DOI: 10.4274/jarem.galenos.2024.53244
J Acad Res Med 2024;14(1):26-33

The Role of Health Literacy in Adult Immunization

Ayşe Sarı[1], Memet Taşkın Egici[2], Özge Börklü Doğan[2]

[1]Taşova District Health Directorate, Family Medicine, Amasya, Türkiye
[2]University of Health Sciences Türkiye, Haydarpaşa Numune Training and Research Hospital, Clinic of Family Medicine, İstanbul, Türkiye

Cite this article as: Sarı A, Egici MT, Börklü Doğan Ö. The Role of Health Literacy in Adult Immunization. J Acad Res Med 2024;14(1):26-33

ABSTRACT

Objective: This study investigated how health literacy (HL) affects adult immunization (AI) knowledge and behavior in individuals aged 18 years.

Methods: This cross-sectional observational study was conducted with adults who presented to an educational family health center. study data were collected using a 28-item questionnaire inquiring about the sociodemographic characteristics, knowledge, attitudes, and behaviors of AI and the 32-item Turkish Health Literacy Survey Questionnaire (HLS-TR-Q32) administered face-to-face interviews.

Results: The study included 312 participants. The mean age of the participants was 38.3±13.6 years (minimum-maximum: 18-83). Of participants, 73.1% (n=228) reported knowing about AI. Approximately 71.4% (n=223) of the respondents had received at least one adult vaccination, the most common being the tetanus vaccine (41.0%, n=128). The most common justification for not getting adult vaccination was "vaccination not being recommended by the doctor" (42.1%, n=37). Additionally, 47.4%, 16.1%, 25.8%, and 10.6% of the respondents had limited, inadequate, sufficient, and excellent HL, respectively. Knowledge of AI and receiving adult vaccination positively correlated with the HLS-TR-Q32 subdomain scores for "Treatment and Service-Appraising Health-Related Information" (p=0.014, p=0.037).

Conclusion: The HL level was found to be mostly inadequate or limited among the participants, and this was found to influence knowledge and behaviors. AI rates can be significantly increased by improving HL as well as by physicians advising adults to get vaccinated.

Keywords: Immunization, knowledge, attitude, health literacy, primary health care

INTRODUCTION

Lifelong immunization is recommended for protection against vaccine-preventable diseases (1). Adults at risk of illness, hospitalization, disability, and, in some cases, death from vaccine-preventable diseases are advised to be vaccinated based on age, medical condition, lifestyle, and previous vaccination status (2). Despite many studies on childhood immunization and the inclusion of childhood immunization in the Expanded Program on Immunization, data on adult immunization (AI) and related factors remain limited, especially in developing countries (3).

Health literacy (HL) is the ability of individuals to access, understand, and use information needed to protect and maintain health (4). HL affects an individual's ability to read and understand written health information, act on this information, communicate needs to health care providers when necessary, and understand health warnings. A low level of HL results in poorer medication adherence and affects individuals' knowledge of diseases and self-care skills (5). HL is significantly associated with general health status, use of resources, hospitalization, and access to care (6).

This study examined the relationship between HL, knowledge of AI, and vaccination uptake among adults. Determination of factors affecting AI, particularly the relationship between AI and the level of HL as an improvable factor, is hypothesized to enhance social awareness and develop relevant family medicine strategies.

METHODS

The study was designed as a cross-sectional, face-to-face survey, and its population consisted of 312 individuals aged 18 years who presented to an educational family health center in May-June 2022 and agreed to participate in the study.

The study was conducted using a 28-item data collection form, which was developed based on the literature and inquiries about sociodemographic characteristics, knowledge, attitudes, and behaviors about adult vaccines, and the 32-item Turkish Health Literacy Survey Questionnaire (HLS-TR-Q32) (7), which was developed by Abacıgil et al. (7) in 2016 and built on the European Health Literacy Research Consortium (HLS-EU CONSORTIUM, 2012) study. The questionnaire was administered through face-to-face surveys.

The HLS-TR-Q32 survey was developed based on the experiences from the Health Literacy Survey Development Workshop and the HLS-EU-TR (European Health Literacy Scale Turkish Adaptation)

ORCID IDs of the authors: A.S. 0000-0001-8786-0916; M.T.E. 0000-0003-2319-5739; Ö.B.D. 0000-0002-4562-7910.

Corresponding Author: Ayşe Sarı,
E-mail: dr.aysesari6@gmail.com

Presented in: The summary of this study was presented as an oral presentation at the 21st National Family Medicine Congress on 27-30 October 2022.

Received Date: 08.01.2024 **Accepted Date:** 06.04.2024

J Acad Res Med 2024;14(1):26-33

Study. Unlike the original survey (HLS-EU), it combined the domains of "disease prevention" and "health promotion" into one domain. It consists of 32 questions categorized into two domains instead of three ("Treatment and Service" and "Disease Prevention/Health Promotion") and four processes (accessing, understanding, appraising, and applying health-related information) (Table 1) (7).

The scale was scored in the range of 0-50 points, as in the original formula. The index calculated is classified into four categories as in the HLS-EU study:

(0-25): Inadequate HL,

(>25-33): Problematic or limited HL,

(>33-42): Sufficient HL,

(>42-50): Excellent HL.

Statistical Analysis

Statistical analyses were performed using SPSS version 25.0. variables were assessed for normality of distribution using histograms and the Kolmogorov-Smirnov test. Descriptive analyses are given in mean, standard deviation, median, interquartile range, and minimum-maximum values. Categorical variables were compared using Pearson's chi-square test. Non-normally distributed (non-parametric) variables were compared between the two groups using the Mann-Whitney U test. Factors influencing knowledge of adult vaccination and vaccination uptake were analyzed using binary logistic regression analysis. Statistical significance was set at $p<0.05$.

Ethical Considerations

Ethical approval was obtained from the Clinical Research Ethics Committee of the University of Health Sciences Türkiye, Haydarpaşa Numune Training and Research Hospital (decision no: HNEAH-KAEK 2022/96, date: 18.04.2022). This research complies with the Helsinki Declaration and Good Clinical Practice principles and does not conflict with the ethical rules of human research. An informed consent form was obtained from the research participants.

RESULTS

Of the 312 respondents, 199 (63.7%) were female and 113 (36.2%) were male, with a mean age of 38.3 years; 202 (64.7%) were university graduates and 44 (14.1%) were healthcare workers. There were 171 (54.8%) respondents whose income was equal to their expenditures, 85 (27.2%) participants had an income less than their expenditures, and 56 (17.9%) respondents had an income greater than their expenditures. Approximately 84 (26.9%) participants had at least one chronic disease and were on continuous medication (Table 2).

The HL level was found to be limited among 47.4% of the participants, sufficient among 25.8%, inadequate among 16.1%, and excellent among 10.6% of them (Table 3).

Of the respondents, 228 (73.1%), including 42 (13.4%) healthcare workers, reported knowing about AI. The participants were most familiar with vaccines for influenza (n=208, 66.6%), tetanus (n=161, 51.6%), and rabies (n=143, 45.8%); they were the least familiar with vaccines for yellow fever (n=34, 10.9%) and shingles (n=45, 14.4%). A few answered "other vaccines" (n=15, 4.8%). On the other hand, 84 (26.9%) respondents reported not knowing about AI (Figure 1).

Among respondents who reported knowing about AI, the source of information was television or the Internet (105, 45.4%), physicians (81, 35.1%), immediate circle (81; 35.1%), training received (72, 31.1%), and books or newspapers (43, 18.6%).

The proportion of individuals who reported knowing about AI was significantly higher among healthcare workers (95.5%) than among non-healthcare workers (69.4%) ($p<0.001$). Likewise, the proportion of individuals who reported knowing about AI was significantly higher among individuals with chronic diseases (86.9%) than among those without chronic diseases (67.9%) ($p=0.001$). The mean age of those who reported knowing about AI was 40.4 years versus 32.6 years for those who reported not knowing about AI ($p<0.001$). Respondents who reported knowing about AI scored 29.0 on the HLS-TR-Q32 subdomain of Treatment and Service-Appraising Health-Related Information, whereas those who reported not knowing scored 26.1 on the same subdomain ($p=0.01$) (Table 4).

Being a healthcare worker increases knowledge of AI by 10.5 times, having a chronic disease by 2.2 times, and increasing each one-unit age by 1.04 times. A one-unit increase in the score from the HLS-TR-Q32 subdomain "Treatment and Service-Appraising Health-Related Information" increased immunization knowledge by 1.04 times (Table 5).

When the respondents were asked whether they had received any vaccination during adulthood, 223 (71.4%) reported receiving at least one vaccination, whereas 89 (28.5%) reported receiving no adult vaccination. Of the participants, 128 (41.0%) reported receipt of tetanus vaccination, 102 (32.6%) influenza vaccination, and 56 (17.9%) hepatitis B vaccination. Approximately 58 respondents (18.5%) who reported receipt of "other vaccines"

Table 1. 2x4 matrix components of the HLS-TR-Q32 and item numbers corresponding to these components (7)

	Access to health-related information	Understanding health-related information	Appraising health-related information	Using/applying health-related information
Treatment and service	1,4,5,7	2,8,11,13	3,9,12,15	6,10,14,16
Disease prevention/ health promotion	18,20,22,27	19,21,23,25	24,26,28,32	17,29,30,31

HLS-TR-Q32: 32-item Turkish Health Literacy Survey Questionnaire

said they received the coronavirus disease-2019 (COVID-19) vaccine and other vaccines. Because COVID-19 vaccination is not included in the routine vaccination schedule, respondents were not questioned separately about that vaccination. However, most participants who selected the option "other vaccines" reported receiving COVID-19 vaccination. Because we did not directly inquire respondents about the "COVID-19 vaccine" as an option, the rate turned out to be low (Figure 1).

Among 58 women aged 19-26 years, only one (1.7%) reported having received human papillomavirus (HPV) vaccination (cervical cancer) recommended for this age group, whereas none of the 18 men reported having received HPV vaccination. Four of nine respondents aged 65 years and over (44.4%) reported receipt of pneumococcal vaccination recommended for this age group. None of the 22 respondents aged 60 years had received the shingle vaccine recommended for this age group.

Of the healthcare workers involved in the study, 39 (88.6%) had received at least one adult vaccination; 30 (68.1%) had received vaccination for tetanus, 26 (59.1%) for hepatitis B, 24 (54.5%) for influenza, 6 (13.6%) for hepatitis A, and 2 (4.5%) for HPV.

Of the respondents with chronic diseases, 63 (75.0%) had received adult vaccinations. Of the 17 participants with diabetes, 10 (58.8%) received vaccination for influenza, 9 (52.9%) for tetanus, and 9 (52.9%) for pneumococcal. Of the 28 subjects with cardiovascular disease, 13 (46.4%) reported receipt of vaccination for seasonal influenza, 12 (42.8%) for tetanus, and 7 (25.0%) for pneumococcal. Of the respondents with chronic lung disease, six reported receipt of flu vaccination, and three reported receipt of pneumococcal vaccination. Finally, two respondents with cancer reported having received flu vaccination.

The uptake of adult vaccination was 88.6% among healthcare workers, 74.4% among other professional groups, and 59.6% among the unemployed/pensioner group (p=0.001). The HLS-TR-Q32 subdomain Treatment and Service-Appraising Health-Related Information score was 29.0 for those who received adult vaccinations and 26.2 for those who did not (p=0.02). The uptake of adult vaccination differs significantly by educational level (p=0.001). Vaccination uptake was higher among university graduates than among primary and high school graduates (77.2% and 59.0%, respectively) (Table 6).

Table 2. Sociodemographic characteristics and chronic disease status

		n	%
Age (range), years (mean ± SD)	38.3±13.6 years (18-83)		
Gender	Male	113	(36.22)
	Female	199	(63.78)
Marital status	Single	107	(34.29)
	Divorced	10	(3.21)
	Married	195	(62.50)
Education level	Illiterate	3	(.96)
	Literate	7	(2.24)
	Primary school	40	(12.82)
	High school	60	(19.23)
	University	202	(64.74)
Is a healthcare worker?	No	268	(85.90)
	Yes	44	(14.10)
Occupation	Civil servant	76	(28.36)
	Worker	29	(10.82)
	Retired/unemployed	22	(8.21)
	Self-employed/trader	59	(22.01)
	Housewife	38	(14.18)
	Student	44	(16.42)
Income level	Income exceeds expenses	56	(17.95)
	Income equals expenses	171	(54.81)
	Income is less than expenses	85	(27.24)
Chronic illness	Yes	84	(26.92)
	No	228	(73.08)

SD: standard deviation

J Acad Res Med 2024;14(1):26-33

Compared with being unemployed and pensioner, being a healthcare worker increases the uptake of adult vaccinations by 3.6 times. Each one-unit increase in the score from the HLS-TR-Q32 subdomain Treatment and Service-Appraising Health-Related Information increases adult vaccination by 1.03 times (Table 7).

When inquired about the reasons for vaccination, 130 (58.0%) of the respondents reported having received vaccination for "protection against diseases," 87 (38.8%) upon "recommendation by physician," 43 (19.2%) for "exposure to sharps injuries," 33 (14.7%) due to "pregnancy," 17 (7.6%) due to "living in crowded environments," 16 (7.1%) because of "animal bites," 15 (6.7%) upon "recommendation by other health personnel and pharmacists," 12 (5.3%) for "traveling abroad," and 11 (4.9%) due to "having a chronic disease".

When asked about the reasons for not having received any adult vaccination, 37 (42.1%) of the participants replied "it was not recommended by the physician," 32 (36.3%) stated "I believe my knowledge of vaccines is inadequate," 9 (10.2%) cited "fear of side effects," 7 (7.9%) said "I believe vaccines are not protective," and 4 (4.5%) mentioned "fear of injection." Approximately 13 (14.7%) participants stated other reasons for not getting vaccinated, the most common answer being "I have found it unnecessary."

DISCUSSION

This study found that knowledge of AI and vaccination uptake were positively correlated with HL. Other salient findings were low levels of AI and "inadequate" or "limited" levels of HL in more than half of the participants. "Being a healthcare worker", "having a chronic disease," "age" and "HL level" emerged as factors influencing vaccination knowledge, whereas "being a healthcare worker" and "HL level" influenced vaccination uptake.

A large proportion (73.1%) of the individuals who participated in this study reported knowing about AI. This rate is similar to the rate reported by Uzuner et al. (8) (64.8%) and higher than 47.2% reported by Uragan et al. (9) and 43.5% reported by Baran Aksakal et al. (10).

In our study, the best-known vaccines were influenza (66.6%) and tetanus vaccines (51.6%), while the least-known vaccines were yellow fever (10.9%) and shingles vaccines (14.4%). Some studies

Table 3. Participants' mean scores on HLS-TR-Q32

	Mean ± ss	Median (IQR)
Total scores on HLS-TR-Q32	31.45±7.17	30.21 (7.81)
"Treatment and service" total score	32.27±7.51	31.25 (8.33)
Access to health-related information	33.57±9.44	33.33 (8.33)
Understanding health-related information	33.58±8.45	33.33 (8.33)
Appraising health-related information	28.24±9.13	29.17 (12.5)
Using/applying health-related information	33.69±9.12	33.33 (12.5)
"Disease prevention/ Health promotion" total score	30.66±7.66	30.21 (7.63)
Access to health-related information	32.94±8.56	33.33 (8.33)
Understanding health-related information	32.32±8.67	33.33 (5.55)
Appraising health-related information	29.28±9.05	29.17 (8.33)
Using/applying health-related information	28.08±9.36	29.17 (12.5)

HLS-TR-Q32: 32-item Turkish Health Literacy Survey Questionnaire, IQR: interquartile range, ss: sum of squares

Table 4. Univariate analysis results in knowledge of adult immunization

		Do you know about adult immunization?				p-value
		No		Yes		
		n	%	n	%	
Healthcare worker	No	82	(30.60)	186	(69.40)	**<0.001***
	Yes	2	(4.55)	42	(95.45)	
Chronic illness	No	73	(86.90)	155	(67.98)	**0.001****
	Yes	11	(13.10)	73	(32.02)	
		Mean ± ss	**Median (IQR)**	**Mean ± ss**	**Median (IQR)**	
Age		32.61±12.13	28 (19)	40.44±13.55	40 (22)	**<0.001¹**
Treatment and Service-Appraising Health-Related Information		26.11±9.04	25 (12.5)	29.03±9.05	29.17(12.5)	**0.010¹**

**Chi-square test, *Fisher's Exact test, ¹Mann Whitney-U test, IQR: interquartile range ss: sum of squares

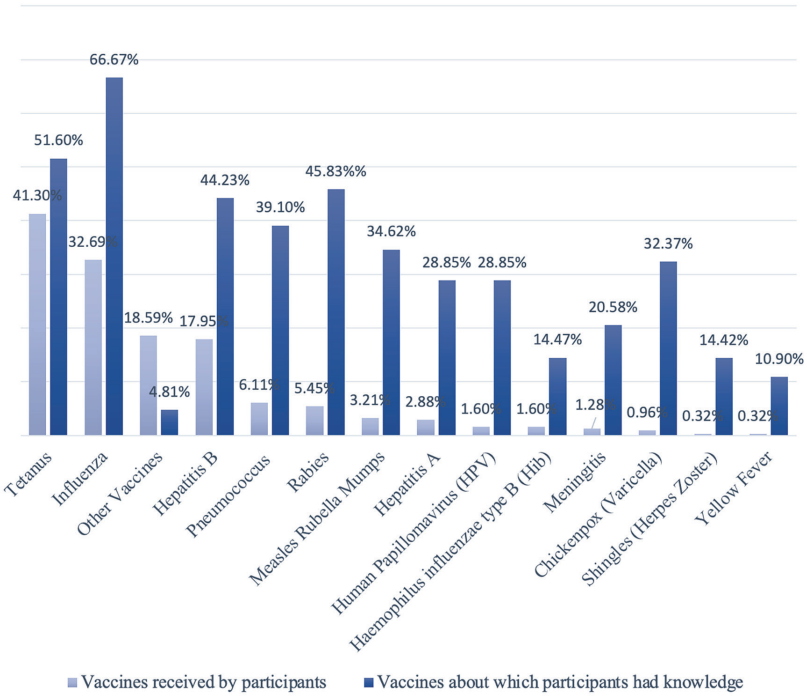

Figure 1. The rates of adult vaccines received during adulthood and vaccines about which participants had knowledge (%)

Table 5. Analysis of factors influencing knowledge of adult immunization

		B	SE	p	Exp(B)	95% CI for Exp(B)	
						Lower	Upper
Step 1[a]	Healthcare worker (yes)	2.357	0.746	**0.002**	10.561	2.447	45.571
	Chronic illness (yes)	0.824	0.386	**0.033**	2.279	1.070	4.852
	Age	0.047	0.012	**0.000**	1.048	1.024	1.074
	Treatment and Service-Appraising Health-Related Information	0.040	0.016	**0.014**	1.040	1.008	1.074

Binary logistic regression, omnibus test p<0.001, Nagelkerke r square =23.3%, Hosmer and Lemeshow test chi-square: 2.838 p=0.944. Step 1a regression analysis refers to a first step in which all independent variables are included in the model at the same time. B: coefficients of the independent variables, SE: standard error, Exp: exponentiation, CI: confidence interval

Table 6. Univariate analysis results for adult vaccination uptake

		Have you had an adult vaccination?				
		No		Yes		p-value
		n	%	n	%	
Education level	Primary school+ high school	41	(47.13)	59	(27.44)	**0.001****
	University	46	(52.87)	156	(72.56)	
Employment status	Retired/unemployed	42	(47.19)	62	(27.80)	**0.001****
	Healthcare worker	5	(5.62)	39	(17.49)	
	Other	42	(47.19)	122	(54.71)	
		Mean ± ss	**Median (IQR)**	**Mean ± ss**	**Median (IQR)**	
Treatment and Service-Appraising Health-Related Information		26.29±8.83	25.00(12.5)	29.02±9.15	29.17(12.5)	**0.020[1]**

**Chi-square test, [1]Mann Whitney-U test, IQR: interquartile range, ss: sum of squares

J Acad Res Med 2024;14(1):26-33

have reported that the best-known vaccines are influenza, tetanus, and hepatitis B vaccines (8,11).

According to the results of this study, the most common sources of information about AI were television or the Internet (45.4%) and physicians (35.1%). Previous studies have identified "media, family health centers, doctors, friends, and neighbors" as sources of information (8,10,12).

The factor that most influenced knowledge about AI was "being a healthcare worker." This result was expected given the training received by healthcare workers and their being at risk of contracting diseases. The second factor that most influenced knowledge about AI was "having a chronic disease." This may be attributed to this group of individuals being a risk group, recommendations given to them by physicians, and frequent media reports urging individuals with chronic diseases to receive adult vaccinations. Another factor that influenced knowledge about AI was found to be "age;" increasing age led to greater knowledge of AI. More regular doctor visits by older people and the opportunity to receive information on AI from doctors during these visits may lead them to prioritize vaccinations (13).

The HLS-TR-Q32 subdomain Treatment and Service-Appraising Health-Related Information' was also found to influence knowledge about AI. This result agrees with some previous studies that found HL to be positively correlated with the level of knowledge and awareness of AI (14,15).

Of the individuals who participated in the study, 71.4% reported having received at least one vaccination during adulthood, whereas 28.5% reported having received none. Previous studies have reported different rates of adult vaccination uptake (60.5%, 57.9%, and 47.4%) (8,9,16). The vaccine most commonly received by the individuals who participated in our study was the tetanus vaccine (41.03%). This result is supported by many previous studies that have reported the tetanus vaccine as the most commonly received vaccination (9,10,16). This is probably because the tetanus vaccine is administered on numerous occasions, such as before employment, in military service, in case of pregnancy, and in the emergency department when indicated in case of injuries.

The current study found that "being a healthcare worker" was the factor that most influenced the knowledge and uptake of adult vaccination. The second most influential factor was the score from the HLS-TR-Q32 subdomain, Treatment and Service-Appraising Health-Related Information. A meta-analysis identified studies that reported a positive and negative correlation between HL and vaccination behavior and studies that found no correlation. Inconsistent results on the correlation between HL and vaccination behavior may be due to the different methods used to assess HL (17). Limited HL has been associated with reduced immunization and lower cancer screening rates, greater use of the emergency room, and higher rates of medication errors (18).

This study also found that adult vaccination uptake among the participants differed significantly by educational level. The vaccination rate was 77.2% among university graduates and 59.0% among primary and high school graduates (p=0.001). This result agrees with previous studies that found that vaccination rates increase significantly with higher educational levels (9,10,16).

The presence of chronic diseases was found to influence knowledge about AI but not its uptake. Previous studies have reported that vaccination uptake is higher among individuals with chronic diseases than among those without chronic diseases (9,16), whereas others have found no association (8,19).

When asked, "If you have ever been vaccinated during adulthood, what was the reason for getting vaccinated?" the participants replied "protection against diseases, doctor's recommendation, sharps injury, and pregnancy" in order of frequency. These answers were found to be consistent with those of previous studies (10,12). On the other hand, when asked, "If you have never been vaccinated during adulthood, what was the reason for not getting vaccinated?" the participants replied "My doctor has not recommended vaccination" and "lack of information," in line with the literature (20,21).

The level of HL in the present study was found to be limited for 47.4% of the respondents, sufficient for 25.8%, inadequate for 16.1%, and excellent for 10.6% of the participants. Tanröver et al. (22) found 40.1% of the population to have problematic and 24.5% to have inadequate HL levels. In contrast, only one-third of the population was categorized as having adequate or excellent

Table 7. Analysis of factors affecting adult vaccination uptake

		B	SE	Sig.	Exp(B)	95% CI for Exp(B)	
						Lower	Upper
Step 1[a]	Education level	0.549	0.308	0.074	1.731	0.947	3.162
	Employment status (retired/unemployed)			**0.048**			
	Employment status (healthcare worker)	1.304	0.551	**0.018**	3.683	1.250	10.855
	Employment status (other)	0.493	0.315	0.117	1.638	0.884	3.035
	Treatment and Service-Appraising Health-Related Information	0.033	0.016	**0.037**	1.033	1.002	1.066

Binary logistic regression, Omnibus test p<0.001, Nagelkerke r square =10.6%, Hosmer and Lemeshow test chi-square: 11.007 p=0.201. Step 1a regression analysis refers to a first step in which all independent variables are included in the model at the same time. B: coefficients of the independent variables, SE: standard error, Sig.: significance, Exp: exponentiation, CI: confidence interval

HL. According to HL data from the USA, 53% of more than 19,000 adults had intermediate levels of HL, 22% had basic HL, 14% had below-basic HL, and 12% had adequate HL (23). Sørensen et al. (24), on the other hand, found that more than 10% of the population had inadequate HL, and between 29% and 62% had limited HL. These rates show that much remains to be done about HL, which is a modifiable factor.

The uptake of the influenza vaccine in any influenza season was found to be 32.6% among the adult population in our study. Other studies have reported 24.0% and 29.6% influenza vaccination rates (8,11). The influenza vaccine coverage rate was reported to be 41.8% according to a 2019 study from Canada and 46.1% among adults according to 2018 data from the United States of America (USA). The World Health Organization's (WHO) "Healthy People 2020" initiative set a target influenza vaccination goal of 70% (25-27).

The pneumococcal vaccine uptake in this study was found to be 6.1% for the adult population and 44.4% among participants aged 65 years. Other studies from Türkiye have found coverage rates of 4.7% and 3.4% for the pneumococcal vaccine (8,11). According to a study from Canada, pneumococcal vaccine uptake was 25.4% among individuals aged 19-64 years and 58.1% among individuals aged 65 years. On the other hand, 2018 data from the USA showed that 23.3% of people aged 19-64 years and 69% of people aged 65 years and over had received at least one dose of pneumococcal vaccine. The WHO set its "Healthy People 2020" target for pneumococcal vaccination at 60% for people aged 19-64 years and 90% for people in the age group 65 and over (25-27). The coverage rates found in our study for both vaccines were well below the target rates, which is in line with other studies from Türkiye.

The WHO's "Healthy People 2020" target for the shingles vaccine was 30% for the group over 60 years of age. However, our study found that shingles vaccination was received by none of the participants over 60 years of age. This result is in line with other studies from Türkiye, which have found the shingles vaccination uptake to be very low (0.9%, 3.2%) (8,9). Coverage rates in the USA and Canada have approached the target, whereas the rates found in our study remain well below the target (25-28). Such low vaccination rates may be attributed to the shingles vaccine not being reimbursable in Türkiye and the lack of information about it.

The rate of tetanus vaccination uptake at any time was found to be 41% among the adult population in this study. Only 13.7% of the participants reported receiving a regular tetanus vaccination every 10 years. Other studies from Türkiye have reported similar results, while a study from Canada reported a rate of 69%, and 2018 data from the USA reported a rate of 62.9% (8,11,25,26).

In our study, the uptake of HPV vaccination among women aged 19-26 years was 1.7%, whereas men had never received this vaccine, a result in line with other studies from Türkiye. According to 2018 data from the USA, 52.8% of women aged 19-26 years and 34.4% of men aged 19-21 years have received HPV vaccination (8,9,26). The high vaccination rate in the USA may be attributed to the HPV vaccine being reimbursable and its inclusion in the routine vaccination schedule. In contrast, in Türkiye, this vaccine is not reimbursable, is not included in the vaccination schedule, and is not sufficiently known among the population, which may explain why it is rarely administered.

Study Limitations

The fact that the study is a cross-sectional study and was conducted in a training family health center affiliated with our hospital prevents generalization of the results. Other limitations include the lack of a standard measurement tool to determine AI knowledge and attitudes. The fact that the study was conducted under pandemic conditions may have affected the results.

CONCLUSION

At a time when the elderly population is growing, increasing rates of AI could contribute to healthy aging. Therefore, it is essential that family physicians provide recipients of preventive health services with counseling about AI. According to our study, the most prominent reasons for not receiving adult vaccines were physicians not sufficiently advising patients on AI and individuals' lack of knowledge. In contrast, the most common reasons for receiving adult vaccines were "protection against diseases" and "physicians' advice." A more effective use of preventive health services, particularly immunization, requires access to accurate information and improvement of HL. Therefore, HL can be improved through several actions, including cross-sectoral cooperation and effective use of communication tools, as well as communication of accurate messages to service users by healthcare personnel, especially physicians.

It is essential that physicians inquire about individuals' adult vaccination status, no matter for what reason they present, and recommend adult vaccines appropriate for individuals' health status and age. Further information and awareness-raising activities on AI can help increase vaccination uptake in the community. It is also recommended that vaccination units be established in hospitals and family health centers where people with chronic diseases can receive vaccines.

Ethics Committee Approval: Approval was obtained from the Clinical Researches Ethics Committee of University of Health Sciences Türkiye, Haydarpaşa Numune Training and Research Hospital (decision no: HNEAH-KAEK 2022/96, date: 18.04.2022). The study was conducted in accordance with the Good Clinical Practice and the Declaration of Helsinki ethical standards.

Informed Consent: Written informed consent was obtained from all participants.

Author Contributions: Concept - A.S., M.T.E., Ö.B.D.; Design - A.S., M.T.E., Ö.B.D.; Data Collection and/or Processing - A.S., M.T.E., Ö.B.D.; Analysis and/or Interpretation - A.S., M.T.E., Ö.B.D.; Literature Search -A.S., M.T.E., Ö.B.D.; Writing - A.S., M.T.E., Ö.B.D.

Conflict of Interest: The authors have no conflict of interest to declare.

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

REFERENCES

1. Mehta B, Chawla S, Kumar V, Jindal H, Bhatt B. Adult immunization: the need to address. Hum Vaccin Immunother 2014; 10: 306-9.

J Acad Res Med 2024;14(1):26-33

2. Williams WW, Lu PJ, O'Halloran A, Kim DK, Grohskopf LA, Pilishvili T, et al. Surveillance of Vaccination Coverage among Adult Populations - United States, 2015. MMWR Surveill Summ 2017; 66: 1-28.
3. Zaki S, Usman A, Tariq S, Shah S, Azam I, Qidwai W, et al. Frequency and Factors Associated with Adult Immunization in Patients Visiting Family Medicine Clinics at a Tertiary Care Hospital, Karachi. Cureus 2018; 10: e2083.
4. Ratzan SC. Health literacy: communication for the public good. Health Promot Int 2001; 16: 207-14.
5. Sørensen K, Van den Broucke S, Fullam J, Doyle G, Pelikan J, Slonska Z, et al. Health literacy and public health: A systematic review and integration of definitions and models. BMC Public Health 2012; 12: 80.
6. Sadeghi S, Brooks D, Stagg-Peterson S, Goldstein R. Growing awareness of the importance of health literacy in individuals with COPD. COPD 2013; 10: 72-8.
7. Abacıgil F, Harlak H, Okyay P. Türkiye Sağlık Okuryazarlığı Ölçekleri Güvenilirlik ve Geçerlilik Çalışması. İçinde: Okyay P, Abacıgil F, editöler. Türkiye Sağlık Okuryazarlığı Ölçeği-32. 1st ed. Ankara: Anıl Advertising Printing Co. Ltd; 2016. s. 43-60.
8. Uzuner A, Arabacı Ş, Yüceel İA, Kocatürk AC, Kaynar E, Khan A. Knowledge, Attitude and Behaviors of Adults About Adulthood Immunization. Turk J Fam Med Prim Care 2018; 12: 215-25.
9. Uragan B, Akdeniz M, Kavukcu E. The Assessment of the Knowledge About Adult Vaccine, And Vaccination Coverage in Adults Aged 18 and Older In Turkey. MATTER Int J Sci Technol 2019; 5: 204-10.
10. Baran Aksakal FN, Koçak C, Uğraş Dikmen A, Altun B, Büyükdemirci E. Investigation of Knowledge, Attitudes and Behaviors Related To Adult Vaccination of People Over 18 Years Old Who Apply To Family Health Centers in Ankara. Flora 2018; 23: 124-34.
11. Aşık Z, Çakmak T, Bilgili P. Knowledges, attitudes and behaviours of adults about adult vaccines. Turk J Fam Pract 2013; 17: 113-8.
12. Bolatkale MK, Kutlu R, Eryilmaz MA. Aile Hekimliği Polikliniğine Başvuran Bireylerin Erişkin Aşıları Hakkındaki Bilgileri ve Aşılanma Durumları. Konuralp Tıp Dergisi 2019; 11: 362-8.
13. Borga LG, Clark AE, D'Ambrosio C, Lepinteur A. Characteristics associated with COVID-19 vaccine hesitancy. Sci Rep 2022; 12: 12435.
14. Çam C, Ünsal A, Arslantaş D, Kılınç A, Emiral GÖ. Erişkinlerin Bağışıklama Bilgi Yeterlilik Düzeylerinin, Tutum ve Davranışları ile Sağlık Okuryazarlık Düzeylerinin Değerlendirilmesi. Osmangazi Tıp Dergisi 2021; 43: 7-19.
15. Lorini C, Santomauro F, Donzellini M, Capecchi L, Bechini A, Boccalini S, et al. Health literacy and vaccination: A systematic review. Hum Vaccin Immunother 2017; 14: 478-88.
16. Sarıgül B, Korkmazer B, Asa Afyoncu A, Şahin EM. Adult Immunisation Status and The Affecting Factors In A Tertiary University Hospital Family Medicine Clinic. Turk J Fam Pract. 2021; 25: 105-12.
17. Siena LM, Isonne C, Sciurti A, De Blasiis MR, Migliara G, Marzuillo C, et al. The Association of Health Literacy with Intention to Vaccinate and Vaccination Status: A Systematic Review. Vaccines (Basel) 2022; 10: 1832.
18. Hersh L, Salzman B, Snyderman D. Health Literacy in Primary Care Practice. Am Fam Physician 2015; 92: 118-24.
19. Bal H, Borekci G. 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. Istanb Med J 2016; 17: 121-30.
20. Egici MT, Gelmez Taş B, Özkarafakılı M, Öztürk GZ. Evaluation of Factors Affecting Adult Immunization. Haydarpasa Numune Med J 2018; 58: 128-32.
21. Johnson DR, Nichol KL, Lipczynski K. Barriers to adult immunization. Am J Med 2008; 121(7 Suppl 2): 28-35.
22. Tanrıöver MD, Yıldırım HH, Ready FN, Çakır B, Akalın HE. Sağlık ve sosyal hizmet çalışanları sendikasi Türkiye sağlık okuryazarlığı araştırması. Ankara: Sağlık-Sen Yayınları 2014: 1-96.
23. Kutner M, Greenburg E, Jin Y, Paulsen C. The Health Literacy of America's Adults: Results From the 2003 National Assessment of Adult Literacy. 2006.
24. Sørensen K, Pelikan JM, Röthlin F, Ganahl K, Slonska Z, Doyle G, et al. Health literacy in Europe: comparative results of the European health literacy survey (HLS-EU). Eur J Public Health 2015; 25: 1053-8.
25. Public Health Agency of Canada. Vaccine uptake in Canadian adults 2019 [Internet]. 2022 [cited November 24, 2022]. Available from: https://www.canada.ca/en/public-health/services/publications/healthy-living/2018-2019-influenza-flu-vaccine-coverage-survey-results.html
26. Lu PJ, Hung MC, Srivastav A, Grohskopf LA, Kobayashi M, Harris AM, et al. Surveillance of Vaccination Coverage Among Adult Populations -United States, 2018. MMWR Surveill Summ 2021; 70: 1-70.
27. Healthy People 2020. Immunization and Infectious Diseases [Internet]. [cited November 25, 2022]. Available from: https://wayback.archive-it.org/5774/20220414033335/https://www.healthypeople.gov/2020/topics-objectives/topic/immunization-and-infectious-diseases/objectives
28. Doherty M, Schmidt-Ott R, Santos JI, Stanberry LR, Hofstetter AM, Rosenthal SL, et al. Vaccination of special populations: Protecting the vulnerable. Vaccine 2016; 34: 6681-90.