Turk J Public Health
Available online at: http://dergipark.org.tr/tjph/
Doi: 10.20518/tjph.1074107

TURKISH JOURNAL OF PUBLIC HEALTH

ORIGINAL ARTICLE /ORİJİNAL MAKALE

The relationship of e-health literacy levels of university students studying other than health sciences with health literacy, digital literacy, media and television literacy

Sağlık bilimleri alanı dışında okuyan üniversite öğrencilerinin e-sağlık okuryazarlığı düzeylerinin sağlık okuryazarlığı, dijital okuryazarlık, medya ve televizyon okuryazarlığı ile ilişkisi

İlknur Dolu[1] Serpil Çelik Durmuş[2]

[1]Assoc. Prof., Bartın University, Faculty of Health Science, Department of Nursing, Bartın, Türkiye
[2]Assist. Prof., Kırıkkale University, Faculty of Health Science, Department of Nursing, Kırıkkale, Türkiye

Recieved: 15.02.2022, **Accepted:** 09.12.2022

Abstract

Objectives: Electronic health literacy plays an increasing role for people to protect and promote their health today. To increase the level of eHealth literacy of individuals helps to increase their capacity to meet their health needs. The aim of this study was to define the level of eHealth literacy of university students studying other than health science and its correlation with health literacy, digital literacy, media and television literacy, and screen time.

Methods: This cross-sectional study was carried out by 476 trained undergraduate students in Bartin University, Turkey. In this study, a questionnaire, Health Literacy Scale, E-health Literacy Scale in Adolescents, Digital Literacy Scale, and Scale of Media and Television Literacy Levels were used as data collection tools.

Results: The eHEALS score did not significantly differ according to sociodemographic characteristics of students. Multiple linear regression analysis found that digital literacy, the addiction of media and television, literacy of media and television, and health literacy significantly affect electronic health literacy.

Conclusion: To increase students' digital and media literacy will provide a significant contribution to improve their eHealth literacy skills to be healthier adults and older adults in their future life. Additionally, it is recommended that curriculum should include courses that develop students' digital literacy levels.

Keywords: Health Literacy, Digital Technology, Mass Media, Television, Screen Time

Correspondence: Assoc. Prof. İlknur Dolu, Bartın University, Faculty of Health Scince, Department of Nursing Bartın, Türkiye. **E mail:** idolu@bartin.edu.tr, **Phone:** +90 378 223 53 86.
Cite This Article: Dolu İ, Durmuş SÇ. The relationship of e-health literacy levels of university students studying other than health sciences with health literacy, digital literacy, media and television literacy. Turk J Public Health 2023;21(1):16-27.

Öz

Amaç: Elektronik sağlık okuryazarlığı, günümüzde insanların sağlıklarını korumaları ve geliştirmeleri için artan bir rol oynamaktadır. Bireylerin E-Sağlık okuryazarlık düzeylerini artırmak, sağlık ihtiyaçlarını karşılama kapasitelerini artırmalarına yardımcı olur. Bu çalışmanın amacı, sağlık bilimleri alanı dışındaki üniversite öğrencilerinin E-Sağlık okuryazarlık düzeylerinin sağlık okuryazarlığı, dijital okuryazarlık, medya ve televizyon okuryazarlığı ve ekran süresi ile ilişkisini belirlemektir.

Yöntem: Bu kesitsel çalışma, Türkiye'de Bartın Üniversitesi'nde eğitim gören 476 lisans öğrencisi ile gerçekleştirilmiştir. Veri toplama aracı olarak anket formu, Sağlık Okuryazarlığı Ölçeği, Ergenlerde E-Sağlık Okuryazarlığı Ölçeği, Dijital Okuryazarlık Ölçeği ve Medya ve Televizyon Okuryazarlık Düzeyleri Ölçeği kullanılmıştır.

Bulgular: Öğrencilerin sosyodemografik özelliklerine göre E-Sağlık Okuryazarlık puanları anlamlı farklılık göstermemiştir. Çoklu doğrusal regresyon analizine göre dijital okuryazarlık, medya ve televizyon bağımlılığı, medya ve televizyon okuryazarlığı ile sağlık okuryazarlığının E- sağlık okuryazarlığını önemli ölçüde etkilediğini görülmüştür.

Sonuç: Öğrencilerin dijital ve medya okuryazarlığını artırmak, E-Sağlık okuryazarlığı becerilerinin ileriki yaşamlarında daha sağlıklı yetişkinler olmalarına önemli katkı sağlayacağı öngörülmektedir. Bu bağlamda, müfredatta öğrencilerin dijital okuryazarlık düzeylerini geliştiren derslerin yer alması önerilmektedir.

Anahtar Kelimeler: Sağlık Okuryazarlığı, Dijital Teknoloji, Medya, Televizyon, Ekran Süresi

INTRODUCTION

The concept of health literacy is an important issue of public health in terms of taking responsibility for their own health.[1, 2] Health literacy, is defined as an ability of people to make the right decisions about their own health in their daily lives such as at home, at the workplace, in a health care center is closely related to individual factors such as financial status, age, social status, education, and age.[3] Additionally, the rapid development in technology, information, and communication technologies (ICT) in recent centuries has created an important link between the health literacy level of society and the content of health information spread through technological devices e.g., television, radio, personal computers (PS), tablets or mobile phones with internet access.[2, 4]

Some studies show that the preference for reading from electronic sources is gradually increasing versus printed versions.[5] Although university students generally prefer to use printed textbooks, they tend to use electronic devices for their personal searching.[6] Nowadays adolescents, they generally are defined as 'a digital generation' [7] often prefer to read almost all information from the internet or use it as an entertainment tool and so they spend so much time on their electronic

devices.[8, 9] According to current literature, there are weak evidence for health literacy and screen time among young adults aged between 18 and 25.[10, 11]

Along with the increasing tendency to online reading sources, screen time[9] the utilization of using digital technologies,[12, 13] and literature preference of individuals have begun to be considered among the factors affecting health literacy.[14] Additionally, mass media e.g., television and radio have a considerable role in providing health-related information and affecting the health behavior of the public.[15] Therefore, media literacy, which is defined as 'the ability to access, analyze, evaluate and communicate all written or non-written messages[4, 16] also seems as an important factor affecting the health literacy[17] and eHealth literacy.[15]

The term health literacy seems associated with electronic health (eHealth) literacy, but there is not a defined relationship between them.[18] Health literacy is mainly related to individuals' abilities such as accessing, understanding, and using information to maintain and improve their health.[19] On the other hand, eHealth literacy is the ability to search, find, understand, and assessing of information regarding health from e-sources to be used to point out and find solutions for individuals' health problems.[20] eHealth literacy has an interplay role between computer literacy, media literacy, information literacy, traditional literacy, scientific literacy, and health literacy.[21] A small number of studies searched the association of eHealth literacy with health literacy.[19]

eHealth literacy has an increasing role for people to protect and promote their health and for chronically ill people to involve in their treatment decision through easy access to a vast number of health information from e-sources.[22] Having a high level of eHealth literacy helps individuals to improve their skills to meet their health needs. It is necessary for people to know which factors affect their health and how to manage these factors to take responsibility for their own health.[1] eHealth provides people easy access to health information through computer-mediated platforms e.g., forums, and telemedicine applications regardless of their geographic location. These platforms bring together people who have similar health problems or curiosity about maintaining and promoting health while searching for health information and reading scientific reports. Thus, people also have an opportunity to learn from each other through these platforms.[23]

Most of the studies aimed at defining the eHealth literacy level and its associations were conducted with or predominantly included students in health sciences such as nursing, pharmacy, or medical school.[24-27] However, the relationship of eHealth literacy with health literacy, digital literacy, and media literacy in undergraduate students from the fields other than health sciences is not well documented. Therefore, the aim of this study was to explore the eHealth literacy level of university students from the fields except for health sciences and its correlation with health literacy, digital literacy, and media literacy. The research questions are as follows:

What is the level of eHealth literacy, health literacy, digital literacy, and media literacy in the undergraduate students from the fields except for health sciences?

Is there any relationship of e-Health literacy levels of university students studying other than health sciences with health literacy, digital literacy, media and television literacy?

METHODS

Design, Data Collection and Sample

This cross-sectional study was carried out between 15 September and 31 October 2019 at Bartin University in Turkey. The universe was comprised of 1.318 students from Faculty of Sciences, Faculty of Engineering, Architecture and Design, Faculty of Economics and Administrative Sciences, and Faculty of Education. The sample size was calculated as 442 taking a 5% margin of error with a 99% confidence level. The sample size was determined as 508 (442 + 15% of 442 = 508) taking into account missing data. A stratified sampling method was performed based on the number of students in each faculty. Students were randomly invited to the study until reached the targeted sample size. Finally, 32 participants were excluded because of attending a course related to health, and 476 samples were included in the analysis. The exclusion criteria were the following: (i) attending any course regarding health, (ii) not volunteering to participate.

Measurements

In this study, multiple tools including a questionnaire, Health Literacy Scale, E-health Literacy Scale (e-HEALS) in Adolescent, Digital Literacy Scale, and Scale of Media and Television Literacy Levels were used. *The questionnaire* comprised questions on sociodemographic data that included information about the participants' age, gender, year of undergraduate education, name of faculty, and screen time on weekdays and weekends. Screen time includes the following activities: watching TV/ movies, internet searching with computer, tablets, or mobile phones without the purpose of doing homework, and electronic games.[28]

E-health Literacy Scale (eHEALS) in Adolescents: eHEALS was used to assess students' health literacy levels by using information technology. The scale was developed by Norman and Skinner[20] and validated by Coşkun and Bebiş in the Turkish context in the 14-21 age range with a Cronbach's alpha score of .78.[29] This 5-point Likert type scale consists of 8 items and has choices ranging from 'strongly agree' to 'strongly disagree'. The total score ranges from 8 to 40, with a high score indicating a high level of e-health literacy. Cronbach's alpha coefficient was .83 in the internal consistency analysis in the present study.

Health Literacy Instrument: The health literacy level of the participants was assessed by Turkish Form of Health Literacy Scale which was developed by Sørensen et al. in the framework of Health Literacy Survey in Europe (HLS-E.U)[1] and validated by Aras and Bayik Temel in the Turkish context with a Cronbach's alpha score of .92[30]. This 5-point Likert-type scale consists of 25 items weighted on a scale of 1 (unable) -5 (without any difficulty and contains four subscales of access, understanding, appraisal, and application of health information. An overall score ranges from 25 to 125, with the indicating *least health literacy score* and *maximal health literacy score* respectively. Cronbach's alpha coefficient was .90 in the internal consistency analysis in the present study.

Digital Literacy Scale: Digital Literacy Scale (DLS) was developed by Ng[31] and validated by Üstündağ et al.[32] in the Turkish context aged 21.7 years or older with a Cronbach's alpha score of 0.86. This 5-point Likert type scale has 10 items and respond options ranging from 'strongly disagree' to 'strongly agree'. The increase in the score obtained from the scale, ranging between 5 and 50 points in total, means a high-level digital literacy level. Cronbach's alpha coefficient was 0.88 in the internal consistency analysis in the present study.

Scale of Media and Television Literacy Levels: This scale was developed by Korkmaz and Yeşil with a sample group of university students. The scale, consisting of 18 questions in total, is a 5-point Likert type with response options ranging from 'never' to 'always'. The first 13 questions measure *literacy* with a Cronbach's alpha score of 0.91 and the last 5 questions measure *addiction* with a Cronbach's alpha score of 0.85. Total score of each subscale is converted into standard scores ranging from 20 to 100. The total score is range from 5 to 65 for literacy, and from 5 to 25 for addiction. The high score indicates high-level literacy for the *literacy subscale*, but low-level addiction for the addiction subscale. These score ranges are evaluated as the opposite of the addiction subscale. Cronbach's alpha coefficient was 0.74 for literacy subscale, and 0.93 for addiction subscale in the internal consistency analysis in the present study.

Statistical Analysis

Frequency, percentage, mean, and standard deviation (SD) were used for reporting demographic data of the participants, independent samples t-test, ANOVA, and Pearson correlation were used for normally distributed data, Mann-Whitney-U, Kruskal-Wallis, and Spearman's Rank-Order Correlation were used for non-normality. the normality of distribution of the student data was evaluated using Skewness and Kurtosis values. The multiple linear regression analyses were performed to define variables that were associated with eHEALS. Variables found to have a significant correlation with eHEALS were then included in a multiple linear regression model with stepwise selection (entry criterion of probability $p \leq 0.05$, exit criterion of probability $p > 0.1$). Collinearity statistics were assessed by the maximum level of Variance inflation factors (VIF) was 4 for the collinearity statistics.[33] All analyses were conducted using SPSS the 25.0 version. The significance level was accepted as $p < 0.05$. The study results were reported according to STROBE Statement (STROBE checklist: cross-sectional studies).

Ethical Considerations

Ethical approval (decree code: 2019/057) was obtained for this research from ethics committee of Bartın University. All participants were informed about aim of the study and invited them to attend the study obtaining their verbal informed consent. To ensure the confidentiality of participant information, paper-based questionnaires were de-identified by allocating a code number.

RESULTS

As is shown in Table 1, of the 476 participants, 52.5% were female, 34.7% studied at Faculty of Education, 42.9% were in their first years, and 70.6% were aged 19-21 years. Additionally, it is not in Table 1, the mean age

of the students was 20.13 (SD= 2.09, range 17 to 37). The eHEALS score did not significantly differ according to the sociodemographic characteristics of students, whereas MTLL (Literacy) significantly differ according to all variables studied. On the other hand, a significant difference in screen time (weekdays and weekends) and DLS score were observed according to gender and Faculty registered, HLS score significantly differ according to gender and term. MTLL (Addiction) only significantly differ according to the age group. Detailed information about other variables is also illustrated in Table 1.

Table 1: The mean scores of eHEALS, DLS, MTLL, HLI, and screen time according to sociodemographic characteristics of students.

Characteristics		n	% Mean (±SD)	Screen time in weekdays (hour)	Screen time at the weekend (hour)	eHEALS	DLS	MTLL (Addiction)	MTLL (Literacy)	HLI
				Mean (±SD)	Mean (±SD)	Mean (±SD)	Mean (±SD)	Mean (±SD)	Mean (±SD)	
Gender	Male	226	47.5	3.4 (2.0)	3.6 (2.1)	28.5 (6.2)	37.4 (7.4)	10.3 (5.8)	4.1 (0.8)	4.2 (0.7)
	Female	250	52.5	2.7 (1.9)	3.1 (2.1)	29.2 (5.7)	34.8 (5.9)	9.7 (5.0)	4.1 (0.7)	4.5 (0.6)
t-test/ p				2.761/ 0.01	3.775/ <0.001	1.293/ 0.20	4.146/ <0.001	1.175/ 0.24	24451.000*/ 0.06	34387.000*/ <0.001
Faculty	Faculty of Sciences	51	10.7	3.1 (1.8)	3.7 (2.1)	29.4 (6.2)	36.8 (5.8)	10.4 (5.8)	4.1 (0.6)	4.1 (0.6)
	Faculty of Engineering, Architecture and Design	126	26.5	3.4 (2.1	3.7 (2.1)	28.7 (6.1)	36.9 (6.4)	9.1 (4.7)	4.2 (0.7)	4.4 (0.6)
	Faculty of Education	165	34.7	2.6 (1.9)	2.9 (2.1)	28.8 (5.4)	34.3 (6.8)	10.6 (5.6)	4.0 (0.8)	4.3 (0.7)
	Faculty of Economics and Administrative Sciences	134	28.2	3.1 (2.0)	3.3 (2.0)	29.1 (6.9)	36.8 (7.0)	9.6 (5.4)	4.0 (0.7)	4.3 (0.6)
F/ p				3.453/ 0.02	4.614/ <0.001	.203/ 0.89	4.977/ <0.001	2.306/ 0.08	11.941**/ 0.01	4.299**/ 0.23
Term	First year	204	42.9	2.9 (1.8)	3.4 (2.0)	28.7 (6.3)	35.4 (7.0)	10.9 (5.8)	4.0 (0.7)	4.3 (0.7)
	Second year	174	36.9	3.1 (2.1)	3.2 (2.2)	29.2 (6.0)	36.3 (6.6)	9.2 (5.1)	4.2 (0.7)	4.4 (0.6)
	Third year	39	8.2	3.2 (1.2)	3.1 (1.9)	29.6 (5.3)	35.1 (6.0)	9.7 (4.2)	4.0 (0.8)	4.3 (0.5)
	Fourth year	59	12.4	3.3 (2.2)	3.6 (2.2)	28.2 (4.9)	37.4 (6.7)	8.7 (4.7)	4.0 (0.6)	4.3 (0.6)
F/ p				0.770/ 0.51	0.685/ 0.56	0.722/ 0.54	1.714/ 0.16	4.749/ <0.001	10.657**/ 0.01	15.802**/ <0.001
Age groups	≤18	64	13.4	2.8 (1.8)	3.5 (2.1)	28.4 (6.4)	34.9 (6.2)	12.2 (6.1)	3.9 (0.7)	4.3 (0.6)
	19-21	336	70.6	3.1 (2.0)	3.3 (2.1)	28.9 (5.9)	36.0 (6.7)	9.5 (5.1)	4.1 (0.7)	4.3 (0.6)
	≥22	76	16.0	2.9 (2.3)	3.0 (2.3)	29.2 (5.8)	36.7 (7.4)	9.9 (5.4)	3.9 (0.9)	4.2 (0.7)
F/ p				0.381/ 0.68	1.086/ 0.34	0.380/.068	1.244/0.29	7.053/<0.001	6.621**/0.04	4.347**/0.11

*Mann Whitney U; **Kruskal-Vallis; Abbreviations: eHEALS: E-health Literacy Scale. DLS: Digital Literacy Scale. MTLL: Scale of Media and Television Literacy Levels. HLS: Health Literacy Scale.

Correlations for all the variables are described in Table 2. The mean eHEALS score was 28.9 (SD= ±6.0, range 8 to 40), DLS was 35 (SD= ±6.8, range 10 to 50), MTLL (Literacy) was 50.9 (SD= ±7.7, range 13 to 65), MTLL (Addiction) was 9.9 (SD= ±5.4, range 5 to 25), HLI was 107.8 (SD= ±14.6, range 25 to 125), screen time (hour) in weekdays was 3.0 (SD= ±1.2, range 0 to 7), and screen time at the weekend (hour) was 3.3 (SD= ±2.1, range 0 to 7). DLS, MTLL (Literacy), and HLS were moderately correlated with eHEALS with .464 (95% CI raging .34 to .48), .266 (95% CI ranging from .13 to .25), and .348 (95% CI ranging from .06 to .13) respectively. Additionally, MTLL (Literacy) has moderate correlation with DLS (r = 0.347, 95% CI ranging from .22 to .35) and HLS (r = 0.353, 95% CI raging .13 to .53). Furthermore, there was a strong correlation between screen time in the weekdays and at the weekend (r = 0.704, 95% CI ranging from .60 to .72). In addition, significant but weak correlation existed in HLS with screen time in weekdays (r = 0.107, 95% CI ranging from .02 to .00), MTLL (Addiction) (r = 0.291, 95% CI raging .06 to .14), and MTLL (Literacy) (r = 0.230, 95% CI ranging from .11 to .04). Finally, it was observed a weak correlation between MTLL (Literacy) and MTLL (Addiction) (r = 0.182, 95% CI ranging from .10 to .01).

Multiple analyses found that DLS, MTLL (Addiction), MTLL (Literacy), and HLI scores significantly affect eHEALS scores. After multiple linear regression analyses, DLS remained the strongest predictor of high eHEALS score, followed by MTLL (Addiction), MTLL (Literacy), and HLS. A multivariate model including these three indicators yielded an adjusted R^2 = 0.25% (p=0.00) for explained variance in e-health literacy (Table 3).

Table 2: Means, standard deviations and Pearson correlations with confidence interval among eHEALS, DLS, MTLL, HLI scores, and screen time

Variables	M	SD	1	2	3	4	5	6
1. Screen time in weekdays	3.0	1.2						
2. Screen time at the weekend	3.3	2.1	0.704** [0.60-0.72]					
3. eHEALS	28.9	5.9	0.049 [-0.01-0.05]	0.040 [-0.02-0.05]				
4. DLS	36.0	6.7	0.024 [-0.02-.03]	0.061 [-0.01-0.05]	0.464** [0.34-0.48]			
5. MTLL (Addiction)	51.1	8.7	0.059 [-0.01-0.06]	0.056 [-0.01-0.06]	0.081 [-0.01-0.19]	-0.014 [-0.13-0.10]		
6. MTLL (Literacy)[a]	50.9	7.7	0.042 [-0.01-0.03]	0.045 [-0.01-.03]	0.266** [0.13-0.25]	0.374** [0.22-0.35]	-0.182** [-0.10-0.01]	
7. HLS[a]	10.8	14.6	-0.107* [-0.02-0.00]	0.070 [-0.02-0.01]	0.348** [0.06-0.13]	0.291** [0.06-0.14]	-0.230** [-0.11--0.04]	0.353** [0.13-0.23]

a=Spearman's rho; **Correlation is significant at the 0.01 level (2-tailed); *Correlation is significant at the 0.05 level (2-tailed); Abbreviations: eHEALS: E-health Literacy Scale. DLS: Digital Literacy Scale. MTLL: Scale of Media and Television Literacy Levels. HLS: Health Literacy Scale.

Table 3: Multiple linear regression analysis for the association between eHEALS, DLS, MTLL, and HLI scores

Variable	β (%95 Cl)	p value	Adjusted R
Crude	5.839 (1.56- 10.12)	0.01	0.247
DLS	0.351 (0.28-0.43)	<0.001	
HLS	0.053 (0.02-0.09)	<0.001	
MTLL (Addiction)	0.135 (0.05-0.22)	<0.001	
MTLL (Literacy)	0.065 (0.01-0.12)	0.03	

Abbreviations: eHEALS: E-health Literacy Scale. DLS: Digital Literacy Scale. MTLL: Scale of Media and Television Literacy Levels. HLS: Health Literacy Scale.

DISCUSSION

Using a random sample of 476 university students studying other than health field, the level of eHealth literacy and its association with health literacy, digital literacy, media and television literacy, and screen time were calculated. It was found that the level of eHealth literacy did not differ according to the sociodemographic characteristics of students and screen time. This study sample consisted of students an average of 20 years old. Recent studies show that age did not a predictor of eHealth literacy.[19, 34] To support these findings, the total score of eHealth literacy in current study was consistent with studies conducting adult population (18 years of age and older) in Italy[21] and Kuwait.[34] However, a result of an online survey of the pharmacy students was slightly higher than the total score of eHealth literacy of the study sample.[26]

In this study, eHealth literacy did not differ according to gender. A study conducted in Israel with a 2.201 adult population[35] was consistent with the study findings. Similarly, three other studies did not find any difference between female and male for the level of eHealth literacy in Italy[21], in Lanai Island[36], and in East Carolina[37]. However, there are inconsistent results regarding variation in the level of eHealth literacy between females and males. On the one hand, there is evidence that males had a lower eHealth literacy levels than females[34], on the other hand, another study found that males were more literate regarding eHealth than females[27]. Furthermore, it was not found any differences between the level of eHealth literacy and the enrolment year of the students. But some other studies conducting with pharmacy and nursing students reported that a year increase in student enrollment year scaled up the level of eHealth literacy of students.[26, 27]

According to this study findings, screen time spent on internet searching for entertainment or personal inquiry, watching TV/ movies, and electronic games did not associate with eHealth literacy. Alhuwail and Abdulsalam found that individuals spending time on the internet at least 5 hours a day had a higher level of eHealth literacy compared with those spending less than 3 hours.[34] People frequently spend their time on internet searching for various content for any reason e.g., personal inquiry, health information, or different type of health information have a high level of eHealth literacy.[38] Similarly, people searching for information on various types of content besides health information on the internet had high-level eHealth literacy.[35]

In this study, the total score of eHEALS was moderately correlated with digital literacy, media and television literacy, and health literacy. Additionally, the strongest predictor of eHealth literacy was digital literacy, followed by media and television addiction,

media and television literacy, and health literacy. According to Sharma et al.'s study, nursing students perceived themselves as having good internet skills and a high level of eHealth literacy.[39] Similarly, another study shows that pharmacy students who were mobile health app users had higher eHEALS scores compared with non-users.[26] Frequent using the internet is closely related to a high-level of digital literacy and associatively high level of digital literacy is closely related to eHealth literacy.[35] In today's world, ordinary people, not solely university students or academics, easily have access to high-quality health information thanks to open access policies. Therefore, the digital literacy level of people is emphasized as a processor to increase individuals' health literacy level.[40]

It was expected that media literacy and health literacy had a significant association with eHealth literacy because Norman and Skinner's lily model includes both literacies.[20] Majority of health-related messages and information are transferred to people every day through the channels of television and radio. Also, it was proven that increasing media literacy was an effective intervention to improve the healthy behaviors of young adults.[15] However, Neter and Brainin reported that the level of eHealth literacy did not differ according to obtaining health information from television or radio.[35] Additionally, Del Guidice et al. found a weak correlation between eHealth literacy and health literacy similar to this study findings.[21]

Strengths and Limitations

The strength of this research is revealed the association between eHealth literacy and several variables reflecting participants' actual performance. The findings of this study should be discussed considering some limitations of this study. Firstly, a stratified sampling procedure was used based solely on the number of students in each faculty without considering the students' class levels. Secondly, the e-health Literacy Scale was developed and validated in the age category of 14 to 21 years old. However, this study sample included students aged 22 years old and over (16%). Finally, present study was conducted in one University and does not represent the characteristic of the whole university students studying other than health fields in Turkey. Thus, the results of this study can be generalized to a limited extent.

CONCLUSION

This study reports the association between the level of eHealth literacy of university students not studying in the health field and several related factors including health literacy, digital literacy, media and television literacy, screen time, and sociodemographic characteristics of students. The findings show that the eHealth literacy was moderately correlated with digital literacy, media and television literacy and health literacy, but not differ according to sociodemographic characteristics of students. Also, the strongest predictor of eHealth literacy was digital literacy, followed by media and television addiction, media and television literacy, health literacy. This study results suggest that to increase students' digital and media literacy might provide a significant contribution to improve their eHealth literacy skills to be healthier adults and older adults in their future life. Additionally, it is recommended that curriculum should include courses that develop students' digital literacy levels.

ACKNOWLEDGEMENTS

The authors thank all the students participating in the study.

Conflicts of Interest: The authors declare no conflicts of interest.

Financial Support: There is no funding for the study.

Ethical Declaration: The authors declared that the study was conducted in accordance with the principles of the "Ethical Principles for Medical Research Involving Human Subjects" of World Medical Association Declaration of Helsinki. Institutional permission was obtained from the provincial directorate of health. Ethical approval was obtained (decree code: 2019/057) by Ethical Board of Bartın University.

Authorship Contributions: Concept: İD, SÇD, Design: İD, SÇD, Supervising: İD, Financing and equipment: İD, Data collection and entry: İD, SÇD, Analysis and interpretation: İD, Literature search: İD, SÇD, Writing: İD, Critical review: İD, SÇD.

REFERENCES

1. Sørensen K, Van den Broucke S, Fullam J, Doyle G, Pelikan J, Slonska Z, et al. Health literacy and public health: a systematic review and integration of definitions and models. BMC Public Health 2012;12:80.
2. Sun W, Lei W. 'My health is my own business': Radio, television and advice media in post-Mao China. International Journal of Cultural Studies 2018;21:134-54.
3. Sørensen K, Pelikan JM, Röthlin F, Ganahl K, Slonska Z, Doyle G, et al. Health literacy in Europe: comparative results of the European health literacy survey (HLS-EU). Eur J Public Health 2015;25:1053-1058.
4. Korkmaz Ö, Yeşil R. Medya ve televizyon okuryazarlık düzeyleri ölçeği geçerlilik ve güvenirlik çalışması [Study of validity and reliability scale of media and television literacy levels]. Uluslararası İnsan Bilimleri Dergisi 2011;8:110-26.
5. Soroya SH, Ameen K. Millennials' Reading Behavior in the Digital Age: A Case Study of Pakistani University Students. Journal of Library Administration 2020;60:559-77.
6. Alamri B. Reading Preferences of ESL Students: Electronic Texts vs. Printed. IJET 2019;14:169-79.
7. Rodrigo-Mendizábal IF, López-Jiménez DF, Arribas-Urrutia A. Youth internet consumption in Ecuador: indicators of the national digital generation. International Journal of Web Based Communities 2020;16:296-320.
8. Ashton JJ, Beattie RM. Screen time in children and adolescents: is there evidence to guide parents and policy? Lancet Child Adolesc Health 2019;3:292-294.
9. Hyman A, Stewart K, Jamin AM, Novak Lauscher H, Stacy E, Kasten G, et al. Testing a school-based program to promote digital health literacy and healthy lifestyle behaviours in intermediate elementary students: The Learning for Life program. Prev Med Rep 2020;19:101149.
10. Stiglic N, Viner RM. Effects of screentime on the health and well-being of children and adolescents: a systematic review of reviews. BMJ Open 2019;9:e023191.
11. Wang J, Yang R, Li D, Hong N, Wang C, Wan Y, et al. [Association of health literacy and screen time with depressive symptoms among middle school students]. Wei Sheng Yan Jiu 2019;48:765-71.

12. Conard S. Best practices in digital health literacy. Int J Cardiol 2019;292:277-279.

13. Rosenbaum JE, Johnson BK, Deane AE. Health literacy and digital media use: Assessing the Health Literacy Skills Instrument - Short Form and its correlates among African American college students. Digit Health 2018;4:2055207618770765.

14. Manganello J, Gerstner G, Pergolino K, Graham Y, Falisi A, Strogatz D. The Relationship of Health Literacy With Use of Digital Technology for Health Information: Implications for Public Health Practice. J Public Health Manag Pract 2017;23:380-237.

15. Levin-Zamir D, Bertschi I. Media Health Literacy, eHealth Literacy, and the Role of the Social Environment in Context. Int J Environ Res Public Health 2018;15.1643.

16. Özkan S, Tüzün H, Uğraş Dikmen A, Aksakal NB, Çalışkan D, T aşçı Ö, et al. The Relationship Between Health Literacy Level and Media Used as a Source of Health-Related Information. Health Literacy Research and Practice 2021;5:e109-e17.

17. Akbarinejad F, Soleymani MR, Shahrzadi L. The relationship between media literacy and health literacy among pregnant women in health centers of Isfahan. J Educ Health Promot 2017;6:17.

18. Monkman H, Kushniruk AW, Barnett J, Borycki EM, Greiner LE, Sheets D. Are Health Literacy and eHealth Literacy the Same or Different? Stud Health Technol Inform 2017;245:178-82.

19. Neter EB, E. Association between health literacy, eHealth literacy, and health outcomes among patients with long-term conditions: A systematic review. European Psychologist 2019;24:68-81.

20. Norman CD, Skinner HA. eHealth Literacy: Essential Skills for Consumer Health in a Networked World. J Med Internet Res 2006;8:e9.

21. Del Giudice P, Bravo G, Poletto M, De Odorico A, Conte A, Brunelli L, et al. Correlation Between eHealth Literacy and Health Literacy Using the eHealth Literacy Scale and Real-Life Experiences in the Health Sector as a Proxy Measure of Functional Health Literacy: Cross-Sectional Web-Based Survey. J Med Internet Res 2018;20:e281.

22. Pohl A-L, Griebel L, Trill R. Contemporary eHealth Literacy Research – An Overview with Focus on Germany [Online]. Available at : http://ceur-ws.org/Vol-1574/paper10.pdf. Accessed June 30, 2021.

23. Paige SR, Stellefson M, Krieger JL, Anderson-Lewis C, Cheong J, Stopka C. Proposing a Transactional Model of eHealth Literacy: Concept Analysis. J Med Internet Res 2018;20:e10175.

24. Tsukahara S, Yamaguchi S, Igarashi F, Uruma R, Ikuina N, Iwakura K, et al. Association of eHealth Literacy With Lifestyle Behaviors in University Students: Questionnaire-Based Cross-Sectional Study. J Med Internet Res 2020;22:e18155.

25. Holt KA, Overgaard D, Engel LV, Kayser L. Health literacy, digital literacy and eHealth literacy in Danish nursing students at entry and graduate level: a cross sectional study. BMC Nurs 2020;19:22.

26. Üstün G, Söylemez S, Uçar N, Sancar M, Okuyan B. Assessment of the pharmacy students' e-health literacy and mobile

health application utilization and mobile health application utilization. Journal of Research in Pharmacy 2020;24:23-29.

27. Shiferaw K, Mehari E, Eshete T. eHealth literacy and internet use among undergraduate nursing students in a resource limited country: A cross-sectional study. Informatics in Medicine Unlocked 2020;18:100273.
28. Sirard JR, Bruening M, Wall MM, Eisenberg ME, Kim SK, Neumark-Sztainer D. Physical activity and screen time in adolescents and their friends. Am J Prev Med 2013;44:48-55.
29. Coşkun S, Bebiş H. Adolesanlarda e-sağlık okuryazarlığı ölçeği: Türkçe Geçerlik ve güvenirlik çalışması. Gülhane Tıp Dergisi 2015;57:378-384.
30. Aras Z, Bayik Temel A. Evaluation of Validity and Reliability of the Turkish Version of Health Literacy Scale. Florence Nightingale Journal of Nursing 2017;25:85-94.
31. Ng W. Can we teach digital natives digital literacy? Computers & Education 2012;59:1065-1078.
32. Üstündağ M, Güneş E, Bahçivan E. Turkish Adaptation of Digital Literacy Scale and Investigating Pre-service Science Teachers' Digital Literacy. Journal of Education and Future 2017;12:19-29.
33. Hair J, Black W, Babin B, Anderson R. Multivariate Data Analysis. New York: Pearson, 2010.
34. Alhuwail D, Abdulsalam Y. Assessing Electronic Health Literacy in the State of Kuwait: Survey of Internet Users From an Arab State. J Med Internet Res 2019;21:e11174.
35. Neter E, Brainin E. Health literacy: a marker for "digital divide" in health information. Reviews in Health Care 2012;3:145-151.
36. Witten NA, Humphry J. The Electronic Health Literacy and Utilization of Technology for Health in a Remote Hawaiian Community: Lana'i. Hawaii J Med Public Health 2018;77:51-59.
37. Reyes MA. Understanding Undergraduate Students' eHealth Use and Views of the Patient-Provider Relationship: East Carolina University; 2021.
38. Wong DK, Cheung MK. Online Health Information Seeking and eHealth Literacy Among Patients Attending a Primary Care Clinic in Hong Kong: A Cross-Sectional Survey. J Med Internet Res 2019;21:e10831.
39. Sharma S, Oli N, Thapa B. Electronic health-literacy skills among nursing students. Adv Med Educ Pract 2019;10:527-532.
40. Morris L, Bower K. Digital Literacy is Health Literacy. Collaborate: Libraries in Learning 2016;1:1-5.