

## Original Article

# e-Health Literacy Levels of University Students in Turkey and Affecting Factors

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### Abstract

**Objective:** University students must possess the knowledge and skills required to search for health information on the internet and to use this information appropriately. This descriptive study was conducted with the purpose of determining the e-health literacy levels of university students and the factors affecting these levels.

**Methods:** The study was performed on 284 students attending Nursing, Medicine, Law, and Computer Engineering programs at a state university in Ankara, Turkey. A descriptive characteristics form and e-Health Literacy Scale (eHEALS) were used to collect data. The median score on the scale was 25.5 (SD, 6.2). It was found that students of the Nursing Department scored better than students of other departments. However, no significant differences in scores were noted among the departments. Further, students who had performed research within the last week within the health area, by reading periodicals articles, did not report difficulties in accessing information, believed the accuracy of information found on the internet, and scored better on the scale.

**Conclusion:** It is suggested that university students should be given literacy training in computers and e-health, encouraged to read periodicals and articles on health, and must be informed about the evaluation of accuracy/reliability of information they obtain from the internet.

**Keywords:** e-health literacy, e-Health Literacy Scale, nursing, university student, internet.

### Introduction

Literacy in e-health is, “the ability of individuals to seek, find, understand, and appraise health information from electronic sources and apply such information to addressing or solving a health problem”(Stellefson et al., 2011; Norman & Skinner, 2006). e-Health literacy combines literacy skills in different areas (including traditional literacy, health literacy, knowledge literacy, scientific literacy, media literacy, and computer literacy) with the purpose of improving and sustaining e-health (Norman & Skinner, 2006). This is the most important characteristic differentiating e-health literacy from other types of literacy.

With an increasing amount of high-quality health information available online, the Internet is an important source for health information (Park, Moon, & Baeg, 2014). Based on a study carried out by the Pew Internet & American Life Project Research Center in 2013, approximately 74% of adults use the internet, and 80% of these users search for information about health ([http://www.pewinternet.org/Static-Pages/Trend-Data-\(Adults\)/WhosOnline.aspx](http://www.pewinternet.org/Static-Pages/Trend-Data-(Adults)/WhosOnline.aspx).; <http://www.pewinternet.org/2008/08/26/the-engaged-e-patient-population/>). Approximately 70% of Japanese internet users (Mitsutake, Shibata, Ishii, Okazaki, & Oka, 2011), 90% of individuals in South Korea (Park & Lee, 2015), and approximately 70% of individuals in Turkey

in the last quarter of 2017 ([http://www.tuik.gov.tr/PreTablo.do?alt\\_id=1028](http://www.tuik.gov.tr/PreTablo.do?alt_id=1028)) searched for health information online. Additionally, a study carried out by Coşkun and Bebiş (2015) found that a great majority (77%) of students in the 14–21 age group often use the internet to obtain information related to their health. These results show that internet has become a powerful source for obtaining information in the health arena.

Internet users search for information on their health status before seeing a physician. The Internet is convenient and free of charge for information retrieval (Kim, Kim, & Choi, 2018). Online health-related information can have many advantages; however, there are some concerns about the reliability, accuracy, and quality of health information on the Internet. The quality of online health-related information varies and is inconsistent (Kim & Son, 2017). In addition, finding and assessing sources related to health requires special skills (Kim & Son, 2017; Norman & Skinner, 2006). Such skills, which are both analytical and situation-specific, require working with technology, critical thinking in media and scientific areas, and behavioral competency in navigating between sources related to e-health (Stellefson et al., 2011). Otherwise, individuals can make false and dangerous behaviors such as self-diagnosis, treatment method determination based on the inaccurate information obtained from internet (Kim & Son, 2017; Yilmaz, 2013). It was found in a study by Stellefson et al. (2011) that reading skills, use/evaluation of e-health information, and overall health literacy of university students are not satisfactory. Additionally, a study carried out by Hanik and Stellefson (2011) found that students lack the knowledge and skills required for obtaining and evaluating health information from the internet. As stated by Park and Lee (2015), nursing students are capable of finding online health sources; however, they are unable to appropriately differentiate source quality (i.e., low or high).

Considering that health informatics applications will be instrumental in the management of diseases, nurses must be aware of the opportunities and drawbacks arising from the technologic innovations (Bodur & Kaya, 2015). The United Kingdom Central Council, American Association of Colleges of Nursing (1998), American Nurses Association, and Pew Health

Commission have emphasized that the use of technology is one of the most important competencies of the 21<sup>st</sup> century, that nurses should be computer-literate, and that they should have detailed informatics capabilities (Isik & Kaya, 2011). Computer literacy and internet literacy will help nursing students in reaching these learning targets (Hallila, Zubaidi, Ghamdi, & Alexander, 2014).

Previous studies investigating the levels, and associated factors affecting the e-health literacy of university students and four-year nursing programs are limited in number (Stellefson et al., 2011; Park & Lee, 2015; Hanik & Stellefson, 2011; Robb & Shellenbarger, 2014; Tubaishat & Habiballah, 2016). Further, very few studies targeting the evaluation of the levels of e-health literacy of university students in Turkey and the factors influencing these levels have been found (Sengul, Cinar, Capar, Bulut, & Cakmak, 2017). University students must possess the knowledge and skills required to appropriately utilize information and communication technologies. Specifically, to search for and find health information, and to use this information for issues related to their health. This, in turn, requires determining the existing knowledge and skills of students in relation to e-health literacy. Therefore, the current study was conducted with the purpose of determining the e-health literacy levels of university students attending different departments and the factors influencing these levels. Additionally, the current study sought to compare the e-health literacy levels of nursing students (as they will play active roles in every area of healthcare services, guiding patients in health issues), with students attending other departments, to determine their training needs.

## Materials and Methods

**Study Description:** The current descriptive study was conducted with the purpose of determining the levels and affecting factors of e-health literacy in university students.

**Participants:** This study was carried out in 284 volunteer students of the nursing, computer engineering, law, and medical departments (in Turkish and English languages) at a state university in Ankara, who had taken a basic information technologies course in the spring semester of the 2014–2015 academic year. The study was carried out only on students in their second year because nursing students take this

course in their second year. These departments were selected as sample departments as they represent the fields of science, health, and social science.

**Data Collection Tools:** Data were collected by the investigator using a questionnaire examining the descriptive characteristics of students prepared based on the relevant literature (Norman & Skinner, 2006; Coskun & Bebis, 2015; Norman & Skinner, 2006; Hallila, Zubaidi, Ghamdi, & Alexander, 2014) and the e-Health Literacy Scale (eHEALS).

**Student Questionnaire:** The questionnaire consisted of two parts. The first part contained 28 items used to determine the descriptive characteristics of students (age, academic history, educational attainment of parents, etc.) and their use of computer and internet. The second part contained 17 items used to assess the behaviors of students in cases of illness, how they obtain information from the internet, as well as their level of knowledge and training regarding e-health literacy.

**The eHEALS:** Norman and Skinner developed the eHEALS in 2006 to assess traditional literacy, literacy on health, ability to obtain information, scientific research ability, media literacy, and computer literacy (Norman & Skinner, 2006). Validity and reliability studies for the scale in Turkey were carried out by Coskun and Bebis in 2014. The scale consists of 2 items related to internet use and 8 items measuring attitude toward the internet, with answers provided on a 5-point Likert scale (1 = *I absolutely disagree*, 5 = *I absolutely agree*). The range of points possible from this scale is between 8 and 40, with higher scores denoting a higher level of e-health literacy. Cronbach's alpha of the Turkish version of the scale was 0.78, and test-retest reliability coefficient was found as  $r = 0.87$  (Coskun & Bebis, 2015). In the current study however, Cronbach's alpha for the eHEALS was 0.89.

**Application of the Study:** This study was conducted in the spring semester of the 2014–2015 academic year. Questionnaires were administered at dates and times approved by the department heads/ coordinators with the purpose of reaching all the students and ensuring more participation. The objective of the study was explained to the students and questionnaires were distributed to the students who volunteered. Completing the questionnaire took an average of 5–10 minutes.

**Ethical Considerations:** Written approval of the ethical committee of the university, department head, and dean of the relevant departments was acquired prior to commencement of the study. Further student participation was voluntary. The researcher acquired written permission of the authors performing validity and reliability study of the scale in Turkish in order to able to use the "e-Health Literacy Scale".

**Data Analyses:** SPSS (Statistical Package for the Social Sciences) 21.0 was used for analysis. Median, standard deviation, and range of values were used in descriptive statistics. Normal distribution was confirmed through the use of Shapiro-Wilk tests. Further, categorical variables were indicated with numbers and percentages. Student's  $t$ , Mann-Whitney  $U$ , and Kruskal-Wallis  $H$  tests were used for testing of hypotheses. Pearson's  $r$  was calculated to determine the relationships between categorical variables, and Somers'  $D$  and Cramer's  $V$  tests were used to determine the magnitude of the relationships. Thirty-two of the 284 participants did not answer the scale items, and left the questionnaire unfinished. Therefore,  $n = 252$  was used for calculations in tables involving the scale scores. Eight items of the scale were answered by 252 individuals in total; however, two individuals each left one item in the scale unanswered. The total number of items expected to be answered was  $252 \times 8 = 2016$ . The number of items with lost data is two (0.099%). Mean and median values of the answers of participants to other items were taken into consideration to fill these two cells. Accordingly, the mean score of individual 141 in the remaining 7 items was 3.14 and the median was 3, while the mean score of the individual 118 in 4 items was 2.71 and the mean was 3. Therefore, number of cells relevant for these two individuals was taken as 3.

## Results

The mean age of the students participating in the study ( $N = 284$ ) was  $21.2 \pm 1.3$  (range = 19–28) years, with the majority being (70.1%) females and graduated the Anatolian/Science High School (71.8%). Additionally, 39.6% reported reading one article per month. Other sociodemographic characteristics of students are given in Table 1.

Despite not being indicated in the table, the majority of the students stated that they had a personal computer (94.3%) and internet

connection (96.8%) and there were computers enabling easy internet access at their places (93.2%) and more than half of them (68.2%) stated that they used computer everyday but there was not a computer enabling easy internet access at the school (62.6%) and they used computer for

2-6 hours a day (68.2%). It was identified that the majority of the students (72.1%) did not receive computer training prior to university education and the majority (41.6%) of the students who received computer training (n=78) found this training “partially satisfactory”.

**Table 1.** Descriptive characteristics of university students by department (n = 284)

Descriptive characteristics	Nursing		Computer Engineering		Law School		Medical School		Total	
	n	%	n	%	n	%	n	%	n	%
<b>Age</b>										
-19–20 years	43	54.4	4	4.9	9	18.4	22	34.4	78	28.5
-21–22 years	31	39.3	61	74.4	35	71.4	39	60.9	166	60.6
-23 years and over	5	6.3	17	20.7	5	10.2	3	4.7	30	10.9
<b>Total*</b>	<b>79</b>	<b>100.0</b>	<b>82</b>	<b>100.0</b>	<b>49</b>	<b>100.0</b>	<b>64</b>	<b>100.0</b>	<b>274</b>	<b>100.0</b>
X ± SS = 21.2 ± 1.3      Min = 19 years; Max = 28 years										
<b>Gender</b>										
-Female	70	81.4	54	65.1	35	71.4	40	60.6	199	70.1
-Male	16	18.6	29	34.9	14	28.6	26	39.4	85	29.9
<b>Total</b>	<b>86</b>	<b>100.0</b>	<b>83</b>	<b>100.0</b>	<b>49</b>	<b>100.0</b>	<b>66</b>	<b>100.0</b>	<b>284</b>	<b>100.0</b>
<b>Education status</b>										
- General High School	23	26.7	16	19.3	2	4.1	3	4.5	44	15.5
- Private high school	0	0.0	4	4.8	3	6.1	4	6.1	11	3.9
- Vocational high School	3	3.5	0	0.0	1	2.0	0	0.0	4	1.4
- Health vocational high School	0	0.0	1	1.2	1	2.0	0	0.0	2	0.7
- Anadolu / Science High School ****	56	65.1	59	71.1	35	71.4	54	81.8	204	71.8
- Other*****	4	4.7	3	3.6	7	14.3	5	7.6	19	6.7
<b>Total</b>	<b>86</b>	<b>100.0</b>	<b>83</b>	<b>100.0</b>	<b>49</b>	<b>100.0</b>	<b>66</b>	<b>100.0</b>	<b>284</b>	<b>100.0</b>
<b>Kaldığı yer</b>										
- Government dorm	29	33.7	8	9.6	2	4.1	5	7.6	44	15.5
- Private dormitory	15	17.5	6	7.2	8	16.3	10	15.2	39	13.7
- At home with friend	10	11.6	10	12.1	9	18.4	7	10.6	36	12.7
- Home alone	2	2.3	4	4.8	2	4.1	4	6.1	12	4.2
- Next to the relatives	2	2.3	2	2.4	1	2.0	3	4.5	8	2.8
- With Family	28	32.6	53	63.9	27	55.1	37	56.1	145	51.1
<b>Total</b>	<b>86</b>	<b>100.0</b>	<b>83</b>	<b>100.0</b>	<b>49</b>	<b>100.0</b>	<b>66</b>	<b>100.0</b>	<b>284</b>	<b>100.0</b>
<b>Income Level</b>										
-Income equals expenses	59	68.6	57	68.7	31	63.3	41	63.1	188	66.4
-Income exceeds expenses	13	15.1	18	21.7	13	26.5	20	30.8	64	22.6
-Income lower than expenses	14	16.3	8	9.6	5	10.2	4	6.1	31	11.0
<b>Total*</b>	<b>86</b>	<b>100.0</b>	<b>83</b>	<b>100.0</b>	<b>49</b>	<b>100.0</b>	<b>65</b>	<b>100.0</b>	<b>283</b>	<b>100.0</b>
<b>Healthcare professionals in the family</b>										
-Yes	15	17.6	10	12.5	9	18.4	16	24.6	50	17.9
-No	70	82.4	70	87.5	40	81.6	49	75.4	229	82.1
<b>Total*</b>	<b>85</b>	<b>100.0</b>	<b>80</b>	<b>100.0</b>	<b>49</b>	<b>100.0</b>	<b>65</b>	<b>100.0</b>	<b>279</b>	<b>100.0</b>
<b>Student with chronic diseases</b>										
-Yes	4	4.7	9	11.2	2	4.2	7	10.6	22	7.9
-No	81	95.3	71	88.8	46	95.8	59	89.4	257	92.1
<b>Total*</b>	<b>85</b>	<b>100.0</b>	<b>80</b>	<b>100.0</b>	<b>48</b>	<b>100.0</b>	<b>66</b>	<b>100.0</b>	<b>279</b>	<b>100.0</b>

\*n changed due to blank response.

**Table 2.** Distribution of university students answers to the open-ended questions in the e-HEALS by department (n = 252)

Answers to the open-ended questions in the e-HEALS	Nursing		Computer Engineering		Law School		Medical School		Total	
	n	%	n	%	n	%	n	%	n	%
<b>Do you think the internet is useful in making decisions about your health?</b>										
-I think it is very useful	6	14.3	8	20.0	3	9.7	3	10.0	20	14.0
-I think it is partially useful	35	83.3	28	70.0	26	83.9	27	90.0	116	81.1
-I do not think it is useful	1	2.4	4	10.0	2	6.4	0	0.0	7	4.9
<b>Total*</b>	<b>42</b>	<b>100.0</b>	<b>40</b>	<b>100.0</b>	<b>31</b>	<b>100.0</b>	<b>30</b>	<b>100.0</b>	<b>143</b>	<b>100.0</b>
<b>How important is it for you to have access to health sources on the internet?</b>										
- Important	23	62.2	13	38.2	13	52.0	13	44.8	62	49.6
-Partially important	13	35.1	17	50.0	10	40.0	15	51.7	55	44.0
- Not important	1	2.7	4	11.8	2	8.0	1	3.5	8	6.4
<b>Total*</b>	<b>37</b>	<b>100.0</b>	<b>34</b>	<b>100.0</b>	<b>25</b>	<b>100.0</b>	<b>29</b>	<b>100.0</b>	<b>125</b>	<b>100.0</b>

\*n changed due to blank response.

**Table 3.** Distribution of the points obtained from the e-HEALS of the university students by department

Department	n	$\bar{X} \pm SS$	Median	Min.	Max.	Statistical Assessment
-Nursing	72	27.0 $\pm$ 5.3	26	13	39	$\chi^{2**} = 3.195$ $p = 0.363$
-Computer Engineering	74	25.5 $\pm$ 7.2	24	8	40	
-Law School	47	25.4 $\pm$ 6.9	25	8	40	
-Medical School	54	26.1 $\pm$ 5.4	25	11	40	
<b>Total</b>	<b>252*</b>	<b>26.0 <math>\pm</math> 6.2</b>	<b>25.5</b>	<b>8</b>	<b>40</b>	
Number of individuals with overall median score of 25.5 or lower; n = 126 (% 50.0)						
Number of individuals with overall median score of 25.5 or higher, n = 126 (%50.0)						

\* n changed due to blank response \*\*  $\chi^2$  = Kruskal-Wallis analysis.

**Table 4.** Comparison of descriptive characteristics and eHEALS scores of university students (n = 252)

Descriptive characteristics	n	Scale Points				Statistical Assessment
		$\bar{X} \pm SD$	Median	Min.	Max.	
<b>Age (n=243)*</b>						
-19–20 years	65	26.6 ± 5.1	26	13	39	$\chi^{2**} = 5.961$ $p = 0.051$
-21–22 years	152	26.3 ± 6.5	25	8	40	
-23 years and over	26	22.9 ± 6.6	23	8	32	
<b>Gender</b>						
-Female	178	26.2 ± 6.1	26	8	40	$Z^{***} = 0.619$ $p = 0.536$
-Male	74	25.7 ± 6.6	25	8	40	
<b>Education status</b>						
- General High School	39	26.1±7.4	26	11	40	$\chi^{2**} = 12.011$ <b>p= 0.017</b>
- Private high school	10	24.3±3.3 <sup>a</sup>	24	21	33	
- Vocational high School	4	33.0±4.3 <sup>ab</sup>	31.5	29	40	
- Health vocational high School	2	31.5±0.7 <sup>ab</sup>	31.5	31	32	
- Anatolian / Science High School ****	179	26.1±5.9	26	8	40	
- Other*****	18	23.8±7.3 <sup>b</sup>	22.5	8	40	
<b>Kaldığı yer</b>						
- Government dorm	40	27.1±5.5	26.5	15	39	$\chi^{2**} = 5.913$ $p = 0.315$
- Private dorm	35	24.9±6.8	25	8	40	
- At home with friend	29	26.1±4.5	25	20	36	
- Home alone	11	26.7±4.8	26	8	36	
- Next to the relatives	7	21.4±6.1	24	8	25	
- With Family	130	26.2±6.6	26	8	40	
<b>Income level</b>						
-Income equals expenses	168	25.4 ± 6.2	25	8	40	$\chi^{2**} = 1.825$ $p = 0.401$
-Income exceeds expenses	56	26.7 ± 5.8	27	11	40	
-Income is lower than expenses	28	26.4 ± 6.9	24	16	40	
<b>Healthcare professionals in the family (n = 247) *</b>						
-Yes	40	25.7 ± 6.8	24.5	8	40	$Z^{***} = 0.113$ $p = 0.910$
-No	207	26.1 ± 6.2	26	8	40	
<b>Chronic diseases (n = 250) *</b>						
-Yes	20	28.1 ± 6.5	29.5	15	40	$Z^{***} = 1.537$ $p = 0.124$
-No	230	25.8 ± 6.2	25	8	40	

\* n changed due to blank response

\*\*  $\chi^2$  = Kruskal-Wallis analysis.

\*\*\*Z = Mann-Whitney U.

\*\*\*\* Groups were combined to perform statistical testing.

\*\*\*\*\* Other: The graduates of Anatolian teacher high school, abroad high school, military high school.

a,b: The same letters indicate the groups with differences in-between.

**Table 5.** Comparison of computer/internet use, investigation on health in the internet and eHEALS scores of university students (n=252)

Descriptive characteristics	n	Scale Points				Statistical Assessment
		$\bar{X} \pm SS$	Median	Min.	Max.	
<b>Having its own computer (n=251)*</b>						
-Yes	239	26.1±6.3	26	8	40	Z**=0.662
-No	12	25.6±4.7	24.5	21	37	p= 0.508
<b>Computer usage frequency (n=251)*</b>						
- Everyday	174	26.1±6.6	25.5	8	40	$\chi^{2***}=0.811$ p= 0.847
- Every 2-3 days	43	25.5±5.9	26	8	36	
- Once a week	20	26.8±5.5	26.5	13	37	
- Once a month or more	14	25.6±4.1	24.5	20	32	
<b>Internet connection on computer / mobile phone (n=250)*</b>						
-Yes	242	26.1±6.3	26	8	40	Z**=0.742
-No	8	24.9±3.9	24.5	20	33	p= 0.458
<b>The internet can be reached easily from where they stay (n=250)*</b>						
-Yes	235	26.2±6.2	26	8	40	Z**=1.761
-No	15	23.5±5.8	24	8	32	p= 0.078
<b>Computer accessible at school (n=249)*</b>						
-Yes	94	25.8±6.4	25	8	40	Z**=0.184
-No	155	26.1±6.2	26	8	40	p= 0.854
<b>The mean period of being online each day (n=230)*</b>						
< 2 hours	47	25.5±5.1	25	12	40	$\chi^{2***}=1.410$ p= 0.494
2–6 hours	157	25.9±6.3	26	8	40	
> 6 hours	26	27.5±7.3	27.5	14	40	
<b>Previous training on computer use (n=250)*</b>						
-Yes	67	25.2±7.4	24	8	40	Z**=1.458
-No	183	26.4±5.7	26	8	40	p= 0.145
<b>Adequacy of training on computer use (n=67)</b>						
- Adequate	24	26.3±8.2	27.5	8	40	$\chi^{2***}=4.282$ p= 0.118
- Inadequate	16	21.9±5.4	22	11	31	
- Partially adequate	27	26.0±7.4	26	8	40	
<b>Any investigation on health in the internet within the last week (n = 250)*</b>						
-Yes	90	27.5±6.8	28	8	40	Z**=2.769
-No	160	25.2±5.7	24	8	40	p= <b>0.006</b>
<b>Difficulties experienced in accessing information related to health on the internet (n = 251)*</b>						
-Experienced	21	23.4±5.8 <sup>a</sup>	23	8	34	$\chi^{2**}=10.987$ p= <b>0.004</b>
-Not experienced	183	26.7±6.3 <sup>ab</sup>	27	8	40	
- Partially experienced	47	24.8±5.6 <sup>b</sup>	24	12	40	
<b>Belief in the accuracy of information obtained from the internet (n=250)*</b>						
-Believes	39	28.6±6.9 <sup>ab</sup>	30	13	40	$\chi^{2***}=7.086$ p= <b>0.029</b>
-Disbelieves	44	24.8±6.6 <sup>a</sup>	24	8	40	
-Partially believes	167	25.8±5.8 <sup>b</sup>	25	8	40	
<b>The information related to health, sourced from the internet (n=251)*</b>						
- Applying	166	26.5±6.2	26	8	40	Z**=1.736
- Do not applying	85	25.2±6.2	24	8	40	p= 0.083
<b>Frequency of reading periodicals/articles on health (n=251)*</b>						
-Everyday	4	27.8±6.4	29.5	19	33	$\chi^{2***}=15.393$ p= <b>0.009</b>
-Once every 2-3 days	23	26.6±7.4	26	8	40	
-Once a week	39	28.0±5.9 <sup>a</sup>	28	8	40	
-More than once a month	18	24.6±7.5	23.5	8	40	
-Once a month	102	26.6±5.6	26	8	40	
-Never	65	24.0±5.9 <sup>a</sup>	24	11	40	

\* n changed due to blank response \*\*Z= Mann-Whitney U. \*\*\* $\chi^2$  = Kruskal-Wallis analysis. a,b: The same letters indicate the groups with differences in-between.

It was found out in our study that a small portion of the students (37.0%) did web research on health in the previous one week; most of them read health magazines/articles "once a month" (39.6%); they did not have difficulty in accessing information on health on the web (71.1%); they "partially" believed in accuracy of the information on health obtained online (67.0%) and they applied the info information on health obtained online in their life (64.3%).

In our study, most of the students (88.8%) mentioned that they were not aware of e-health literacy and nearly all of them (99.3%) told they did not receive e-health literacy training in the past. When definition of e-health literacy was asked to the students; majority of them (39.8%) told they did not know the definition and 33.8% of them defined it as "obtaining information on health online".

It was found out by examining the answers given to the open ended questions in the scale by the students that majority of them (n=143) (81.1%) considered internet to be "partially useful" to determine something regarding their health; nearly half of them (n=125) (49.6%) considered accessing health sources online to be "significant" and this reply was given by the students of nursery department most frequently (62.2%) (Table 2).

Despite not being indicated in the table, it was found out in our study that majority of the nursery department students "participated" in the questions regarding how to find useful health sources online, how to apply the information on health obtained online, how to distinguish high quality medical sources from low quality ones and how to determine whether the information on health obtained online will be useful for his/her personal health and students of medicine and computer engineering departments "moderately participated" in these questions.

It was identified in our study that mean score of the students (n=252) in e-Health Literacy Scale was 25.5 (6.2) out of 40; half of the students (50.0%) received scores lower than the general mean scale score; mean score of the nursing department students was [26 (5.3)] and their mean score was higher than the scores of students of computer engineering, law and medicine departments [24 (7.2), 25 (6.9), 25 (5.4) respectively] but there was not a significant difference among the groups ( $p>0.05$ ) (Table 3).

It was found out in our study that mean scores of the students of vocational high schools (mean=31.4) and vocational high school of health (mean=31.5) for e-Health Literacy Scale was significantly higher than their counterparts in the private high schools and other high schools ( $p<0.05$ ). It was also found out that there was not a significant difference among mean scores of the students for e-Health Literacy Scale with regards to their age, gender, residential place, income level and existence or non-existence of medical staff and chronic diseases in their families ( $p>0.05$ ) (Table 4).

It was also found out in our study that there was not a significant difference among mean scores of the students for e-Health Literacy Scale with regards to their owning personal computers, computer usage frequency, existence of internet connection for computer/mobile phone, easily accessing to the internet at their residences and schools, daily average time spent on internet, receiving training on computer usage and satisfaction level of these trainings ( $p>0.05$ ) (Table 5).

On the other hand, it was identified that the mean score of the students reading health magazines/articles once a week [28 (5.9)] was significantly higher than those who did not; that the mean score of the students making a web research on health in the previous week [28 (6.8)] was significantly higher than those who did not; the mean score of the students not having difficulty in accessing to information [27 (6.3)] was significantly higher than those who had such difficulties; the mean score of the students stating to believe in accuracy of the information on health obtained online was significantly higher than those who "partially believed" or "did not believe" in accuracy of such information ( $p<0.05$ ) (Table 5).

## Discussion

In our study, e-health literacy levels of the university students were measured to be lower than the expectations. Similar results were also achieved in a study conducted by Kim and Son (Kim & Son, 2017). Results of the current study demonstrated that scale scores of nursing students were higher when compared to other students; however, there were no significant differences between the groups. Although medicine and nursing are a division in the field of health, lack of a significant difference between

the students of faculty of medicine and nursery compared to their counterparts in other departments is an unexpected finding. It was also found that university students did not receive any training in e-health literacy, and almost half of them did not know the definition of e-health literacy. These results suggest that university students in Turkey lack the necessary information related to the subject. It has been stated in one study that knowledge and skills of university students to perform accurate searches related to health on the internet are not satisfactory (Stellefson et al., 2011), and that students in the health field particularly should receive more training on this subject (Tubaishat & Habiballah, 2016). These findings of these studies are similar to those of the current study.

In our study, a significant correlation was not identified between gender of the students and their mean score for e-Health Literacy Scale ( $p>0.05$ ). There are varying results in the literature regarding effect of gender on e-health literacy. It was determined in the study performed by Robb and Shellenbarger (2014) to identify the e-health literacy perceptions of the university students and factors affecting these perceptions that there was not a significant difference between e-health literacy scores of male and female students. On the other hand, it was found out in the study conducted by Norman and Skinner (2006) that e-health literacy scores of the male students were higher than their female counterparts.

It was identified in our study that most of the students graduated from Anatolian/Science high schools. On the other hand, it was also determined that the mean of scores of the students of vocational high schools and vocational high school of health for e-Health Literacy Scale was significantly higher than their counterparts in the private high schools and other high schools ( $p<0.05$ ). Considering that Anatolian high schools and science high schools provide better education compared vocational high schools and vocational high schools of health, higher scores achieved by the students of vocational high schools and vocational high school of health are interesting. However, it is believed that acquaintance of the students of vocational high school of health with medical issues is a significant factor behind these results.

It was found out in our study that nearly all of the students did not receive training on and were not

aware of e-health literacy and half of them did not know definition of e-health literacy and remaining students mostly defined e-health literacy as ‘obtaining information on health online’. This indicates that the university students were not trained on e-health literacy and they were barely aware of this concept.

Additionally, results indicate that most students consider the internet as “partially useful” in making decisions related to health, and approximately half considered having access to health sources in the internet is “important” (it is noteworthy that this answer was given mostly by nursing students). In a study conducted by Sengul et al. (2017) with the students of health sciences, 39.7% of the students stated that they found “useful” and 55.0% of the students found “important”. However, in studies by Park and Lee (2015), Robb and Shellenbarger (2014), and Tubaishat and Habiballah (2016), it has been reported that the majority of students considered internet “useful” in making decisions related to their health (61%, 78%, and 70%, respectively), and that having access to sources related to health in the internet is “important” (56%, 75%, and 63.5%, respectively). This result suggests that students in other countries attach greater importance to the internet as compared to Turkey.

Periodicals/articles related to health being read by students “once a month” in our study, and amount of nursing and medical school students answering “never” to this item show that the status of students following professional publishing in the health area is poor. In our study, the fact that the score of students who read periodicals/articles related to health “once a week” was significantly higher than the score of students who never read them shows that increased exposure to periodicals/articles is effective in improving the level of e-health literacy.

The fact that nearly all of the students in our study had computer and internet connection indicates that university students closely follow technology nowadays irrespective of their socioeconomic levels. However, it was also found out in our study that there was not a significant difference among mean scales scores of the students with regards to their owning personal computers, computer usage frequency, existence of internet connection for computer/mobile phone, easily accessing to the

internet at their residences and schools, daily average time spent on internet, receiving training on computer usage and satisfaction level of these trainings ( $p>0.05$ ). It was indicated in a previous study that socioeconomic levels of the individuals affected their way of using information technologies (Hsieh, Rai, & Keil, 2011).

From this perspective, it is seen that socioeconomic level and way of using technology of the students did not affect their level of e-health literacy. Similar to our research, the study conducted by Norman and Skinner (2006) also showed that socioeconomic level and way of using technology did not affect level of e-health literacy.

Results in the current study also indicated that more than half of the students went online 2–6 hours on an average per week. One study has been obtained similar results (Robb & Shellenbarger, 2014). Additionally, it was found that very few students (37.0%) performed a search on the internet within the last week. Upon reviewing the literature, it was found in other studies performed in varying age groups (<http://www.pewinternet.org/2008/08/26/the-engaged-e-patient-population/>; Mitsutake, Shibata, Ishii, Okazaki, & Oka, 2011; Park & Lee, 2015; [http://www.tuik.gov.tr/PreTablo.do?alt\\_id=1028](http://www.tuik.gov.tr/PreTablo.do?alt_id=1028)) that ratios of searching the internet in relation health were higher (between 70% and 80%) than the ratios observed in our study. It was also found that scores of those who had performed a search on the internet demonstrated significantly higher scores than those who had not. This finding suggests that carrying out searches on the internet about health is associated with higher levels of e-health literacy.

It was seen in our study that students who did not report difficulties in accessing information related to health scored significantly higher. Norman and Skinner (2006) reported in their study that individuals with lower e-health literacy levels demonstrated difficulties in accessing information related to e-health, supporting the findings in this study. It can be said that not having problems when searching for relevant information on electronic media, affect levels of e-health literacy.

It was found in our study that the median scores of students who believed the accuracy of information acquired from the internet were

significantly higher than those who did not. Previous research has shown that non-supervised information found on the internet lead to negative consequences (Ozer, Santas, & Budak, 2012), and erroneous or incomplete information obtained from informal and/or unreliable sources can cause individuals to make risky decisions (Yilmaz, 2015). Based on the current results, it can be said that students must have the ability to correctly evaluate the accuracy and reliability of information obtained from the internet.

**Conclusion:** Our study has shown that the level of e-health literacy of students is low and the level of e-health literacy of nursing students is similar to that of the students of other departments. It is recommended that university students, particularly nursing students who play a significant role in patient care, must be given training to improve their knowledge and skills in e-health literacy throughout their education in four-year programs. Additionally, university management should provide all university students the opportunity to use computers and internet for their training and practice for the purpose of ensuring that students possess the ability to be competent within their fields, fully understanding the principles of investigation. Furthermore, students should be encouraged to search the internet regarding health related issues and the reading of periodicals/articles on health issues should be included in the curriculum. Finally, students should be informed about how to evaluate the accuracy and reliability of information they obtain from the internet. To accomplish this, trainers should guide students in performing expedient searches, and help them cultivate a better awareness of how and where to find accurate and reliable information, as well as how to analyze this information and place it into practice.

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