.7 |
| Yellow fever vaccine | 11 | 4.2 |
| Typhoid vaccine | 5 | 1.9 |
| Hepatitis B vaccine | 3 | 1.2 |
| Meningitis vaccine | 2 | 0.8 |
| Measles vaccine | 2 | 0.8 |
| Rabies vaccine | 1 | 0.4 |
| Reasons for Vaccinations (n=124) | | |
| Upon the doctor's recommendation | 82 | 66.1 |
| Due to exposure to sharp object injury | 14 | 11.3 |
| For pilgrimage | 14 | 11.3 |
| Due to pregnancy | 9 | 7.3 |
| Due to exposure to animal bites | 2 | 1.6 |
| Upon the recommendation of relatives | 2 | 1.6 |
| Upon the recommendation of the pharmacist | 1 | 0.8 |
| The Reasons for Not Being Vaccinated (n=143)* | | |
| Because not informed about the vaccines | 65 | 47.8 |
| Didn't think it was necessary | 63 | 46.3 |
| Because the doctor didn't recommend | 10 | 7.4 |
| Didn't think it was reliable and effective | 4 | 2.9 |
| Due to fear of development of allergy | 1 | 0.7 |
| Vaccination Status After 65 Years of age | | |
| Those who weren't vaccinated | 181 | 69.6 |
| Those who were vaccinated | 79 | 30.4 |
| The Reasons for Being Vaccinated (n=79) | | |
| Due to exposure to sharp object injury | 37 | 46.8 |
| Upon the doctor's recommendation | 31 | 39.2 |
| For pilgrimage | 8 | 10.1 |
| Upon the recommendation of the pharmacist | 1 | 1.3 |
| Due to exposure to animal bites | 1 | 1.3 |
| Upon the recommendation of relatives | 1 | 1.3 |
| The Reasons for Not Being Vaccinated (n=181) | | |
| Because not informed about the vaccines | 125 | 69.1 |
| Didn't think it was necessary | 44 | 24.3 |
| Because the doctor didn't recommend | 8 | 4.4 |
| Didn't think it was reliable and effective | 3 | 1.7 |
| Due to fear of development of allergy | 1 | 0.5 |

| The Vaccinations Made (n=102)* | | |
|---|----|------|
| Influenza vaccine | 73 | 28.1 |
| Pneumococcal (pneumonia) vaccine | 11 | 4.2 |
| Tetanus vaccine | 8 | 3.1 |
| Typhoid vaccine | 5 | 1.9 |
| Yellow fever vaccine | 3 | 1.2 |
| Meningitis vaccine | 2 | 0.8 |
| The Place of Vaccination (n=79) | | |
| Health Institution | 33 | 41.7 |
| Pharmacy | 27 | 34.2 |
| Home | 6 | 7.6 |
| Others | 13 | 16.5 |
| Payment for the Vaccination (n=79) | | |
| I wasn't charged for vaccination | 60 | 75.9 |
| I was charged for vaccination | 19 | 24.1 |
| *More than one option is marked | | |

them were aged between 65 and 74 years, 55.4% of them were females, and 91.5% of them mostly lived in a city. Furthermore, 95% of those individuals most of whom were primary school graduates (55%) and married (65%) were not working and 48.8% were retired. In addition, 49.2% of the study participants had an income of 1000 TL or less, 20.8% lived alone, and 39.6% lived with another person. Besides, 77.3% of them had chronic diseases, 56.7% had more than one chronic disease, 83.1% used drugs continuously, and a majority (88.5%) of participants were non-smokers. Regarding the chronic diseases, 82.6% had cardiovascular diseases, followed by endocrine system diseases (46.3%), respiratory system diseases (10.9%), and joint and bone system diseases (10%), and 52.8% of them were using more than one medication for these diseases (Table 1).

Details of childhood and adulthood vaccinations of the study individuals are summarized in Table 2. It was observed that 45.8% of them were unaware of their childhood vaccination status, 36.5% of them had completed their childhood vaccinations, and 17.7% did not complete the childhood vaccinations. While 47.7% of the study participants had over-18 vaccinations, 52.3% of them stated that they did not, and 34.2% of those who had over-18 vaccinations had influenza vaccination and 12.7% had tetanus vaccination; however, the number of individuals who had other vaccinations was very low. Of those who had over-18 vaccinations, 66.1% of them stated that they had it because the doctor recommended, 11.3% had the vaccination because they were exposed to sharp object injuries, 11.3% took it to go on a pilgrimage, 7.3% had because they were pregnant, 1.6% had because they were exposed to animal bites, 1.6% took the vaccination because their relatives recommended, and 0.8% had the vaccination because the pharmacists recommended. Of those who did not have vaccinations, 47.8% of them stated that they did not have it because they had no information about vaccinations, 46.3% did not have because they did not think it was necessary, 7.4% stated because the doctor did not recommend, 2.9% said because they did not think it was reliable and effective, and 0.7% did not have the vaccination because of the fear of development of allergy.

Table 3. The comparison of descriptive characteristics and health-related characteristics of the study group with the vaccination statuses in adulthood

| Variable | Vaccination status during adulthood | | | | | | | | | |
|---|-------------------------------------|------|----------------|------|-------|----------------------|------|----------------|------|-------|
| | Over-18 vaccinations | | | | | Over-65 vaccinations | | | | |
| | Vaccinated | | Not Vaccinated | | p | Vaccinated | | Not Vaccinated | | p |
| | Number | % | Number | % | | Number | % | Number | % | |
| | | | | | | | | | | |
| Age | | | | | | | | | | |
| 65-74 years | 88 | 71.0 | 100 | 73.5 | 0.635 | 45 | 57.0 | 143 | 79.0 | 0.001 |
| 75- 84 years | 29 | 23.4 | 26 | 19.1 | | 28 | 35.4 | 27 | 14.9 | |
| ≥85 years | 7 | 5.6 | 10 | 7.4 | | 6 | 7.6 | 11 | 6.1 | |
| Gender | | | | | | | | | | |
| Female | 62 | 50.0 | 82 | 60.3 | 0.095 | 36 | 45.6 | 108 | 59.7 | 0.035 |
| Male | 62 | 50.0 | 54 | 39.7 | | 43 | 54.4 | 73 | 40.3 | |
| Working Status | | | | | | | | | | |
| Working | 7 | 5.6 | 6 | 4.4 | 0.649 | 1 | 1.3 | 12 | 6.6 | 0.117 |
| Not working | 117 | 94.4 | 130 | 95.6 | | 78 | 98.7 | 169 | 93.4 | |
| Educational Background | | | | | | | | | | |
| Illiterate | 27 | 21.7 | 42 | 30.9 | 0.071 | 19 | 24.1 | 50 | 27.6 | 0.023 |
| Primary school graduate | 72 | 58.1 | 71 | 52.2 | | 39 | 49.4 | 104 | 57.5 | |
| High school graduate | 10 | 8.1 | 16 | 11.8 | | 8 | 10.1 | 18 | 9.9 | |
| University graduate | 15 | 12.1 | 7 | 5.1 | | 13 | 16.4 | 9 | 5.0 | |
| Marital Status | | | | | | | | | | |
| Married | 85 | 68.5 | 83 | 61.0 | 0.205 | 50 | 63.3 | 118 | 65.2 | 0.768 |
| Single | 39 | 31.5 | 53 | 39.0 | | 29 | 36.7 | 63 | 34.8 | |
| Income | | | | | | | | | | |
| 0-1000 | 53 | 42.7 | 75 | 55.1 | 0.159 | 31 | 41.8 | 95 | 52.5 | 0.087 |
| 1001-2000 | 53 | 42.7 | 45 | 33.1 | | 32 | 40.5 | 66 | 36.5 | |
| Over 2001 | 18 | 14.6 | 16 | 11.8 | | 14 | 17.7 | 20 | 11.0 | |
| Occupation | | | | | | | | | | |
| Housewife | 51 | 41.2 | 69 | 50.7 | 0.402 | 30 | 38.0 | 90 | 49.7 | 0.014 |
| Retired | 65 | 52.4 | 62 | 45.6 | | 47 | 59.5 | 80 | 44.2 | |
| Self-employed | 6 | 4.8 | 4 | 2.9 | | 0 | 0.0 | 10 | 5.5 | |
| Doctor | 1 | 0.8 | 1 | 0.8 | | 1 | 1.2 | 1 | 0.6 | |
| Unemployed | 1 | 0.8 | 0 | 0.0 | | 1 | 1.3 | 0 | 0.0 | |
| The Number of Persons in the Family | | | | | | | | | | |
| One | 26 | 21.0 | 28 | 20.6 | 0.654 | 22 | 27.8 | 32 | 17.7 | 0.263 |
| Two | 54 | 43.5 | 49 | 36.0 | | 29 | 36.7 | 74 | 40.9 | |
| Three | 29 | 23.4 | 35 | 25.7 | | 19 | 24.1 | 45 | 24.8 | |
| ≥Four | 15 | 12.1 | 24 | 17.7 | | 9 | 11.4 | 30 | 16.6 | |
| The Place Where He/She Lived for the Longest Period of Time | | | | | | | | | | |
| Province | 114 | 91.9 | 124 | 91.2 | 0.826 | 71 | 89.9 | 167 | 92.3 | 0.524 |
| District | 10 | 8.1 | 12 | 8.8 | | 8 | 10.1 | 14 | 7.7 | |
| Chronic Disease | | | | | | | | | | |
| Yes | 99 | 79.8 | 102 | 75.0 | 0.352 | 64 | 81.0 | 137 | 75.7 | 0.346 |
| No | 25 | 20.2 | 34 | 25.0 | | 15 | 19.0 | 44 | 24.3 | |
| The Number of Chronic Diseases | | | | | | | | | | |
| One | 42 | 42.4 | 45 | 44.1 | 0.809 | 29 | 45.3 | 58 | 42.3 | 0.692 |
| More than one | 57 | 57.6 | 57 | 55.9 | | 35 | 54.7 | 79 | 57.7 | |
| The Status of Drug Use | | | | | | | | | | |
| Those using drugs | 105 | 84.7 | 111 | 81.6 | 0.511 | 71 | 89.9 | 145 | 80.1 | 0.053 |
| Those not using drugs | 19 | 15.3 | 25 | 18.4 | | 8 | 10.1 | 36 | 19.9 | |
| Smoking Status | | | | | | | | | | |
| Smoker | 14 | 11.3 | 16 | 11.8 | 0.905 | 11 | 13.9 | 19 | 10.5 | 0.426 |
| Non-smoker | 110 | 88.7 | 120 | 88.2 | | 68 | 86.1 | 162 | 89.5 | |

When the vaccination status of people aged 65 years or older was examined, 69.6% of the participants stated that they did not have vaccination. Of those who had vaccination, 46.8% stated that they had vaccination because they were exposed to sharp object injuries, 39.2% said because the doctor recommended, 10.1% took the vaccination to go on a pilgrimage, 1.3% took it because the pharmacists recommended, 1.3% had it because they were exposed to animal bites, and 1.3% took it because their relatives recommended. Of those who did not have vaccination, 69.1% said they did not have vaccination because they did not know about vaccinations, 24.3% said because they did not think it necessary, 4.4% did not have because the doctor did not recommend, 1.7% said because they did not think it was reliable and effective, and 0.5% did not have the vaccination because of the fear of development of allergy. It was observed that 28.1% of those who had over-65 vaccinations had the influenza vaccine, 4.2% had pneumococcal vaccine, and 3.1% had tetanus vaccine. The proportions of other vaccinations were found to be low.

The findings regarding the comparison of the vaccination status in adulthood and descriptive and health-related characteristics were given Table 3. Among the study participants, 73.5% of those aged 65–74 years, 60.3% of women, 95.6% of the unemployed, 52.2% of primary school graduates, 61% of married individuals, 55.1% of those with an income of 0–1000 TL, 50.7% of housewives, 36% of those living with another person, and 91.2% of those who mostly lived in a city did not have over-18 vaccinations. There was no statistically significant relationship between some descriptive characteristics of the study group (age, sex, working status, educational status, marital status, occupation, number of people living in the family, and place of living) and over-18 vaccinations ($p>0.05$).

When descriptive characteristics of the study participants were compared with the status of having over-65 vaccinations, while there was a statistically significant relationship between age, gender, educational status, occupation, and vaccination status ($p<0.05$), there was no statistically significant relationship between other descriptive characteristics and the over-65 vaccination status ($p>0.05$).

When the health status of the study participants and over-18 vaccinations was examined, it was observed that 79.8% of individuals with chronic diseases, 57.6% of those with more than one chronic disease, and 84.7% of drug users had vaccination ($p>0.05$). When the vaccination status of individuals aged 65 years and above was compared with the health status, it was observed that 81% of those with chronic diseases, 54.7% of those with more than one chronic disease, and 89.9% of drug users had over-65 vaccinations ($p>0.05$).

When smoking and vaccination statuses of the study group were compared, 11.3% of smokers had over-18 vaccinations and 13.9% of smokers had over-65 vaccinations, and no statistically significant relationship was found between smoking status and vaccination status (Table 3).

When the vaccination status of the study participants was compared with the information they had about over-65 vaccinations, it was observed that 20.3% of them were aware about

the vaccines that were applied and they were vaccinated, 9.4% of them were aware about the vaccines but did not have vaccinations, and 90.6% of them were unaware about the vaccines and did not have vaccinations ($p<0.05$). It was also observed that the majority of those who were not vaccinated were not informed about the vaccines (influenza vaccine, pneumococcal vaccine, tetanus vaccination, whether it was paid for or not) ($p<0.05$).

Of the study group, 34.5% stated that they had recommendations for the vaccinations administered in adulthood. Of those who had recommendations about the vaccinations, 72.2% stated that they wanted their vaccination follow-ups to be done, 18.9% wanted to be informed about vaccinations, 6.7% wanted the vaccinations to be reliable and effective, and 2.2% of them wanted the vaccinations to be free of charge.

Discussion

Aging is a chronological, social, and biological process that cannot be overcome. Today, as a result of social, economic, medical, scientific, and technological changes, the elderly population of the world has increased and continues to increase. In developed countries, while the life expectancy at birth in the 1900s was 45–50 years, the average life span has now increased to 80 years. It has been reported that individuals aged 65 years and above accounted for 7% of the world population in 2008, reaching 506 million; in 2040, this ratio will increase to 14% and will reach 1.3 billion (24). Along with the process of aging, some physiological and anatomical changes occur in the human body, which decrease the resistance of the body to infectious diseases. The goals and strategies for a lifelong health and for healthy aging include reducing the incidence of infectious diseases and the deaths resulting from these diseases (2).

In the fight against life-threatening infectious diseases, approximately 2–3 million deaths are prevented each year by immunization (25). Vaccination is the most effective, the most reliable, and the least expensive method to protect children and adults from infectious diseases. Children in our country are vaccinated under the extended immunization program. Giving the required importance to the vaccination registries, regular registration and storage of vaccination records are of great importance for future health assessments. In our country, there is no common and single health or vaccination card (26). However, since there are no vaccinations records covering the whole life, records cannot be reached for every individual regarding childhood vaccinations in the adulthood.

Of the participants, 45.8% stated that they were unaware of their childhood vaccination status, 36.5% stated they had completed their childhood immunizations, and 17.7% said that they did not complete the childhood immunizations. Gülgün et al. (27) evaluated the vaccination status of children aged 0–24 months who applied to the pediatric polyclinic of a military hospital and found that 85.2% of the children were fully vaccinated and 14.8% of them were not vaccinated. In 2013, 83.1% of children aged 19–35 months in the US received four doses of DTaP vaccination, 92.7% of them received three doses of poliovirus vaccination, 91.9% received one dose of MMR vaccination, 82% received Hib vaccination, 90.8% received three doses of

hepatitis B vaccine, 91.2% received one dose of varicella vaccination, and 82% received four doses of conjugated pneumococcal vaccine (28). The vaccination rate of children aged 15–26 months who were born in Turkey between 2010 and 2013 has been reported to be 74%. Tuberculosis vaccination was applied at a rate of 94%, one dose of DBT vaccine at a rate of 94%, two doses of DBT vaccine at a rate of 89%, three doses of DBT vaccine at a rate of 86%, measles vaccine at a rate of 90%, one dose of hepatitis vaccine at a rate of 96%, two doses of hepatitis vaccine at a rate of 92%, three doses of hepatitis vaccine at a rate of 87%, one dose of pneumococcal vaccine at a rate of 90%, two doses of pneumococcal vaccine at a rate of 85%, and three doses of pneumococcal vaccine at a rate of 82% (29). It has been observed that childhood immunization rates have recently increased in our country and in developed countries. However, if adult vaccinations are to be administered correctly and regularly, childhood vaccination registries must be maintained on a regular basis. It was observed that approximately half of our study participants were unaware about their childhood vaccination status.

Some of the immunogenic vaccines provide lifelong protection and some provide partial protection against the disease; some vaccines need to be readministered on a regular basis. Therefore, individuals who have completed their childhood vaccinations should also be administered adulthood vaccinations (8). Worldwide, vaccination rates are lower in adults than in children (5, 15, 16). The reason for the low adult vaccination rate is the belief that the vaccination is usually performed in childhood (30). Of the individuals who participated in our research, 52.3% stated that they did not have over-18 vaccinations and 69.6% did not have vaccinations after the age of 65 years. Aşık et al. (31) conducted a study with 100 people in five family health centers in Antalya in 2012 and reported that 41% of them did not have any adult vaccination at any time in their lives and 59% were vaccinated at least once. Another study conducted by Lu et al. (32) in the United States showed that the vaccination rates of individuals aged 65 years and above were found to be 30.1% in 1989 and 70% in 2004.

Regarding over-18 vaccinations, 34.2% of the participants had influenza vaccination, 12.7% had tetanus vaccination, 4.2% had yellow fever vaccination, and 1.9% had typhoid vaccination. It was observed that the rate of having other vaccinations is lower. In the study of Aşık et al. (31) in 2012, it was observed that 45.7% of those who had adult vaccinations had tetanus vaccination, 29.6% had influenza vaccination, 17% had hepatitis B vaccination, 3.4% had pneumococcal vaccination, and 4.3% had other vaccinations. In the study conducted by Kadioğlu (33), 56.8% of the participants had tetanus vaccination, 26.6% had influenza vaccination, 18.6% had hepatitis B vaccination, and 2.2% had pneumococcal vaccination at least once. The results of our study and other studies indicate that the most common vaccinations are tetanus and influenza vaccinations. While tetanus vaccination ranked the topmost in the earlier studies, influenza vaccination was found to be in the first place in our study. Awareness about influenza outbreaks and influenza vaccination in recent years may have contributed positively to the application of this vaccination in adults. In our study, the number of people who had other vaccinations such as hepatitis B and meningitis was found to be very low.

When the vaccination status of our study individuals was examined, influenza vaccination was found to be the topmost (28.1%), followed by pneumococcal (4.2%) and tetanus (3.1%) vaccinations. In the study conducted by Christenson et al. (34) on people aged more than 65 years in Sweden, the rates of vaccinations were found to be 46% for influenza, 2%–9% for pneumonia, 36% for pneumococcal pneumonia, and 52% for invasive pneumococcal disease. Baxter et al. (35) reported that the rates of influenza vaccination in the United States are 12.4% in the 50- to 64-year-old age group and 8.5% in those aged 65 years and above. Regarding the studies conducted in our country, the study conducted by Zeybek et al. (6) on individuals aged more than 65 years who applied to Healthy Adult Polyclinic of Başkent University in Ankara in 2003 reported that 26.8% of the participants had influenza vaccination and 1.8% had tetanus vaccination in the last 10 years. Ünal et al. (36) found that 14% of individuals aged more than 65 years had influenza vaccination, 11.6% had pneumococcal vaccination, 2.6% had tetanus vaccination, and 0.3% had hepatitis B vaccination. The authors also specified that the rates of pneumococcal vaccination increased along with the instructions given by the family physicians. It was observed that the vaccination rate of adults aged 65 years and above is generally low. In our study group, over-18 vaccination rate was higher than over-65 vaccination rate. When compared to other countries, it can be said that the vaccination rate of adults in our country is low. Influenza vaccination was found to be the most common among over-65 vaccinations.

Increase in the lifespan in the last 20–30 years, occurrence of diseases along with aging, and the prevention of infectious diseases related to health status, workplace, and travel are considered as important reasons for vaccination in adults (37). Of the participants in our study, 66.1% of them stated that they had over-18 vaccinations because the doctor recommended, 11.3% said because they were exposed to sharp object injuries, 11.3% stated because they would go on a pilgrimage, and 7.3% had the vaccination because they were pregnant. Of those who had vaccination after the age of 65 years, 46% were vaccinated because they were exposed to sharp object injuries, 39.2% had it because the doctor recommended, and 10.1% were vaccinated to go on a pilgrimage. In our study group, the reasons for having a vaccination over the ages of 18 and 65 years are similar. In a study conducted in five different European countries (Germany, Italy, Spain, England, and France), influenza vaccination rates of individuals aged 14 years and above were investigated during the influenza season, and it was observed that 55.8% of the respondents said that they thought influenza was a serious disease, 55.2% of them were vaccinated because family physicians and nurses recommended them, and 36.1% were vaccinated because they did not want to infect other family members with the disease (38). In another study, Blank et al. (39) noted that awareness of influenza as a serious illness, the recommendation of family physicians, and unwillingness to infect other family members with the disease increased the immunization rates. In our country, Turhan (40) stated that 68.2% of pneumococcal vaccine recipients were vaccinated upon doctor's recommendations and 31.8% were vaccinated on their own wishes or their children's recommendations. In the study conducted by Kadioğlu (33), it was reported that 40% of those who had tetanus vaccination at least once had it due to sharp

object injuries, 30% of them had it due to pregnancy, 20.2% had it for protective purposes, 4.9% had due to animal bites, 3.7% had it via school vaccination, 0.4% had the vaccination in their military service, and 0.4% were vaccinated in the vaccination campaign. Moreover, in this study it was reported that 4.9% of the people who had meningitis vaccination had it to go on a pilgrimage. In the studies conducted in our country, it was observed that adult vaccinations are mostly administered due to injury and obligation, and the doctor's recommendation is seen to play an important role among the reasons for vaccination.

Despite the fact that there is a timetable for vaccinations administered to children, the lack of such a timetable for adults, the fact that the rapel doses of vaccines such as tetanus–diphtheria in children are not administered on time, and the lack of sufficient knowledge regarding when and to whom the vaccinations will be administered are considered to be among the reasons for adults not being vaccinated. The reasons why individuals who participated in our research do not have over-18 and over-65 vaccinations are similar, i.e., being uninformed about the vaccinations, thinking that it is unnecessary, not being recommended by the doctor, doubting about the safety and effectiveness, and the fear of development of allergy were among the primary reasons of not having any vaccination. In some studies on influenza, the study participants stated that they were not vaccinated because they did not think that they would catch the flu, they suspected the effectiveness of the vaccine, and the family physician did not recommend (38, 39). In the study by Aşık et al. (31) on individuals who applied to the five family health centers in Antalya in 2012, the authors stated that 37% of the participating individuals in the survey thought that only adults with certain diseases should be vaccinated and that it was not necessary to vaccinate the entire population; 4% stated that vaccinations for adults were not necessary and 4% thought that vaccinations were necessary only for children. Studies show that people in the community are unaware about vaccinations, that they do not have confidence in vaccinations and have negative thoughts, that the importance of vaccination is not well known, and that the doctors do not recommend vaccinations. Problems related to the fact that vaccine-preventable diseases are not known, that the vaccines are thought not to be safe and ineffective, that the vaccinations are administered according to the risk rather than age, and that the vaccinations are charged for are among the factors that affect adult vaccination (6, 21).

In the present study, it was found that 73.5% of participants who were aged 65–74 years, 60.3% of women, 95.6% of the unemployed, 52.2% of primary school graduates, 61% of married individuals, 55.1% of those with a monthly income of 0–1000 TL were not vaccinated during adulthood. Aşık et al. (31) assessed the vaccination status of 100 individuals participating in their study by gender and found that 70% of women and 48% of men were vaccinated. While the rate of female and male immunization was equal in our study, the rate of not being vaccinated in women was higher than that in men. Sav Aydın et al. (41) conducted a study on 150 individuals aged 18 years and above in Ankara in 2008–2009 and reported no significant differences among those who were vaccinated in terms of age, gender, marital status, and health insurance. The au-

thors stated that the vaccination rate was significantly higher in those with a high level of monthly income than the other population. Although university and college graduates have higher vaccination rates, they emphasized that there was no significant difference.

When the health status of our study participants and the status of having over-18 vaccinations were compared, it was observed that 79.8% of those with chronic diseases and 57.6% of those with more than one chronic disease were vaccinated ($p>0.05$). Kadioğlu (33) stated that 38.1% of individuals with chronic illnesses below the age of 65 years had at least one influenza vaccination and 22.6% had an influenza vaccination each year. Szucs et al. (38) stated in their study that the rate of vaccination of individuals with a chronic disease was 49.6%. Blank et al. (39) reported the rates of influenza vaccination were approximately 55% in England, 25% in Germany, 40% in Italy and Spain, 38% in Portugal, 35% in France, 30% in Ireland, 25% in Finland, 15% in Austria and Czech Republic, and 12% in Poland. Study results show that the vaccination rate is high in people with chronic diseases. The presence, number, and diversity of chronic diseases can be considered as factors that affect the vaccination status.

In our study group, it was observed that the rates of over-18 and over-65 vaccinations are high in individuals with chronic diseases ($p<0.05$). In addition, drug users have also been found to have higher rates of having adult vaccinations (over-18: 84.7%; over-65: 89.9%) ($p>0.05$). In the study by Erer et al. (42) conducted on 100 patients diagnosed with Chronic obstructive pulmonary disease (COPD), it was found that 40% of the patients had influenza vaccination and 10% had pneumococcal vaccination. Kadioğlu (33) found that 40.3% of individuals with type 2 diabetes had at least one influenza vaccination and 43.5% of asthmatic patients and 28.6% of individuals with COPD had influenza vaccination. In the study conducted by The Turkish Association of Internal Medicine Speciality, Aegean Region Study Group, on adult immunization screening in 2008, it was found that 5.2% of 1,712 diabetes patients, 6.6% of 637 individuals with hematologic disease, and 4.6% of 242 individuals with COPD had hepatitis B vaccination (43). While there was no significant difference between the rate of influenza vaccination and age, gender, educational level, smoking, and COPD in the study of Erer et al. (42), the vaccination rate was found to be higher in those with a COPD drug report.

Conclusion

The findings of the present study show that the vaccination rates of adults aged 65 years and above were found to be low and it was observed that some variables (age, sex, education, occupation, etc.) influenced the rate of vaccination. Examining the vaccination follow-ups of individuals aged 65 years and above, it was observed informing them about the vaccines and ensuring that the vaccines are reliable and effective and are free of charge can contribute to increased vaccination rates. It is also important to increase the knowledge of health personnel about adult vaccination before and after graduation. Health institutions and the media, especially physicians and nurses in family health centers, should take a more active role in this issue to raise awareness on adult vaccination.

Ethics Committee Approval: Ethics committee approval was received for this study from Mersin University Clinical Studies Ethics Committee (No: 78017789/050.01.04/450).

Informed Consent: Verbal informed consent was obtained from patients who participated in this study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept - G.B.; Design - G.B.; Supervision - G.B., H.B.; Data Collection and/or Processing - H.B.; Analysis and/or Interpretation - H.B., G.B.; Literature Review - HB, GB; Writing - G.B., H.B.; Critical Review - G.B., H.B.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study has received no financial support.

References

- WHO. Ageing and health. Available from: URL: <http://www.who.int/mediacentre/factsheets/fs404/en/>. Erişim tarihi: 20.07.2016.
- TC. Sağlık Bakanlığı Türkiye Halk Sağlığı Kurumu. Türkiye Sağlıklı Yaşlanma Eylem Planı ve Uygulama Programı 2015-2020. Erişim Adresi: <http://sbu.saglik.gov.tr/Ekutuphane/kitaplar/Sa%C4%9Fli%C4%B1kl%C4%B1%20Ya%C5%9F.%202015-2020%20Pdf.pdf>. Erişim tarihi: 20.07.2016.
- Hızal K. Yaşlılık döneminde görülen başlıca enfeksiyonlar. *Türk Geriatri Dergisi* 2012;15: 40-1.
- Aslan D. İleri yaşta bağışıklama. Yaşlı Sağlığı Modülleri. T.C. Sağlık Bakanlığı Temel Sağlık Hizmetleri Genel Müdürlüğü, 2011, Ankara, 15-23. <http://sbu.saglik.gov.tr/Ekutuphane/kitaplar/yaslisagligi.pdf>.
- Öztürk R. Erişkinde bağışıklama. *Klinik Gelişim* 2012; 25: 49-59.
- Zeybek Y, Tokalak İ, Boyacıoğlu S. Altmış beş yaş ve üzeri erişkinlerde aşılanma durumu. *Türk Geriatri Dergisi* 2004; 7: 152-4.
- World Health Organization (WHO). Vaccines and diseases. Available from: URL: <http://www.who.int/immunization/diseases/en/>.
- T.C. Sağlık Bakanlığı Temel Sağlık Hizmetleri Genel Müdürlüğü, Genişletilmiş Bağışıklama Programı Genelgesi, Genelge 2009/17.
- Öztürk R. Erişkinlerde aşılanma. İçinde: Akkaya N, Camcıoğlu Y, Gür E, Öztürk R, editörler. Çocuk ve erişkinlerde aşılanma. İstanbul: Doyuran Matbaası, 2010: 65-88.
- Öztürk R. Erişkinde bağışıklama. *Sağlıkta nabız: aktüel ve sosyal tıp dergisi* 2009; 6: 52-65.
- Centers for Disease Control and Prevention (CDC). Vaccine Information for Adults. Available from: URL: <https://www.cdc.gov/vaccines/adults/rec-vac/index.html>.
- CDC. Recommended Adult Immunization Schedule-United States-2016. Available from: URL: <https://www.cdc.gov/vaccines/schedules/downloads/adult/adult-combined-schedule.pdf>.
- Topaç O. Ülkemizde erişkinlere yönelik aşı uygulamaları. 6. Ulusal Aşı Sempozyumu. 21-25 Ekim Ankara, 2015: 52-63.
- Jiang H, Yu D, Ruan F, Xu W, Huang T, Li L, et al. Clinical characteristics of adult influenza in patients in ten provinces in China and analysis of severe risk factors. *Zhonghua Liu Xing Bing Xue Za Zhi* 2015; 36: 216-21.
- Sukumaran L, McCarthy NL, Kharbanda EO, McNeil MM, Naleway AL, Klein NP, et al. Association of Tdap vaccination with acute events and adverse birth outcomes among pregnant women with prior tetanus-containing immunizations. *JAMA* 2015; 314: 1581-7. [CrossRef]
- Taheri Tanjani P, Babanejad M, Najafi F. Influenza vaccination uptake and its socioeconomic determinants in the older adult Iranian population: a national study. *Am J Infect Control* 2015; 43: e1-5. [CrossRef]
- Güleç Balbay E, Tanrıverdi E, Alaşan F, Özmen Süner K. Düzce ilinde kronik obstrüktif akciğer hastalığı tanılı hastaların aşılanma sıklığı. *Düzce Üniversitesi Sağlık Bilimleri Enstitüsü Dergisi* 2013; 3: 15-7.
- Polat HH, Öncel S, Turhan Ö, Akcan A, Eravşar K, Yalçın AN. Influenza vaccination in 65 and over age adults in Antalya/Turkey. *Turkish Journal of Geriatrics* 2012; 15: 371-7.
- Deveci SE, Açık Y, Deveci S, Oğuzöncül AF. Bir üniversite hastanesinde temizlik çalışanlarının temizlik ve hijyen konusundaki davranışlarının değerlendirilmesi. *F.Ü. Sağlık Bilimleri Tıp Dergisi* 2010; 24: 123-7.
- Leblebicioğlu H. Erişkinde aşılanma. *ANKEM Dergisi* 2003; 17: 175-9.
- Erişkin Bağışıklama Rehberi. Türkiye Enfeksiyon Hastalıkları ve Klinik Mikrobiyoloji Uzmanlık Derneği, Erişkin Bağışıklama Rehberi Çalışma Grubu. 2016 Available from: URL: <http://ekmud.org.tr/wp-content/uploads/EriskinBagisiklamaRehberi-web.pdf>
- Turgut H, Yalçın N, Erensoy S. Erişkinlerde bağışıklama. *ANKEM Dergisi* 2000; 14: 440-6.
- Ünal S. Erişkinlerde Aşılanma. Antalya Halk Sağlığı Müdürlüğü 1. Aşı Sempozyumu. 21 Mayıs 2014, Antalya, 1-5.
- C. Kalkınma Bakanlığı Özel İhtisas Komisyonu Raporu. Yaşlanma. Erişim: <http://www.kalkinma.gov.tr/Lists/zet%20ihtisas%20Komisyonu%20Raporlar/Attachments/248/Ya%C5%9Flanma%20%C3%96zel%20%C4%B0htisas%20Komisyonu%20Raporu.pdf>.
- World Health Organization (WHO). Immunization. Available from: URL: <http://www.who.int/topics/immunization/en/>.
- Anısoy ES, Ceyhan M, Çiftçi E, Hacımustafoğlu M, Kara A, Kuyucu N, et al. The National Vaccination Schedule in Previously Healthy Children: The Practical Recommendations About Additional Vaccines. *J Pediatr Inf* 2014; 8: 1-6. [CrossRef]
- Gülgün M, Fidancı K, Karaoğlu A, Güneş Ö, Kesik V, Altun S ve ark. Bir askeri hastanenin çocuk polikliniğine başvuran çocukların 0-24 ay arasındaki aşılanma durumlarının değerlendirilmesi. *Gulhane Med J* 2014; 56: 13-6.
- Centers for Disease Control and Prevention (CDC). Vaccines and immunizations. Available from: URL: <http://www.cdc.gov/>.
- Türkyılmaz S, Çavlin A. 2013 Türkiye Nüfus ve Sağlık Araştırması. Ulusal Toplantı. Ankara, 2014: 56-58.
- Tosun S. Erişkin aşılanması. *Actual Medicine* 2013; 24-37.
- Aşık Z, Çakmak T, Bilgili P. Erişkinlerin erişkinlik dönemi aşıları hakkındaki bilgi, tutum ve davranışları. *Türk Aile Hekimliği Dergisi* http://www.turkailehekderg.org/wp-content/uploads/2014/04/TAHD_2013003005.pdf
- Lu P, Bridges CB, Euler GL, Singleton JA. Influenza vaccination of recommended adult populations, U.S., 1989-2005. *Vaccine* 2008; 26: 1786-93. [CrossRef]
- Kadıoğlu E. Samsun'da bireylerin erişkin aşıları hakkındaki farkındalıklarının ve mevcut erişkin aşılanma durumlarının tespiti ve değerlendirilmesi. Uzmanlık tezi, Ondokuz Mayıs Üniversitesi Tıp Fakültesi Aile Hekimliği Anabilim Dalı, Samsun, 2011.
- [http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(00\)04237-9/abstract](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(00)04237-9/abstract)
- Baxter R, Ray GT, Fireman BH. Effect of influenza vaccination on hospitalizations in persons aged 50 years and older. *Vaccine* 2010; 28: 7267-72. [CrossRef]
- Ünal S, Tanrıöver MD, Taş E, Güner İ, Çetin ÖY, Sayar İ. Aile hekimlerine eğitim verilmesi ve aşılanma hedeflerinin belirlenmesinin pnömokok aşılanma oranları üzerine etkileri. *FLORA Enfeksiyon Hastalıkları ve Klinik Mikrobiyoloji Dergisi* 2015; 20: 10-5.
- Özgüneş İ. Erişkinlerde güncel aşılar. *ANKEM Dergisi* 2014; 28: 193-8.
- Szucs TD, Müller D. Influenza vaccination coverage rates in five European countries-a population-based cross-sectional analysis of two consecutive influenza seasons. *Vaccine* 2005; 23: 5055-63. [CrossRef]
- Blank PR, Schwenkgenks M, Szucs TD. Vaccination coverage rates in eleven European countries during two consecutive influenza seasons. *J Infect* 2009; 58: 446-58. [CrossRef]

40. Turhan Ö. Pnömonokok aşısı. Kuwait Medical Journal 2010; 42: 135-8.
41. Sav Aydınli M, Ceyhun Peker AG, Tekiner AS, Dağlı Z, Ak F, İnan S. Risk gruplarında mevsimsel grip aşısıyla bağışıklanma ve aşı hakkında bilgilendirilme durumu. 9. Ulusal Aile Hekimliği Kongresi. 3-7 Kasım 2010, Antalya, Kongre Kitabı. s.131-2.
42. Erer OF, Karadeniz G, Gazibaba D, Ürpek G, Yalnız E, Aktoğu SÖ. Kronik obstrüktif akciğer hastalığında aşılama; gerçekten yaptırtıyor muyuz? İzmir Göğüs Hastanesi Dergisi 2013; 27: 31-9.
43. Türk İç Hastalıkları Uzmanlık Derneği. Ege Bölgesi Çalışma Grubu: Ege Bölgesi Erişkin İmmünizasyonu Tarama Çalışması. İzmir. 2008.