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Examination of Adolescents' E-Health Literacy Levels in Terms of Internet Usage and Some Variables Related to Covid-19

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Abstract

Objective: E-Health literacy is important for obtaining accurate health information, promote and encourge health. The aim of this study is to examine of adolescents their internet usage habits, Covid-19 infection status, Covid-19 vaccination status and their views on the Covid-19 vaccine in terms of the e-health literacy levels.

Methods: This cross-sectional design study was carried out among to 442 students in a high school in the 2021-2022 academic year. The independent variable of this study is the e-health literacy level of adolescents, the dependent variables are their internet usage habits, Covid-19 infection status, Covid-19 vaccination status and their some views on the Covid-19 vaccine.

Results: It was determined that there was a statistically significant difference in the e-Health Literacy Scale mean scores of those who thought that internet use was important and useful in making health-related decisions (respectively 15.630 /0.000; 2,656 / 0.030). There was no statistically significant difference between having had a Covid-19 infection, being vaccinated against Covid-19, and e-Health literacy score averages (respectively 0.534/0.594; 1.032/0.302).

Conclusion: According to the research results, we recommend that awareness studies be carried out to increase the e-Health literacy level of the young population and to use digital media efficiently to correct incorrect health information.

Keywords: adolescent, Covid-19, e-Health literacy, outbreak, vaccine

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Ergenlerin E-Sağlık Okuryazarlık Düzeylerinin İnternet Kullanımı ve Covid-19 ile İlgili Bazı Değişkenler Açısından İncelenmesi

Öz

Amaç: E-Sağlık okuryazarlığı, doğru sağlık bilgilerine ulaşmak, sağlığı geliştirmek ve teşvik etmek açısından önemlidir. Bu çalışmanın amacı ergenlerin internet kullanım alışkanlıklarını, Covid-19 enfeksiyon durumlarını, Covid-19 aşı durumlarını ve Covid-19 aşısına ilişkin görüşlerini e-sağlık okuryazarlık düzeyleri açısından incelemektir.

Yöntemler: Kesitsel tasarımdaki bu çalışma, 2021-2022 eğitim-öğretim yılında bir lisede öğrenim gören 442 öğrenci üzerinde gerçekleştirilmiştir. Bu çalışmanın bağımsız değişkeni ergenlerin e-sağlık okuryazarlığı düzeyi, bağımlı değişkenleri ise internet kullanım alışkanlıkları, Kovid-19 enfeksiyon durumu, Kovid-19 aşılanma durumu ve Kovid-19 aşısına ilişkin bazı görüşleridir.

Bulgular: İnternet kullanımının sağlıkla ilgili kararların alınmasında önemli ve yararlı olduğunu düşünenlerin e-Sağlık Okuryazarlığı Ölçeği puan ortalamalarının istatistiksel olarak anlamlı bir fark oluşturduğu saptanmıştır (sırasıyla15.630 /0.000; 2,656 / 0.030). Covid-19 enfeksiyonu geçirmiş olmak, Covid-19 aşısı olmak ile e-Sağlık okuryazarlığı puan ortalamaları arasında istatistiksel olarak anlamlı bir fark saptanmamıştır (sırasıyla 0,534/0,594; 1,032/0,302).

Sonuç: Araştırma sonuçlarına göre genç nüfusun e-Sağlık okuryazarlık düzeyinin artırılması, yanlış sağlık bilgilerinin yeniden düzenlmesi için dijital medyanın verimli kullanılmasına yönelik farkındalık çalışmalarının yapılmasını öneriyoruz.

Anahtar kelimeler: aşı, Covid-19, ergen, e-Sağlık okuryazarlığı, salgın

INTRODUCTION

Developments in the digital world have led people to include healthy living habits in their lives or to actively participate in decisions about their treatments[1]. The digitalization of our world and the widespread use of the internet have revolutionized health literacy, leading to the emergence of e-health literacy. E-health literacy is defined as the ability to use information and communication technologies in health services for preventing, diagnosing, treating, observing diseases, and managing health[2]. e- Health literacy requires access to the correct resources and information to correct reading[3]. In the end, incorrect reading of e-Health resources causes negativ health consequences[4].

The worldwide Covid-19 epidemic has disrupted people's daily life routines and their behaviours5. People who had to stay in their homes for long periods of time due to restrictions passed a lot of time with to digital network. For these reasons, the notion of e-Health literacy gained value during the pandemic period. Digital applications that provide access to health records such as "Life Fits Home", "e-Pulse" and "e-Government" applications at the national level and "World of Meter", where epidemic data are tracked globally, are examples for this situation6. The Covid-19 pandemic has encouraged the transition to digital applications, clearly revealing its importance[7]. And we need to control our health-related variables for this Covid-19 pandemic that continues to threaten.

In addition to studies suggesting that vaccination is a collective responsibility in the prevention of Covid-19 infection in the literature, there have also been those associated with many socio-demographic factors that cause vaccine hesitancy/rejection/willingness[8,9].

Although it is known that the Covid-19 infection, which affects all members of the society, is mild and moderate in adolescents compared to older people, the negative impact of the epidemic on the general well-being of adolescents cannot be denied[10]. Adolescent is described as the years

between the ages of 10 and 19[11]. Adolescent period is that serious illnesses and deaths can be prevented depending on behavioral, environmental and social factors. Adolescents acquire healthy lifestyle behaviours during this period. This is important in order to have healthy years of life in the future[12]. It is known that the closure of schools and the quarantine measures taken due to epidemic measures have significant effects on adolescents' health and educational activities[13]. During this period, adolescents who spend a lot of time on the digital network are likely to access most of the health-related information digitally.

Therefore, it is vital for adolescents to evaluate the reliability of this information accurately, as the prevalence of false, misleading, and poor-quality health information is high, which can lead to negative consequences[14]. It is important for adolescents to develop affirmative attitudes and behaviors in acquiring true e- Health information and to maintain affirmative e-Health behaviors in the future.

This study aim to examine internet usage habits and to be contaminated Covid-19, intention to be gotten Covid-19 vaccine in terms of their e-Health literacy levels of adolescents.

In order to achieve these aims, were answered to the following questions.

1. What is extent of e-health literacy level among adolescents?

2. Is there a difference in the adolescents' literacy level of e- health with whether their had Covid-19 infection?

3. Is there a difference in the adolescents' literacy level of e- health with whether their received the Covid-19 vaccine?

4. Is there a difference in the adolescents' literacy level of e- health with whether their internet usage characteristics?

METHODS

This cross-sectional design study was performed out in a high school between December 2021 - February 2022.

The universe of this research consisted of 619 adolescents reached Mustafa Kemal Atatürk Vocational and Technical High School. Simple random sampling method was used in sample selection, and those who voluntarily agreed to participate in the research and filled out the survey forms completely constited the sample. According to the sample size calculation made in the Roasoft program, the number of people to be reached within the 95% confidence interval in the universe of 619 people is 238. The inclusion criterion is to be studying at Mustafa Kemal Atatürk Vocational and Technical High School and to volunteer to participate in the study. A total of 442 (70.9%) students who agreed to participate in the research during the data collection phase formed the study group.

The independent variable of this study is the e-Health literacy level of adolescents, the dependent variables are their internet usage habits, Covid-19 infection status, Covid-19 vaccination status and their views on the Covid-19 vaccine. A survey form consisting of three parts was used. The first part contains 17 questions about sociodemographic characteristics and regarding Covid-19 infection. These questions are about "age, gender, class level, family income status, place of residence, presence of chronic diseases, number of individuals living at home, cases of Covid-19 infection, side effects after Covid-19, hearing about Covid-19 vaccines, being vaccinated with Covid-19, whether thinking that the Covid-19 vaccines are dangerous or not, the type of vaccine considered to be the most reliable, the state of thinking that the application of Covid-19 vaccines to young people will cause diseases in the coming years, the state of thinking that the application of

Covid-19 vaccines to young people will cause gene change, the complaint experienced after the vaccine (side effect), the state of experiencing Covid-19 infection (PCR +) despite being vaccinated." The second part consisted of 5 questions about the internet usage of individuals. These questions are 'the duration and purpose of use of the internet, the status of using the internet regarding health in the last week, the thought about the usefulness of the importance of the internet in creating health-related decisions, the importance of accessing health resources on the internet. The third part includes the statements in the e- Health literacy scale. İt was developed by Norman and Skinner in 2006 to determine traditional literacy, health-related literacy, obtaining information, scientific research, media literacy, and computer literacy. It is a scale consisting of 10 items that indicate participants' e- Health literacy levels as five: 1=strongly disagree, 5=strongly agree[15]. Coşkun and Bebiş carried out the validation and reliability investigation of the scale in the Turkish context in 2015[16]. The scale provides information about individuals' attitudes towards internet use on health issues. The first two questions are not evaluated. The score that can be obtained from the scale is between 8 and 40. A high score from the scale indicates high e- Healthliteracy skills. For this study Cronbach's alpha value was 0.94.

For this study, ethics committee approval with the decision number of 21.18.18 with session number 18 on 18.10.2021 were got from the clinical research ethics committee of Harran University Medical faculty and the necessary permissions were obtained from the Mustafa Kemal Atatürk Vocational and Technical High School headmastership. Verbal consent was obtained from students who were informed about the research in the classroom environment and agreed to participate in the research. Students were asked to fill out the surveys themselves.

Statistical analysis was conducted using the SPSS 22.0 software (SPSS Inc., Chicago, IL, USA). The normality of numeric variables was assessed through the Kolmogorov-Smirnov test, Skewness, and Kurtosis. Descriptive statistics, including mean±standard deviation, number, and percentage, were employed to present numeric variables. It was established that the data exhibited a normal distribution. For variables with a normal distribution in two groups, the t-test was employed to compare means, while one-way analysis of variance was used to compare mean values among more than two groups. Furthermore, the Tukey HSD post hoc test was applied to pairwise comparisons of sub-groups displaying statistically significant differences. Significance in all analyses was considered for "p" values less than 0.05

RESULTS

The mean age of 15.18±1.46 ranged from 12 to 18, of the participants. 79.1% were female, 49.8%, 9th grade, 79.6% stated that they lived in the city center, 75.2% medium level family income (Table 1).

Table I: Distribution of Some Sociodemographic Variables of the Participants

	n	%
Age (Mean: 15.16±1.46)		
14 and below	167	39.6
15-16	141	33.4
17 and above	114	27.0
Gender		
Female	334	79.1
Male	88	20.9
Educational status		
9th grade	210	49.8
10th grade	77	18.2
11th grade	42	10.0
12th grade	93	22.0
Place of living		

The participants of 36.5% had Covid-19 infection, 79.9% have been vaccinated against Covid-19, 46.2% complained after had received the Covid-19 vaccine. The most common side effect was headache (31.3%). The participants

of 13.7% had Covid-19 reinfection despite recieved Covid-19 vaccine (Table 2).

Table II: Distribution of Some Covid-19 Related Characteristics of Participants

	n	%
Have You Had Covid-19 infection?		
Yes	154	36.5
No	268	63.5
Have You Being Covid-19 Vaccine?		
Yes	337	79.9
No	85	20.1
Have you had complaints after being Covid-19 vaccine?		
I didn't get vaccine	85	20.1
Yes	195	46.2
No	142	33.6
Most common side effect after vaccination		
Headache	132	31.3
Myalgia	53	12.6
Dizziness	9	2.1
Not side effect	133	31.5
Other	10	2.4
Have you being Covid-19 reinfection despite Covid-19 vaccine?		
Yes	58	13.7
No	282	66.9

Although not given in the table, the scores the study group received from the e- Health literacy scale ranged between 8 and 38, and the average score was 17.84±7.60. The participants of 8.1% reported that Covid-19 vaccines would pose a danger to their health, 19.0% thought that Covid-19 vaccines would cause disease in the coming years. The frequency of those who thought that Covid-19 vaccines could cause gene change was 16.1%. There was no difference between the e- Health literacy score and participants' opinion about Covid-19 vaccine (p value respectively 0.685; 0.795; 0.710) (Table 3).

Table III: Comparison of e-Health Literacy Scale Scores According to Participants' opinion about Covid-19 vaccine

	n(%)	Mean	SD	Test value/p
Do you think that Covid-19 vaccines are danger?				
Yes	34(8.1)	18.82	7.70	0.379/0.685
No	215(50.9)	17.62	7.61	
I'm undecided	173(41.0)	17.91	7.59	
Do you think that Covid-19 vaccines will cause any disease in the coming years?				
Yes	80(19.0)	17.81	7.41	0.230/0.795
No	158(37.4)	17.54	7.70	
I'm undecided	184(43.6)	18.10	7.62	
Do you think that Covid-19 vaccines will change genes?				
Yes	68(16.1)	17.15	7.84	0.340/0.710
No	219(51.9)	17.93	7.24	
I'm undecided	135(32.0)	18.04	7.60	

The participants of 36.5% had Covid-19 infection, 79.9% being Covid-19 vaccine. There was no difference between the e- Health literacy score and having had a Covid-19 infection and have been vaccinated against Covid-19 (p value respectively 0.594; 0.302) (Table 4).

Table IV: Comparison of e-Health Literacy Scale Scores According to Participants' had Covid-19 infection and being Covid-19 vaccines

	n(%)	Mean	SD	Test value/p
Having Had Covid-19 İnfection				
Yes	154(36.5)	17.58	7.66	0.534/0.594
No	268(63.5)	17.99	7.57	
Being Vaccinated Covid-19				
Yes	340(79.9)	18.03	7.69	1.032/0.302
No	85(20.1)	17.06	7.17	

The participants of 50.2% reported that they spent more than three hours a day on the internet. 41.0% of the study group reported that

they spent time on the internet for playing games, 22.5% for homework, 21.6% for social media accounts, and 14.9% for reading and watching health news. No statistically significant difference was found between the duration of internet use and reasons for internet use of the study group and the e- Health literacy scale mean scores (p value respectively 0.955; 0.878) (Table 5).

Table V: Comparison of e-Health Literacy Scale Scores According to Participants' Internet Usage Characteristics

	n(%)	Mean	SD	**Test value/p**
Avarage of spent time a day for Internet usage				
I don'tcome in everyday.	7(1.7)	17.29	5.96	0.109 / 0.955
0-1 hours a day	39(9.2)	18.08	7.85	
2-3 hours a day	164(38.9)	18.05	7.64	
Morethan 3 hours a day	212(50.2)	17.65	7.61	
Reasons of Internet using				
Homework	95(22.5)	18.13	7.58	0.226 / 0.878
Socail media account	91(21.6)	18.22	6.75	
The game	173(41.0)	17.52	7.79	
Health News	63(14.9)	17.73	8.35	
How important is it for you to be able to access health resources on the Internet?**?**				
Not important at all	139(32.9)	10.46	2.25	**15.630 /<0.001**
Not important	156(37.0)	16.47	1.79	
Unsure	51(12.1)	22.47	1.67	
İmportant	43(10.2)	28.56	1.59	
Veryimportant	33(7.8)	34.27	1.52	
How useful do you feel the Internet is in helping you in making decisions about your health **?**				
Not useful at all	123(29.2)	14.46	2.52	**2,656 / 0.030**
Not useful	174(41.7)	18.63	1.98	
Unsure	52(12.3)	23.26	1.95	
Useful	39(9.3)	25.66	1.53	
Very useful	32(7.5)	30.18	1.68	

When the study group was asked about the importance of internet use in making decisions about health; 32.9% stated that it was not important at all, 37.0% stated that it was not important, 12.1% stated that they were undecided, 10.2% stated that it was not important, 7.8% stated that it was very important. It has been determined that there is a significant difference between the importance of internet use in making decisions about health and the e- Health literacy scale mean score of the study group (p=0.000) (Table 5). When the study group was asked whether internet use is helpful in making decisions about health, 29.2% stated that it was not helpful at all. It was determined that there was a significant difference between the usefulness of internet use in making decisions about health and the e-Health literacy scale mean scores of the study group (p=0.030) (Table 5).

DISCUSSION

In this study, it was determined that 36.5% of the participants had a Covid-19 infection, and 79.9% have been vaccinated against Covid-19. The scores of the study group on the e- Health literacy scale score mean of 17.84±7.60. The participants of 50.2% reported to spent more than three hours a day on the internet. We determined that there was a significant difference between the usefulness of internet use in making decisions about health and the e-Health literacy scale mean scores of the study group.

The frequency of those who had Covid-19 infection in the study group was 36.5%. According to the data of the World Health Organization (WHO), the incidence of Covid-19 infection in adolescents aged 15-24 is 14.5%[17]. According to American Academy of Pediatric (AAP), nearly 15.6 million cases have been reported as in 2023[18]. Our results of that adolescents related to had Covid-19 infection are higher than the WHO and AAP frequencies. Although it is observed that the Covid-19 infection is mild or without symptoms in the adolescent population, it is possible to say that the incidence of Covid-19 infection in the adolescent population worldwide should not be overlooked.

It is known that vaccination practices are one of the most important preventive measures that reduce the spread of infections in the protection of health, control of infectious diseases and ensuring safety[19]. In our study, it was determined that 79.9% of the participants were vaccinated against Covid-19. Thakkar et al. has reported that 829 (73.5%) students were vaccinated in their study conducted with 1128 students in the South Carolina region[20]. The frequency of those in the 0-19 age group who received at least one dose of vaccine was 62.95% in Hong Kong and 45.7% in Italy[21]. Although clinical studies have shown that Covid-19 vaccines are safe and effective for adults, adolescents and young children[22]. According to results of our study, the frequency of at least one dose of vaccination was higher among Turkish adolescent students. This result may be because of the country's free vaccination policy, as well as the fact that deaths and sequelae caused by Covid-19 infection are easily accessible to the society through social media visibility.

It is known that one of the most important public health practices for the prevention of communicable diseases and the maintenance of health is vaccination[23]. According to the Vaccine Hesitancy Report of the World Health Organization Strategic Advisory Group (SAGE) Working Group of Experts, vaccine hesitancy is defined as 'delayed acceptance or rejection of a vaccine despite the availability of vaccination services[24]. Vaccine hesitancy is a complex issue that can be seen in all societies and varies. It is known that vaccine hesitancy, which is known to be affected by the factors such as peace of mind, convenience and trust, is affected by individual and group effects and contextual factors[25]. In our study, 8.1% of the participants reported that they thought the Covid-19 vaccines would pose a danger to their health. The frequency of those who stated that they think the Covid-19 vaccine would cause disease in the coming years was 19%. Further considerations, according to our study findings, are that vaccination can induce gene changes. In our study, 16.1% of the participants reported that the Covid-19 vaccines could change the gene. Our study findings have shown that there are some doubtful opinions developed against vaccines. We think that having a high level of e-Health literacy may prevent such confusion.

According to Norman and Skinner, e- Health literacy can be determined as the capability to search, find, comprehend and analyze e- Health-related information through digital sources and to use the information retrieved in this context to identify or sort out a health problem[15]. Adolescent students in this study indicated a satisfactory mean e- Health score of 17.84 ± 7.60. Previously studies reported by Tümer ve sümer e- Health score 27.52±66.76, Eyimeya et al (2021) 27.51, Gazibara et al. (2019) as 26.0, Coskun and Bebis¸ (2015) as 27.46 Park et al. (2017) as 29.5626,27,16,28. Our study results are lower than the results of the studies in the literature. The e- Health literacy requires reading, ability to use the digital environment, ability to look for information and understand and use the- Health information[15]. It is worrying that the adolescents we included in the study

have low e- Health scores. Despite widespread internet networks and digital technology resources; not having the ability to access correct information, read and evaluate may lead to more diseases and poor quality of life in the future.

There was no significant difference between the participants' Covid -19 had infected and/or received vaccine and their e-Health literacy scores (Table3, Table 4). The originality of our study was to compare the level of e- Health score with variables related to Covid-19 infection. In this sense, our study is a first in the literature. We didn't found statistically difference e- Health literacy levels of adolescents with had or had not Covid-19 infection, being or not recevied the Covid-19 vaccine (vaccines are danger, vaccine will change gene or vaccines will cause any disease in the coming years). It has been reported that family type, mother/father's education level, and income level are factors related to e- Health score[14,27].

The majority of participants (70.9%) thought that the internet was ''not useful at all'' and ''not useful'' in making decisions about their health. But it was determined that there was a significant difference between the importance of internet use in making decisions about health and the e- Health literacy scale mean scores. However, this significant difference was negative. Our results supported the results in the literature. In the studies of Tümer and Sümer (2021) reported that high school students, who obtained similar results, had good internet access, but that there was no effective factor in their health and decision-making[14]. Eyimaya et al. (2021) found that adolescents reported opinions as "important" at the highest level and "not important at all" at the lowest level[26]. These studies and our study have shown that adolescents don't find the internet useful in reaching the right information and in making decisions with their health.

The sixty nine point nine (69.9%) responded as 'not important at all'' and ''not important''. There was a statistically significant difference between the groups, but this was in the form of the majority of negative opinions. One of the situations that affect the perception of importantly can be disinformation in the digital world. Because not all information in electronic resources is accurate and reliable. Similar to our study findings, in the study of Saygın et al. (2021) was reported that the e- Health literacy level of those who answered the this question as very important and important was higher than those who answered as not important at all and less important[29]. In the study of Tümer and Sümer (2021) emphasized that the frequency of the importance of being able to access health-related resources on the Internet was 46.1%[14]. Eyimaya and et al (2021) was reported as 52.1% this frequency[26].

The low level of e- Health literacy poses a great threat to both individual health and public health, because the application of false and misleading information on the internet can cause serious health problems[30].

Conducting this study in only one school is an important limitation of the study. It is considered that organizing educational activity studies in larger sample groups will be beneficial and will shed light on the determination of policies and approaches to be developed.

CONCLUSION

In this study, the participant' e- Health literacy mean score was found to be 17.84±7.60, and a difference was found between their internet use in decision-making on health-related issues and their e- Health literacy scale mean score. In addition, it was determined that there was no difference between the participants' had infected with Covid-19, had received with Covid-19 and their opinions about the Covid-19 vaccine and their e- Health literacy score

average. In addition, no difference was found between the participants' e- Health literacy scale score averages and the reasons and duration of internet use. According to the results of the study, making the available resources effective and awareness studies to be carried out with the state, school-family and non-governmental organizations will be beneficial for adolescents. In addition, another recommendation within the scope of the current study; health/''e- Health literacy'' to be included in the curriculum.

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Ethics Committee Approval: For this study, ethics committee approval with the decision number of 21.18.18 with session number 18 on 18.10.2021 were got from the clinical research ethics committee of Harran University Medical faculty and the necessary permissions were obtained from the Mustafa Kemal Atatürk Vocational and Technical High School headmastership.

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