Original Article

E-health literacy level in adolescents in terms of some descriptive characteristics

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Abstract

Aim: The study was planned to determine the e-health literacy attitudes of adolescents with different socio-economic levels studying at secondary schools.

Material and Methods: The study was a cross-sectional study. Descriptive Characteristics Form and e-Health Literacy Scale were used.

Results: The average age of the participants is 15.98±1.10 and score average of this scale's is 26.61±7.43. The independent variable affecting e-Health Literacy Scale were age, sex, grade and type of access internet. The children at the school with low socio-economic level have lower e-Health Literacy Scale scores than the others, younger students have lower scores than the others, girls have lower scores than boys, those with internet access from a single source have lower scores than those with access from several sources while the difference was found to be significant.

Conclusion: The study found that the e-health literacy of the adolescents was at a medium level and their scale score averages with respect to sex, age, grade and socio-economic level were significantly different. Should be given particularly to the individuals with low health literacy for child and they should be informed

Keywords: Adolescent; e-health; health; health literacy; internet access

INTRODUCTION

As a result of the rapid technological developments in our era, the use of internet and technology is widespread and mobile information processing and communication technologies are commonly used as an information source in several topics with gradually increasing coverage of the field of health services and public health (1). The internet provided a strong platform to change people's way to cope with health problems (2). In the last ten years, e-health has been used as an easy and accessible source to obtain health information (3). The World Health Organization defines "e-health" as the use of the information and communication technologies for health (4). The concept of e-health literacy is a hybrid and multidimensional concept at the junction of the dimensions of e-health literacy and information technology literacy (5). The concept is defined to be the skill to search, find, understand and evaluate health information from electronic sources, to

implement the obtained information for the purpose of dealing and/or solving a health problem. The required skills for e-health literacy are reading, computer use, searching information, understanding and implementing health information (6). Although e-health literacy is related to health or health literacy, it is distinguished from them as it requires the skills to have knowledge of and be able to use electronic sources (7,8). Studies indicate that support from other people, inner motivation or anxiety of the person, and characteristics including age and sex may be determinant for obtaining health information (4-8).

Developing e-health literacy skill during early adolescence is particularly important as it will provide information for making health decisions during the later stages of life.

Understanding and promoting health literacy among adolescents is essential for multiple reasons: (1) adolescents are developing lifelong health behaviors and habits, and adequate health literacy skills may support

informed health-seeking lifestyles; (2) adolescents are future independent health care system users, and young adults who are health literate may contribute to a generation-level reduction of poor health outcomes known to be associated with low health literacy among adults; (3) adolescents are gradually being provided with access to online health services as more health systems rely on internetbased services; and (4) the few studies investigating adolescent literacy and health literacy have shown that low literacy/health literacy is associated with risky behaviors including tobacco use, problem behaviors (eg, aggression, gun carrying) obesity and lower levels of health-promoting behaviors (9)

Almost all of the adolescents are able to access and use the internet every day at home, at school, in a library or any other place. Therefore, the internet is considered to be the most appropriate channel for widespread health information in adolescents. However, there are few studies on the factors affecting the level and development of e-health literacy of adolescents despite the increasing interest in e-health literacy (6,10,11). For instance, Gray et al. (2005) reported that adolescents had difficulties in using and understanding online health information although they frequently use information technologies (12). It is known that adolescents, who quite frequently use the internet, need safe surf on the internet particularly for the important health issues, and wrong, misleading and low-quality information on the internet would cause great problems (13).

The aim of the present study was based on the requirement to respond to these questions and planned to determine the e-health literacy attitudes of adolescents with various socio-economic levels studying at secondary education institutions.

MATERIAL and METHODS

The study was a descriptive and cross-sectional study and its population consists of the secondary education students in the centre of Giresun province in the Eastern Black Sea region. The sample consists of three secondary school institutions from different socio-cultural level determined by the cluster sampling and homogenous sampling method which is one of the targeted sampling methods. Eserpek reported that there are several criteria determining the social layer/class system while the most used criteria are "the environment of living, education level, profession and income level"(14). The schools in this study are divided into schools according to their environment of living and income level like good (school A), medium (school B) and bad (school C). Observations of researchers and verbal statements of school administrators were determinant in grouping schools. The sampling number was calculated according to the sample selection method (14) from the group with a known population (n=Nt2pq/d2(N-1)+t2pq; N=1390, t=0.05, p=0.5, q=0.5). The number of total students studying in the selected schools is 1390 in the academic year of 2017 to 2018 while the minimum sampling size was calculated to be 302 people but the sampling reached to 326 people because of possible losses. Participants were divided into layers per their grades and the required number of participants is achieved by using the simple random number table from each layer (74 people for grade 9, 78 people for grade 10, 88 people from grade 11 and 86 people from grade 86).

Instruments
Students' Identifying Characteristics Form and e-Health Literacy Scale (e-HEALS: The E-Health Literacy Scale) were used as the data collection tools in this study. The Students' Identifying Characteristics Form was organized by the researchers in line with the concerned literature and includes questions like the age and sex of the students, income level, education and employment status of the family, family type and the number of children. Coşkun and Bebiş carried out the validity and reliability analyses for Turkey of e-HEALS that was developed by Norman and Skinner in 2006 for determining traditional literacy, health literacy, obtaining information, scientific study, media literacy and computer literacy (Cronbach's Alpha value 0.78) (6). This scale consists of 2 items on internet use and 8 items on the internet attitude. The scale items were organized with the 5 points Likert type scaling method like "1=strongly disagree, 2= disagree, 3= no idea, 4=agree, 5=strongly agree". The lowest and highest scores from the scale are 8 and 40 points respectively. The high point from the scale indicates a high level of e-health literacy. The Cronbach Alpha value for e-Heals in this study was found to be 0.90.

The independent variables of the study are the socio-demographic qualities of the participants (age, sex, family type, education level of parents, occupation of parents, the major place of living, grade) and their health history (smoking/alcohol habits, chronic disease-physical or mental problems etc.) The dependent variable of the study is the E-HEALS scale.

Data Collection
Students were informed about the objective and importance of the study before its implementation, and data were collected in the classroom environment through face to face interview method after forms were given to students who accepted to participate in the study.

Ethical Issues
Before the study, permissions were obtained from the Directorate of National Education in the province of the study and University Ethics Committee in the same province. The data of the study were collected between February 12 and March 9 2018. Individuals were informed in detail in line with the ethical principles before including them into the research. The principle of "confidentiality" was observed throughout the study by explaining that the particulars of the participants and the obtained data would be kept confidential. Written consents were taken from the participants of 18 years and older and from the parents of those who were younger than 18.

Data Analysis
Data were evaluated by a statistics package program and error checks, tables and statistical analyses were

done. Percentage and average were used in statistical evaluations. Chi-square test was used for categorical data Mann Whitney-U test and Kruskall Wallis tests were used for measurement data depending on the properties of the variables. Tukey's HSD test/Mann Whitney U test was applied to determine the differences between these groups. Averages were given together with standard deviation and $p < 0.05$ was considered to be a statistical significance.

The fact that the study findings are limited with three schools with different properties in the province centre is a limitation of this study

RESULTS

The average age of the students participating in the study is 15.98±1.10 (14-19). 51.2% of the students are male and 22.7% of them are in grade 9. When we review the education status of parents, 6.5% of mothers and 3.4% of

Table 1. Distribution of the socio-demographic qualities of the participant students (N=326)		
Characteristics	**n**	**%**
School		
C (socio-economic level is poor)	95	29.1
B (socio-economic level is moderately)	125	38.3
A (socio-economic level is good)	106	32.5
Class		
9	74	22.7
10	78	23.9
11	88	27.0
12	86	26.4
Age (15.98±1,10; min:14, max:19)		
Between 14-16 arası	210	64.4
17 and above	116	35.6
Sex		
Female	159	48.8
Male	167	51.2
Family type (n=322)		
Core	249	77.3
Wide	48	14.9
Broken	25	7.8
Mather education		
Only literate, no school	21	6.4
Primary school	167	51.2
Secondary school	84	25.8
High school	48	14.7
University	6	1.8
Father education		
Only literate, no school	11	3.4
Primary school	124	38.0
Secondary school	90	27.6
High school	74	22.7
University	27	8.3
Mather working status (n=320)		
Yes	100	31.2
No	220	68.8
Father working status (n=319)		
Yes	268	84.0
No	51	16.0

fathers are only literate. 31.2% of mothers and 84.0% of the fathers are employed (Table 1).

12% of the students who participated in the study stated that they have a chronic disease. When we review the distribution of the systemic sources of the problems, we see that 38.9% is caused by the respiratory system, 13.9% by sensory organs, 5.6% by cardiovascular problems and a similar percentage by neurologic system and oncology. Finally, mental and hematologic problems were determined by a percentage of 2.8% each. On the other hand, it was determined that 2.1% of the participants have a physical handicap, 4.6% have a mental problem and 3.7% have any social problem. 38.3% of the students said they visit a doctor when they get ill, 23.5% go to a hospital and 23.5% use the medicines at home. When we look at the primary sources preferred by the students for health information, 46.1% preferred doctors, 31.6% the internet and 12.1% television. 45.4% of the participants have internet access from home, 41.1% from the mobile phone, 3.1% from school and 10.4% from all sources.

Scale score average is 26.61±7.43 (8-40). The study also evaluated the distribution of the score averages between some socio-demographic properties, health qualities and attitudes of the participants. The e-HEALS score average of the students in school C was found to be lower than the others. Lower grade students, younger students, girls and those with single internet access had lower e-HEALS score average than the students in

Table 2. Distribution of the e-HEALS score average and score rankings of the students who participated in the study according to some variables (N=326).			
Characteristics	**n**	**Mean±SD**	**Test Value**
School			
C (socio-economic level is poor)	95	25.26±7.64 (146.63)[a]	KW=6.169
B (socio-economic level is moderately)	125	27.64±7.48 (178.22)[a]	p=0.046
A (socio-economic level is good)	106	26.76±7.03(161.26)	
Class			
9	74	25.48±8.21(153.49)[a]	
10	78	25.04±7.32(138.90)[b,c]	KW=11.399
11	88	27.32±7.38 (173.13)[b]	p=0.010
12	86	28.44±6.43 (184.58)[a,c]	
Age			
Between 14-16 arası	210	25.94±7.46 (154.97)	U=10388.00
17 and above	116	27.95±7.22 (178.95)	p=0.028
Sex			
Female	159	25.64±7.14 (146.91)	U=10638.00
Male	167	27.63±7.58 (179.30)	p=0.002
Income level perception (n=320)			
Income in excess	54	24.28±8.25 (134.48)	KW=5.862
Expense in excess	224	27.30±7.07 (167.85)	p=0.053
Equal income and expense	42	26.23±7.72 (154.75)	
Family type (n=322)			
Core	249	26.64±7.43 (161.05)	KW=0.134
Wide	48	26.14±7.78 (160.43)	p=0.935
Broken	25	27.76±6.86 (168.00)	
Type of Access			
Home connection	148	27.06±7.30 (169.87)[a,b]	
Connection in mobile phone	134	25.27±7.46 (144.46)[a,c]	KW=18.065
Connection at school	10	26.50±4.03 (139.95)[d]	p=0.001
After all	34	30.30±7.46 (217.72)[b,c,d]	
[a,b,c,d] Groups causing difference			

the other schools, older students, boys and those with multiple internet access respectively. A statistically significant difference was determined as well (Table 2). No relation was found between the e-HEALS score average and the fact of having a physical, social and mental problem or having a family member with a health issue.

As shown in Table 3, this study found a significant difference on the benefit of the internet for health decisions according to the school and age variables and on the importance of accessing the internet health sources according to the school variable (p<0.05).

Table 3. Distribution of the attitudes of the students who participated in the study regarding the benefit of the internet in giving health decisions and the importance of accessing internet health sources (N=326)							
The benefit of the Internet in giving health decisions							
Characteristics	**n**	**Very useful Frequency (%)***	**Little useful Frequency (%)***	**Moderate useful Frequency (%)***	**Partially useful Frequency (%)***	**Not useful Frequency (%)***	**Test Value**
Age							χ^2=10.569 sd=4 **p<=0.032**
Between 14-16	210	24 (11.6)	22 (10.6)	46 (22.2)	58 (28.0)	57 (27.5)	
17 and above	116	17 (15.3)	20 (18.0)	27 (24.3)	15 (13.5)	32 (28.8)	
Sex							χ^2=20.254 sd=4 **p<=0.001**
Female	159	13 (8.2)	23 (14.5)	25 (15.7)	44 (27.7)	54 (34.0)	
Male	167	28 (17.6)	19 (11.9)	48 (30.2)	29 (18.2)	35 (22.0)	
Grade							χ^2=30.419 sd=8 **p<=0.001**
[c]C school	95	6 (6.3)	14 (14.7)	11 (11.6)	25 (26.3)	39 (41.1)	
[b]B school	125	20 (16.9)	17 (14.4)	35 (29.7)	16 (13.6)	30 (25.4)	
[a]A school	106	15 (14.3)	11 (10.5)	27 (25.7)	32 (30.5)	20 (19.0)	
The importance of accessing Internet Health Sources.							
Characteristics	**n**	**Very useful Frequency (%)***	**Little useful Frequency (%)***	**Moderate useful Frequency (%)***	**Partially useful Frequency (%)***	**Not useful Frequency (%)***	**Test Value**
Age							χ^2=2.871 sd= 4 p=0.580
Between 14-16	210	42 (20.4)	16 (7.8)	48 (23.3)	42 (20.4)	58 (28.2)	
17 and above	116	20 (18.0)	15 (13.5)	25 (22.5)	20 (18.0)	31 (27.9)	
Sex							χ^2=7.699 sd=4 p=0.103
Female	159	26 (16.4)	14 (8.8)	31 (19.5)	36 (22.6)	52 (32.7)	
Male	167	36 (22.8)	17 (10.8)	42 (26.6)	26 (16.5)	37 (23.4)	
Grade							χ^2=23.036 sd=8 **p<=0.003**
[c]C school	95	14 (14.7)	13 (13.7)	12 (12.6)	22 (23.2)	34 (35.8)	
[b]B school	125	25 (21.4)	15 (12.8)	27 (23.1)	18 (15.4)	32 (27.4)	
[a]A school	106	23 (21.9)	3 (2.9)	34 (32.4)	22 (21.9)	23 (21.9)	
*Percentage of row is taken. [a] Socio-economic level is good shool, [b] socio-economic level is moderately school, [c] socio-economic level is poor school							

DISCUSSION

The adolescents who frequently use the developing technology need to know how to use information technology on health that is to use e-health literacy in order to develop their health and increase their life qualities (6). The study intends to determine the e-health literacy of adolescents and related factors.

The study group primarily selected the doctors (46.1%) for health information followed by the internet (%31.6). According to the study by the Turkey Statistics Institution in 2016, 61.2% of individuals use the internet for searching health information (15).

A study in US (16) involving participants in the age group of 15 to 24 years found that 68% of the participants obtained

online health information while another study in the same country for a similar age group found this ratio to be 49%. (17). Another study conducted in three schools reported the ratio of students to use the internet for searching health information to be 67% (first school), 73.9% (second school) and 71% (third school) (18), 99% of the young people in Canada access to the internet and a majority of them said that they use the internet to get information about their health (6). Another study found that the owners of smart telephones searched health information from the internet and 19% of them had at least one mobile health application (19). As seen here, ratios regarding the source of access to health-related information for the adolescents vary per countries which can be explained by the development levels of countries. The fact that the health professionals, who are the first the most reliable sources of health-related information, don't have time to provide health education may be directing individuals to the internet and other media sources. When evaluated with respect to the results, those with low health literacy may face the problem of reaching reliable information.

This study found the total e-Heals average of the participants at a medium level of 26.61±7.43 (8-40). Although the study by Richter et al. with the participants who were in similar age with the present study found the scale score to be close with the one in this study (27.1±6.67) (8), a study by the Spanish adolescents found this score higher than the present study (30.6) (20). However, in another study in adult's group using e-Heals scale found the scale score to be 30.94±6.00 which is much higher than the adolescents (21). In Turkey, in a study applied to university students Sengül et al. (2017) determined the scale score to be 28.537 ± 6.11 (22). In another study on the health literacy of the university students, the total health literacy of students found to be above medium level; their interactive health literacy including advanced cognitive, literacy and social skills to be high; and their functional health literacy showing the basic health-related reading and writing skills to be above medium level (23). Ivanitskaya et al. (2006) found that the e-health literacy of school children to be very poor (24). Stellefson et al. (2011) determined that the e-health literacy, information, evaluation and usage skills of the school children were very poor (18). The ratio of using the internet for health purposes gets closer to the medium level as the education level increases, while this ratio is below the average in primary school children. The use of the internet as a source of health information became popular. An individual needs to have a high health literacy level to make an internet search and reach the proper information among the lots of health information lost in information pollution.

This study determined that boys, older students and those from higher grades, those with medium socio-economic level and those who access the internet from several sources had significantly high e-Heals attitude scale scores. The study by Vaart et al. found that the difference between age and education level didn't create a relation with respect to e-Heals (25). The study by Norman et al. found significantly high scale score of male adolescents despite no difference with the scale score which is similar to the present study However, it was found that the age variable was not significant which is different to the present study (6). A study conducted in Turkey found that girls and those at the 4th grade had high total scores from the scale (26). Another study found that the individuals living in rural areas and towns and those with low education level also have low health literacy levels and women were considered to be a risk group with respect to health literacy (27). Living in rural areas, having a low education level and being a woman are also considered as determinants of sociocultural disadvantages. Similar to this study, no difference was found between the self-health perceptions of the adolescents and their scale scores (28). The reason for the varying similarity and differences may be the fact that the studies were conducted with the individuals of different socio-cultural levels and by different measuring methods.

In the present study, the question "how useful do you find the internet for health-related decisions?" was answered by 27.3% as "not useful" and by 22.4% as "partly and intermediately useful". The ratio of those who state that the health information obtained from the internet was very effective in their health-related decisions was 30.4% in the study by Tekin et al., and 39.7% in the study by Sengül et al (22,29). The study by Birru et al. found that almost half of the people looking for health-related information on the internet stated (30) that the internet has a significant effect in understanding health issues and in establishing communication with the doctors (22,29,30). In another study, 39% of the participants generally stated that online health information was "very useful" while only 5% stated "not very useful" and 1% stated "not useful at all" (16). In the study by Park and Lee (2015), participants stated that the internet is a useful or very useful tool to help them take health-related decisions (31).

The use of health services including the protective services like obtaining information on certain behaviours and topics (smoking, contraception, nutrition etc.) increases in parallel to the increase in health literacy. Literacy and health quality are stated to be closely related (32).

Obtaining health information from the social media instruments which have a heavy population of users in Turkey just like the other countries of the world is a very popular type of behaviour. There must be a sufficient level of health literacy for individuals to take proper health decisions. It is inevitable to face problems based on the social harms and negative effects of the technology used in countries that have insufficient e-health literacy education.

CONCLUSION

The study found the e-health literacy of the adolescents to be at a medium level and determined that the factors including sex, age, class and socio-economic level have a statistically significant difference with respect to scale

score average. Majority of adolescents stated that the internet was "not useful" in taking the health-related decision and that reaching to the health sources on the internet was "not important" for them.

In today's health system, individuals have new roles like getting informed about the health problems and the service given, knowing their responsibilities and rights, and being able to take health-related decisions. At this point, it is necessary to increase the health literacy level of individuals in order to be more understandable for the health professionals, take more active roles in participating in health decisions, be able to benefit from a more quality health service and maintain a healthy life. The reason for that is the changing health system reveals the necessity to improve the health literacy level of the whole society. Improvement in health literacy level will ensure the development of health culture, proper use of resources as well as making the individuals decisive on their own health and health of the society.

Health literacy education should be given from the early childhood period to increase health literacy. There must be multidimensional programs in accordance with the qualities and capacities of the individuals. Inadequate health literacy causes individuals not to understand that their health condition is bad and results in less use of protective health services, non-observance of the recommended treatments, lack of self-care, delay in health-seeking behaviour in the symptomatic period, an increase in health expenses and mortality. Priority should be given particularly to the individuals with low health literacy in the risk group and they should be informed. Health is the most valuable capital of humans and other capitals can be obtained and gain meaning as long as the health capital is convenient.

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