Coronavirus Pandemic

The fear of COVID-19, health literacy and levels of compliance with prevention measures of adult individuals in Turkey

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Abstract

Introduction: It is known that health literacy and fear of COVID-19 are effective in complying with COVID-19 prevention measures. A limited number of studies have shown the relationship between health literacy, fear of COVID-19, and compliance with COVID-19 prevention measures. The purpose of this study is to investigate the fear of COVID-19, health literacy, compliance levels with prevention measures of adult individuals and influential factors.

Methodology: The cross-sectional study used an online questionnaire and was conducted with 1018 adults aged 18-64 in Turkey between 01-31 December 2020. The convenience sampling method was used to determine the sample. Student t-test, ANOVA, correlation, and multiple linear regression were used.

Results: Half of the participants (49.9%) had inadequate and problematic-limited health literacy (HL). Adults' compliance with measures during the COVID-19 pandemic and some sociodemographic characteristics had a significant relationship with HL and fear of COVID-19 ($p < 0.05$). It was determined that those with high HL and those afraid of COVID-19 paid more attention to precautions ($p < 0.05$). Health literacy was a predictor of fear of COVID-19 ($\beta = -0.091$; $p < 0.001$).

Conclusions: Governments need to invest in increasing health literacy.

Key words: health literacy; fear; COVİD-19; prevention measures; adult individuals.

Introduction

The novel and highly contagious coronavirus disease (COVID-19) pandemic has been declared a public health emergency. The disease is also a massive burden on countries around the world [1,2]. Since the declaration of the COVID-19 situation as a pandemic [3], authorities across the globe have made significant efforts and taken the necessary precautions to contain the spread of the virus. These precautions generally include health-protective behaviors such as frequent hand washing, wearing a face mask, and maintaining a safe physical distance [4-7]. In addition to these, health behaviors such as physical activity and proper nutrition also have an important role in protecting and promoting health during the COVID-19 outbreak [8].

The first case of COVID-19 in Turkey was recorded on March 11, 2020. Following this date, various measures such as quarantine, isolation, wearing masks, social distancing and hand hygiene have been implemented throughout the country, as in other countries [9]. The rapid spread of this novel pandemic has resulted in people experiencing panic and anxiety. As the number of patients and deaths increased rapidly, the unknown course and duration of the pandemic caused fear [10]. Fear manifests itself as exhibiting protective behaviors and thus avoiding risky situations [11]. During the COVID-19 pandemic, it has been observed that the level of fear or anxiety increases the tendency to obey rules [12]. Many studies have stated that individuals with high levels of fear are more likely to comply with COVID-19 precautions [13,14]. It was also stated that demographic factors such as age, gender, and education were associated with the fear of COVID-19 (15) During this period, due to the uncertainty of COVID-19, baseless and false information began to increase in social media and the internet to an extent that created fear and panic in society. This may lead to negative consequences such as incorrect treatments and failure to comply with precautions [1]. Therefore, the World Health Organization reported that misinformation and extreme fear are major problems and recommended governments share accurate information in a timely and transparent manner to reduce fear [16,17]. Confronting the constant flow of information during the pandemic period may cause problems in individuals' ability to

obtain, distinguish, and understand accurate medical information [18]. Therefore, people need to be sufficiently health literate to be able to access, understand and use reliable information, adopt protective behaviors, and cope with the COVID-19 outbreak [19,20]. The importance of high health literacy for healthy people was emphasized (21). Health literacy (HL) is of irreplaceable importance in public health but is still underestimated globally. Therefore, is considered a silent epidemic [22]. Although its importance was emphasized during previous coronavirus pandemics such as Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS) [18], it has once again come to light with the COVID-19 outbreak that; HL is crucial in controlling contagious diseases as well as preventing non-contagious diseases [23]. HL is also considered the key to raising public awareness and flattening the COVID-19 infection curve [24]. It is a focal issue for preparing health systems for situations that require rapid intervention in the fight against diseases [25]. HL is a social determinant of health, and although low HL is associated with illiteracy, poverty, unemployment, and low socioeconomic status, those with higher education and income levels may also exhibit low HL when faced with a new issue [26-28]. Inadequate HL was seen as a common problem in the pre-pandemic period [29-31]. It has also been shown that the HL level of society has been generally low during the pandemic period [32,33]. Individuals with adequate HL are more likely to adopt positive health behaviors related to COVID-19 and have a lower fear of COVID-19. In Belgium, participants with adequate HL during the pandemic period were found to have a lower risk of not complying with social distancing than those with low HL [19]. Medical students with high HL in Vietnam have been shown to be less afraid of COVID-19 [34].

In line with all of this information, it can be said that HL, whose importance was emphasized in the pre-pandemic period, came to the fore once again by increasing during the pandemic period. Although it has been stated that individuals with a high level of fear pay more attention to the precautions [14], it is well established that individuals pay more attention to the recommended precautions when their awareness and knowledge levels are increased helping them to avoid the risk of infection, and thus minimizing their level of fear. However, there are limited studies in the literature investigating the levels of HL, fear of COVID-19, and compliance with precautions during the pandemic period. Very few studies were also found in Turkey.

This study is important in that it investigates the relationship between these triple on a large population in Turkey. Shedding light on the levels of individuals' fear of COVID-19, HL, and compliance with the measures will make significant contributions to the literature. In addition, future studies can develop ways of managing the outbreak and decreasing the level of fear by increasing the level of compliance with the measures and practices aimed at increasing the level of HL of society. In this respect, this study will serve as a stepping stone for future research in this area. For this reason, this study was carried out to investigate adult individuals' fear of COVID-19, health literacy, compliance levels with prevention measures, and influencing factors.

Research Questions
1. What is the HL level of adults?
2. What is the level of adults' fear of COVID-19?
3. What are the factors associated with adults' HL and fear of Covid-19?
4. Does the HL level of adults affect the fear of COVID-19?

Methodology
Study Design
A descriptive, cross-sectional, and correlational research design was used in the study. The study was conducted in Turkey between 01-31 December 2020.

Population and Sample of the Study
The participants of the study consisted of adults between the ages of 18-64 living in Turkey. The sample size was calculated using the G*Power program version 3.1.9.7. The sample size was determined as 134 with an alpha value of 0.05, effect size of 0.3, and 95% power [35]. The convenience sampling method was used to determine the sample. The data were collected with the help of an online (Google Forms) questionnaire prepared by the researchers. The questionnaire was sent to the participants through social networks (WhatsApp, Facebook, Messenger, etc.) and they were made to fill it out. Informed consent was obtained from the participants by making necessary explanations about the research in the introduction part of the online questionnaire. Participants were instructed to fill out the questionnaire only once. Participants were required to answer mandatory questions. Therefore, there is no missing data in the study. A total of 1045 participants living in different provinces of Turkey

completed the questionnaire. The data were examined for repeated answers and no repeated answers were found. 27 participants who were not in the determined age group were not included in the study and the study was completed with 1018 participants. The response time was an average of 15-20 minutes.

Inclusion criteria

Living in Turkey, volunteering to participate in the study, being between the ages of 18-64, being literate in Turkish, and having the ability to use technology.

The Techniques of Collecting the Data

The "Personal Information Form", "COVID-19 Prevention Measures Compliance Form", "Turkey Health Literacy Scale-32 (TSOY-32)" and "The Fear of COVID-19 Scale" were used to collect data.

Personal Information Form

This form was created by the researchers by scanning the literature. The form includes demographic characteristics of individuals such as age, gender, marital status, and economic status; It consisted of questions that include information about illness/health such as assessing health status, disease status, and information about COVID-19, such as contracting COVID-19 and the presence of relative who died from COVID-19.

COVID-19 Prevention Measures Compliance Form

This form was developed by researchers using the guidelines published by the Ministry of Health of the Republic of Turkey for public use [9]. The form consisted of expressions such as wearing a mask, regular hand washing, staying at home, paying attention to keeping a social distance of at least 1.5 m, avoiding meeting with relatives, friends, etc., adequate and balanced nutrition, regular exercise, and adequate sleep. Questions about compliance with protective measures were asked by the researcher in a 5-point Likert style (1: Never, 2: Rarely, 3: Sometimes, 4: Often, 5: Always). Then, those who answered between 1-3 were classified as 'No', and those who answered between 4-5 were classified as 'Yes' and analyzed.

The Fear of COVID-19 Scale

It was adapted into Turkish by Satıcı *et al.* [36]. The applicable age scope of the scale is wide and applies to university students and adults. All items of the scale consisting of seven questions were scored positively. The questions were scored from 1 to 5 (1- Strongly disagree…5-Strongly agree) using a 5-point Likert-type scaling. There is no reverse-scored item in the scale. A score between 7 and 35 is taken from the scale. A high score indicates a 'high' COVID-19 fear level. In the Turkish validity and reliability study of the scale, the Cronbach Alpha value was found to be 0.82. In this study, the Cronbach Alpha value of the scale was determined as 0.88

Turkish Health Literacy Scale-32 (TSOY-32)

The reliability and validity of the scale were tested by Okyay *et al.* [37], and it was developed based on the Conceptual Framework of the HLS-EU Study [38]. The scale is a new 32-item HL scale that measures HL in literate people aged 15 and over. The conceptual framework includes two health-related dimensions (treatment and service, disease prevention/health promotion) and four information-gathering processes (access, understanding, evaluation, and use/application) associated with health-related decision-making and practices. In the calculation of the scale; Each item is graded as "1: Very easy, 2: Easy, 3: Difficult, 4: Very difficult." and Code 5 was used for the expression "I have no idea". In order to facilitate calculation, the total score was standardized with the help of the formula "Index = (arithmetic mean-1) × [50/3]" to take a value between 0-50. A high score indicates high HL. The index is classified into four categories: Inadequate HL (0-25 points), problematic-limited HL (> 25-33 points), sufficient HL (> 33-42 points), and excellent HL (> 42-50 points). The alpha value was found to be 0.927. In our study, the Cronbach's alpha value of the scale was found to be 0.962.

Ethics of the Study

The study abided by the Declaration of Helsinki. Written permission was obtained from the Republic of Türkiye General Directorate of Health Services of the Ministry of Health (14.07.2020 /2020-07-14T15_07_28). The study was approved by the Dicle University Non-Interventional Ethics Committee (22.10.2020/344). Online informed consent was obtained from all participants before participation.

Statistical Analysis

All data were analyzed in the IBM SPSS Statistics 20.0 program. Mean, standard deviation, minimum, maximum, number, and percentage were used in the analysis of descriptive data. In the study, whether the scales showed a normal distribution within each group by calculating the total score average was examined. Kurtosis, Skewness, and Shapiro-Wilk were used in normality tests and it was determined that the scale

scores showed normal distribution. Therefore, the Student t-test, ANOVA test, and Pearson correlation were used to compare independent variables with scale scores. Scheffe Post Hoc test was used to determine the source of the difference resulting from the ANOVA test. Variables that were significant in the Student t-test and ANOVA analysis were included in the regression analysis. Multiple linear regression analysis was performed to predict COVID-19 fear based on independent variables. Categorical variables were included in the model as dummy variables. All of the variables with a variance inflation factor (VIF) over 10 among the predictors included in the regression model were excluded from the model. Cronbach's alpha coefficient was calculated in the internal consistency analysis of the scales. All findings were evaluated at $p < 0.05$ significance level.

Results

It was determined that 13.0% of the participants had inadequate, 36.9% problematic-limited, 30.4% sufficient, and 19.7% excellent HL. In addition, TSOY-32 scores were 34.09 ± 8.04 and COVID-19 fear scores were 19.27 ± 6.07 (Table 1).

It was determined that the mean age of the participants was 33.53 ± 11.81 years, 62.2% were women and 50.5% were married. 71.8% of the participants are university graduates, 75.1% have medium economic status, 58.4% have a job, and 64.0% live in the city center (Table 2). 84.5% of the participants did not have any chronic disease, 60.0% perceived their health status well, 16.4% were diagnosed with COVID-19, 32.8% had a relative who died from COVID-19, and 22.6% of them got the most information about COVID-19 from television (Table 3).

There were significant distinctions in terms of gender, educational status, economic status, perception of health, and the source from which they obtained the information in relation and the HL total score averages of the participants ($p < 0.05$). In the Scheffe analysis, it was determined that HL total score averages were higher for females than males; those with postgraduate degrees than graduates of primary education and university; those with high economic status than those with low and medium economic statuses; those who perceive their health status as good than those who perceive it as bad or moderate; those whose information source was scientific research than those whose information source was television, internet, social media or family-friends-acquaintances ($p < 0.05$).

Table 1. The participants' HL levels and averages of scale scores. (n = 1018).

Characteristics	n/Mean ± SD	%/Min-Max
Inadequate HL	132	13.0
Problematic-limited HL	376	36.9
Sufficient HL	309	30.4
Excellent HL	201	19.7
TSOY-32	34.09 ± 8.04	7.17-50
The Fear of COVID-19	19.27 ± 6.07	7-35

Table 2. Comparison of scale scores with sociodemographic characteristics of participants (n = 1018).

Characteristics	HL			The Fear of COVID-19	
	Mean ± SD	Min-Max	t-F/p	Mean ± SD	t-F/p
*Age	33.53±11.81	18-64	r = -0.056, p = 0.074		**r = 0.114, p = 0.000**
	n (%)	Mean ± SD	t-F/p	Mean ± SD	t-F/p
Gender					
Female	633 (62.2)	34.67 ± 7.80	t = 2.943	20.25 ± 6.00	t = 6.779
Male	385 (37.8)	33.14 ± 8.34	**p = 0.003**	17.65 ± 5.85	**p < 0.001**
Marital status					
Married [1]	514 (50.5)	33.53 ± 7.98	F = 2.514	19.86 ± 5.95	F = 12.121
Single [2]	472 (46.4)	34.68 ± 8.08	p = 0.081	18.40 ± 6.06	**p = 0.000**
Widowed [3]	32 (3.1)	34.38 ± 8.02		22.50 ± 6.05	1 > 2; 3 > 2
Educational status					
Primary education [1]	38 (3.7)	31.86 ± 6.80	F = 6.983	22.61 ± 6.68	F = 4.041
High [2]	113 (11.1)	35.08 ± 8.35	**p = 0.000**	19.27 ± 6.19	**p = 0.007**
University [3]	731 (71.8)	33.59 ± 7.89	4 > 1; 4 > 3	19.12 ± 6.00	1 > 2; 1 > 3; 1 > 4
Postgraduate [4]	136 (13.4)	36.59 ± 8.35		19.13 ± 5.97	
Economic status					
Low [1]	161 (15.8)	32.85 ± 7.93	F = 5.859	18.86 ± 6.31	F = 0.773
Moderate [2]	765 (75.1)	34.07 ± 8.03	**p = 0.003**	19.40 ± 5.95	p = 0.462
High [3]	92 (9.0)	36.43 ± 7.89	3 > 1; 3 > 2	18.85 ± 6.66	
Employment status					
Employed	595 (58.4)	34.08 ± 8.25	t = -0.043	19.23 ± 5.98	t = -0.102
Unemployed	423 (41.6)	34.10 ± 7.74	p = 0.965	19.32 ± 6.20	p = 0.811
Place of residence					
City center	652 (64.0)	33.87 ± 8.27	F = 0.692	19.56 ± 6.15	F = 2.652
County center	286 (28.1)	34.47 ± 7.47	p = 0.501	18.92 ± 5.92	p = 0.071
town + village	80 (7.9)	34.52 ± 8.11		18.13 ± 5.80	

*Pearson Correlation, [1-7]Scheffe Post Hoc, t: Independent Sample T-Test, F: ANOVA.

There was a significant difference in terms of age, gender, marital status, education level, having a chronic disease, and perceiving health according to the total mean score of fear of COVID-19 ($p < 0.05$). The fear of COVID-19 increases with age. In the Scheffe analysis, it was determined that the total mean score of fear of COVID-19 was statistically higher for women than men; married and widowed individuals than those who were unmarried; primary school graduates than high school and university graduates, and those with postgraduate degrees; those with chronic diseases than those without; those who perceived their health status as bad or moderate than those who perceived it as good ($p < 0.05$), (Table 2, 3).

It was determined that 99.3% of the participants wore masks, 96.2% washed their hands regularly, 77.3% usually stayed at home, 78.7% paid attention to keeping a social distance of at least 1.5 meters, 73.7%

Table 3. Comparison of scale scores with participants' health-related characteristics and information (n = 1018).

Characteristics	n (%)	HL		The Fear of COVID-19	
		Mean ± SD	t-F/p	Mean ± SD	t-F/p
Chronic disease					
Yes	158 (15.5)	33.39 ± 8.28	t = -1.192	20.18 ± 6.55	t = 2.058
No	860 (84.5)	34.22 ± 7.99	p = 0.234	19.10 ± 5.97	***p = 0.040***
Psychological disease					
Yes	35 (3.4)	32.86 ± 6.94	t = -0.923	19.80 ± 7.20	t = 0.530
No	983 (96.6)	34.13 ± 8.07	p = 0.356	19.25 ± 6.03	p = 0.596
Perception of health					
Bed[1]	25 (2.5)	30.12 ± 9.08	F = 15.782	22.60± 7.88	F = 8.541
Moderate[2]	382 (37.5)	32.60 ± 7.66	***p = 0.000***	19.92 ± 6.41	***p = 0.000***
Good[3]	611 (60.0)	35.19 ± 8.04	3 > 1; 3 > 2	18.72 ± 5.69	1 > 3; 2 > 3
Diagnosed with COVID-19					
Yes	167 (16.4)	33.10± 8.18	t = -1.744	18.74 ± 6.52	t = -1.217
No	851 (83.6)	34.28 ± 8.00	p = 0.082	19.37 ± 5.98	p = 0.224
Relative who died from COVID-19					
Yes	334 (32.8)	33.52 ± 8.16	t = -1.588	19.42 ± 5.89	t = 0.565
No	684 (67.2)	34.37 ± 7.97	p = 0.133	19.19 ± 6.16	p = 0.572
The most common source of information about COVID-19					
Health Workers[1]	106 (10.4)	34.07 ± 8.80		19.03 ± 6.69	
Ministry/Official Organization[2]	198 (19.4)	35.31 ± 7.57		18.90 ± 6.04	
Scientific research[3]	94 (9.2)	36.96 ± 8.84	F = 4.213; ***p = 0.000***;	18.67 ± 6.13	
Television[4]	230 (22.6)	33.66 ± 7.84	3 > 4; 3 > 5; 3 > 6; 3	20.38 ± 5.75	F = 1.740; p = 0.109
Internet[5]	208 (20.4)	33.29 ± 7.61	> 7	18.95 ± 5.71	
Social media[6]	152 (14.9)	32.92 ± 8.01		19.01 ± 6.25	
Family-friends-acquaintances[7]	30 (2.9)	31.84 ± 7.54		19.27 ± 7.20	

[1-7]Scheffe Post Hoc, t: Independent Sample T-Test, F: ANOVA.

Table 4. Comparison of participants' scale scores with compliance with Covid-19 measures (n = 1018).

Characteristics	n (%)	HL		The Fear of COVID-19	
		Mean ± SD	t/p	Mean ± SD	t/p
Wore masks					
Yes	1011 (99.3)	34.09 ± 8.03	t = 0.064	19.28 ± 6.05	t = -0.741
No	7 (0.7)	34.28 ± 10.2	p = 0.949	17.57 ± 8.94	p = 0.459
Regular hand washing					
Yes	979 (96.2)	34.19 ± 8.01	t = -1.906	19.36 ± 6.08	t = -2.409
No	39 (3.8)	31.69 ± 8.56	p = 0.057	16.97 ± 5.48	***p = 0.016***
Stay home					
Yes	787 (77.3)	34.37 ± 8.13	t = -2.055	19.51 ± 6.12	t = -2.388
No	231 (22.7)	33.14 ± 7.65	***p = 0.040***	18.43 ± 5.84	***p = 0.017***
Pay attention to keeping a social distance of at least 1.5 m.					
Yes	801 (78.7)	34.78 ± 7.84	t = -5.314	19.55 ± 6.07	t = -2.917
No	217 (21.3)	31.55 ± 8.25	***p = 0.000***	18.20 ± 5.95	***p = 0.004***
Avoiding meeting with relatives, friends, etc.					
Yes	750 (73.7)	34.11 ± 8.10	t = -0.135	19.68 ± 6.02	t = -0.925
No	268 (26.3)	34.03 ± 7.89	p = 0.893	18.12 ± 6.07	***p = 0.000***
Adequate and balanced diet					
Yes	688 (67.6)	34.73 ± 7.93	t = -3.713	19.43 ± 6.18	t = -1.286
No	330 (32.4)	32.75 ± 8.11	***p = 0.000***	18.91 ± 5.83	p = 0.199
Regular exercise					
Yes	159 (15.6)	34.44 ± 8.08	t = -0.598	18.79 ± 6.55	t = 1.083
No	859 (84.4)	34.03 ± 8.03	p = 0.550	19.35 ± 5.98	p = 0.279
Enough sleep					
Yes	533 (52.4)	35.08 ± 8.08	t = -4.163	18.97 ± 5.85	t = 1.649
No	485 (47.6)	33.00 ± 7.85	***p = 0.000***	19.59 ± 6.29	p = 0.100

avoided meeting with relatives, friends, etc. 67.6% had an adequate and balanced diet during this period, 15.6% of them exercised regularly, and 52.4% of them got enough sleep. According to the HL total score averages of the participants; those who stayed at home; those who paid attention to keeping a social distance of at least 1.5 m; those who had adequate and balanced nutrition; and those who got enough sleep had statistically higher scores ($p < 0.05$). According to the total score average of fear of COVID-19, it was determined that those who wash their hands regularly; those who stayed at home; those who paid attention to keeping a social distance of at least 1.5 m; those who avoided meeting with relatives, friends, etc. had statistically higher scores ($p < 0.05$) (Table 4).

Multiple linear regression analysis between the fear of COVID-19 and independent variables is given in Table 5. When there is a one-unit change in age, the fear of COVID-19 increases by 0.075, being a woman increases the fear of COVID-19 by 2,941 points when the health status is perceived well, the fear of COVID-19 decreases by 1.050, and the fear of COVID-19 increases by 1.194 in those who paid attention to keeping a social distance of at least 1.5. It was also determined that a one-unit increase in the HL score decreased the fear of COVID-19 by 0.091. All coefficients obtained are statistically significant and 9.1% of the dependent variable of the fear of COVID-19 is explained together with these predictors (F = 21,278, $p = 0.000$, Adj. $R^2 = 0.091$, SE = 5,789.).

Discussion

This study, which aims to examine the fear of COVID-19, health literacy, compliance levels with prevention measures, and affecting factors of adult individuals, is one of the limited studies that makes significant contributions to the literature. The findings of the study show that one out of every two participants had inadequate and problematic-limited HL. In various studies conducted in Turkey in the pre-pandemic period, the inadequate and problematic HL level of the participants was found to be between 52.7% and 80.7% [29,37,39]. Similar results have been obtained in

different countries [30,31]. In studies conducted during the pandemic period as well, it has been reported that HL is low in the population [32,33]. As can be seen, the level of inadequate and problematic-limited HL is lower in this study compared to other studies. This can be explained by the participation of only individuals with a certain level of education who can use technology since the data were collected with the help of an online questionnaire. In addition, the use of different measurement tools in the studies may have made a difference. In any case, the results showed that the inadequate and problematic level of HL was a public health problem in Turkey and around the world, both in the pre-pandemic period and during the pandemic period. Despite a relatively highly educated group, the prevalence of inadequate and problematic-limited HL was high in this study.

In the current study, it was determined that gender difference was a determinant in HL. The HL levels of women were higher than men. Different results have been reported in the literature regarding the relationship between gender and HL. Contrary to our findings, there are studies reporting that inadequate HL is more common in women than men [40], and there are also studies that support our findings that being female is associated with high HL [41]. In addition, it was stated in a study that there was no relationship between HL and gender [32]. In this study, the reason why women have higher HL than men may be due to the fact that the majority of the participants were female and their education level was high. Additionally, women may have sought more health information during the pandemic period.

High HL is associated with a higher education level [27,40-42]. However, individuals with a high level of education may also have low HL [28]. In this study, HL increases as the education level increases. Especially having a postgraduate education increased the level of HL. HL is associated with basic literacy, and basic literacy affects individuals' cognitive, behavioral, and social skills and abilities [43].

In this study, individuals with higher economic status had higher HL levels. Similar results have been

Table 5. Multiple linear regression analysis between the fear of COVID-19 and independent variables (Stepwise model).

Characteristics	B (%95CI)	Beta	t	p	Zero-order	Partial	Part
(Constant)	17.729 (15.727 – 19.731)		17.379	0.000			
Age	0.075 (0.044 – 0.106)	0.145	4.723	0.000	0.114	0.147	0.141
Gender	2.941 (2.184 – 3.698)	0.235	7.625	0.000	0.208	0.233	0.228
Perception of health	-1.050 (-1.790 – -0.310)	-0.085	-2.783	0.005	-0.110	-0.087	-0.083
Social distancing of at least 1.5 m	1.194 (0.301 – 2.087)	0.081	2.623	0.009	0.091	0.082	0.078
HL	-0.091 (-0.137 – 0.045)	-0.121	-3.908	0.000	-0.108	-0.122	-0.117

B: Unstandardized Coefficients, Beta: Standardized Coefficients, F = 21.278, $p = 0.000$, Adj.$R^2 = 0.091$, SE = 5.789. Gender (Female: 1 Male: 0), Perception of health (Good: 1 Moderate: 0 Bed: 0), Social distancing of at least 1.5 m (Yes: 1 No: 0) were taken as Dummy variables. Durbin Watson:1.893

obtained in other studies [40,44]. Sorensen *et al.* emphasized that low socioeconomic status is the strongest predictor of low HL [26]. These findings confirm the assumption that low socioeconomic status may adversely affect HL and thus lead to poor health outcomes [45]. Low socioeconomic status may also lead to poor health outcomes during the pandemic period.

Yiğitalp *et al.* stated that individuals who perceive their health status well have higher HL [39]. Similar results have been reported in other studies [26,42]. The results of the present study also support the literature. Individuals with high HL levels can take more responsibility for their health. They can use accurate and reliable information sources to promote their health and prevent diseases, so they can have a better perception of health. During the pandemic, individuals with high health perception (and therefore individuals with high health literacy) may adopt more health-protective behaviors.

In the study, individuals who provided information about COVID-19 from reliable sources such as health workers, ministry/official organizations, and scientific research had higher HL scores. In a study conducted in Japan, it was reported that those with high HL levels used newspapers and the Internet more frequently [46]. In today's technology age, the rate of access to scientific research etc. via the internet is high, and the participants may have been able to access scientific research, etc., by using the internet effectively. In the study, the education level of the individuals participating in the study was higher than the general population. This may indicate that they use reliable information sources to obtain information.

No consistent data has been found in the literature regarding the relationship between the fear of COVID-19 and age. Giordani *et al.* reported that the fear of COVID-19 decreased as age increased [47]. Haktanır *et al.* reported that there was no significant difference between age and the fear of COVID-19 [48]. The current study, on the other hand, supports studies reporting that the fear of COVID-19 increases as age increases [11]. These results may be due to the fact that the studies were conducted in different places and at different times. Considering that elderly individuals have a more severe disease and higher mortality rates due to COVID-19 [49], it is an expected finding that they experience more fear. On the other hand, young individuals may not feel threatened by the disease.

There may be gender differences in the fear of COVID-19, and women may experience more fear than men [13,34,47,48,50]. In this study, it was determined that the fear of COVID-19 was higher in women, in line with the literature. Also, being a woman was an important predictor of fear of COVID-19. Women may have experienced more fear, possibly due to their emotional nature and their perspective on events. In addition, this may be due to the fact that women are under more pressure at home during the COVID-19 period, they are more burdened than men in terms of childcare, housework, domestic violence, inequalities, and inability to access reproductive health services [51].

In this study, married people and widows had a higher fear of COVID-19 than those who are unmarried. Although, contrary to our findings, married individuals were generally reported to be less afraid of the pandemic [33]. Our findings are supported by the results of Aksoy *et al.* [50]. There can be two explanations for this; First, married and widowed individuals may have been worried about their children, spouses, etc., aside from themselves, and therefore their fear may have increased. Second, unmarried individuals may not see themselves at risk for COVID-19 infection because they are likely younger, and thus may experience less fear.

Many studies have reported a negative relationship between education level and the fear of COVID-19 [50,52]. In the current study, the fear of COVID-19 among primary school graduates was higher than those with higher levels of education. Individuals with a low level of education may not have access to reliable information and may be frightened by false information, possibly through rumors.

Although an association between the fear of COVID-19 and the presence of chronic disease was not reported in some studies [48], this study found that the fear of COVID-19 was high in those with chronic disease. A study conducted in Chile had similar findings to ours [52]. Considering that those who had severe illness and those who died during the COVID-19 period had concomitant diseases [53], it can be said that it is an expected finding that individuals with any chronic disease experience more fear.

In this study, individuals who perceived themselves as possessing good health had lower fear of COVID-19 than those with perceptions of personal health being poor or moderate. In addition, perceiving good health was an important predictor of fear of COVID-19. In a study conducted in Iran, it was stated that there is a positive relationship between the fear of COVID-19 and perception of poor health [14]. Since the perception of poor personal health may be associated with the presence of any chronic disease, the fear of COVID-19

may be lower in those who perceive their health status well during the pandemic period.

In this study, it was seen that those who comply with the COVID-19 measures such as staying at home, paying attention to keeping a social distance of at least 1.5 m, adequate and balanced nutrition and enough sleep during the pandemic have higher levels of HL than those who do not. A relationship was found between HL and some health behaviors under normal circumstances too. For example, Chen *et al.* reported a positive association between HL and healthy eating [54]. Öztürk and Ayaz-Alkaya reported a positive relationship between HL and health promotion behaviors [44]. Ishikawa *et al.* reported that individuals with high HL levels are more likely to take preventive measures against health risks [46]. Additionally, in the study conducted by Hermans *et al.* during the pandemic period, they found a lower risk of non-compliance with social distancing in participants with adequate HL compared to those with low HL [19]. Naveed *et al.* reported that HL was a positive predictor of protective behaviors against COVID-19 [20]. It is likely that the importance of preventive health behaviors such as adequate and balanced nutrition and adequate sleep, which are very important for health, come to the fore even more during the pandemic period. It can be said that high HL increases the level of adherence to precautions and the tendency to health-protective behaviors by reducing fear and panic in individuals during the pandemic period [55].

In this study, it was observed that those who complied with COVID-19 measures such as regular hand washing, staying home, paying attention to keeping a social distance of at least 1.5 m, avoiding meeting with relatives, friends, etc. during the pandemic period had higher COVID-19 fear levels than those who did not. In addition, paying attention to keeping a social distance of at least 1.5 m was an important predictor of fear of COVID-19. Yıldırım *et al.* reported that the fear of COVID-19 is an important predictor of preventive behaviors [13]. Other studies also support these findings [12,14,47]. These results can be interpreted as fear motivating individuals to exhibit positive health behaviors. Furthermore, the participants may have developed their skills for protective behaviors in order to protect themselves from the negative effects of COVID-19 (such as severe illness, and death) and its uncertainty.

In studies, it was reported that the fear of COVID-19 is low in individuals with high HL [33,34,56]. In this study, HL was an important predictor of fear of COVID-19. From these findings, we can conclude that HL has a protective effect against the fear of COVID-19. Considering the fact that high HL allows individuals to properly interpret and analyze problems, crises, and difficulties, especially related to their health [57], the importance of efforts to raise HL against the detrimental effects of the fear of COVID-19 cannot be ignored.

Limitations and strengths

This study has some limitations: First; Since the study was conducted with a limited number of participants using an online survey method and convenience sampling technique, the results cannot be generalized to the whole population. Second; The study sample represents users who can use technology. Therefore, those who do not have this opportunity are excluded. Third; causality cannot be inferred since the study was conducted in a cross-sectional design. Fourth; As there was a lack of validated tools regarding preventive health measures during the design of the research, questions prepared by the researchers in this area were used. For this reason, it may not fully reflect the opinion of individuals about the behavior of complying with the measures. Despite these limitations, the study is valuable because it is one of the few studies that provide important information in the context of individuals' compliance with protective measures, HL and fear of COVID-19 during the pandemic.

Conclusions

Half of the participants in this study had inadequate and problematic-limited HL. It showed that adults' compliance with measures and some sociodemographic characteristics during the COVID-19 pandemic had a significant relationship with HL and fear of COVID-19. In addition, it has been revealed that those with high HL and those who are afraid of COVID-19 pay more attention to the precautions and that high HL reduces the fear of COVID-19. During the pandemic, widespread information pollution can lead individuals to false information and behaviors. This can cause both fear and panic in individuals, as well as prolonging the pandemic duration. In this aspect, the importance of society's need to have an adequate level of HL emerges. This study can be a guide for future research conducted with the intention of taking steps to increase the HL levels of society, particularly against possible pandemics, and thus speeding up research in this field. Researchers and authorities have important responsibilities in this regard. It has been understood once again, with the COVID-19 pandemic, that HL plays an important role in the prevention and management of contagious as much as non-contagious

diseases. For this reason, governments need to invest particularly in increasing HL. Joint efforts of universities, non-governmental organizations, the communication sector, etc. are also necessary to improve the HL of society. For this reason, it is important to convey information in a language and methods that society can understand, in line with its needs and expectations. Health professionals should also consider this information in public education. In addition, individuals should be taught ways to cope with fear. For example; Training can be given such as doing relaxation exercises, engaging in activities that one loves, and obtaining information from the right sources.

Acknowledgements

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