ORIGINAL RESEARCH ORİJİNAL ARAŞTIRMA

The Relationship Between E-Health Literacy and Attitude to Vaccine: A Descriptive Study

E-Sağlık Okuryazarlığı ile Aşıya Karşı Tutum Arasındaki İlişki: Tanımlayıcı Araştırma

Emel AVÇİNᵃ, Şeyda CANᵇ

ᵃYalova University Thermal Vocational School, Department of Medical Services and Techniques, Yalova, Türkiye
ᵇDepartment of Medical Nursing, Yalova University Faculty of Health Sciences, Yalova, Türkiye

ABSTRACT Objective: In this study, it was aimed to examine the relationship between e-health literacy and attitudes towards vaccination. **Material and Methods:** The research is descriptive and relation-seeking type. The sample of the study consisted of 423 volunteers between the ages of 18-65 who agreed to participate in the research between October 13, 2021-December 31, 2021. The data of the study were collected through an online questionnaire using the "information form", "E-Health Literacy Scale" and "Anti-Vaccination Scale". **Results:** In the study, a statistically significant relationship was found between the level of decision-making about their health and e-health literacy according to the education level, income level, duration of internet use, and information obtained from the internet (p<0.05). Those who said that the negative comments about the vaccine on the internet affected them negatively, those who thought that the internet was very useful when making decisions about their health, and those who stated that it was important to access health resources on the internet had high scores in both E-Health Literacy Scale and Anti-Vaccination Scale (p<0.05). It was determined that there was a negative significant relationship between e-health literacy and anti-vaccination (r=-0.143; p=0.007). **Conclusion:** In line with these results, awareness of individuals on increasing e-health literacy and reducing anti-vaccination should be ensured. It is recommended to implement approaches in this direction.

Keywords: Health; health literacy; vaccines; vaccination hesitancy

ÖZET Amaç: Bu araştırmada, e-sağlık okuryazarlığı ile aşıya karşı tutum arasındaki ilişkinin incelenmesi amaçlanmıştır. **Gereç ve Yöntemler:** Araştırma, tanımlayıcı nitelikte ve ilişki arayıcı tipte gerçekleştirilmiştir. Araştırmanın örneklemini 13 Ekim 2021-31 Aralık 2021 tarihleri arasında araştırmaya katılmayı kabul eden 18-65 yaş arası 423 gönüllü birey oluşturmuştur. Araştırmanın verileri "bilgi formu", "E-Sağlık Okur Yazarlığı Ölçeği" ve "Aşı Karşıtlığı Ölçeği" kullanılarak çevrim içi anket aracılığıyla toplanmıştır. **Bulgular:** Araştırmada katılımcıların eğitim durumu, gelir düzeyi, internet kullanım süresi ve internetten edinilen bilgilere göre sağlıkları hakkında karar verme düzeyleri ile e-sağlık okuryazarlıkları arasında istatistiksel olarak anlamlı bir ilişki bulunmuştur (p<0,05). Aşı ile ilgili internetteki olumsuz yorumların kendilerini olumsuz etkilediğini söyleyenlerin, sağlığı hakkında karar verirken internetin çok yararlı olduğunu düşünenlerin ve internette sağlık kaynaklarına erişebilmenin önemli olduğunu belirtenlerin hem E-Sağlık Okur Yazarlığı Ölçeği hem de Aşı Karşıtlığı Ölçeği'nden yüksek puan almışlardır (p<0,05). E-sağlık okuryazarlığı ile aşı karşıtlığı arasında negatif yönde anlamlı bir ilişki olduğu belirlenmiştir (r=-0,143; p=0,007). **Sonuç:** Bu sonuçlar doğrultusunda bireylerin e-sağlık okuryazarlığının artırılması ve aşı karşıtlığının azaltılmasına yönelik farkındalıkları sağlanmalıdır. Bu doğrultudaki yaklaşımların hayata geçirilmesi önerilmektedir.

Anahtar Kelimeler: Sağlık; sağlık okuryazarlığı; aşılar; aşı kararsızlığı

In the modernizing world, it is required that the person has information about health protection and improvement and health services, to be able to make decisions about his health status, and to know his rights and responsibilities.[1] With the technological developments in the modern world, the health literacy has come to be very essential for many reasons such as the rapid and easy access to information, the constant encounter with new information, the increase in the variety and number of health services offered, and the ease of access to health services.[2,3] Health literacy is defined as "the degree to which individuals can receive, process, and understand basic health information and services required to make appropriate

health decisions".[4] According to the World Health Organization (WHO), health literacy is the cognitive and social skills that enable an individual to access, understand and use health-related information in order to protect, maintain and improve their current health.[5]

Health literacy enables individuals to make health decisions on time and in place and to exhibit the necessary behaviors to maintain their health.[6] Developments in information and internet technology ensure the continuity of change in all areas. This development in technology brings about progress and changes in the production, presentation, and utilize of health services. These changes have led to the emergence of the concept of "Electronic Health (e-Health) Literacy" in addition to health literacy. E-health literacy is the ability to seek, find, understand and evaluate health information through electronic resources and apply this knowledge to solving a health-related problem or making a health-related decision. This concept is a literacy that is affected by the development of technology, personal and social changes, constantly evolving with new information, and far from stagnation.[7] E-health literacy paves the way for the development and improvement of health by allowing health-related information to be obtained from virtual and online environments.[8] In the related literature, it has been determined that individuals with insufficient health literacy benefit less from preventive health services, they mostly apply to curative health services, and their treatment adherence is at low levels.[9] While internet usage in our country was 75.3%, according to 2019 data, the internet usage rate in 2020 is 79% in individuals aged 16-74 according to the data of the Turkish Statistical Institute.[10]

Vaccination is one of the first applications considered for preventive services. Vaccination emerges as an application that can have positive and negative social consequences, as well as the necessity of consenting to the application of individuals to themselves or to the individuals for whom they are responsible within the framework of personal rights and freedoms.[11,12] The rapid increase in vaccine applications has brought some problems with it. The effectiveness and benefits of vaccines have been proven since their emergence of vaccines, but people and communities who are against vaccines have caused the development of the thought of anti-vaccine.[13] At the top of the 10 global health problems that WHO plans to solve in 2019 is "anti-vaccine". Anti-vaccine opposition in the world started with the discovery and widespread application of the modern vaccine. The recent publication by Andrew Wakefield et al., which was published in the Lancet Journal in 1998, in which they suggested that there is a relationship between thiomersal in measles, mumps, and rubella vaccine and autism and autism spectrum disorders, was removed from the journal in 2010 because the study was erroneous and its results were biased.[14] However, this publication has been seen by some groups as a scientific basis against vaccine opposition. Childhood vaccinations in Türkiye are provided free of charge by the TR Ministry of Health, but due to the absence of a legal regulation containing a definite statement regarding the necessity of vaccination, people who wish can refuse to be vaccinated. Over the last few years, there has been an expand in the rate of vaccine rejections and vaccine hesitancy in our country, as in many countries around the world.[12,15] In Türkiye, 183 families in 2011, 980 families in 2013, 5 thousand 400 families in 2015, and 12 thousand families in 2016 do not want their children to be vaccinated. The number of cases related to vaccine refusal has increased further and reached the level of twenty-three thousand as of 2018.[4] It is very important to increase this number day by day, to investigate the negative attitude of the society towards the vaccine, and develop a positive attitude. The purpose of this study is to evaluate the attitudes of participants' e-health literacy towards vaccines.

RESEARCH QUESTIONS

Q1: What is the e-health literacy level of the participants?

Q2: What is the attitude of the participants towards the vaccine?

Q3: Is there a relationship among the e-health literacy levels of the participants and their attitudes towards the vaccine?

MATERIAL AND METHODS

STUDY DESIGN

The purpose of the study, which is a descriptive and relationship research, is to examine the relationship among e-health literacy and attitudes towards vaccination.

POPULATION AND SAMPLE

The research population consists of adult individuals among the ages of 18-65 in Türkiye, and the sample consists of those who agreed to participate in the research between August 16, 2021 and November 15, 2021. Individuals who were literate and between the ages of 18-65, who agreed to participate in the study, who had internet access, who use internet applications, who can research on health-related internet were included in the study.

The population among the ages of 18-65, obtained from Turkish Statistical Institute 2021 data, is approximately 52 million. Sample size; it was determined as a minimum of 384 people for this study to represent the main mass with a 5% (0.05) margin of error at a 95% confidence level. However, in the research, this number was exceeded and 423 people were reached. In the power analysis "G*Power 3.1.9.4 (Universität Kiel, Germany)" performed at the end of the study, the power of of the study was found to be 99% with a 5% alpha margin of error (α=0.05).

MEASUREMENT

"Participant form", "E-Health Literacy Scale (EHLS)" and "Anti-Vaccination Scale (AVS)" were used in the study.

Participant form: The participant form was prepared by the researchers in accordance with literature.[1,3,13] It consists of a total of 13 questions to determine the information about the socio-demographic attributes and internet utilize of the participants.

EHLS: The scale was developed by Norman and Skinner.[5] Tamer Gencer performed Turkish validity and reliability of the scale.[16] The scale consists of a total of 10 items measuring internet use (2 items) and internet attitude (8 items). The items on the scale were arranged in a five-point Likert type (1=strongly disagree, 5=strongly agree). While the lowest score that can be got on the scale is 8, the highest score is 40.[16] An increase in the score on the got the scale means an increase in the level of e-health. The Cronbach alpha value of the scale is 0.91. In our study, the Cronbach alpha value was calculated as 0.96.

AVS: The scale developed by Kılınçarslan et al. in 2020 has 2 forms, long and short.[17] The long form of the scale consists of 4 dimensions and 21 items, while the short form consists of 3 dimensions and 12 items. In this study, the short form of the scale was used. The items in the scale were prepared in a five-point Likert type (1=strongly disagree, 5=strongly agree). It consists of 3 dimensions: vaccine benefit and protective value, anti-vaccine, and solutions for not being vaccinated. Vaccine benefit and protective value dimensions are scored in reverse. As the score got from the scale rise, the anti-vaccination/hesitation also rise.[17] The Cronbach alpha value for the short form of the scale was 0.855 and it was found to be 0.76 in this study.

DATA COLLECTION

Data were collected through an online questionnaire created via the "Google form (Google, America)". Google form used in the research were sent to the participants by e-mail/WhatsApp (WhatsApp Inc. California, US) message between October-December 2021. The form was distributed to individuals in different regions by snowball sampling method and the forms were filled with 500 people. The research was completed with 423 people who met the sampling criteria. The rate of representing the universe of the study was found to be 99% with a 5% alpha margin of error (α=0.05) in the power analysis. After being informed, the participants, who clicked the "I agree to participate in the study" button, proceeded to the form filling phase. Since the "required answer" option was coded while preparing the questions, the questions that were forgotten or skipped were warned by the system and could not be sent before the questionnaire was completed.

STATISTICAL ANALYSIS

Data was analyzed by using SPSS 20 (IBM, USA) program. In the evaluation of parametric (continuous) variables; arithmetic mean, standard deviation, min-

imum and maximum values, frequency, and percentage were used in the evaluation of nonparametric (discontinuous) variables. "Reliability Analysis" was conducted to determine the reliability of the scales used. In a normal distribution, the ±1.5 range was accepted as the normal value in skewness and kurtosis tests, and the data in the study were found to be suitable for normal distribution.[18] Comparisons were made with one way analysis of variance (post hoc Bonferroni analysis) and Student t-test to determine the differences among variables. Pearson correlation analysis was applied to determine the relationship between scale scores. The significance level was accepted as 0.05.

ETHICAL PRINCIPLES

Ethical approval was obtained from the Human Research Ethics Committee of Yalova University (date: October 13, 2021; no: 2021/120) to conduct the study. Written permission was obtained from the owner of the scales planned to be used in the study. All stages of the research, Declaration of Helsinki was followed.

■ RESULTS

DESCRIPTIVE RESULTS

Table 1 show of attitudes of the study populations. Table 2 shows the status of the participants regarding their internet usage characteristics.

COMPARISON OF PARTICIPANTS' DESCRIPTIVE CHARACTERISTICS WITH SCALES

Participants aged 41-50 had the highest EHLS scores, and participants aged 51-60 had the lowest scores. However, there was no significant difference between the EHLS scores of the age groups (p>0.05). Considering the AVS score, it was observed that the participants between the ages of 31-40 had the highest scores and the participants between the ages of 41-50 had the lowest scores. A significant difference was found between the mean AVS scores of the age groups (p=0.015). Female participants had higher EHLS and AVS scores than male participants, but there was no significant relationship among the participants (p>0.05). Single participants' EHLS and AVS scores were found to be higher than those of married persons,

TABLE 1: Distribution of descriptive characteristics of the participants (n=423).

Variables	n	%
Age groups		
18-30 age	153	36.1
31-40 age	132	31.3
41-50 age	76	17.9
51-61 age	62	14.7
Gender		
Woman	272	64.3
Man	151	35.7
Marital status		
Married	185	43.7
Single	238	56.3
Educational status		
Literate	11	2.6
Primary school	20	4.7
Middle school	18	4.3
High school	165	39.1
University	203	47.9
Grad student	6	1.4
Working status		
Yes	163	38.5
No	260	61.5
Income rate		
Good	49	11.6
Middle	285	67.3
Bad	89	21.1
Status of having a child		
Yes. there is	94	22.2
No. there is not	329	77.8
X̄±SD	Minimum	Maximum
Age 34.19±9.22	18	61

SD: Standard deviation.

but no significant relationship was found (p>0.05). When the education level variable was examined, the EHLS scores of those with a postgraduate education level were higher than the others, and it was determined that there was a significant differential among the groups (p=0.008). The AVS scores of the literate participants were higher than the others, and a significant variance was found between the groups (p=0.019). Participants working in an income-generating job got a high score on EHLS and a low score on AVS, but it was determined that there was no significant variance among the groups for both scales (p>0.05). Those who defined their income level as "good" got a high score on EHLS and a low score on

TABLE 2: Situations of participants regarding internet usage characteristics.			
Internet Usage Characteristics		**n**	**%**
How long have you been using the internet to search for health-related topics?	Less than 1 year	72	17.0
	Between 1-5 years	204	48.2
	Between 6-10 years	107	25.3
	11 years and over	40	9.5
How long do you use the internet to research health-related topics?	At least 1 hour every day	70	16.5
	A few hours a week	82	19.4
	A few hours a month	39	9.2
	As needed	232	54.8
Do you make decisions about your own or your family's health based on the information you get from the internet?	I always take	24	5.7
	Sometimes I get	308	72.8
	I never take	91	21.5
Do the negative comments on the internet about the vaccine affect you?	Affecting	139	32.9
	Does not affect	115	27.2
	I'm undecided	169	40.0
How useful do you think the internet is in helping you make decisions about your health?	Not useful at all	27	6.4
	Not useful	46	10.9
	No idea	117	27.7
	Beneficial	205	48.5
	Very helpful	28	6.6
How important is it to you to have access to health resources on the Internet?	Does not matter	19	4.5
	No problem	35	8.3
	No idea	80	18.9
	Important	214	50.6
	Very important	75	17.7

AVS, and it was stated that there was a significant difference among the groups on both scales (p<0.05). The AVS scores of those who did not have children were found to be high and there was a significant variance among the groups (p=0.013) (Table 3).

COMPARISON OF PARTICIPANTS' INTERNET USAGE CHARACTERISTICS WITH SCALES

Those who used the internet for less than 1 year to search for health-related topics had higher AVS scores than the others, and a significant variance was found among the groups (p=0.037). Those who used the internet to research health-related topics as often as needed got the highest score on the EHLS and a statistical difference was found between the groups (p=0.005). According to the information you obtained from the internet, those who said "sometimes I make decisions about their own or their family's health" got the highest score on the EHLS, and a statistical variance was found among the groups (p=0.015). The participants who said "it affects" for the comments on the internet about the vaccine got high scores from both EHLS and AVS, and it was determined that there was a significant difference between the groups on both scales (p<0.05). Those who think that the internet is useful while giving decisions about your health got the highest score on the EHLS and a significant difference was found among the groups (p=0.001). Those who think that the internet is very useful when making decisions about your health got the highest score on AVS and it was seen that there was a statistically significant differential among the groups (p=0.001). Those who stated that it is "important" to have access to health resources on the internet got the highest scores in EHLS and AVS, and significant differences were found among the groups on both scales (p=0.001) (Table 4).

THE RELATIONSHIP BETWEEN SCALES

Table 5 shows the relationship among e-health literacy and anti-vaccination. It was estimated that there

TABLE 3: Comparison of participants' descriptive characteristics and EHLS and AVS scores.				
Characteristics of Participants	**EHLS X̄±SD**	**Test and p**	**AVS X̄±SD**	**Test and p**
Age groups				
18-30 age[1]	25.19±8.625	F=0.766	32.30±8.115	F=3.542
31-40 age[2]	25.14±9.649	df=3	32.67±7.223	df=3
41-50 age[3]	26.86±8.595	p=0.514	29.19±7.550	**p=0.015**
51-61 age[4]	24.88±9.734		30.40±6.811	**post hoc: 1-3**
Gender				
Woman	25.96±8.404	t=1.631	31.86±8.283	t=0.858
Man	24.50±9.471	df=421	31.17±7.166	df=421
		p=0.104		p=0.391
Marital status				
Married	25.29±9.845	t=-0.170	30.93±6.995	t=-0.894
Single	25.48±8.554	df=421	31.79±8.113	df=421
		p=0.865		p=0.372
Educational status				
Literate[1]	22.41±8.389	F=3.154	34.65±5.798	F=2.728
Primary school[2]	19.43±8.899	df=3	33.07±6.354	df=3
Middle school[3]	22.56±11.367	**p=0.008**	31.06±7.996	**p=0.019**
High school[4]	25.83±8.917	*post hoc: 2-6*	32.18±7.717	**post hoc: 1-3,5**
University[5]	25.83±8.450		31.15±8.121	
Grad student[6]	32.83±6.998		31.17±9.579	
Working status				
Yes	26.41±8.913	t=1.364	30.48±7.866	t=-1.791
No	25.09±8.769	df=421	32.03±7.885	df=421
		p=0.173		p=0.074
Income rate				
Good[1]	26.65±8.428	F=6.661	30.71±7.943	F=3.890
Middle[2]	26.03±8.671	df=2	31.80±8.193	df=2
Bad[3]	21.97±9.015	**p=0.001**	31.45±6.477	**p=0.021**
		post hoc: 1-3, 2-3		**post hoc: 1-2**
Status of having a child				
Yes	25.86±9.947	t=0.456	30.07±7.841	t=2.504
No	25.35±8.570	df=421	32.04±7.885	df=421
		p=0.648		**p=0.013**

t: Student t-test, F: One-way ANOVA; post hoc: Bonferroni test; EHLS: E-Health Literacy Scale; AVS: Anti-Vaccination Scale; SD: Standard deviation; df: Degree of freedom.

was a negative significant relationship among e-health literacy and anti-vaccination (r=-0.143; p=0.007) (Table 5). In other words, it can be said that as e-health literacy increases, anti-vaccination decreases.

DISCUSSION

When the education level variable of the individuals included in this research is examined, the e-health lit-eracy scores of those with a postgraduate education level were higher than the others and it was deter-mined that there was a significant difference between the groups. This result is similar to the results ob-tained from the other researchers.[19] Unlike the results obtained from the research, there are also studies in which there is no important variance between e-health literacy and educational status.[3] It is thought that the different individual characteristics of the

TABLE 4: Comparison of participants' internet usage characteristics and EHLS and AVS scores.					
Internet Usage Characteristics		**EHLS X̄±SD**	**Test and p**	**AVS X̄±SD**	**Test and p**
How long have you been using the internet to search for health-related topics?	Less than 1 year[1]	24.35±9.587	F=2.447	32.96±8.171	F=2.584
	Between 1-5 years[2]	25.39±8.644	df=3	31.49±7.506	df=3
	Between 6-10 years[3]	25.01±8.771	p=0.063	32.09±7.755	**p=0.037**
	11 years and over[4]	28.83±7.821		28.58±9.142	**post hoc: 1-4**
How long do you use the internet to research health-related topics?	At least 1 hour every day[1]	25.61±9.434	F=4.338	32.13±6.677	F=1.033
	A few hours a week[2]	24.04±8.773	df=3	32.77±8.024	df=3
	A few hours a month[3]	21.67±9.916	**p=0.005**	31.38±7.628	p=0.378
	As needed[4]	26.52±8.244	**post hoc: 3-4**	31.09±8.230	
Do you make decisions about your own or your family's health based on the information you get from the internet?	I always take[1]	22.38±10.107	F=4.242	32.79±7.951	F=1.238
	Sometimes I get[2]	26.18±8.570	df=2	31.84±7.772	df=2
	I never take[3]	23.76±8.977	**p=0.015**	30.54±8.291	p=0.291
			post hoc: 1-2		
Do the negative comments on the internet about the vaccine affect you?	It affects[1]	26.55±8.069	F=3.455	34.88±8.764	F=24.190
	It does not affect[2]	23.61±8.309	df=2	31.65±6.295	df=2
	I'm undecided[3]	26.18±9.578	**p=0.032**	28.91±7.114	**p=0.001**
			post hoc: 2-3		**post hoc: 1-2,3; 2-3**
How useful do you think the internet is in helping you make decisions about your health?	Not useful at all[1]	16.04±7.166	F=24.948	31.19±4.472	F=12.802
	Not useful[2]	20.22±9.554	df=4	30.50±7.339	df=4
	No idea[3]	23.52±8.491	**p=0.001**	31.55±8.845	**p=0.001**
	Beneficial[4]	28.66±7.169	**post hoc: 1-3,4,5; 2-4,5; 3-4**	31.60±7.878	**post hoc: 1-5; 2-5**
	Very helpful[5]	27.50±9.004		34.21±7.223	
How important is it to you to have access to health resources on the internet?	Does not matter[1]	14.63±6.011	F=34.469	31.53±4.477	F=8.359
	Not important[2]	18.63±8.468	df=4	29.77±7.084	df=4
	No idea[3]	20.64±8.686	**p=0.001**	30.99±6.178	**p=0.001**
	İmportant[4]	28.61±7.171	**post hoc: 1-3,4,5; 2-4,5; 3-4,5**	32.07±8.760	**post hoc: 2-4,5**
	Very İmportant[5]	27.44±7.938		31.85±7.981	

F: One-way ANOVA; post hoc: Bonferroni test; EHLS: E-Health Literacy Scale; AVS: Anti-Vaccination Scale; SD: Standard deviation; df: Degree of freedom.

TABLE 5: The relationship between e-health literacy and anti-vaccination.			
		EHLS	**AVS**
EHLS	r	-	
	p value		
AVS	r	-0.143*	
	p value	0.007	-

r: Pearson correlation; *p<0.05; EHLS: E-Health Literacy Scale; AVS: Anti-Vaccination Scale.

sample groups in which the studies were conducted may be effective in these different results.

In the study, the e-health literacy levels of those who perceive their income level as good were found to be significantly higher than those who perceive it as medium or bad. This result is similar to the results

obtained from the other researchers.[20] In the study of Ertuğrul and Albayrak, the difference between the monthly income of families and their health literacy levels was not found statistically significant.[21] Although there are dissimilar results in the writings, it is thought that positive effects affect health literacy levels positively, as well-being can increase depending on income status and access to health services can be facilitated.

It has been stated that the e-health literacy scores of the study population who stated that they use the internet as often as needed when asked how often they use the internet to conduct research on health-related subjects have high e-health literacy scores and there is a statistically significant differential among the groups. This result is similar to the results obtained from the other researchers.[22] Unlike the results

obtained from the research, there are studies in which e-health literacy scores do not differ significantly according to the duration of internet use.[23] In the research, it is seen that e-health literacy increases as the duration of internet use increases. This result shows that the frequency of internet use is important in e-health literacy behaviors.

According to the information obtained on the internet in the research, those who said "I sometimes make decisions about their own or their family's health" got the highest score in e-health literacy and a statistical variance was found among the groups. According to the information on the internet, it is stated that people who constantly make decisions about their health or the health of their families have an insufficient level of health literacy.[24] This result from the research supports the literature.

The e-health literacy levels of the participants who stated that the negative comments on the internet about the vaccine affect themselves were found to be high. Peksoy Kaya and Kaplan's studies did not find a significant relationship between participants' awareness of vaccination regarding COVID-19 infection precautions and health literacy.[25] These results obtained from the research should be evaluated considering the pandemic process during the period of the research and vaccination studies to protect against COVID-19.

In the study, it was stated that the e-health literacy levels of the peoples who declared that the internet is useful when making decisions about their health and that it is "important" to entry health sources on the internet were found to be significantly higher. Sharma et al. also found no relationship between those who use the internet for any purpose; statistically significant results were obtained in those who used it for health purposes. The e-health literacy of those who use the internet for health purposes was found to be significantly higher.[26] In this direction, it can be said that those who think that the internet is useful and important when making decisions about their health have a high e-health literacy.

Looking at the educational status variable, the literate participants' anti-vaccination scores were higher than the others, and a significant variance was found by the among groups. In the study, it was found that individuals with low education levels experienced higher levels of anti-vaccination. Similar to the findings obtained from the research, there are studies in which a negative relationship was found between education level and anti-vaccination.[27] In the study of Dağ and Demirci, however, no significant relationship was found between education level and anti-vaccination.[28] It is thought that having different characteristics in countries and groups may have been effective in these results.

In the study, individuals with a good income level are less against vaccination than those with a medium and low-income level. Similar to the outcomes obtained from the study, it was stated in the study of Dağ and Demirci that as the income level decreases, the anti-vaccination increases.[28] In the study of Türkay et al., anti-vaccination was found to be higher in low-income individuals.[29] The results obtained from the research support the literature.

The anti-vaccination scores of those who did not have children were found to be high and a significant variation was determined among the groups. When we look at the studies on the causes of vaccine rejection in the literature, it is seen that fear of the side effects of the vaccine and doubting the effectiveness of the vaccine are effective.[30] In the our research, it was observed that while the AVS point of the participants did not differ according to their marital status, their anti-vaccination attitudes changed according to their status of having a child. It was thought that this situation might be related to the beliefs of the participants that the vaccine may have negative effects on having children.

Those who used the internet for less than a year to search for health-related topics had higher anti-vaccination scores than the others. The use of the internet on health-related issues can lead to negative perceptions and attitudes toward vaccines in people due to false information produced from wrong sources.[31] In the study, it was thought that the high anti-vaccination opposition of those who have been doing health-related research for less than a year may be related to the pandemic process. Throughout the pandemic time, it was determined that the main

source of information for individuals was the internet and the rate of internet use was high to get more information.[32] For this reason, it was thought that those who used the internet for less than a year in the study may have high anti-vaccination.

In the study, those who say that negative comments on the internet about vaccines affect them negatively, those who think that the internet is very useful when giving decisions about their health, and those who state that it is important to entry health sources on the internet have got high scores on both health literacy and anti-vaccine. Similarly, it is seen in the literature that believing the internet is useful, enjoying the internet, and using the internet increases the level of e-health literacy.[33] In line with these results, it can be said that while the internet negatively affects anti-vaccine sentiment, it positively affects e-health literacy.

In the research, it was stated that there is a negative significant relationship among e-health literacy and anti-vaccine. Similarly, in the studies of Ertaş and Göde, it was stated that there is a significant and negative relationship among the level of health literacy and the level of opposition to vaccination.[34] There is a positive and significant relationship among healthy lifestyle behavior levels and e-health literacy.[35] In this direction, it can be said that with the increase in e-health literacy positively affects the decrease in anti-vaccination.

CONCLUSION

In the study, a statistically significant relationship was found between the level of decision-making about their health and e-health literacy according to the education level, income level, duration of internet use, and information obtained from the internet. A statistically significant relationship was found between the participants' educational status, income level, having children, how long they used the internet to search for health-related topics, and their opposition to vaccination. It was determined that there is a negative significant relationship between e-health literacy and anti-vaccination.

The results of the research revealed the factors affecting individuals' e-health literacy and anti-vaccination. Anti-vaccination is a public health problem. It is recommended that the results obtained from this study be used in awareness planning to reduce anti-vaccination and increase e-health literacy.

Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

All authors contributed equally while this study preparing.

REFERENCES

1. İnkaya B, Tüzer H. Bir üniversitenin sosyal ve sağlık bilimlerinde okuyan öğrencilerinin sağlık okuryazarlığı durumunun incelenmesi [Investigation of health literacy of reading students in social and health sciences of a university]. Kocaeli Tıp Dergisi. 2018;7(3):124-9. [Link]

2. Utma S. Sağlık okuryazarlığı kavramı ve sağlık haberlerini doğru okumak [Correctly reading the concept of health literacy and health news]. IBAD Sosyal Bilimler Dergisi. 2019;5:223-31. [Crossref]

3. Deniz S. Bireylerin E-sağlık okuryazarlığı ve siberkondri düzeylerinin incelenmesi [A study on the e-health literacy and cyberchondria levels of individuals]. İnsan ve İnsan. 2020;7(24):84-96. [Crossref]

4. T.C. Sağlık Bakanlığı. Sağlık İstatistikleri Yıllığı 2017 Haber Bülteni. 2017. [Link]

5. Kickbusch I, Pelikan JM, Apfel F, Tsouros AD. Health literacy: the solid facts. Denmark: WHO; 2013. Cited: July 8, 2021. Available from: [Link]

6. Yılmazel G, Çetinkaya F. Sağlık okuryazarlığının toplum sağlığı açısından önemi [The importance of health literacy for community health]. TAF Preventive Medicine Bulletin. 2016;15(1):69-74. [Link]

7. Norman CD, Skinner HA. eHealth Literacy: Essential Skills for Consumer Health in a Networked World. J Med Internet Res. 2006;8(2):e9. [Crossref] [PubMed] [PMC]

8. Uslu D, Şeremet G. Bireylerin E-sağlik okuryazarlık düzeyinin belirlenmesi [Determining the E-health literacy level of individuals]. Uluslararası Sağlık Yönetimi ve Stratejileri Araştırma Dergisi. 2020;6(2):386-94. [Link]

9. Howard DH, Gazmararian J, Parker RM. The impact of low health literacy on the medical costs of Medicare managed care enrollees. Am J Med. 2005;118(4):371-7. Erratum in: Am J Med. 2005;118(8):933. [Crossref] [PubMed]

10. TÜİK [İnternet]. [Erişim tarihi: 2 Ocak 2023]. Bilişim teknolojileri kullanım araştırması. Erişim linki: [Link]

11. Yiğit T, Oktay BÖ, Özdemir CN, Moustafa Pasa S. Aşı karşıtlığı ve fikri gelişimi [Anti-vaccination and it's intellectual appearance]. Journal of Social and Humanities Sciences Research. 2020;7(53):1244-61. [Crossref]

12. Kutlu R. Çocukluk çağı aşıları [Childhood vaccinations]. Türkiye Klinikleri J Fam Med-Special Topics. 2017;8(5):311-8. [Link]

13. Filiz M, Kaya M. Aşı reddini/kararsızlığını/karşıtlığını etkileyen faktörleri belirlemeye yönelik çalışmaların sistematik olarak derlenmesi [Systematic review of studies to determine factors affecting vaccine rejection/instability/contrast]. Türk Akademik Sosyal Bilimler Araştırma Dergisi. 2019;2(2):1-7. [Link]

14. Godlee F, Smith J, Marcovitch H. Wakefield's article linking MMR vaccine and autism was fraudulent. BMJ. 2011;342:c7452. [Crossref] [PubMed]

15. Smith TC. Vaccine rejection and hesitancy: a review and call to action. Open Forum Infect Dis. 2017;4(3):ofx146. [Crossref] [PubMed] [PMC]

16. Tamer Gencer Z. Norman ve Skinner'in E-Sağlık Okuryazarlığı Ölçeğinin kültürel uyarlaması için geçerlilik ve güvenilirlik çalışması [Analysis of validity and reliability of Norman and Skinner's E-health scale literacy for cultural adaptation]. İstanbul Üniversitesi İletişim Fakültesi Hakemli Dergisi. 2017;(52):131-45. [Crossref]

17. Kılınçarslan M, Sarıgül B, Toraman Ç, Şahin E. Development of valid and reliable scale of vaccine hesitancy in Turkish language. Konuralp Medical Journal. 2020;12(3):420-9. [Crossref]

18. Mishra P, Pandey CM, Singh U, Gupta A, Sahu C, Keshri A. Descriptive statistics and normality tests for statistical data. Ann Card Anaesth. 2019;22(1):67-72. [Crossref] [PubMed] [PMC]

19. Cizmeci E, Deniz S. Chronically searching online: e-health literacy of diabetes patients and healthy individuals in Turkey. UHIVE. 2017;15:71-86. [Link]

20. Yıldızeli F, Alabaz D, Gözüyeşil E. Ebeveynlerin Çocukluk Çağı Aşılarının Kabulünün Sağlık Okuryazarlığı ile İlişkisi [Determining the relationship of parents, knowledge and attitudes and health literacy about the admission or refusal of childhood immunization]. J Pediatr Inf. 2021;15(2):91-9. [Link]

21. Ertuğrul B, Albayrak S. Ebeveynlerin sağlık okuryazarlığı düzeyinin çocukluk dönemi aşılarına yönelik tutum ve davranışlarıyla ilişkisi [The relationship of parents' health literacy level with attitudes and behaviors towards childhood vaccines]. Hacettepe Üniversitesi Hemşirelik Fakültesi Dergisi. 2021;8(2):186-95. [Crossref]

22. Turgut M, Kutlu G, Mut S. Sağlık yönetimi bölümü öğrencilerinin iletişim becerileri ile sosyal medya kullanımları arasındaki ilişkinin belirlenmesi [Determination of the relationship between communication skills and social media use of health management department students]. İşletme Bilimi Dergisi. 2018;6(1):185-205. [Crossref]

23. Özer Ö, Özmen S, Özkan O. Sosyal medya kullanımının E-sağlık okuryazarlığına etkisinin incelenmesi [Investigation of the effect of social media usage on E-health literacy]. Alanya Akademik Bakış. 2020;4(2):353-67. [Crossref]

24. Tarhan N, Tutgun-Ünal A, Ekinci Y. Yeni kuşak hastalığı siberkondri: Yeni medya çağında kuşakların siberkondri düzeyleri ile sağlık okuryazarlığı ilişkisi [New generation disease cyberchondria: relationship between cyberchondria and health literacy of generations in the new media age]. OPUS Uluslararası Toplum Araştırmaları Dergisi. 2021;17(37):4253-97. [Crossref]

25. Peksoy Kaya S, Kaplan S. Hemşirelik öğrencilerinde COVID-19 pandemisi farkındalıklarının ve sağlık davranışlarının sağlık okuryazarlığı ile ilişkisinin değerlendirilmesi [Evaluating the relationship between nursing students' awareness of the COVID-19 pandemic and health behaviors with health literacy]. HEAD. 2020;17(4):304-11. [Link]

26. Sharma S, Oli N, Thapa B. Electronic health-literacy skills among nursing students. Adv Med Educ Pract. 2019;10:527-32. [Crossref] [PubMed] [PMC]

27. Facciolà A, Visalli G, Orlando A, Bertuccio MP, Spataro P, Squeri R, et al. Vaccine hesitancy: An overview on parents' opinions about vaccination and possible reasons of vaccine refusal. J Public Health Res. 2019;8(1):1436. [Crossref] [PubMed] [PMC]

28. Dağ A, Demirci H. Koronavirüs (Covıd-19) aşısı karşıtlığına yönelik nicel bir araştırma [A quantitative research on anti coronavirus (COVID-19) vaccine]. İktisadi ve İdari Bilimler Fakültesi (Unıka Toplum ve Bilim) Dergisi. 2021;1(2):74-83. [Link]

29. Türkay M, Ay EG, Aktekin MR. Antalya ilinde seçilmiş bir grupta aşı karşıtı olma durumu [Anti-vaccine status in a selected groups in Antalya]. Akdeniz Tıp Dergisi. 2017;2:107-12. [Link]

30. Sandhofer MJ, Robak O, Frank H, Kulnig J. Vaccine hesitancy in Austria: A cross-sectional survey. Wien Klin Wochenschr. 2017;129(1-2):59-64. [Crossref] [PubMed]

31. Balçık PY, Demir H. Aşı karşıtlığı ve ekonomisi [Anti-vaccination and its economics]. Hacettepe Sağlık İdaresi Dergisi. 2021;24(2):375-98. [Link]

32. Traunmüller C, Stefitz R, Gaisbachgrabner K, Schwerdtfeger A. Psychological correlates of COVID-19 pandemic in the Austrian population. BMC Public Health. 2020;20(1):1395. [Crossref] [PubMed] [PMC]

33. Yıldız A. Sağlık alanında öğrenim gören yükseköğrenim öğrencilerinin internete yönelik tutumlarının e-sağlık okuryazarlık düzeylerine etkisi [The effect of attitudes of higher education students studying in the field of health towards the internet on e-health literacy level]. Elektronik Sosyal Bilimler Dergisi. 2021;20(79):1420-31. [Crossref]

34. Ertaş H, Göde A. Sağlık okuryazarlığı ile aşı karşıtlığı arasındaki ilişkinin incelenmesi: üniversite öğrencileri üzerinde bir araştırma [Investigation of relationship between health literacy with anti-vaccine: a study on college students]. Journal of Academic Value Studies. 2021;7(1):1-14. [Crossref]

35. Soykan H, Şengül H. Sağlık okuryazarlığının sağlıklı yaşam biçimi davranışlarıyla ilişkisi [The relationship of health literacy with healthy lifestyle behaviors]. Gümüşhane Üniversitesi Sağlık Bilimleri Dergisi. 2021;10(4):691-704. [Crossref]