

E-Health Literacy and Factors Affecting it in Patients Admitted to a University Hospital in Iran

Meghdad Ghodrati¹, Hadi Lotfnezhad Afshar², Zahra Zare Fazlollahi³, Bahlol Rahimi⁴, Ali Rashidi⁵, Mojtaba Maleki⁶

¹ BSc Student in Health Information Technology, Department of Health Information Technology, School of Paramedical, Urmia University of Medical Sciences, Urmia, Iran

² PhD of Health Information Management (HIM), Assistant Professor in Health Information Management, Department of Health Information Technology, School of Paramedical, Urmia University of Medical Sciences, Urmia, Iran

³ MSc in Health Information Management, Department of Health Information Technology, School of Paramedical, Urmia University of Medical Sciences, Urmia, Iran

⁴ PhD of Medical Informatics, Professor in Medical Informatics, Department of Health Information Technology, School of Paramedical, Urmia University of Medical Sciences, Urmia, Iran

⁵ PhD of Library and Information Sciences, Associate Professor in Library and Information Sciences, Department of Health Information Technology, School of Paramedical, Urmia University of Medical Sciences, Urmia, Iran

⁶ MSc of Information Technology (IT), Imam Khomeini Hospital, Urmia University of medical sciences, Urmia, Iran

Type of article: Original

Abstract

Background: Rapid ICT advancements have affected all aspects of life, and healthcare is no exception. Given the significance of E-Health literacy in the current century and its effect on society and the healthcare system, it seems necessary for patients to have adequate health literacy. However, the lack of essential health literacy leads to the low self-management of diseases.

Objective: This study aimed to investigate E-Health literacy and factors affecting it in patients admitted to a University hospital in Iran.

Methods: This cross-sectional study was conducted in Imam Khomeini University Hospital of Urmia, Iran, in 2019. Data were collected using the Persian version of the E-Health Literacy Questionnaire filled by patients. Participants were selected using simple random sampling. Personal and demographic variables were also collected, and their correlation with E-Health literacy was investigated. The Independent-samples t-test and ANOVA were used to compare different groups.

Results: In this study, 200 patients (103 males and 97 females) ($t/f = 41.916$), ($p=0.000$) participated. The mean score of E-Health literacy in patients under study was 25.51 (standard deviation=5.098) which was low and unsatisfactory. Findings suggest that over half of participants were unable to identify and evaluate the quality of online health resources and over half of participants in this study trust online information although they fail to differentiate high quality resources from low quality ones.

Conclusion: Identifying and assessing E-Health literacy of patients is an effective step in improving their health literacy. Findings suggest that these patients need to improve and develop their knowledge of E-Health.

Keywords: Mobile Health, Health literacy, Hospital, E-Health

Corresponding author: Assistant Professor Dr. Hadi Lotfnezhad Afshar, Department of Health Information Technology, School of Paramedical, Urmia University of Medical Sciences, Urmia, Iran.

Tel: +98.4432752306, Fax: +98. 04432770047, E-mail: hadi.afshar@gmail.com

Received: October 17, 2021, Accepted: March 01, 2022, Published: June 2022

Funding / research project approval: Student Research Committee (project No. 98-10-23-9745), Urmia University of Medical Sciences, Urmia, Iran

Ethics approval: IR.UMSU.REC.1398.464 (Urmia University of Medical Sciences, Urmia, Iran)

Publisher: KNOWLEDGE KINGDOM PUBLISHING, <http://www.eurl-knowking.dz/>.

Copyright : © 2022 The Authors. This is an open access article under the terms of the Creative Commons Attribution-NonCommercial-NoDerivs License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.

1. Introduction

Health literacy refers to the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions (1). It concerns the individuals' knowledge, motivation, and competence to obtain, understand, evaluate, and use health information in order to improve their quality of life by judging and deciding on health care, disease prevention, and health promotion (2). According to WHO, health literacy is a major determinant of health (3). Some of the skills found in individuals with high health literacy include their ability to understand instructions of prescribed medications, medical brochures, consent forms, ability to benefit from a sophisticated medical system, reading, listening, analysis and decision making skills and the ability to apply these skills in health situations (4). Various studies have shown that low health literacy seems to cause delayed diagnosis of diseases, inability to take care of oneself, and increased use of emergency services, hospitalization, incidence of various diseases and mortality in individuals (5-7). Rapid advancements in information and communication technologies (ICTs) have affected all aspects of life including health care (8). The Internet is now widely used and the way health information is disseminated has changed dramatically (9). Using the Internet and electronic health resources help people to manage their major health issues, make informed health decisions, and communicate with physicians (10, 11). Yet, access to these resources alone does not suffice. Finding, using, and evaluating resources demand specific skills. E-Health literacy is defined as the ability to seek, find, understand, and appraise health information from electronic sources and apply the knowledge gained to addressing or solving a health problem (9). This definition consists of two major elements; individuals' ability to understand information and making appropriate decisions using this information (12). According to the health literacy concept, E-Health literacy emphasizes the role ICTs play in health information. E-Health literacy demands a combination of health, information, knowledge, media, computer, and Internet literacy (13). E-Health literacy includes six basic skills including: traditional literacy, health literacy, information literacy, scientific literacy, media literacy and computer literacy. Thus e-health literacy is influenced by factors such as; Age, gender, education, availability and access to the Internet and income (14-17). Thus, E-Health developed with several key objectives in various sectors, including patients' health records, online health interventions, teaching and learning, mobile technologies, and research (18). This scientific and technological phenomenon have numerous benefits such as: the communication with the wider geographic coverage, faster diagnosis of diseases, treatment and prevention of diseases, the better physician-patient interaction, faster response to treatment, a healthy competitive environment between healthcare professionals and practitioners (19). Several studies have investigated factors leading to E-Health literacy using various methods. In a systematic fundamental study, Skinner and Norman (9) investigated characteristics, which lead to E-Health literacy. Findings suggested that gender affects E-Health literacy, while age and the use of technology have no effects on E-Health literacy scores. In a study, E-Health literacy of nursing students in Jordan was investigated. Findings demonstrated that despite having an acceptable level of this skill, the majority of students go without the ability to evaluate and validate the provided health information (20). A study suggested that E-Health literacy is affected by education history, having an intrinsic interest in health and the history of using the Internet (21). Generally, studies suggest that people lack sufficient skills to search for E-Health materials. They have problems in finding and appraising the quality of relevant information. These may affect treatment outcomes (22, 23). Few studies conducted in Iran suggest that participants were aware of online health resources and knew how to search, locate, and use them; however, they lacked the skills to evaluate and differentiate low-quality from high-quality resources. In addition, they were uncertain about using this information to make health decisions (23, 24). Although the use of the Internet has many benefits in providing health services, but still does not have full influence in Iranian society. A significant number of physicians and patients are interested in the traditional process of identifying the disease and introducing medicine. The reason for such a desire can be considered in the inability to use information technology to maintain health (25). The aim of the current study is therefore to investigate E-Health literacy among patients admitted to a University hospital in Iran and the factors affecting it.

2. Material and Methods

2.1. Search strategy

Statistical population of this descriptive survey was all patients admitted to Imam Khomeini University Hospital (Surgery departments for men and women, ENT, gastroenterology, orthopedics, blood, nephrology, urology, lung and rheumatology) of Urmia in 2019. Stratified random sampling was used to select study participants. A total of 200 patients participated in the study. After coordinating with the security and management of the hospital and obtaining the required permits, we provided patients with a questionnaire (the first part of demographic profile and the second part of the E-Health literacy questionnaire) by frequent and face-to-face visits to the surgical and internal wards. Inclusion criteria were having a smart phone, tablet or laptop and access to the Internet and the criterion of

exclusion was not having any of the mentioned cases that were mentioned. First, we explained the objectives to patients and informed written consent was obtained. Then, patients had 15 minutes to answer the questions without others help or using the Internet. The author was also present, collected the questionnaires, and answered possible questions of patients. Completing the questionnaire caused no disruptions in the treatment and care process.

2.2. E-Health Literacy Questionnaire

The E-Health Literacy Questionnaire (eHLQ) (9) with eight items was used to measure E-Health literacy. This self-reported scale deals with the knowledge and understanding of what health information resources are available on the Internet, where a person can find useful health resources, how one can access these resources, how to use the Internet to answer health questions, the ability to evaluate online health information and differentiate low-quality from quality resources on the Internet. Respondents answered the items based on a 5-point Likert scale from Strongly Disagree (1) to Strongly Agree (5). The final score ranged between 8 and 40. It is worth mentioning that the mean standard score for eight 5-choice questions was 24, which is the sum of the third option of each item and the mean score for E-Health literacy. A score of ≥ 32 indicated higher E-Health literacy (22). In this study, two additional statements on the usefulness of the Internet were used to decide on health-related issues and the importance of accessing Internet resources, as recommended by the developers of the E-Health Literacy Questionnaire (16). Validity and reliability of the Persian version of E-Health Literacy Questionnaire were approved in a study by Bazm et al. (26).

2.3. Data Analysis

Data were analyzed in SPSS 16. The mean of scores was calculated to measure the level of E-Health literacy. The normality of data was assessed using Kolmogorov-Smirnov test. Results showed that the distribution of E-Health literacy score did not deviate significantly from the normal distribution ($p > 0.05$) and therefore, parametric tests were applied. The Independent-samples t-test was used to compare the mean score of E-Health literacy between male and female participants. The ANOVA was used to investigate the significant relationship between demographic data and E-Health literacy and to find out what variables predict a high E-Health literacy score.

3. Results

3.1. Demographic Profile

In this study, 200 electronic questionnaires were distributed among patients admitted to Imam Khomeini University Hospital in Urmia, which were filled through interviews. The questionnaire was filled by 103 male (51.5%) and female (48.5%) patients. Demographic data are shown in Table 1.

3.2. E-Health Literacy

The mean score of E-Health literacy in this study was 3.185 with standard deviation of 0.81 (ranged from 1 to 5). The mean score of each item in the E-Health Literacy Questionnaire is shown in Table 2. Over half of patients ($n=114$, 57%) disagreed upon the usefulness of the Internet to decide on health-related issues and 128 patients (64%) disagreed upon the significance of access to online health-related resources. As shown in Table 2, their responses had a similar mean score. Over half of participants were aware of useful health resources ($n=121$, 60.5%), how to find them ($n=113$, 56.5%), how to use the available health information well ($n=122$, 61.0%), skills to assess online health resources ($n=114$, 57.0%) and confidence on the use of information available on the Internet to make health decisions ($n=116$, 58.0%). On the other hand, over half of participants lacked the ability and knowledge of Internet-based health resources ($n=139$, 69.5%) and how to differentiate high-quality from low-quality resources ($n=102$, 51.0%) (Table 2).

3.3. Factors related to E-Health Literacy

Results showed that the mean score of E-Health literacy of participants was significantly different in terms of age ($p=0.019$), gender ($p=0.000$), the usefulness of the Internet in making health decisions ($p=0.000$), and the importance of access to health resources on the Internet ($p=0.000$). However, education was an exception ($p=0.219$) (Table 1). The Independent-samples t-test indicated a significant difference between the mean score of E-Health literacy among men and women. Women enjoyed higher E-Health literacy compared to men (Table 1). A comparison of five age groups (Table 1) indicated that participants between 31 and 40 and under 20 years old showed a higher mean score of E-Health literacy and the lowest mean score belonged to the age group over 51 years old. Findings suggest that those who found the Internet useful to decide on health-related issues had higher mean score of E-Health literacy (Table 1). In addition, those who disbelieved the significance of access to health-related resources on the Internet had higher mean score of E-Health literacy (Table 1).

Table 1. Factor associated with eHEALS

Characteristic		n (%)	eHEALS Mean (SD)	Statistics (t/f)	eHEALS significance level	95% CI
Age	≤20	25 (12.5)	3.38 (0.61)	3.007	0.019	(3.13-3.36)
	21 to 30	29 (14.5)	3.06 (0.69)			(2.79-3.32)
	31 to 40	37 (18.5)	3.40 (0.45)			(3.25-3.55)
	41 to 50	44 (22)	3.20 (0.63)			(3.01-3.39)
	≥51	65 (32.5)	3.03 (0.67)			(2.86-3.20)
Sex	Male	103 (51.5)	3.09 (0.63)	41.916	<0.001	(2.97-3.21)
	Female	97 (48.5)	3.28 (0.62)			(3.16-3.41)
Level of education	Associate & Lower	185 (92.5)	3.16 (0.63)	1.531	0.219	(3.07-3.25)
	B.Sc.	12 (6)	3.42 (0.64)			(3.01-3.83)
	M.Sc.	3 (1.5)	3.58 (0.26)			(2.93-4.22)
	PH.D.	0 (0)	0			0
Perceived usefulness of internet	Strongly disagree	13 (6.5)	3.69 (0.14)	21.721	<0.001	(3.60-3.77)
	Disagree	114 (57)	3.42 (0.54)			(3.32-3.52)
	Unsure	21 (10.5)	2.77 (0.62)			(2.49-3.06)
	Agree	46 (23)	2.68 (0.52)			(2.52-2.84)
	Strongly agree	6 (3)	2.97 (0.62)			(2.32-3.63)
Perceived importance of internet	Strongly disagree	21 (10.5)	3.60 (0.20)	6.905	<0.001	(3.51-3.70)
	Disagree	128 (64)	3.23 (0.58)			(3.13-3.33)
	Unsure	17 (8.5)	3.12 (0.65)			(2.78-3.46)
	Agree	32 (16)	2.82 (0.79)			(2.53-3.11)
	Strongly agree	2 (1)	2.25 (0.00)			(2.25-2.25)

Table 2. eHealth Literacy Scale (eHEALS)

eHEALS statements	Rating scale (n and %)					Mean (SD)
	Strongly disagree	Disagree	Unsure	Agree	Strongly agree	
I know what health resources are available on the Internet.	0 (0)	110 (55.0)	29 (14.5)	57 (28.5)	4 (2.0)	2.78 (0.932)
I know where to find helpful health resources on the Internet.	3 (1.5)	59 (29.5)	17 (8.5)	119 (59.5)	2 (1.0)	3.29 (0.954)
I know how to find helpful health resources on the Internet.	3 (1.5)	62 (31.0)	22 (11.0)	110 (55.0)	3 (1.5)	3.24 (0.963)
I know how to use the Internet to answer my questions about health.	6 (3.0)	62 (31.0)	25 (12.5)	102 (51.0)	5 (2.5)	3.19 (1.00)
I know how to use the health information I find on the Internet to help me.	10 (5.0)	44 (22.0)	24 (12.0)	120 (60.0)	2 (1.0)	3.30 (0.987)
I have the skills I need to evaluate the health resources I find on the Internet.	8 (4.0)	59 (29.5)	19 (9.5)	104 (52.0)	10 (5.0)	3.24 (1.059)
I can tell high quality health resources from low quality health resources on the Internet.	9 (4.5)	50 (25.0)	43 (21.5)	93 (46.5)	5 (2.5)	3.18 (0.984)
I feel confident in using information from the Internet to make health decisions.	11 (5.5)	42 (21.0)	31 (15.5)	109 (54.5)	7 (3.5)	3.30 (1.016)

4. Discussion

This study aimed to measure E-Health literacy among patients admitted to Imam Khomeini University hospital in Urmia and factors related to it. It is essential for health policy-makers and the healthcare market to understand patients' health literacy and factors affecting it. This study provides critical information for patients and helps decision-makers to design their strategies for those with low health literacy. In this study, the mean score of E-Health literacy in patients admitted to the Hospital was 25.51 (SD=5.098), slightly higher than the standard score of 24, which is not satisfactory. Tadayon et al. investigated E-Health literacy of patients visiting a military hospital in

Tehran. They reported a mean score of 25.35 (SD=8.256) in the population under study which was comparable with the mean obtained in this study. In this study, gender and age were effective in E-Health literacy and women as well as some age groups had higher literacy, which complies with the results of Tadayon et al. (24). This study indicated that women's E-Health literacy was higher compared to men's, which complies with the results obtained by Park et al. (22). Other studies reported higher E-Health literacy in men than women (27-29). Several studies suggested that women seek for information for their families; this may explain their desire to seek health information and gain higher E-Health literacy scores compared to men (22). In some studies, no correlation was found between gender and E-Health literacy (17, 20, 22, 30, 31). In a study, the mean score of E-Health literacy of students in Mashhad University of Medical Sciences was 28.21 (SD=6.95) which was higher than the mean score obtained in this study and on the contrary, education was effective in E-Health literacy (23). Results of this study indicated no correlation between education and mean score of E-Health literacy similar to the previous studies (32, 33). In other studies, the results have shown that with the increase in education, the level of e-health literacy also increases (20, 34-37). Results of two studies conducted in the United States and Israel on E-Health literacy measured by the E-Health Literacy Questionnaire showed that a lower level of education was associated with lower E-Health literacy (38, 39). Results of this study suggested a significant relationship between age and E-Health literacy as reported by previous studies (17, 24). In addition, a study showed that e-health literacy was negatively correlated with age, so that at older ages they had less perceived E-Health efficiencies (40). Findings indicated that over half of respondents were unable to identify and evaluate the quality of online health resources, and several other studies reported the same findings (3, 20, 22, 24). However, a systematic review of college students showed that low E-Health literacy skills lead to poor ability to use, identify, and evaluate health information available on the Internet (41). On trusting health resources available on the Internet, results showed that over half of the patients participating in the study trust these resources despite their inability to distinguish high-quality resources from low-quality ones and another similar study reported similar results (34). Other studies in this field reported low trust of users in using the Internet for health-related issues (42-44). Results showed that those who repudiated the Internet as a useful tool for making health-related decisions had a higher mean score of health literacy, and other studies indicated contrary results to this study (20, 22, 24). In addition, those who repudiated the importance of access to health resources on the Internet had higher mean score of E-Health literacy compared to others, and similar studies showed lower mean score of E-Health literacy (20, 22, 24).

5. Limitations

According to this study, the difference found between the results of this study and the literature seems to be due to the differences in methodology such as different designs and samples, study environment, and data collection tools. In this study, patients' E-Health literacy was measured using a self-reported scale that may fail to reflect their actual literacy. In addition, in this study the E-Health Literacy Questionnaire was used as a standard scale, which lacked functional, interactive, and critical dimensions. Given that the statistical population of this study consisted of patients, they may not be in their best physical and mental mood when responding and the results seem to be affected.

5. Conclusions

Results show that E-Health literacy was low among patients admitted to Imam Khomeini University Hospital of Urmia. Given the importance of E-Health literacy in the information age and its effect on the developed and developing countries' healthcare system, identifying and assessing E-Health literacy of patients is an effective step in improving their health literacy. In addition, it is a standard for health care policy makers to design strategies for those with low E-Health literacy.

Acknowledgments:

This article resulted from research project No. 98-10-23-9745 funded by Student Research Committee, Urmia University of Medical Sciences, Urmia, Iran. The authors acknowledge all nurses in the Imam Khomeini of Urmia.

Conflict of Interest:

There is no conflict of interest to be declared.

Authors' contributions:

conception or design of the work (all authors); Acquisition of data (MG, MM); Analysis or interpretation of data (HLA); Drafting the manuscript (MG, HLA); Revising the manuscript (HLA, ZZF, BR, AR, MM); Accountable for all aspects of the work (all authors).

References:

- 1) Tavousi M, Ebadi M, Azin A, Shakerinejad G, Hashemi A, Fattahi E, et al. Definitions of health literacy: a review of the literature. *PAYESH*. 2014; 13(1): 119-124
- 2) Sørensen K, Van den Broucke S, Fullam J, Doyle G, Pelikan J, Slonska Z, et al. Health literacy and public health: a systematic review and integration of definitions and models. *BMC public health*. 2012;12(1):1-13. DOI: 10.1186/1471-2458-12-80. PMID: 22276600, PMCID: PMC3292515.
- 3) Macdonald JJ, Smith A, Gethin A, Sliwka G, Monaem A, Powell KJ. Pathways to despair: a study of male suicide (aged 25-44). *Public Health Res*. 2014; 4(2): 62-70. doi: 10.5923/j.phr.20140402.03.
- 4) Kickbusch I, Wait S, Maag D. *Navigating health: The role of health literacy*. 1st ed. Alliance for Health and the Future. 2005.
- 5) Baker DW, Wolf MS, Feinglass J, Thompson JA, Gazmararian JA, Huang JJAoim. Health literacy and mortality among elderly persons. *Arch Intern Med*. 2007;167(14): 1503-9. DOI: 10.1001/archinte.167.14.1503. PMID: 17646604.
- 6) Javadzade H. Health literacy among adults of Isfahan, Iran. *Health Sys Res*. 2013; 9(5): 540-549.
- 7) Park JY, June KJ. Influencing factors on functional health literacy among the rural elderly. *J Korean Acad Community Health Nurs*. 2011; 22(1): 75-85. DOI: <https://doi.org/10.12799/jkachn.2011.22.1.75>.
- 8) MK Booyesen. An assessment of the computer literacy status of nurse managers in a private hospital group in the nelson mandela metropolitan university. Faculty of Health Sciences. 2009.
- 9) Norman CD, Skinner HAJ. eHEALS: the eHealth literacy scale. *J Med Internet Res*. 2006;8(4):e27. DOI: 10.2196/jmir.8.4.e27. PMID: 17213046, PMCID: PMC1794004.
- 10) Vahedian-Azimi A, Ebadi A, Saadat S, Ahmadi FJ. Intelligence care: a nursing care strategy in respiratory intensive care unit. *IRCMJ*. 2015;17(11). DOI: 10.5812/ircmj.20551. PMID: 26734480, PMCID: PMC4698142.
- 11) Segal J, Sacopulos M, Sheets V, Thurston I, Brooks K, Puccia RJ. Online doctor reviews: do they track surgeon volume, a proxy for quality of care?. *J Med Internet Res*. 2012;14(2):e50. DOI: 10.2196/jmir.2005. PMID: 22491423, PMCID: PMC3376525.
- 12) Nutbeam DJSs, medicine. The evolving concept of health literacy. *Soc Sci Med*. 2008;67(12):2072-8. DOI: 10.1016/j.socscimed.2008.09.050. PMID: 18952344.
- 13) Chan CV, Kaufman DRJ. A framework for characterizing eHealth literacy demands and barriers. *J Med Internet Res*. 2011;13(4):e94. DOI: 10.2196/jmir.1750. PMID: 22094891, PMCID: PMC3222196
- 14) Lewis T. Seeking health information on the internet: lifestyle choice or bad attack of cyberchondria? *Media, Culture & Society*. 2006;28(4):521-539. doi: 10.1177/0163443706065027.
- 15) Osei Asibey B, Agyemang S, Boakye Dankwah A. The Internet Use For Health Information Seeking among Ghanaian university students: a cross-sectional study. *Int J Telemed Appl*. 2017;2017:9. doi: 10.1155/2017/1756473. PMID: 29225620, PMCID: PMC5684546.
- 16) Norman CD, Skinner HAJ. eHealth literacy: essential skills for consumer health in a networked world. *J Med Internet Res*. 2006;8(2):e506. DOI: 10.2196/jmir.8.2.e9. PMID: 16867972, PMCID: PMC1550701.
- 17) Xesfingi S, Vozikis A. eHealth literacy: in the quest of the contributing factors. *Interact J Med Res*. 2016;5(2):e4749. DOI: 10.2196/ijmr.4749. PMID: 27226146, PMCID: PMC4899620.
- 18) Eysenbach G, Jadad ARJ. Evidence-based patient choice and consumer health informatics in the Internet age. *J Med Internet Res*. 2001;3(2):e19. DOI: 10.2196/jmir.3.2.e19. PMID: 11720961, PMCID: PMC1761898.
- 19) Yousefi M, Assariarani A, Sahabi B, Kazemnejad A, Fazaeli S. Development of Electronic Health and Household's Health Expenditure Reduction. *JHIM*. 2014;10(6):876-86.
- 20) Tubaishat A, Habiballah L. eHealth literacy among undergraduate nursing students. *Nurse Educ Today*. 2016;42:47-52. DOI: 10.1016/j.nedt.2016.04.003. PMID: 27237352.
- 21) Yang S-C, Luo Y-F, Chiang C-HJ. The associations among individual factors, eHealth literacy, and health-promoting lifestyles among college students. *J Med Internet Res*. 2017;19(1):e15. DOI: 10.2196/jmir.5964. PMID: 28073739, PMCID: PMC5263862.
- 22) Park H, Cormier E, Gordon G, Baeg JH. Identifying health consumers' eHealth literacy to decrease disparities in accessing eHealth information. *Comput Inform Nurs*. 2016;34(2):71-6. DOI: 10.1097/CIN.0000000000000205. PMID: 26657619.
- 23) Dashti S, Peyman N, Tajfard M, Esmaeeli H. E-Health literacy of medical and health sciences university students in Mashhad, Iran in 2016: a pilot study. *Electron Physician*. 2017;9(3):3966. DOI: 10.19082/3966. PMID: 28461871, PMCID: PMC5407229.

- 24) Rasouli HR, Farajzadeh MA, Tadayon AH. Evaluation of e-health literacy and its predictor factors among patients referred to a military hospital in Tehran, Iran, 2017. *J Mil Med.* 2018;20(1):83-92.
- 25) Ghazimirsaeed S, Ghaemizade M. E-Health Literacy among Postgraduate Students in Tehran University of Medical Sciences, Iran, during 2015-2016. *Health Inf Manage* 2018;14(6):243-8.
- 26) Bazm S, Mirzaei M, Fallahzadeh H, Bazm RJ. Validity and reliability of Iranian version of eHealth literacy scale. *JCHR.* 2016;5(2):121-30.
- 27) Bora JK, Saikia N. Gender differentials in self-rated health and self-reported disability among adults in India. *PLoS One.* 2015;10(11):e0141953. DOI: 10.1371/journal.pone.0141953. PMID: 26536133, PMCID: PMC4633186.
- 28) Jerdén L, Burell G, Stenlund H, Weinehall L, Bergström EJ. Gender differences and predictors of self-rated health development among Swedish adolescents. *J Adolesc Health.* 2011;48(2):143-50. Doi: <https://doi.org/10.1016/j.jadohealth.2010.06.005>.
- 29) Huang CL, Yang S-C, Chiang C-H. The Associations between Individual Factors, eHealth Literacy, and Health Behaviors among College Students. *Int J Environ Res Public Health.* 2020;17(6):2108. DOI: 10.3390/ijerph17062108. PMID: 32235749, PMCID: PMC7143736.
- 30) Richtering SS, Hyun K, Neubeck L, Coorey G, Chalmers J, Usherwood T, et al. eHealth literacy: predictors in a population with moderate-to-high cardiovascular risk. *JMIR Hum Factors.* 2017;4(1):e4. DOI: 10.2196/humanfactors.6217. PMID: 28130203, PMCID: PMC5303199.
- 31) Fung IC-H, Hao Y, Cai J, Ying Y, Schaible BJ, Yu CM, et al. Chinese social media reaction to information about 42 notifiable infectious diseases. *PLoS One.* 2015;10(5):e0126092. DOI: 10.1371/journal.pone.0126092. PMID: 25946020, PMCID: PMC4422708.
- 32) Mitsutake S, Shibata A, Ishii K, Oka KJ. Association of eHealth literacy with colorectal cancer knowledge and screening practice among internet users in Japan. *J Med Internet Res.* 2012;14(6):e153. DOI: 10.2196/jmir.1927. PMID: 23149453, PMCID: PMC3510729.
- 33) Van der Vaart R, Van Deursen AJ, Drossaert CH, Taal E, van Dijk JA, van de Laar MAJ. Does the eHealth Literacy Scale (eHEALS) measure what it intends to measure? Validation of a Dutch version of the eHEALS in two adult populations. *J Med Internet Res.* 2011;13(4):e86. DOI: 10.2196/jmir.1840. PMID: 22071338, PMCID: PMC3222202.
- 34) Park H, Lee E. Self-reported eHealth literacy among undergraduate nursing students in South Korea: a pilot study. *Nurse Educ Today.* 2015;35(2):408-413. DOI: 10.1016/j.nedt.2014.10.022. PMID: 25466791.
- 35) Stellefson M, Hanik B, Chaney B, Chaney D, Tennant B, Chavarria EAJ. eHealth literacy among college students: a systematic review with implications for eHealth education. *J Med Internet Res.* 2011;13(4):e102. DOI: 10.2196/jmir.1703. PMID: 22155629, PMCID: PMC3278088.
- 36) Tomás C, Queirós P, Ferreira TJ. Analysis of the psychometric properties of the Portuguese version of an eHealth literacy assessment tool. *Revista de Enfermagem Referencia.* 2014;4(2):19-28. DOI: 10.12707/RIV14004.
- 37) Hanik B, Stellefson MJIE. E-Health Literacy Competencies among Undergraduate Health Education Students: A Preliminary Study. *JoHE.* 2011;14:46-58.
- 38) Knapp C, Madden V, Wang H, Sloyer P, Shenkman EJ. Internet use and eHealth literacy of low-income parents whose children have special health care needs. *J Med Internet Res.* 2011;13(3):e75. DOI: 10.2196/jmir.1697. PMID: 21960017, PMCID: PMC3222184.
- 39) Neter E, Brainin EJ. eHealth literacy: extending the digital divide to the realm of health information. *J Med Internet Res.* 2012;14(1):e19. DOI: 10.2196/jmir.1619. PMID: 22357448, PMCID: PMC3374546.
- 40) Choi NG, & DiNitto DM. The digital divide among low-income homebound older adults: Internet use patterns, eHealth literacy, and attitudes toward computer/internet use. *Journal of Medical Internet Research,* 15(5), e93. doi: 10.2196/jmir.2645. PMID: 23639979, PMCID: PMC3650931.
- 41) Stellefson M, Hanik B, Chaney B, Chaney D, Tennat B, Chavarria EA. eHealth literacy among college students: a systematic review with implications for eHealth education. *J Med Internet Res.* 2011;13:4. DOI: 10.2196/jmir.1703. PMID: 22155629, PMCID: PMC3278088.
- 42) Robb M, Shellenbarger TJO-L. Influential factors and perceptions of eHealth literacy among undergraduate college students. *Online J. Nurs. Inform.* 2014;18(3).
- 43) Brown CA, Dickson R. Healthcare students'e-literacy skills. *J Allied Health.* 2010;39(3):179-184. PMID: 21174023.
- 44) Manafò E, Wong S. Assessing the eHealth literacy skills of older adults: A preliminary study. *J. Consum.* 2012;16(4):369-81. DOI: 10.1080/15398285.2012.701163.