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Relationship between electronic health literacy, quality of life, and self-efficacy in Tehran, Iran: A community-based study

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Abstract:

BACKGROUND: The concept of electronic health literacy has become a main focus of health-care professionals along with the increasing use of the Internet. In Iran, the Internet not yet has much impact on providing health services, and the physicians' and patients' community are now more willing to use the traditional method for diagnosing disease and prescribing medicines. This study aimed to determine the correlation between electronic health literacy, quality of life (QoL), and self-efficacy among Tehran citizens.

MATERIALS AND METHODS: The present study is a descriptive, cross-sectional study with a correlation approach that was conducted on 400 clients of community health centers of Shahid Beheshti University of Medical Sciences in 2019. Samples were selected by stratified random sampling method. Data were collected using E-Health Literacy Questionnaire ($\alpha = 0.88$), 12-item Short-Form Health Survey ($\alpha = 0.73$), and General Self-Efficacy Scale ($\alpha = 0.87$). Analytic statistics were using by descriptive statistics (mean and standard deviation) and inferential statistics (Pearson correlation coefficient and regression analysis) at the significant level ($P < 0.05$).

RESULTS: Correlation between electronic health literacy and QoL was 0.14 and with self-efficacy was 0.10, which was positive and statistically significant ($P < 0.05$). In addition, the correlation between QoL and self-efficacy was 0.33, which was positive, statistically significant, and moderate ($P < 0.05$).

CONCLUSION: According to the findings of this study, it is possible to improve the QoL through the promotion of electronic health literacy and self-efficacy. The results of this study can be used as a basis for health service providers and policymakers in designing and implementing health-related interventions.

Keywords:

Electronic health literacy, health literacy, quality of life, self-efficacy

Introduction

People use electronic tools in order to obtain health information. There is a need to share information between care providers and clients in an accurate and timely manner.[1] The Internet is considered an important source to get health information and is a valuable tool to cope with all health concerns.[2] The World Wide Web and other technology-based applications have become a common part of public health and health-care settings, and people use these tools increasingly as their primary source to seek information and access medical advices, instead of consulting health professionals.[3] Extensive Internet access has facilitated access to information, which was previously available only through health professionals.[4] In addition,

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use of the Internet has increased people's awareness and knowledge about medical and health issues and has helped them to participate more in their health-care activities by making informed decisions.[5] The Internet is a powerful platform to change people's lifestyles and how people deal with health issues[6] and also has been shown to be a great hopeful source without changing health information. From 2000 to 2016, Internet penetration has grown by 900%.[7] In 2012, every one of the two Americans used the Internet to obtain health information.[8] Health literacy is, as defined in the United States (US) Department of Health and Human Services Healthy People 2010 report, "the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions."[9] Electronic health literacy refers to the ability to find, understand, and evaluate health information through electronic resources and use of this information to resolve or identify a health problem.[5] People need electronic health literacy in order to use health information properly.[10] Electronic health literacy refers to the ability to find, understand, and evaluate health information through electronic resources and use of this information to resolve or identify a health problem[9] including the following six main skills: traditional literacy, health literacy, information literacy, scientific literacy, media literacy, and computer literacy, and also are influenced by various factors including age, sex, educational status, Internet access, and individual income.[11]

According to the Affordable Care Act, electronic health literacy is a degree of personal skills and competencies, which is used to provide, create, communicate, process, and understand the basic services and health information to make proper decisions about health. Therefore, people with e-Health literacy skills use web-based search strategies and can identify high-quality health information.[12] Some benefits of using the Internet such as low cost, high speed of searching, and access to information anonymously have made the Internet a viable option for health information search.[13]

In the USA, there is continuous monitoring on the content and quality of health information resources. In addition to this monitoring, the American Medical Association has published guidelines for patients to inform them about evaluating and using the Internet for their medical and health questions. Unlike the USA, there is not such a system in Iran, so it is more likely that information published on social media will not be valid and approved compared to evidence-based recommendations. Based on the research, false information may have negative effect on one's health beliefs and behavior. Therefore, besides the basic knowledge for using the Internet and electronic health literacy, it is recommended that health-care providers, as reliable information sources, be aware of ways to evaluate information sources.[13] Previous studies have shown that, low electronic health literacy is associated with low awareness of diseases such as colorectal cancer and chronic diseases. In addition, it has been confirmed that people who use the Internet have higher electronic health literacy and more awareness. Electronic health improves efficiency in health services, reduces costs, and increases the quality of services in various health units.[14]

Research has shown that using the health information on the Internet is effective in improving people's sports and eating habits. Similarly, people with high levels of e-Health literacy are more likely to adopt healthy nutritional behaviors, exercise, and sleep behaviors. Recent studies have shown that e-Health literacy also affects physical health behaviors.[15] The study by Mitsutake *et al*. showed that health behaviors including exercise and balanced nutrition were independently correlated with e-Health literacy among Japanese.[16] Although there is not clear and reliable information on the average e-Health literacy among Iranians, the research conducted on patients has shown that they tend to use communication technology in their health care.[14] People need various forms of health literacy, including e-Health literacy in order to improve their quality of life (QoL).[17] This e-Health literacy can be a step toward creating an acceptable QoL for people in the society.[18] The World Health Organization defines QoL as an individual's understanding of their position in life within the value and cultural system framework in which they live and is related to their goals, expectations, standards, and concerns.[19] The results of numerous studies have shown that health literacy affects the general health (GH) status and QoL of people. However, more researches are needed to identify the relationship between e-Health literacy and its impact on the QoL.[20]

Self-efficacy is people's belief about their ability and capacity to perform a task or to meet life's challenges. It is also referred as personal effectiveness and the extent or power of one's belief in their personal ability to perform tasks and achieve goals.[21] Self-efficacy is an effective factor in the successful performance of a behavior, and it links between knowledge and action.[22] A person with high self-efficacy is more likely to search for health awareness opportunities and feel power and strength through making control of his/her health.[23] Research has shown that increasing self-efficacy is associated with adherence to treatment, health-promoting behaviors, and improving QoL.[24] Studies have shown that people do not have enough skills to search for electronic health information,[1,9,11] and few studies have been conducted on electronic health literacy in Iran. Due to the influence of self-efficacy and QoL on the information obtained

from the Internet and sites, the aim of the present study is to determine the relationship between electronic health literacy, QoL, and self-efficacy among Tehran (the capital of Iran) citizens.

Materials and Methods

The present study is a descriptive, cross-sectional study with a correlation approach in Tehran (the capital of Iran) citizens in 2019. A total of 400 clients of community health centers of Shahid Beheshti University of Medical Sciences were selected by stratified random sampling method based on the inclusion criteria of the study. The community health centers of Shahid Beheshti University of Medical Sciences include two health centers in the north and east. Each of these centers has health centers with multiple deliveries, out of which two centers and finally four delivery health centers were randomly selected (draw card). Then, convenience sampling was done at the centers. The tendency to respond to the questionnaire was considered as the inclusion criterion of the study and also incomplete answering to the questionnaire was considered as the exclusion criterion of the study. The study data were collected through the general questionnaire, E-Health Literacy Questionnaire (eHLQ), 12-item Short-Form Health Survey, and General Self-Efficacy Scale (GSE).

General questionnaire

This tool includes 14 questions on demographic information such as sex, age, marital status, educational status, number of family members, family income sufficiency, level of skill in using the Internet, Internet usage rate, used Internet services, necessity to attend Internet courses, the usefulness of the Internet in health decision-making, the importance of accessing to health resources on the Internet, and the amount of attention to health and the history of chronic disease.

E-Health Literacy Questionnaire

This questionnaire consists of eight items with a 5-point Likert-type scale (1 = strongly disagree, 5 = strongly agree). The score range of this questionnaire is from 8 up to 40. The questionnaire questions focus on the available sources of health information on the Internet, the site of useful health resources on the Internet, how to access these resources, how to use the Internet for responding the health issues, and the ability to evaluate online health information and to identify high-quality sources from poor-quality sources on the Internet. Finally, whatever mean score of the questionnaire increases, e-Health literacy is higher.[14] In 2006, Skinner and Norman, in a fundamental study, systematically investigated the features that lead to e-Health literacy. They conducted a study on 664 participants with age range between 13 and 21 to evaluate the psychometric property measurement of the e-Health Literacy Scale. Participants' responses were collected from 14 schools in a large Canadian city. Cronbach's alpha was reported as 0.88, which indicates favorable reliability of the questionnaire.[11] The content and face validity of the eHLQ in a study by Bazm *et al*. was approved by the professors, and its predictive validity was also reported appropriate compared to other computer literacy tools. In their study, they reported the factor loading of items from 0.723 up to 0.862, which was acceptable. Cronbach's alpha coefficient was 0.88 and its reliability was confirmed by test-retest. The study results showed that the items in the translated version were equivalent to the original measure and had good validity and reliability with Iranian e-Health literacy.[14] In the present study, in order to do accurate analysis, the scores of the eHLQ were also considered as spectral, in which the range of 10–20 score was considered as poor e-Health literacy, 20–30 as moderate e-Health literacy, and 30–40 as high e-Health literacy.

12-item Short-Form Health Survey

The 12-item version of the Quality of Life Questionnaire (1996) was designed by Ware *et al*. This questionnaire evaluated the QoL in terms of GH perception, physical functioning, physical limitation due to physical health (RP), role limitation due to emotional problems (RE), bodily pain, social functioning (SF), vitality (VT), and mental health (MH). The higher score obtained from this questionnaire indicated a better status of QoL.[25] The validity and reliability of this questionnaire were confirmed by Ware *et al*. Reliability was reported as 0.89 for the 12-item Physical Component Summary (PCS) and 0.76 for the 12-item Mental Component Summary (MCS), indicating an acceptable reliability of the questionnaire. The validity of this questionnaire was evaluated by Ware *et al*. through the experimental validity method,[26] and also by Kontodimopoulos *et al*. through construct validity, where both studies reported desirable validity.[27] In Iran, the validity and reliability of this tool were investigated by Montazeri *et al*. The reliability of the 12-item PCS was 0.73 and reliability of the 12-item MCS was 0.73, which are confirmed. The validity of the tool was evaluated by convergent method. There was a high correlation between questions of four physical component subscales and physical component total score, and also the questions of three MH subscales were highly correlated with the total score of the mental component.[25]

General Self-Efficacy Scale

The GSE-10 was designed by Schwarzer and Jerusalem to evaluate general self-efficacy. This scale shows the optimistic perception of one toward itself. People with high self-efficacy can manage and solve problems and adapt to the situations when facing problems. This scale has 10 items, and the answers are graded based on a

Likert scale from inaccurate to completely inaccurate (scores 1–4) and therefore, the total acceptable score of this tool can be in a range from 10 up to 40. Scores ranging from 10 to 15 have poor self-efficacy, 15–25 have moderate self-efficacy, and above 25 indicate high self-efficacy.[28] Cronbach's alpha coefficient for the Persian version of this tool was reported to be 0.85 by Moeini *et al*., which confirms the high reliability of the tool.[29]

In the present study, internal consistency and stability determination methods were used to identify the reliability of this tool. To determine internal consistency, Cronbach's alpha was determined as 0.87 in the eHLQ; its reliability was reported to be 0.89 for the 12-item PCS and 0.76 for the 12-item MCS, indicating desired reliability level of questions in this questionnaire. The self-efficacy reliability was 0.85, which indicated that the questionnaires had a proper reliability.

The researchers referred to the delivery health centers to provide questionnaires for clients after obtaining the necessary permits. Before initiating the research, the aims and details were described to the participants, and written informed consent was obtained from them. Then, the participants had 30 min to answer questions without consulting with others and without using electronic resources such as mobile Internet. The study had no cost for the study samples. Data were analyzed by SPSS software version 18 software (SPSS, Inc., Chicago, IL, USA). using descriptive statistics (mean and standard deviation) and inferential statistics (Pearson's correlation coefficient and regression analysis) at the statistical significant level ($P < 0.05$).

Ethical considerations

This study was approved by the Ethics Committee of Shahid Beheshti University of Medical Sciences under the Code of ethics IR.SBMU.RETECH.REC.1397.1085.

Results

Among the 400 participants in the study, 245 were male (61.3%) and 155 were female (38.8%), with the age range of 17–75 years. Nearly 41.5% of them were single and 56.5% were married. The majority of participants (49.5%) had a bachelor's degree. Almost 48.5% of the participants agreed with the benefits of using the Internet in adopting health actions. The majority of the study population (36.8%) reported a good level of proficiency in the use of the Internet, and 46.8% of them used the Internet several times a day. Other demographic information is available in Table 1.

The mean score for e-Health literacy was 28.7 that 52.3% of the participants had moderate e-Health literacy (range 20–30). The mean score for QoL in the study samples was 34.24 that 63.7% of them had a moderate level of life quality (range 25–36). The results showed that the majority of the study population (72.3%) had high self-efficacy and the self-efficacy mean score was 29.16 [Table 2].

According to the study results, the correlation between e-Health literacy with QoL was 0.14 and with self-efficacy was 0.10, and also this correlation was positive and significant. The correlation between

Table 1: Demographic characteristics of clients of community health centers of Shahid Beheshti University of Medical Sciences

Variables	Frequency (%)
Gender	
Male	245 (61.3)
Female	155 (38.8)
Marital status	
Single	166 (41.5)
Married	226 (56.5)
Divorced and widowed	8 (2)
Educational state	
Elementary	3 (0.8)
Secondary	9 (2.3)
High school	27 (6.8)
Diploma	78 (19.3)
College or more	283 (70.8)
Skills in using the Internet	
Very weak	7 (1.8)
Weak	13 (3.3)
Moderate	133 (33.3)
Good	147 (36.8)
Very good	100 (25)
Internet usage rate	
Never	6 (1.5)
Several times a month	19 (4.8)
Every week	26 (6.5)
Every day	162 (40.5)
Several times a day	187 (46.8)
The amount of attention to your health	
Very much	136 (34)
Much	198 (49.5)
Don't care	18 (4.5)
Low	41 (10.3)
Very low	7 (1.8)

Table 2: Mean±standard deviation of e-health literacy, quality of life, and self-efficacy clients of community health centers of Shahid Beheshti University of Medical Sciences

Variables	Mean±SD
E-health literacy	28.7375±5.32960
QoL	34.2475±5.69450
Self-efficacy	29.1600±6.23511

SD=Standard deviation, QoL=Quality of life

QoL and self-efficacy was 0.33, which is positive and significant [Table 3].

The results of regression analysis showed the effect of e-Health literacy and other demographic variables on QoL. With increasing one e-Health literacy score, QoL score was increased by an average of 0.12. With the increase in educational status and skill in using cyberspace, the QoL score was increased by an average of 0.44 and 0.75, respectively [Table 4]. The results also showed that with increasing 1 year of age, self-efficacy score increased by an average of 0.08. It was found that with an increase in (internet-using skills), the self-efficacy score was increased by an average of 0.83 and also, self-efficacy score increased to 0.69 by increasing a rating on the (benefit of the internet)., [Table 5].

Table 3: Correlation between E-health literacy, quality of life, and self-efficacy clients of community health centers of Shahid Beheshti University of Medical Sciences

Variable	E-health literacy	QoL	Self-efficacy
E-health literacy			
Spearman's correlation coefficient	1		
P			
QoL			
Spearman's correlation coefficient	0.143	1	
P	0.004*		
Self-efficacy			
Spearman's correlation coefficient	0.102	0.333	1
P	0.042*	0.001*	

*Correlation is significant at 0.05, QoL=Quality of life

Table 4: Regression analyses of E-health literacy and significant demographic characteristics impacting on the quality of life of clients of community health centers of Shahid Beheshti University of Medical Sciences

Variable	Unstandardized coefficients		Standardized coefficients	*t*	*P*
	B	SE	(β)		
E-health literacy	0.121	0.053	0.114	2.277	0.023
Education	0.438	0.207	0.105	2.117	0.035
Internet-using skills	0.752	0.316	0.121	2.379	0.018

SE=Standard error

Discussion

In this study, the mean score of e-Health literacy was higher than the mean of the tool used in the study. In a similar study in Iran on the level of e-Health literacy in postgraduate students, the mean score of e-Health literacy in the study population was higher than the mean of the study tool, which is consistent with the results of this study.[13] Given that the majority of participants in the present study had an academic degree and most of them were aware of the benefits of using the Internet, the results of the study were predictable. Therefore, using the community potential, more emphasis can be placed on electronic health literacy to educate and promote health concepts.

In addition, the majority of the study population had a moderate level in terms of life quality, which is consistent with the results of similar studies. The QoL concept is multidimensional and nowadays, it is considered a key element in policymaking, especially in the health field, and is also referred to as the development index. In the present study, the results of logistic regression showed that the educational status and skill of using the Internet may influence the individuals' QoL. People with high levels of educational status and skill of using the Internet make greater use of the Internet, which may also be used for health information. Correct health information can increase people's self-efficacy in using this information to change their lifestyles to adopting healthy behaviors. It can be concluded that the Internet is a powerful platform to improve people's QoL.

The majority of people in the present study had a high self-efficacy mean score, which is consistent with the results of similar studies. Logistic regression results also showed that self-efficacy is directly related to the skill of using cyberspace and its usefulness. To explain this finding, online learning environments can be one of the most stimulating tools for learning and acquiring health information. The use of cyberspace seems to enhance social and up-to-date capabilities and make them feel more self-efficient. As cyberspace users search different pages of the Internet to find answers for their questions, their sense of scientific self-efficacy and capability will be increased.

In the present study, the results of the correlation between e-Health literacy and self-efficacy were positive and significant. In the study by Efthymiou *et al*., it was found that e-Health literacy has a positive and significant relationship with self-efficacy of caregivers,[23] which is in agreement with the results of the present study. With regard to the fast spread of information on websites for supporting community members, it is necessary to adopt and evaluate new technologies, and using the Internet and new technologies is considered as a facilitating factor to meet the health needs of community members. People with high eHealth literacy more likely have self-efficacy in using the correct information from the Internet. Therefore, they are more likely to change and improve their health-promoting behaviors and lifestyle. As there was no observed study about the relationship between e-Health literacy and QoL in databases, it was not possible to compare and analyze the results of the

Table 5: Regression analyses of E-health literacy and significant demographic characteristics impacting on self-efficacy of clients of community health centers of Shahid Beheshti University of Medical Sciences

Variable	Unstandardized coefficients		Standardized coefficients (β)	*t*	*P*
	B	SE			
E-health literacy	0.077	0.060	0.066	1.288	0.199
Benefit of the Internet	0.689	0.339	0.102	2.030	0.043
Age	0.084	0.029	0.156	2.925	0.004
Internet-using skills	0.828	0.370	0.121	2.238	0.026

SE=Standard error

present study. However, this study indicated that the relationship between e-Health literacy and QoL was positive and significant.

The correlation between QoL and self-efficacy was positive and significant. The results of the study by Peters *et al*., as well as Shaabani *et al*., are consistent with the results of this study,[30,31] which conclude that the self-efficacy status and QoL of people can be improved in different dimensions by developing strategies and programs. In Iran, access to online health information is not readily comprehensible and easy for audiences, while this aspect of health information is emphasized in other countries, and some health associations and organizations such as the Medical Library Association and British Medical Association (BMA) have introduced reputable and high-quality health websites. Furthermore, the information on these websites is regularly evaluated by reputable organizations such as associations and organizations affiliated with the Department of Health, National Health System, BMA, Medical Library Association, and HON Code of Conduct for Medical and Health websites. In Iran, the issue of evaluating the health information on websites has not prioritized yet and is not formally considered. In addition, there are some doubts on the validity of the information provided on these websites.[12] The findings of this study indicate the readiness of people to deal with electronic health, and the results indicate the strengths and weaknesses of e-Health literacy level of the respondents and the indicators that strengthening them in the community can increase the efficiency of e-Health systems. Accordingly, information provided by relevant organizations, including the Ministry of Health and Medical Education, has an impact on the increasing levels of health literacy and e-Health literacy among the different levels of the society. Collecting information through self-reporting and affecting the mental states of the study participants was one of the limitations of this study. Therefore, similar study is recommended to remove these limitations and to implement effective interventions in order to improve e-Health literacy at community level. Thus, further researches on this topic should be considered by researchers.

Conclusion

The use of e-Health tools is inevitable, according to the results of the present study, on the relationship between e-Health literacy with QoL and self-efficacy and the need to keep pace with the global medical community. The findings of this study can be used by health policymakers to implement e-Health infrastructure in the country. In particular, by emphasizing indicators, which can be strengthened at the community level, the efficiency of the e-Health system can be improved to make the optimal use of these tools for health.

Understanding what factors and how e-Health literacy affects people is an important issue for health decision makers and health-care providers. The results of this study can be used to improve the e-Health literacy of people in the community.

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Conflicts of interest

There are no conflicts of interest.

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