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THE EFFECT OF DEMENTIA AND HEALTH LITERACY ON THE DECISION TO RECEIVE A COVID-19 VACCINE IN INDIVIDUALS OVER SIXTY

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ABSTRACT

Aim: In this study, we aimed to examine the effect of dementia and health literacy on the decision to receive a COVID-19 vaccine in individuals over sixty.

Methods: Participants over 60 years of age who were registered in the Mustafakemalpaşa Sırmalar Family Health Center and Yalıntaş Family Health Center between July-2021 and June-2022 and who received or did not receive COVID-19 vaccination were evaluated. The Newest Vital Sign (NVS) scale was used to evaluate Health Literacy and Standardized Minimental Test (SMMT) was used to evaluate cognitive functions of the participants.

Results: The rate of dementia was 14% among those who received the vaccine and it was 68% among those who did not (p<0.001). In the case group, the rate of those who did not trust the vaccine was 44%, the rate of those who were afraid of the vaccine was 42%, and the rate of those who thought that the vaccine was not protective was 14%. The risk of single participants not getting vaccinated was 24.04 times higher than those who were married. One-unit increase in the total score obtained from the NVS reduced the tendency not to get vaccinated by 29%. Loss of cognitive functions had a negative effect on the decision of vaccination.

Conclusion: When it comes to individuals living alone, those with reduced cognitive function and those with low health literacy, family physicians may need to make extra efforts to follow up and train these patients. In the fight against COVID-19, which is a vaccine-protectable disease, family physicians should identify their patients in the higher risk group and follow these patients more closely.

Keywords: Coronavirus, COVID-19 vaccine, dementia, health literacy.

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Introduction

One of the important issues in the relationship between infectious diseases and health literacy (HL) is vaccine hesitation. People can be prejudiced against vaccination despite the demonstration of vaccine benefits. Insufficient HL has been reported to be among the main factors that cause inadequate vaccine knowledge. In a study conducted by Montagni et al., a significant relationship was found between vaccine hesitation and inadequate HL levels (1). HL should be encouraged in target audiences; consistent communication by institutions is crucial to build public confidence in vaccination programs.

In a study, it was found that patients with dementia had a higher risk of developing COVID-19 compared to patients without dementia (2). Patients with dementia and COVID-19 have a two-fold higher risk of hospitalization over a 6-month period compared to patients with COVID-19 without dementia, and fourfold higher risk of hospitalization compared to patients with dementia but without COVID-19. Therefore, these patients should be given priority in vaccination. However, with the closure of the appointments due to the pandemic, the control of these patients was lost and the patients remained neglected and could not reach vaccination. Vaccination rates were found to be low due to insufficient HL in themselves and their caregivers.

In a study conducted by Amanda et al., the demographic determinants of vaccine hesitation that emerged in the literature review were determined as age, income, educational status, HL, rural and parenting (3). Individuals may withdraw from vaccination due to lower education levels, lack of knowledge about the efficacy and safety of vaccines, or negative attitudes towards the vaccine. Health knowledge is associated with more positive attitudes toward vaccination.

Studies have shown that patients' HL levels decrease with advancing age (4-8). This situation is tried to be explained by the negative effect of dementia on HL in elderly individuals. At the same time, it has been demonstrated in the studies that elderly individuals feel inadequate in terms of participating in health screenings and vaccination.

In this study, it is aimed to examine the relationship between dementia and HL in individuals over the age of sixty and the decision not to receive COVID-19 vaccine.

Methods

The study was conducted between July 2021 and June 2022, and 60-year-old and older participants who were registered in Mustafakemalpaşa Sırmalar Family Health Center (FHC) and Mustafakemalpaşa Yalıntaş FHC, who were vaccinated against COVID-19, and who were not vaccinated against COVID-19 were included in the study. Ethical approval was obtained from the hospital's ethical committee.

Our study is a descriptive study. Questionnaire technique was used in the study. Prior to the survey, the patients were informed and their consent was obtained. Patient confidentiality has been taken care of. As a result, the results of 200 participants over the age of sixty who volunteered to participate in the study were evaluated. General characteristics of the participants were recorded.

Folstein et al. developed Standardized Minimental Test (SMTT) scale in 1975 (9). The scale evaluates cognitive functions in five different sections (orientation, registration, attention and calculation, recall and language). The Turkish adaptation and validity study of SMMT was conducted by Güngen et al. (10).The lowest score that can be received on the scale is 0 and the highest score is 30. 24-30 points are

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evaluated as "within normal limits", 20-23 as "mild cognitive disorder", 10-19 as "moderate cognitive disorder", and 0-9 as "advanced cognitive disorder". In mild cognitive disorders, the individual may experience problems in his/her work and social environment, but he/she can maintain his/her individual life. In moderate and advanced cognitive disorders, the individual needs support to sustain his/her life (8,9).

Weiss et al. (11) developed the Newest Vital Sign (NVS) scale and Çiftçi et al. (12) validated it in Turkish. In the scale, patients are given a copy of a food label and asked six questions about the label. Among these, the first four questions require computational ability, and the last two questions do not require numerical skill. Each correct answer is scored as 1 point and the HL level of the individual is determined according to the total score. The cut-off total score for the scale was '4' (12).

Statistical Analysis

Experimental (posthoc) power analysis was performed considering the current findings of the study. The effect size value was obtained from the comparison of the total scale scores calculated on the NVS scale between the case group (n=100; 1.27 ± 11.61) and the control group (n = 100; 3.73 ± 1.76), and was calculated as d=1.47, but the lower limit of the large effect size, d=0.80, was accepted as the effect size. Using the calculated effect size, the power value obtained from our study, in which the type I error was accepted as 5%, was determined as 98%, with a total of n=200 participants, and the relevant analysis was made using the G*Power program (13).

The suitability of continuous variables for normal distribution was examined by Shapiro Wilk test. According to the normality test result, Mann Whitney U test was used in the comparisons between the two groups. Categorical variables were compared between

the groups using Pearson's chi-square test, Fisher's exact chi-square test and Fisher Freeman-Halton test. While the internal consistency of the scales used in the study was examined with Cronbach's alpha and Kuder-Richardson 20 (KR-20) coefficients, the relationships between the scores obtained from the SMMT and NVS scales were examined with correlation analysis and the Spearman correlation coefficient was calculated. The factors affecting the non-vaccination behavior of the participants were examined by logistic regression analysis. For the statistical analysis SPSS (IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp.) program was used and p<0.05 was considered statistically significant.

Results

The distribution of the participants according to their socio-demographic characteristics and the comparisons between the case and control groups according to these characteristics are given in Table 1. There is a difference between the participants according to their marital status, occupation and location (p<0.001).

Table 1: Sociodemographic characteristics of the participant

	Case	Control	p-value	
Age	68(60:99)	66(59:80)	0.117 ^a	
Gender				
Male	37(%37)	42(%42)	0.470 ^b	
Female	63(%63)	58(%58)	. 0.470	
Educational Status				
Below High School	93(%93.94)	85(%85)		
High School	4(%4.04)	7(%7)	0.092 ^b	
Above High School	2(%2.02)	8(%8)		
Marital Status				
Married	44(%44)	87(%87)		
Single	9(%9)	2(%2)	<0.001°	
Divorced	2(%2)	3(%3)		
Widow	45(%45)	8(%8)		
Income Status				
Bad	80(%80)	67(%67)		
Moderate	19(%19)	32(%32)	0.062 ^c	
Good	1(%1)	1(%1)		
Job				
Civil Servant	17(%17)	9(%9)		
Worker	12(%12)	6(%6)		
Housewife	49(%49)	40(%40)	0.005 ^c	
Retired	22(%22)	44(%44)		
Other	0	1(%1)		
Settlement				
Village	68(%68)	21(%21)		
District	28(%28)	77(%77)	<0.001 ^c	
Center	4(%4)	2(%2)		
Smoking Status	23(%23	31(%31)	0.203 ^b	
Alcohol Intake	3(%3)	3(%3)	>0.99 ^d	

Data are expressed as n (%) and median (minimum: maximum). a: Mann Whitney U test, b: Pearson Chi-Square test, c: Fisher Freeman Halton test, d: Fisher's Exact Chi-Square test

The comparisons between the case and control groups regarding the incidence rates of chronic diseases are presented in Table 2. It was defined that Gastroesophageal Reflux Disease (GERD), Diabetes Mellitus DM, hypertension and Coronary Artery Disease incidence rates were lower in the participants in the case group compared to the control group (p<0.001, p=0.001, p<0.001 and p=0.033, respectively).

Table2. Comparisons of chronic diseases betv	veen the groups
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	Case	Control	p-value
	(n=100)	(n=100)	
Gastroesophageal Reflux Disease	35(%35)	65(%65)	<0.001 ^b
Diabetes Mellitus	9(%9)	28(%28)	0.001 ^b
Hypertension	56(%56)	82(%82)	<0.001 ^b
Coronary Artery Disease	18(%18)	31(%31)	0.033 ^b
Cancer	0	1(%1)	>0.99 ^d
Asthma- COPD	8(%8)	11(%11)	0.469 ^b
Rheumatologic Disease	2(%2)	3(%3)	>0.99 ^d
Thyroid Disease	3(%3)	5(%5)	0.721 ^d
Psychiatric Diseases	16(%16)	15(%15)	0.845 ^b

Data are expressed as n (%). b: Pearson Chi-Square Test, d: Fisher's Exact Chi-Square test

The rate of dementia was 41% on average in the case and control groups. The rate of dementia was 14% among those who received the vaccine and it was 68% among those who did not (p<0.001). 32% of the case group was within normal limits, 35% had early dementia, 32% had moderate dementia, and 1% had severe dementia. While 86% of the control group was within normal limits, 13% had early dementia and 1% had moderate dementia. The analyses for the comparison of the scores obtained from the NVS and SMMT scales used in the study between the case and control groups are presented in Table 3. When Table 3 is examined, it is seen that the median scale score obtained from the SMMT scale in the control group is higher than the case group (p<0.001).

Table3.Comparison of scores belonging to the scales used in the study

	Case (n=100)	Control (n=100)	p-value ^a
Standardized Mini Mental Test	21(9:30)	26(19:30)	<0.001
	20.91(±4.53)	26.07(±2.40)	
Orientation	8(4:10)	10(7:10)	<0.001
	8.23(±1.63)	9.82(±0.58)	
Recording Memory	3(2:3)	3(2:3)	<0.001
	2.85(±0.36)	2.99(±0.10)	
The Attention-Calculation	1(0:5)	3(0:5)	<0.001
	1.50(±1.33)	2.77(±1.50)	
Recall	1,50(0:3)	2(1:3)	<0.001
	1.41(±0.93)	2.13(±0.71)	
Language	7(3:9)	8(7:9)	<0.001
	6.90(±1.44)	8.37(±0.63)	
Newest Vital Sign	0(0:6)	4(0:6)	<0.001
	1.27(±1,61)	3.73(±1.76)	

Datas are expressed as median (minimum: maximum) and medium(±st.deviation)a: Mann Whitney U Test

In the non-vaccinated case group, 11% had sufficient HL; 33% had limited HL and 56% had insufficient HL; 62% had sufficient HL in the vaccinated control group; 28% had limited literacy and 10% had insufficient HL.

the rate of those who did not trust the vaccine was 44%, the rate of those who were afraid of the vaccine was 42%, and the rate of those who thought that the vaccine was not protective was 14%.

The reasons for not vaccinating the participants in the case group are given in Figure 1. In the case group,



Figure1. Reasons For Not Getting Covid-19 Vaccine

Table 4 presents the results of multivariate logistic regression analysis aimed to determine the risk factors affecting non-vaccination. In multivariate logistic regression analysis, it was identified that the model obtained in the final step was significant (p<0.001)and compatible with the data set (p=0.921). When Table 4 was examined, it was specified that the risk of not getting vaccinated was 24.04 times higher in single participants than in married participants, and that the participants who were widowed tended not to get vaccinated 9.31 times more. It was detected that the settlement was not effective on the decision to get vaccinated. It was determined that those without GERD had a 2.54 times higher tendency not to get vaccinated compared to the participants with this Table4. Risk factors negatively affecting decision of vaccination

disease. It was signified that the participants without DM tended not to get vaccinated 4.20 times more than the patients with DM and the participants without hypertension tended not to get vaccinated 6.01 times more than the patients with hypertension. It was defined that a one-unit increase in the total score obtained from the NVS scale reduced the tendency not to get vaccinated by 29%. It was determined that a one-unit increase in the scale score to be obtained from the SMMT-registration memory sub-dimension increased the risk of not getting vaccinated 25.01 times. And, one-unit increase in the scale score obtained from the SMMT-language sub-dimension decreased the tendency not to get vaccinated by 68%.

	Wald	p-value	OR	%	%95 (GA)	
				Low	High	
Marital Status						
Single	8.78	0.003	24.04	2.93	197.05	
Divorced	0.89	0.346	0.11	0.01	10.66	
Widow	14.06	<0.001	9.31	2.90	29.91	
Settlement						
Village	0.49	0.484	2.29	0.23	23.39	
District	0.23	0.635	0.58	0.06	5.49	
Gastroesophageal Reflux Disease (absent)	3.98	0.046	2.54	1.02	6.35	
Diabetes Mellitus (absent)	4.85	0.028	4.20	1.17	15.09	
Hypertension (absent)	10.94	0.001	6.01	2.08	17.37	
Newest Vital Sign	4.88	0.027	0.71	0.53	0.96	
Standardized Mini Mental Test - Recording Memory	18.24	<0.001	25.01	5.72	110.01	
Standardized Mini Mental Test - Language	13.80	<0.001	0.32	0.19	0.59	
Model χ ² =14.19; p<0.001						
HosmerandLemeshow Test: p=0.921						

OR: Oddsratio(odds rate), CI: Confidence Interval

The "married" category for the marital status variable, the "center" category for the settlement, the "exist" category for the presence of Gastroesophageal Reflux Disease, the "exist" category for the presence of Diabetes Mellitus, the "exist" category for the presence of Hypertension were accepted as the reference category.

Discussion

The rate of dementia was 14% among those who received the vaccine and it was 68% among those who did not. In the case group, the rate of those who did not trust the vaccine was 44%, the rate of those who were afraid of the vaccine was 42%, and the rate of those who thought that the vaccine was not protective was 14%. The risk of single participants not getting vaccinated was 24.04 times higher than those who were married. One-unit increase in the total score obtained from the NVS reduced the tendency not to get vaccinated by 29%.

In a study conducted in the USA, it was reported that 14.8% of the respondents did not want to be against COVID-19 and vaccinated 23% were undecided about getting this vaccine. Men, the elderly, those with high income and university degree, democrats, married people, people with previous medical problems and those with influenza vaccination were found to have a high vaccination rate (14). In our study, there was no statistically significant difference in education status, gender distribution and income status. The fact that different results were obtained in our study may be due to the socioeconomic difference between these two countries.

In the case group of our study, the rate of those who did not trust the vaccine, who were afraid of the vaccine and who thought that the vaccine was not protective was higher than the control group. The first four reasons for hesitation about the vaccine were found to be concerns about the side effects of the vaccine, allergic responses to the vaccine, doubts about the effectiveness of the vaccine, and thinking that immunity can be developed by passing the disease. Other reasons were found to be fear of needles, getting immune from past infections, being young and not worrying about developing a serious disease (14). The primary cause for vaccine hesitation is hesitation about the safety and efficacy of the vaccine. In our study, individuals who did not receive vaccination did not trust the vaccine, were afraid of the vaccine and thought that the vaccine was not protective.

In a study conducted in China, the desire to accept the COVID-19 vaccine among the elderly and those with chronic diseases was investigated. The main reasons for public vaccine hesitation are vaccine safety concern, perception that the risk of infection is low, willingness to wait for the administration of the vaccine and to see the results, vaccine effectiveness and price. In the study, the decision of the elderly who perceived COVID-19 disease as a high risk of infection and trusted governments to accept the vaccine was found to be positive (15). In the current study, it was found that those with chronic diseases were more willing to get the COVID-19 vaccine.

In the present study, 11% of the case group who did not receive vaccination had sufficient HL; 33% had limited literacy and 56% had insufficient HL; 62% of the control group who received vaccination had sufficient HL; 28% had limited literacy and 10% had insufficient HL. It was determined that a one-unit increase in the total score obtained from the NVS scale reduced the tendency not to get vaccinated by 29% In other words, the increase in HL increased the rate of vaccination. During the pandemic process, urgent decisions and measures should be taken to protect public health, there is no time to improve HL; it is necessary to create easy-to-apply warnings to manage the pandemic and to ensure that the public can easily access this information. In a study conducted on US university students, both HL and digital HL were measured; those with higher digital HL were associated with the desire to be vaccinated against COVID-19. While the planned vaccination behavior varies according to the level of digital HL, it varies according to the level of HL. Those who are very likely to be vaccinated have been reported to have higher digital HL than unlikely ones (16).

Conclusions

As a result, when it comes to individuals living alone, with reduced cognitive functions and low HL, family physicians may need to make extra efforts to follow up and train these patients. In the fight against COVID-19, which is one of the vaccine-protectable diseases, family physicians should identify their patients in the risky group and follow these patients more closely.

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Conflicts of Interest

Author has any conflict of interest to disclose.

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