

Original Research / Orijinal Araştırma

Health Literacy, COVID-19 Vaccine Literacy and Related Factors of Individuals Registered with a Family Health Center

Bir Aile Sağlığı Merkezine Kayıtlı Bireylerin Sağlık Okuryazarlığı, COVID-19 Aşı Okuryazarlığı ve İlişkili Faktörler

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Abstract

Background: This study aimed to examine health literacy and COVID-19 vaccine literacy levels among adults and the factors associated with these levels. **Methods:** This cross-sectional study was conducted in a family health center in Ankara in October-November-December 2021. The sample consisted of 372 adults who agreed to participate in the study. The Personal Information Form, the Health Literacy Scale, and the COVID-19 Vaccine Literacy Scale were used to collect data. **Results:** It was determined that 55,6% of the participants were women, 52,2% were between the ages of 40-64, 65,1% were married, 51,6% were university graduates, 50,3% had income equal to their expenses, 39,5% had chronic diseases, 85,8% of them had not contracted COVID-19, and 3,5% had not been vaccinated against COVID-19. The mean score of the Health Literacy Scale was 108.19 (SD=14.63). The mean score of the COVID-19 Vaccine Literacy Scale was 2.74 (SD=0.60). The health literacy and COVID-19 vaccine literacy scores of the elderly, individuals with low education and low income levels were found to be significantly lower ($p<0.05$). Education level, being vaccinated against COVID-19 or not, and health literacy explained 37% of COVID-19 Vaccine Literacy. **Conclusions:** The current study found that the health literacy level of the participants was sufficient, and the COVID-19 vaccine literacy level was moderate. It was determined that age group, level of education, and level of income affected these levels. In addition, education level, COVID-19 vaccination status and health literacy level were determined as predictors of COVID-19 vaccine literacy. It is recommended to consider predictive factors to increase COVID-19 vaccine literacy.

Keywords: health literacy, COVID-19 pandemic, vaccine.

Özet

Giriş: Bu çalışma, yetişkinler arasında sağlık okuryazarlığı ve COVID-19 aşı okuryazarlığı düzeylerini ve bu düzeylerle ilişkili faktörleri incelemeyi amaçlamıştır. **Yöntem:** Kesitsel tipteki bu çalışma 2021 yılının Ekim-Kasım-Aralık aylarında Ankara'da bir aile sağlığı merkezinde yürütülmüştür. **Örneklem,** çalışmaya katılmayı kabul eden 372 yetişkinden oluşmaktadır. Veri toplamak için Kişisel Bilgi Formu, Sağlık Okuryazarlığı Ölçeği ve COVID-19 Aşı Okuryazarlığı Ölçeği kullanıldı. **Bulgular:** Katılımcıların %55,6'sının kadın, %52,2'sinin 40-64 yaş arasında, %65,1'inin evli, %51,6'sının üniversite mezunu, %50,3'ünün giderine eşit gelire sahip, %39,5'inin kronik hastalığı olduğu belirlendi. Katılımcıların %85,8'i COVID-19'a yakalanmadığı ve %3,5'i COVID-19'a karşı aşılanmadığı belirlendi. Sağlık Okuryazarlığı Ölçeği puan ortalaması 108.19 (SS=14.63), COVID-19 Aşı Okuryazarlığı Ölçeği ortalama puanı 2.74 (SS=0.60) bulundu. Yaşlıların, eğitim düzeyi ve gelir düzeyi düşük olan bireylerin Sağlık Okuryazarlığı ve COVID-19 Aşı Okuryazarlığı puanları anlamlı olarak daha düşük olduğu belirlendi ($p<0.05$). Eğitim düzeyi, COVID-19 aşısı olma durumu ve sağlık okuryazarlığı, COVID-19 aşı okuryazarlığının %37'sini açıkladı. **Sonuç:** Mevcut çalışmada, katılımcıların sağlık okuryazarlığı düzeyinin yeterli olduğunu ve COVID-19 aşı okuryazarlığının orta düzeyde olduğu belirlenmiştir. Yaş grubu, eğitim düzeyi ve gelir düzeyinin bu düzeyleri etkilediği belirlendi. Ayrıca eğitim düzeyi, COVID-19 aşısı olma durumu ve sağlık okuryazarlığı düzeyi COVID-19 aşı okuryazarlığının yordayıcıları olarak belirlendi. COVID-19 aşı okuryazarlığını artırmak için yordayıcı faktörlerin göz önünde bulundurulması önerilmektedir. **Anahtar kelimeler:** sağlık okuryazarlığı, COVID-19 pandemisi, aşı.

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Introduction

Individuals need to develop their health literacy skills to protect, maintain, and improve their health.¹ Health literacy skills require individuals to be active and in control, not passive, regarding both health and illness in their lives.² With the COVID-19 pandemic, in particular, societies at the global level have been introduced to new concepts and plenty of new information about the meanings of these concepts. One of the issues emphasized the most by society is COVID-19 vaccines, thus giving rise to the concept of COVID-19 vaccine literacy.³ Health literacy and COVID-19 vaccine literacy, which have gained even more value with the pandemic, are essential for the entire world population and these issues must be examined.

Individuals' ability to access information about health and health services, understand, appraise, and apply this information to make improving health decisions is defined as health literacy..⁴ A study of eight European countries reported that 47% of individuals have insufficient-problematic health literacy.⁵ Studies conducted in Turkey have reported that more than half of the adults have insufficient health literacy levels.^{6,7,8} Insufficient levels of health literacy decrease the possibility of utilizing health services,⁹ and increase calls to emergency services and health expenditures¹⁰, whereas adequate levels of health literacy positively affect the quality of life and reduce depression and anxiety.¹¹

Vaccine literacy is defined as the degree to which individuals can obtain, process, and understand basic health information and services in order to make appropriate health decisions about vaccines. It is derived from the concept of health literacy..¹² Based on the concept of vaccine literacy, the concept of COVID-19 vaccine literacy and scale has been introduced to the literature. COVID-19 vaccine literacy is the capacity to access, understand, and appraise information about the COVID-19 vaccine.³ COVID-19 vaccine literacy allows the individual to make an appropriate decision about getting vaccinated.¹³ A study conducted in Italy reported that the COVID-19 vaccine literacy level of the participants was high.³ A moderate level of knowledge about the COVID-19 vaccine was observed in participants in a Croatian study..¹⁴

Studies of health literacy, which has become more important with the COVID-19 pandemic, have been made.^{5,6,7,8} However, research on COVID-19 vaccine literacy, which is a new concept, is limited.^{3,14} This study aims to examine the health literacy, COVID-19 vaccine literacy, and related factors of adults who applied to a family health center.

Research Questions

- 1) What is the health literacy level of individuals?
- 2) What is the COVID-19 vaccine literacy level of individuals?
- 3) What demographic factors are associated with individuals' health literacy?
- 4) What demographic factors are associated with individuals' COVID-19 vaccine literacy?
- 5) What are the factors that predict the COVID-19 vaccine literacy of individuals?

Method

Research population and sample

This is a cross-sectional study. The population of the research consists of approximately 10,000 population over the age of 18 registered to Demirlibahçe Family Health Center. The sample was determined in line with the sample size calculation formula for the studies whose target population is known. The sample size was calculated as approximately 370 ($\sigma = 0.05$ and $\alpha: 0.05$). The sample of the study is 372 people who filled out the data collection tools.

Instruments

Data collection tools are a Personal Information Form, the Health Literacy Scale, and the COVID-19 Vaccine Literacy Scale.

Personal Information Form

In this form, questions including socio-demographic characteristics were asked about the person's age, gender, income, chronic disease history, whether they were infected with COVID-19 and whether they were vaccinated against COVID-19 (type and number of doses).

Health Literacy Scale (HLS)

Toçi, Bruzari, and Sorenson worked together to simplify the 47-item HLS-EU (Health Literacy Survey in Europe) form first developed by Sorensen. Aras and Bayik Temel made the validity and reliability analysis of the Turkish version of the scale.¹⁵ The HLS consists of 25 items and four subscales (Access, Understand, Appraise, and Apply information). Access has five items (Items 1-5); Understand, seven items (6-12); Appraise, eight items (13-20), and Apply, five items (21-25). The minimum score is 25 and the maximum score is 125 for the whole scale. The

answers are presented in a Likert-type scale: “5: I have no difficulty, 4: I have little difficulty, 3: I have some difficulty, 2: I have a lot of difficulty, 1: I cannot/I have no skill/it is impossible.” Low scores indicate inadequate, problematic, and weak health literacy, while high scores indicate adequate and excellent health literacy. The higher the score, the higher the individual’s health literacy level. The scale’s α value in the validity and reliability study is 0.92. The Cronbach alpha coefficient was found to be 0.93 in our study.

COVID-19 Vaccine Literacy Scale (COVID-19 VLS)

Biasio et al developed the COVID-19 VLS based on the health literacy scale developed by Ishikawa et al. The scale in the Turkish validity and reliability study made by Durmuş et al. (2021) consists of 12 items and two subscales (Interactive/Critical and Functional skills).¹⁶ The α value for the entire scale in the validity and reliability study is 0.87. The Cronbach alpha coefficient was found to be 0.83 in our study. The interactive/critical skills subscale includes the skills to access, use and evaluate information about Covid-19 vaccines and available vaccines. The functional skills subscale includes the ability to understand information about Covid-19 vaccines and available vaccines. The expressions in the data collection tool were rated using a 4-point Likert scale. Interactive/critical subscale questions were rated as (1) Never, (2) Rarely, (3) Sometimes, (4) Often; the functional subscale statements were rated as (4) Never, (3) Rarely, (2) Sometimes, (1) Often. The fact that the average of the scores obtained from the scale is close to 4 indicates that the vaccine literacy level is high.

Data Collection

Data were collected at the Demirlibağçe Family Health Center in October, November, and December 2021. Individuals receiving outpatient treatment go to family health centers in Turkey for the polyclinic service, pregnancy and baby monitoring, immunization (including COVID-19 vaccine services), injury dressing, and injection services. Data collection tools were administered face to face to individuals who had gone to the family health center for any reason. The individuals gave their informed consent before filling in the data collection tools. Only those who consented to participate in the study filled in the data collection forms. It took approximately 10 minutes for the individuals to fill in the data collection forms.

Ethical Considerations

Before collecting the data, permission was obtained from the Ankara University ethics committee (Date: September 13, 2021, No:13/154), the Ministry of Health, and the Ankara Provincial Health Directorate. The participants gave their oral and written consent.

Data Analysis

The data were analyzed via the Statistical Package for the Social Sciences (SPSS) version 14.0. The statistical methods to be used in the study were determined by first taking into account the Kolmogorov Smirnov test whether the mean scores of the scale and subscales showed normal distribution. We determined that the skewness and kurtosis values, which are indicators of the normality of the data, were within normal limits in all the subscales of both scales. The values of skewness and kurtosis were all within the recommended limit of ± 2 , which indicates the normal distribution of all the constructs of the study. The t-Test for Independent Groups, one of the parametric statistical methods, was used to compare the means of two independent groups, and the one-way analysis of variance or ANOVA test was used to compare the means of three or more groups. Tukey’s multiple comparison test was used to identify the groups from which the differences found using ANOVA came. The relationship between the HLS and Covid-19 VLS was examined using Pearson correlation analysis. Multiple linear regression analysis was performed to determine the predictive level of sociodemographic variables and the HLS for the Covid-19 VLS total score. The variables were identified through the regression analysis’s enter method and added to the model. The Variance Inflation Factor (VIF) and tolerance were used to assess whether there were multiple correlations between the variables. Variables with a tolerance value >0.2 and a VIF value <10 were included in the regression analysis. The significance level was accepted as 0.05.

Results

Of the participants, 55,6% (n=207) were female, 52,2% (n=194) were aged 40-64, 65,1% (n=242) were married, 51,6% (n=192) were university graduates, 50,3% (n=187) had equal incomes and expenses, 39,5% (n=147) had a chronic disease, 85,8% (n=319) had not contracted COVID-19, 3,5% (n=13) had not been vaccinated against COVID-19 (Table 1).

The mean score for the HLS was 108.19 (SD=14.63) (Table 2). Regarding gender, marital status, chronic illness, COVID-19 infection status, and COVID-19 vaccination status, there was no significant difference in the

HLS total score or any of the subscales. When evaluated according to the age group, it was determined that the participants aged 65 and over scored significantly lower in the HLS total score ($p < 0.002$), access ($p < 0.001$), understanding ($p < 0.001$), and appraisal ($p < 0.028$) subscales compared with the participants in other age groups. The mean scores for HLS total score and all its subscales were found to increase as the education level increased, with university graduates scoring significantly higher ($p < 0.001$). Similarly, the mean scores for the HLS total score ($p < 0.001$), access ($p < 0.001$), understanding ($p < 0.001$), appraisal ($p < 0.008$), and application ($p < 0.032$) subscales increased as income level increased, and those with a higher income than their expenses scored significantly higher ($p < 0.05$) (Table 1).

The mean score of the COVID-19 VLS was 2.74 ($SD = 0.60$) (Table 2). No significant difference was found in the COVID-19 VLS total score and all subscales in terms of gender, marital status, chronic disease, COVID-19 infection status, and COVID-19 vaccination status ($p > 0.05$). When evaluated according to the age group, it was determined that the participants aged 65 and over had significantly lower scores in the COVID-19 VLS total score ($p < 0.001$) interactive-critical subscale ($p < 0.043$), and functional subscale ($p < 0.001$) compared with the participants in other age groups. The mean scores for the COVID-19 VLS total score and all its subscales were found to increase as the education level increased, with university graduates scoring significantly higher ($p < 0.001$). It was determined that the average of the COVID 19 VLS scores increased as the income level increased, and those with more income than their expenses had significantly higher scores in the COVID 19 VLS total score ($p < 0.036$) and Interactive-critical subscale ($p < 0.047$) (Table 3).

A moderate positive correlation was found between COVID-19 VLS and HLS ($r = 0.584$, $p < .001$). The regression model established to test the effect of COVID-19 VLS on HLS and sociodemographic variables is significant. ($F = 25,665$, $p < .001$). Education level, being vaccinated against COVID-19 or not, and health literacy explained 37% of COVID-19 VLS (Table 4).

Table 1. Distribution of HLS and subdimensions scores according to sociodemographic variables

Variables		n(%)	HLS Overall Score Mean(SD)	Access Mean (SD)	Understanding Mean(SD)	Appraisal Mean(SD)	Application Mean(SD)
Gender	Female	207(55.6)	108.26(15.13)	21.93(3.68)	29.84(4.71)	35.10(5.36)	21.37(3.42)
	Male	165(44.4)	108.10(14.02)	21.97(3.55)	29.87(4.58)	34.87(5.08)	21.38(3.46)
	Test value		$t = 0.103$	$t = -.102$	$t = -.056$	$t = .418$	$t = -.014$
	^a p		.918	.919	.676	.989	
Age	18-39 ^a	94(25.3)	111.57(10.97)	22.63(2.61)	30.91(3.43)	36.05(3.85)	21.96(3.12)
	40-64 ^b	194(52.2)	108.46(15.12)	22.27(3.59)	30.10(4.72)	34.93(5.50)	21.13(3.61)
	65 and above ^c	84(22.6)	103.77(16.04)	20.44(4.21)	28.09(5.20)	33.96(5.74)	21.27(3.30)
	Test value		$F = 6.564$	$F = 10.294$	$F = 9.105$	$F = 3.610$	$F = 1.904$
	^a p		.002	< .001	< .001	.028	.150
Marital status	Post hoc		$c < a - b$	$c < a - b$	$c < a - b$	$c < a$	
	Single	130(34.9)	109.16(14.80)	22.00(3.54)	30.24(4.51)	35.43(5.21)	21.47(3.54)
	Married	242(65.1)	107.66(14.54)	21.92(3.66)	29.64(4.72)	34.76(5.23)	21.32(3.37)
	Test value		$t = .945$	$t = .208$	$t = 1.181$	$t = 1.185$	$t = .402$
	^b p		.345	.835	.239	.237	.688
Educational level	Primary school ^a	41(11.0)	94.41(16.42)	18.53(4.43)	25.48(5.03)	30.21(6.64)	20.17(3.54)
	Secondary school ^b	40(10.8)	99.25(15.04)	20.30(3.55)	27.12(4.61)	32.05(5.38)	19.77(3.49)
	High school ^c	99(26.6)	107.38(14.82)	21.52(3.93)	29.42(4.82)	35.18(4.99)	21.25(3.64)
	University ^d	192(51.6)	113.19(10.73)	23.25(2.43)	31.58(3.42)	36.54(4.01)	22.03(3.11)
	Test value		$F = 31.603$	$F = 29.985$	$F = 32.200$	$F = 25.413$	$F = 7.346$
	^b p		< .001	< .001	< .001	< .001	< .001
Income status	Post hoc		$a - b < c - d$	$a - b < c - d$	$a - b < c - d$	$a - b < c - d$	$a - b < d$
	Income is less than expense ^a	111(29.8)	104.28(17.13)	20.88(4.38)	28.77(5.33)	33.83(5.89)	20.79(3.72)
	Income is equal to expense ^b	187(50.3)	108.67(13.04)	22.08(3.29)	29.93(4.28)	35.22(4.89)	21.42(3.23)
	Income is more than expense ^c	74(19.9)	112.82(12.91)	23.24(2.54)	31.28(4.09)	36.16(4.72)	22.13(3.36)
	Test value		$F = 8.053$	$F = 10.145$	$F = 6.701$	$F = 4.838$	$F = 3.474$
	^b p		< .001	< .001	.001	.008	.032
Chronic disease	Post hoc		a < b < c	a < b < c	a < c	a < c	a < c
	Yes	147(39.5)	107.18(16.28)	21.55(4.15)	29.41(5.12)	34.97(5.61)	21.23(3.81)
	No	225(60.5)	108.84(13.44)	22.21(3.20)	30.14(4.31)	35.01(4.98)	21.47(3.16)
	Test value		$t = -1.031$	$t = -1.623$	$t = -1.432$	$t = .081$	$t = -.615$
	^a p		.303	.106	.153	.936	.539
Having contracted COVID-19	Yes	53(14.2)	106.39(16.01)	21.28(4.25)	29.45(5.13)	34.18(5.96)	21.47(3.20)
	No	319(85.8)	108.48(14.39)	22.06(3.49)	29.92(4.57)	35.13(5.10)	21.36(3.47)
	Test value		$t = -.964$	$t = -1.460$	$t = -.683$	$t = -1.219$	$t = .212$
	^a p		.336	.145	.495	.224	.832
Covid-19 vaccination status	Yes	359(96.5)	108.18(14.77)	21.93(3.64)	29.83(4.69)	34.99(5.27)	21.41(3.45)
	No	13(3.5)	108.46(10.40)	22.46(3.07)	30.38(3.35)	35.15(3.99)	20.46(2.78)
	Test value		$t = -.068$	$t = -.514$	$t = .415$	$t = -.108$	$t = .980$
	^a p		.946	.608	.678	.914	.328

^at-test, ^bANOVA test

HLS:Health Literacy Scale, SD: Standard deviation

Table 2. Mean Scores of HLS and COVID-19 VLS

Scales		Mean (SD)	Min-Max
HLS	Overall Score	108.19(14.63)	25-125
	Access	21.95 (3.61)	5-25
	Understanding	29.85(4.65)	7-35
	Appraisal	35.00(5.23)	8-40
	Application	21.37(3.43)	5-25
COVID-19 VLS	Overall Score	2.74(0.60)	1-4
	Functional	2.57(0.78)	1-4
	Interactive-critical	2.83(0.72)	1-4

HLS:Health Literacy Scale, COVID-19 VLS: COVID-19 Vaccine Literacy Scale
SD: Standard deviation

Table 3. Distribution of Covid-19 VLS and subscales scores according to sociodemographic variables

Variables		n(%)	Covid-19 VLS Overall Score Mean(SD)	Functional Mean (SD)	Interactive-critical Mean(SD)
Gender	Female	207(55.6)	2.75(0.60)	2.50(0.78)	2.87(0.71)
	Male	165(44.4)	2.74(0.60)	2.65(0.78)	2.79(0.75)
	Test value		t= .103	t=-.102	t=-.056
	^a p		.918	.919	.955
Age	18-39 ^a	94(25.3)	2.84(0.58)	2.71(0.72)	2.91(0.73)
	40-64 ^b	194(52.2)	2.81(0.57)	2.56(0.80)	2.94(0.68)
	65 and above ^c	84(22.6)	2.48(0.61)	2.41(0.79)	2.51(0.73)
	Test value		F=11.360	F=3.162	F=11.477
	^a p		< .001	.043	< .001
Marital status	Single	130(34.9)	2.81(0.59)	2.64(0.80)	2.90(0.73)
	Married	242(65.1)	2.71(0.60)	2.53(0.78)	2.80(0.72)
	Test value		t=1.510	t=1.275	t=1.182
Educational level	Primary school ^a	41(11.0)	2.16(0.63)	2.08(0.76)	2.20(0.73)
	Secondary school ^b	40(10.8)	2.45(0.72)	2.46(0.86)	2.45(0.87)
	High school ^c	99(26.6)	2.73(0.55)	2.59(0.74)	2.79(0.68)
	University ^d	192(51.6)	2.94(0.47)	2.68(0.76)	3.07(0.58)
	Test value		F=27.820	F=7.102	F=25.142
	^b p		< .001	< .001	< .001
Income status	Income is less than expense ^a	111(29.8)	2.64(0.63)	2.52(0.79)	2.70(0.76)
	Income is equal to expense ^b	187(50.3)	2.76(0.60)	2.54(0.79)	2.87(0.73)
	Income is more than expense ^c	74(19.9)	2.87(0.53)	2.70(0.75)	2.95(0.63)
	Test value		F=3.362	F=1.452	F=3.076
	^b p		.036	.235	.047
Chronic disease	Yes	147(39.5)	2.70(0.60)	2.53(0.79)	2.78(0.71)
	No	225(60.5)	2.78(0.60)	2.59(0.78)	2.87(0.73)
	Test value		t=-1.241	t=-.803	t=-1.104
Having contracted COVID-19	Yes	53(14.2)	2.64(0.59)	2.50(0.74)	2.71(0.71)
	No	319(85.8)	2.76(0.60)	2.58(0.79)	2.85(0.73)
	Test value		t=-1.310	t=-.616	t=-.1291
Covid-19 vaccination status	Yes	359(96.5)	2.76(0.60)	2.57(0.78)	2.85(0.72)
	No	13(3.5)	2.42(0.60)	2.57(0.95)	2.35(0.70)
	Test value		t=1.957	t=-.026	t=.370
^a p		.051	.979	.015	

^a t-test, ^b ANOVA test

COVID-19 VLS: COVID-19 Vaccine Literacy Scale, SD: Standard deviation

Table 4. Regression model predicting Covid-19 VLS

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% CI	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	,099	,252		,392	,695	-,396	,594
Gender	-,030	,050	-,025	-,599	,549	-,129	,069
Age	-,069	,043	-,079	-1,613	,108	-,154	,015
Marital status	-,012	,057	-,010	-,216	,829	-,123	,099
Education level	,108	,029	,183	3,772	,000	,052	,165
Income level	,007	,037	,008	,184	,854	-,067	,080
Having contracted COVID-19	-,044	,071	-,026	-,615	,539	-,184	,097
Having chronic disease	,019	,056	,015	,338	,735	-,091	,129
Covid-19 vaccination status	,298	,137	,091	2,179	,030	,029	,568
HLS Overall Score	,020	,002	,485	10,354	,000	,016	,024

Notes: Durbin-Watson =1.734; F =25.665, p <.001; R =0.624; R² =0.390; Adjusted R² =37.4%. Abbreviations: CI, confidence interval; SE, standard error; β , standardized regression coefficient. *Significance level was accepted as p <.05.

HLS:Health Literacy Scale, COVID-19 VLS: COVID-19 Vaccine Literacy Scale

Discussion

This study examined the levels of health literacy, which has grown in importance during the COVID-19 pandemic, along with levels of COVID-19 vaccine literacy, a new concept that is expected to increase COVID-19 immunization being emphasized at this time. The current study found that the health literacy level of the participants was sufficient, and the COVID-19 vaccine literacy level was moderate. It determined that age group, education level, and income level affected health literacy and COVID-19 vaccine literacy. In addition, this study revealed that education level, COVID-19 vaccination status, and health literacy level are predictors of COVID-19 vaccine literacy.

This study also determined that the health literacy levels of the participants were sufficient. Studies conducted in Turkey have reported that more than half of adults have insufficient health literacy levels.^{6,7,8} The difference between the results of this study and the literature may be connected with when the study was done. The studies in the literature were seen to have been done before the pandemic. The data for this study were collected approximately 1,5 years after the pandemic began. Society may have become more mindful of health issues during the COVID-19 pandemic and society's ability to access, understand, appraise, and apply health-related information may have increased. In addition, the study found health literacy to be an important predictor of COVID-19 vaccine literacy, as Covid-19 vaccine literacy increased as health literacy scores increased. Supporting this finding, Rowlands's study (2014) states that increasing health literacy skills can increase knowledge about vaccines.¹⁷ It is thought that health literacy should be increased to increase society's COVID-19 vaccine literacy.

This study determined that the participants had moderate levels of COVID-19 vaccine literacy. A study conducted in Croatia found a moderate level of COVID-19 vaccine literacy in individuals and a study conducted in Italy reported that the COVID-19 vaccine literacy level of the participants was high.³ Any similarities or differences in the results could be attributed to educational attainment or cultural traits. By educating the public about COVID-19 vaccines, it is important to raise the level of COVID-19 vaccine literacy and thus increase the rate of COVID-19 vaccine uptake. In this study, the health literacy scores of participants 65 and older were significantly lower than those of participants in other age groups. The body of research backs up the assertion that older people are less health literate. According to the Wu et al. study, people over 65 are more likely to have poor health literacy.¹⁸ The study by Ayaz Alkaya and Ozturk found the health literacy levels of individuals over the age of 40 to be lower.¹⁹ Yu et al. conducted a longitudinal study covering individuals aged between 59 and 100 years and stated that the health literacy score of 83.5% of the participants decreased by 1% each year, whereas the level of health literacy remained constant and did not decrease in 16.5% of participants.²⁰ The fact that the health literacy level of a small part of the elderly did not decrease in the study by Yu et al. shows that the health literacy level of the elderly is not destined to decrease. In addition, the COVID-19 vaccine literacy scores of the participants aged 65 and over were significantly lower than the participants in other age groups. Similarly, Gusar et al. (2021),

reported that as age increases, COVID-19 vaccine literacy decreases.¹⁴ Biassio et al. (2020) found that Interactive-critical COVID-19 vaccine literacy decreased significantly after the age of 65.³ Low health literacy and COVID-19 vaccine literacy in the elderly may be due to reduced physical and mental capacity. For the health literacy and COVID-19 vaccine literacy level in adulthood not to decrease during old age, education should be provided for the elderly on these issues.

The current study determined that as the education level increased, the average of the HLS and COVID-19 VLS scores increased, with university graduates scoring significantly higher. Furthermore, this study found that education level is a predictor of COVID-19 vaccine literacy. Similarly, Sorensen et al. (2015) found the health literacy of individuals with a high level of education to be high.⁵ Two studies conducted in Turkey associated high health literacy scores with higher education levels.^{6,8} Additionally, this research revealed that as education level rises, so do COVID-19 vaccine literacy scores, with high school and university graduates scoring higher than primary and junior high school grads. In their studies, Biasio et al. (2021) and Gusar et al. (2021) also noted that COVID-19 vaccine literacy increased along with educational outcomes.^{3,14} Increasing the level of education increases both health literacy and COVID-19 vaccine literacy. Therefore, efforts should be made to increase the education level of society.

This study found that as the level of income increased, so did health literacy scores, noting that those with more income than expenditures had higher health literacy scores. The study by Ozkan et al. (2018) associated high health literacy scores with high-income levels (8). Similarly, the study by Sun et al. (2013) found that as the income level increases, so does the level of health literacy.²¹ Sorensen et al. (2015) and Palumbo et al. (2016) found that individuals with poor financial status had a lower level of health literacy.^{5,22} In this study, the COVID-19 vaccine literacy total score and Interactive-critical subscale score were found to be higher for those whose income is greater than their expenditures. Since the income level variable was not examined in the other studies that examined COVID-19 vaccine literacy, a comparison could not be made for this finding.^{3,14}

The World Health Organization recommends and encourages immunization at a global level with the COVID-19 vaccine, which is one of the measures to safeguard against COVID-19.²³ In this study, the COVID-19 Overall Score and the Interactive-critical Score were higher. Additionally, COVID-19 vaccine literacy could be predicted by receiving the vaccine. In other words, adults who had received their own COVID-19 vaccination had better access to, comprehension of, and ability to evaluate information about the COVID-19 vaccine. This is reversed by a study done on the adult population in Syria, which observed that acceptance of the COVID-19 vaccine is positively correlated with high vaccination knowledge.²⁴ In this study, the rate of those who would not get the COVID-19 vaccine is 3.5%. A global study of potential vaccine acceptance rates conducted in 19 countries stated that when the COVID-19 vaccine is available, the vaccine non-acceptance rate is 14.2% and that this rate should be reduced to ensure herd immunity.²⁵ A study comparing two countries reported a COVID-19 vaccination hesitation rate of 14% in the United Kingdom and 31% in Turkey.²⁶ The reason for these reservations about getting vaccinated may be the lack of sufficient and accurate information about the vaccine. The level of COVID-19 vaccine literacy must be increased to eliminate these reservations and ensure herd immunity.

Conclusion

The current study found that the health literacy level of the participants was sufficient, and the COVID-19 vaccine literacy level was moderate. To raise the level of health literacy and COVID-19 vaccine literacy higher, society has to be better informed. The study determined that age group, education level, and income level affect health literacy and COVID-19 vaccine literacy levels. We recommend giving priority to the elderly and those with low education and income levels in the education to be given on Health Literacy and COVID-19 Vaccine Literacy. In addition, the current study revealed that education level, COVID-19 vaccination status, and health literacy level are predictors of COVID-19 vaccine literacy. We recommend considering predictive factors to increase COVID-19 vaccine literacy. Interventional studies to increase society's health literacy and COVID-19 vaccine literacy should be planned and implemented in future research.

Practice Implications

The current study determines adults' health literacy, COVID-19 vaccine literacy levels, and the factors affecting these dependent variables. It is thought that the results of this study will give an idea to interventional studies that will improve society's health literacy and COVID-19 vaccine literacy. In studies to increase the health literacy and COVID-19 vaccine literacy of society during the COVID-19 pandemic, priority should be given to those aged 65 and over, and groups with low education levels and low-income levels. In addition, education level, COVID-19 vaccination status, and health literacy were found to be predictive factors for COVID-19 vaccine literacy. These factors must be considered in plans to increase COVID-19 vaccine literacy. The data of this study were collected in a family health center, which is a primary health care institution. To increase health literacy and COVID-19

vaccine literacy, we recommend that the health education that is to be given to society be given by doctors and nurses who work in family health centers.

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