Original Article

E-Health Literacy and Individual Innovation in University Students Enrolled in Health-related Departments

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Abstract

Background: This study, which is descriptive and relational screening in nature, aims to investigate the relationship between e-health literacy and individual innovation in university students enrolled in health-related departments.
Methods: The study was conducted with the participation of 227 people who accepted to participate in the study and who were enrolled in health-related departments. Data were collected using the Socio-demographic Form, E-health Literacy Scale, and Individual Innovation Scale.
Results: Students' e-health literacy was found to be at moderate level. Additionally, categorization of the participants according to their Individual Innovativeness Scale scores showed that 55.9% were laggards. Moreover, there was a negative relationship between E-Health Literacy Scale and Individual Innovativeness Scale mean scores and positive, significant relationship between age ($p<0.05$, $p<0.01$)
Conclusion: According to the Individual Innovation Scale, no students were found to be in the innovative group. Besides, there was a negative relationship between Individual Innovation and e-health literacy.

Keywords: E-Health, Health Communication, Health Literacy, Individual Innovation

Introduction

The concept of innovation is defined by different researchers as the desire for change, wanting to try different or new things, and even the level of adopting change. Innovation has a vital role for the health sector. Innovations and developments in the health sector directly affect human life and quality of life (Valente, 2010). Health team, the most important group for human life, should not be considered to be away from technological developments. Rapid developments in both health and computer fields have caused these two sectors to be closer to each other and even display compatible developments with each other. While scientific knowledge increases rapidly, information technology becomes to have an increasing and developing main role for managing, recording, storing, and sharing information and managing the health service (Ozen, Yazicioglu, & Cinar, 2017; Sayılan, & Mercan, 2016; Sonmez, Nazik, Turkol, & Dag, 2014: Sut, & Kucukkaya, 2016).

There have been developments in the field of e-health with the increase in the importance given to innovation. Electronic health (E-health) means "health services and information presented or developed through internet and related technologies". (Kim, & Xie, 2017).

The concept of health literacy has emerged within the last 30 years and while discussions are going on about the concept, there is still no

universally accepted definition of the term. However, it can briefly be defined as critical literacy in which people analyze information critically and use it on their own health in order to improve individual autonomy and apply a number of skills (Institute of Medicine, 2004; Nutbeam, 2000; Sykes, Wills, Rowlands, & Popple, 2013).

Effective health literacy is associated with effective partnership among patients, care givers, and health professionals and is believed to be necessary in order to encourage best health (Berkman, Sheridan, Donahue, Halpern, & Crotty, 2011). Health literacy is supported with a series of strategies that include providing informative materials and giving verbal information and expert recommendations on time. For optimal effect, health information should be presented in order to improve health literacy and adapted in a way to meet individual patient needs. Therefore, it is important to collect and investigate information about current knowledge and understanding a specific health topic (Durrant, Taylor, Thompson, Usher, & Jackson, 2018). A study conducted in Turkey reported health literacy level of students enrolled in health departments as "problematic-limited health literacy". Students' efforts are recommended to be supported in terms of understanding health literacy and applying it to daily life (Ergün, 2017).

Internet is widely used in today's world for accessing information about many topics. Half of the people who sought information about health in internet stated that internet had important effects in understanding the health problems and communicating with their doctors (Buhi, Daley, Fuhrmann, & Smith, 2009; Kreps, & Neuhauser, 2010; Wald, Dube, & Anthony, 2007).

As stated by Thackeray et al. (2013), social media sites have become a potential source for health information, which is an important indicator that health behaviors have changed via social media (Thackeray, Crookston, & West, 2013). In addition, social webs have been used commonly in the field of health by disseminating health information online, distributing information to large mass, enabling rapid announcement and effect, and changing interactions and human relationships (Chretien, & Kind, 2013).

Despite the fact that internet does not replace the role of trusted peer and adult roles, it has an important place in adolescents' health information sources. Gray et al. reported that although adolescents frequently used information technologies, they had difficulty in using and understanding online health information (Gray, Klein, Noyce, Sesselberg, & Cantrill, 2005a). It was also reported that was is insufficient knowledge about e-health literacy perceptions and attitudes of this group who used internet frequently; that there was a need for safe surfing in the internet especially for important health topics; and that wrong, misleading and low-quality information might cause serious consequences (Gray, Klein, Noyce, Sesselberg, & Cantrill, 2005b; Kanuga, & Rosenfeld, 2004).

Study aim: This study aims to investigate the relationship between e-health literacy and individual innovation in university students enrolled in health-related departments.

Methods

Participants and Setting: This study is descriptive and relational screening in nature. It was conducted in a university in the eastern part of Turkey between January and March, 2018. Target population of the study was 330 students who were enrolled in the Nursing and Nutrition and Dietetics departments of the Health High School. No sampling was performed, the study was conducted with 227 students who attended school between these dates and who volunteered to participate in the study.

Data Collection: Data were collected using the Socio-demographic Form, E-Health Literacy Scale, and Individual Innovativeness Scale. After the necessary explanations were made, data were collected by the researchers in the classroom environment, and the forms that were filled were collected back. Filling in the data collection form took 5 to 10 minutes.

Socio-Demographic Form: It is an 8-item form which was developed by the researchers and which included socio-demographic features of the participants (age, marital status, gender, class, possession of a smart phone, duration of average internet use, etc.).

E-Health Literacy Scale: E-Health Literacy Scale was developed by Norman and Skinner in 2006 with a view to identifying traditional literacy, health-related literacy, obtaining information, scientific search, media literacy and computer literacy. The 5-point Likert type scale includes two items that measure internet use and

eight items that measure attitudes towards internet. Scores to be obtained from the scale range from 8 to 40. Higher scores to be obtained from the scale indicate higher e-health literacy (Norman, & Skinner, 2006). Validity and reliability of the Turkish form of E-health Literacy Scale was performed by Çoşkun and Bebiş (2015), who found Cronbach's alpha value as .78 (Coşkun, & Bebiş, 2015). Cronbach's alpha value was found .87 in this study.

Individual Innovativeness Scale: Individual Innovativeness Scale was developed by Hurt, Joseph ve Cook (1977) in order to evaluate individuals' general innovativeness (Hurt, Joseph, & Cook, 1977). Kılıçer and Odabaşı (2010) adapted the 5-point Likert type scale to Turkish. The scale has 12 positive and 8 negative items, 20 items in total. Innovativeness score is calculated by subtracting the score obtained from the negative items from the total score obtained from the positive items, and adding 42 points to the result. Scores to be obtained from the scale range from 14 to 94. Individuals are categorized in terms of innovativeness according to the scores obtained from the scale. Accordingly, those who receive over 80 points are Innovators, between 69 and 80 are Early Adopters, between 57 and 68 are Early Majority, between 46 and 56 are Late Majority and 46 and lower are Laggards. Total Cronbach's Alpha value was found .82 (Kılıçer, & Odabaşı, 2010). Cronbach's Alpha value in this study was found .75.

Data Analysis

Data were analyzed using SPSS statistical package programming. Analysis included numbers, percentages, means, Kolmogorov Smirnov test, Kruskal Wallis, Mann Whitney U and Spearman correlation tests. The significance level was set at $p < 0.05$ for all statistical tests.

Ethical Considerations

Written permission was obtained from the institution where the study was conducted. Ethical approval is approved by the Independent Ethics Committee of the XXX University and agreed with the ethical principles of the Declaration of Helsinki.

Results

An analysis of the participants' socio-demographic features showed that average age of the group was 20.37±1.79; 59.0% of them were female; 96% were single; and 49.3% were first year students. Of all the participants, 95.5% had smart phones; 55% connected to the internet a few times in an hour; 53.3% found internet beneficial while they made decisions about their own health; and 59.5% thought that it was important to access health sources in internet (Table 1).

Findings showed that the students' Individual Innovativeness Scale total mean score was 46.01 ± 8.83, and the scores ranged between 25 and 78. E-Health Literacy Scale total mean score was 27.64 ± 5.79, and the scores ranged between 8 and 40 (Table 2). Categorization of the participants according to their Individual Innovativeness Scale scores showed that 55.9% were laggards, 31.7 % were Late Majority, 11.5 % Early Majority, 0.9%were Early Adopters; no students were found to be innovators (Table 3). Individual Innovativeness Scale total mean score was found to be significantly higher in males. The groups indicated no significant differences in terms of class level, frequency of use of internet, benefit level of internet about health-related decisions, and importance level of access to health sources in internet. E-health Literacy Scale total mean score was found to be significantly higher in those who were enrolled in the 3rd or 4th year, who found internet very beneficial in health-related decisions, and who thought that access to health sources in internet was very important. No significant differences were found between gender and frequency of internet use (Table 4). There was a negative relationship between E-Health Literacy Scale and Individual Innovativeness Scale mean scores and positive, significant relationship between age ($p<0.05$, $p<0.01$) (Table 5).

Table 1. Students' Socio-demographic Features (N=227)

Socio-demographic Features	N	%
Gender		
Female	136	59.9
Male	91	40.1
Marital Status		
Single	218	96.0
Married	9	4.0
Year		
1st year	112	49.3
2nd year	41	18.1
3rd year	39	17.2
4th year	35	15.4
Possession of a smart phone		
Yes	219	96.5
No	8	3.5
Frequency of Internet Use		
A few times a week	9	4.0
Once a day	9	4.0
A few times a day	84	37.0
A few times an hour	125	55.0
Benefit Level of Internet about Health-related decisions		
Not beneficial at all	7	3.1
No beneficial	36	15.9
No idea	44	19.4
Beneficial	121	53.3
Very beneficial	19	8.4
Importance level of access to health sources in internet		
Not important al all	6	2.6
Not important	15	6.6
No idea	29	12.8
Important	135	59.5
Very important	42	18.5
	$\overline{X}$ ±SD	
Age	20.37±1.79 (min. 18 max. 30)	

Table 2. Students' Individual Innovativeness Scale and E-Health Literacy Scale Mean Scores

Scale	$\overline{X}$ ±SD	Min	Max
Individual Innovativeness Scale	46.01 ± 8.83	25	78
E-Health Literacy Scale	27.64 ± 5.79	8	40

Table 3. Distributions of Students according to the Scores obtained from the Individual Innovativeness Scale

Individual Innovativeness Level	N	%
Early Adopters	2	0.9
Early Majority	26	11.5
Late Majority	72	31.7
Laggards	127	**55.9**
Total	227	100

Table 4. Distribution of E-health Literacy and Individual Innovativeness Scale Mean Scores according to Socio-demographic Features (N= 227)

Socio-demographic Features	E-Health Literacy Scale			Individual Innovativeness Scale		
	$\overline{X} \pm SD$	KW/U	p	$\overline{X} \pm SD$	KW/U	p
Gender						
Female	27.43±5.62	U=5630.0	.249	44.90±8.45	U=4941.5	**.010**
Male	27.96±6.08			47.68±9.16		
Year						
1st year	25.89±6.39			46.10±8.96		
2nd year	28.44±4.42	KW=23.411	**.000**	47.61±8.73	KW=2.993	.393
3rd year	29.77±4.75			45.69±8.98		
4th year	29.94±4.56			44.23±8.38		
Frequency of Internet Use						
A few times a week	24.00±8.25			46.67±7.84		
Once a day	30.11±4.23	KW=3.079	.380	48.67±5.50	KW=1.593	.661
A few times a day	27.44±5.62			45.89±9.33		
A few times an hour	27.86±5.75			45.86±8.80		
Benefit Level of Internet about Health-related decisions						
Not beneficial at all	21.57±7.04			49.14±8.17		
No beneficial	26.17±5.54	KW=24.746	**.000**	45.17±8.50	KW=5.285	.259
No idea	25.66±6.15			47.59±7.73		
Beneficial	28.79±4.93			45.83±8.65		
Very beneficial	30.00±7.09			43.95±12.62		
Importance level of access to health sources in internet						
Not important al all	21.00±12.44			42.33±5.20		
Not important	27.33±5.01	KW=28.817	**.000**	45.73±8.75	KW=9.459	.051
No idea	23.69±5.66			48.52±9.74		
Important	27.96±4.90			46.47±9.14		
Very important	30.40±5.65			43.43±6.99		

Table 5. Relationship between E-Health Literacy Scale Mean Score and Individual

Innovativeness Scale Mean Score and Age (N= 227)

		E-Health Literacy Scale Score
Individual Innovativeness Scale Score	r	-.170[*]
	p	.010
Age	r	.197[**]
	p	.003

*p<0.05 **p<0.01

Discussion

Young people use mass media and other technologies frequently in order to access health information, which makes them target group for a number of educational interventions related to health. Besides, because of being in an important phase of their development, young people bring their learning skills to adulthood (Manganello, 2007). According to a study conducted in Canada, 99% of young people access to internet and majority of them reportedly use internet to get information about their health (Norman, & Skinner, 2006). Another study shows that internet is widely used among young people, especially 35.3% of the people aged 15 and 24 use internet as a source of information about health (Spadaro, 2003). A study conducted with the participation of young people in Turkey showed that 77% of the participants accessed information about their health from internet within the last one week. The same study also showed that 55% (n=55) found the information they obtained from internet beneficial/very beneficial, and 68% (n=68) found access to health sources from internet important/very important (Coşkun, & Bebiş, 2015). The present study found that majority of young people had smart phones, accessed to internet a few times an hour, found internet beneficial while making decisions about their health, and thought access to health sources in internet was important.

According to the results of a review article about the factors affecting use of e-health, specific users of the e-health service, particularly active users, obtained important benefits of their use. However, other potential users reportedly thought that it had little effect on information. Efforts should target those who cannot benefit from e-health services due to factors such as age, ethnicity, education level and socio-economic status. Better access to internet and computer

should be encouraged in order to increase familiarity, practicality and convenience perceptions (Hardiker, & Grant, 2011). With adequate health literacy skills, young people could constantly improve their lifelong health behaviors and habits and support their healthy life styles. Therefore, health literacy is of importance especially among young people for encouraging health in the fields of healthy diet and interpersonal relationships (Cho, Lee, Arozullah, & Crittenden, 2008; Gazmararian, Williams, Peel, & Baker, 2003; Ghaddar, Valerio, Garcia, & Hansen, 2012; Moreno, Ralston, & Grossman, 2009; Schillinger et al., 2002). Results of the present study showed that students' e-health literacy was above moderate level. This result could be associated with students' attending health-related departments and shorter time needed for accessing knowledge.

Innovativeness is defined as searching, finding, trying, improving, monitoring and adopting new products by improving the old or creating a new idea. People, units, and institutions should continuously and consistently renew themselves and see innovation as a need so that they can adapt to the developments and innovations in today's world (Bender, Williams, & Su, 2016; D'Alfonso, Zuniga, Weberg, & Orders, 2016; Weng, Huang, Chen, & Chang, 2015). A study conducted in Turkey that utilized Individual Innovativeness Scale showed that majority of university students were categorized as Early Majority and Late Majority (Kılıçer, & Odabaşı, 2010). Results of the present study showed that when the participants were categorized according to their Individual Innovativeness Scale score, majority of them were found to have Late Majority and Laggards features; however, the reasons of this finding should also be investigated. This finding is considered to be associated with the factors such as the current

health system and sociocultural and socioeconomic structure. Although the present study indicated a negative relationship between E-Health Literacy Scale and Individual Innovativeness Scale mean scores, there was a positive, significant relationship with age. The decrease in the individual innovativeness with the increase in e-health literacy is also an important issue to be discussed because this finding indicates that individual innovativeness might decrease as access to information in electronic environment is very quick and easy.

Implications for clinical practice

Although e-health is a new concept today, it will be a more frequently encountered issue with the developments in technology. Individuals this way will access to the right information, which will lead to right diagnosis. Therefore, e-health services should be designed and presented to people very well. Especially people who receive health education should be educated and supported about this issue.

Limitations of the study

Limitation of this study is that it was conducted with the participation of students enrolled in the health-related departments of only one university.

Conclusion

Young people should be informed about what e-health literacy means and enabled to access reliable e-health sources. In addition, health education programs should utilize educational methods that encourage innovativeness and improve e-health literacy; and descriptive and experimental studies that show the effects of different methods on students' individual innovativeness and e-health levels should be conducted.

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