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Research Paper

Title: Evaluation of eHealth Literacy among Non-Clinical Graduate Students; An Iranian Experience

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Abstract

Background and Aim: e-health literacy is the ability to search, find, understand and evaluate health information from electronic information sources and use this information to diagnose or resolve health disorders.

Objective: The aim of this study was to investigate the e-health literacy of non-clinical graduate students of Tabriz University of Medical Sciences.

Materials and Methods: In this descriptive-survey research, 159 graduate students and 41 Ph.D. students were randomly selected and investigated. The data collection tool was a standard version of the e-Health questionnaire. The collected data was analyzed by using the SPSS.22 software.

Results: The results showed that the level of e-health literacy in 56.8% of students was moderate, 16.7% in good condition and 3.1% in very good condition. Twenty-one percent of the students had poor health literacy and 2.5% had a low level of e-health literacy. The level of e-health literacy of Ph.D. students was higher than that of M.Sc. students. The results of independent t-test for comparing the level of e-health literacy between the two groups indicated a significant level ($p < 0.5$).

Conclusions: Regarding the "moderate (relatively favorable)" level of e-health literacy among non-clinical students of Tabriz University of Medical Sciences; informing in line with having access to online, comprehensible and validated health information, and the training web-based health information assessment by the relevant authorities such as The Ministry of Health and

Medical Education will be effective in increasing the level of health literacy and e-health literacy.

Keywords: Electronic Health Literacy, Web-Based Health Information, Students.

Introduction

"Electronic Health Literacy (E-Health Literacy)" is the ability to search, find, understand and evaluate health information from electronic information sources and use this information to diagnose or resolve a specific health disorder (1). According to the Affordable Care Act (ACA), E-Health literacy is a degree of personal skills and competencies required to provide, establish, communicate, process, and understand the basic health information and services needed to make appropriate health decisions (2, 3). Therefore, those with e-health literacy skills will use web-based search strategies more efficiently and have the ability to identify high-quality health information (4).

One of the most prominent examples of electronic technology in the healthcare field is health information websites, web-based healthcare groups, mobile applications and interactive programs that have been created and developed in response to users' needs for access to health information (5). In this context, the Internet has been considered as one of the important dimensions of web-based health information search (6) and an effective tool for improving healthcare provision (7-9) and as an important tool in the process of transmission and access to health information (10-14). The Internet, as a fast and easy communication medium and channel, makes it possible to transfer health information without any time and space limit to a large number of health information users. Although it is difficult to decide on the quality of information provided in the Internet environment (15), various users, including citizens, students, university students, and people with chronic illnesses, commonly use the Internet to seek information and make informed health decisions (4, 5), the academic community has also widely accessed the scientific and medical sites and national and international databases through the Internet, and in this regard they are Internet-dependent (16). Meanwhile, the ability to find, evaluate and use web-based health information is influenced by the e-health literacy of individuals (4).

In general, users of health information on the Internet are looking for health information in a specific subject area (7), information prescriptions, receiving readiness information for surgery and rapid post-surgical recovery, getting information and guidance from other patients about the symptoms of the disease, enjoying the emotional support and facing with favorable and positive conditions in adverse situations through the health information available on the Internet (4, 8). Different estimates are presented with regard to the Internet impact on health care improvement (8). Various studies have shown that physicians do not consider the process of having access to health resources on the Internet as a problematic process, and they believe that patients had received complete and clear explanations after referring to health resources on the Internet, and many doctors believed that the Internet has made it easier to explain and teach complex medical problems to patients and they believe that using the internet has a high potential for improving therapeutic outcomes (17, 18). Although there is an immediate access to health resources and information electronically and through the Internet, in order to access information and convert it to the knowledge that can be used by individuals, many skills are required, such as equipping users to track and diagnose health information on the Internet, (1, 19).

Given that a large number of Internet users are students, the age of these users has caused concern about the physical, psychological and social health of the future generation of the country (20); attention to the different levels of electronic resources use, the usability of information and having electronic literacy will be useful in analyzing the results (21).

A look at the scientific literature in this field shows that the study of the level of e-health literacy of people has been considered by many researchers in different societies. For example, Quinn et al. in a study investigated the level of health literacy and e-health literacy by using browser-based tools and software for tracking web health information behavior. Based on the research results, those with advanced e-health literacy skills had better web search strategies and the ability to identify the quality of health information sources was higher in them (4). In another study, Song et al. examined the level of e-health literacy and spouse intervention in patients with prostate cancer in making effective decisions in treating these individuals. The results showed that spouses' high health literacy and their effective use of electronic information resources and social networks were related to effective decision making in order to obtain health information (22). Manganello et al. examined the role of health literacy and e-health literacy in the search for health information by mothers in line with wounds in young children. The findings indicated that the Internet was a major contributor to seeking health information by mothers and urgent need to improve their e-health literacy (23). In Iran, most of the research has examined the information technology literacy and computer literacy. For example, Sadoughi et al. reviewed the role of information technology literacy in the individual health of patients admitted to hospitals affiliated to Kashan University of Medical Sciences. The results of their study showed that patients' attitudes towards information technology are relatively good and it is better to present information on how to use drugs and diet through the compact discs and the hospital's website (24). Lotfnejad Afshar et al. reviewed the computer and information literacy of medical students of Urmia University of Medical Sciences. According to their results, formal training courses have been used to improve the computer literacy of students in using medical databases (25). Among the reviewed scientific texts, the research by Qazi Mirsaeed and Ghaemizade was devoted to the topic of e-health literacy among nursing students, health, health economics, medical librarianship and information technology, health information technology and management of health services at the University of Medical Sciences Tehran. The findings indicated that the level of e-health literacy of the subjects was higher than the average level. However, in this study, such as health information search skills, assessment and validation of health information, the ability to select appropriate information and the correct use of information were examined, but assessing the level of computer literacy and IT skills were highlighted (26). Due to the lack of comprehensive research on e-health literacy, this paper examines the level of e-health literacy of non-clinical M.Sc. students of Tabriz University of Medical Sciences with emphasis on the Internet, in addition to identifying the utilization capabilities and understanding of retrieved health resources on the Internet, the amount e-health literacy skills of M.Sc. students in each dimension of research tools should be investigated. The

tool used in the research was the eHealth questionnaire, included a set of skills needed to use information technology for health promotion (27).

Materials and Methods

This was a descriptive survey and the statistical population of this study was composed of non-clinical students of Tabriz University of Medical Sciences. The data was collected by using EHEALS standard questionnaire with verified validity and reliability (28), five-point Likert scale for each item (very weak, weak, average, good and very good with a score of 0-4) and within 5 months. The data were then coded and analyzed by using appropriate tests in SPSS version 20 software. The following formula was used to obtain sample size and 180 people were selected as sample size.

$$n = \frac{n_o}{1 + \left(\frac{n_o - 1}{N}\right)} = \frac{384}{1 + \left(\frac{384 - 1}{340}\right)} = 180$$

According to the statistical population of the study (270 M.Sc. students and 70 Ph.D. students), the sample size of M.Sc. students was 159 and the sample size of Ph.D. students was 41. After distributing the questionnaires, 41 questionnaires were received from the Ph.D. students and 121 from M.Sc. students. In other words, 90 percent of the distributed questionnaires were completed. Of the total number of 162 participants, 89 were women and 73 were men.

Results

The degree of e-health literacy among non-clinical Ph.D. students of Tabriz University of Medical Sciences

The highest levels of e-health literacy was devoted to items "familiarity with the way of using the resources and health information retrieved from the Internet" (53.7 percent at a good level and 22 percent at a very good level), "the level of familiarity with how to search for useful web-based health resources" (43.9 percent at a good level and 24.4 percent at a very good level), and "knowing how to use the Internet to answer health questions" (43.9 percent at a good level and 22 percent at a very good level). The lowest level of e-health literacy is related to the items "the level of familiarity with the skills required to assess the health and resources retrieved from the Internet" (2.4% very weak, 8.9 poor and 36.6% very weak). Therefore, the degree of Ph.D. students' familiarity with e-health literacy skills was "good" (Table 1).

Table 1: The degree of e-health literacy among non-clinical Ph.D. students of Tabriz University of Medical Sciences

Item	Very weak	Weak	Moderate	Good	Very good
	Frequency (percent)				
The level of familiarity with a variety of health resources available on the Internet	0 (0)	8 (19.5)	10 (24.4)	16 (39)	7 (14.1)
The level of familiarity with the health	2 (4.9)	3 (7.3)	12 (29.3)	18 (43.9)	6 (14.6)

resources available on the Internet					
The level of familiarity with the way of searching for useful health resources on the Internet	0 (0)	4 (9.8)	9 (22)	18 (43.9)	10 (24.4)
The level of familiarity with the way of learning how to use the Internet to answer health questions	0 (0)	3 (7.3)	11 (26.8)	18 (43.9)	9 (22)
The level of familiarity with the way of using the resources and health information retrieved from the Internet	0 (0)	1 (2.4)	9 (22)	22 (53.7)	9 (22)
The level of familiarity with the skills necessary to assess the resources and health retrieved from the Internet	1 (2.4)	4 (9.8)	15 (36.6)	18 (43.9)	3 (7.3)
The ability to diagnose high-quality from low-quality or poor health resources	2 (4.9)	6 (14.6)	9 (22)	19 (46.3)	5 (12.2)
The level of confidence in the health information available on the Internet	0 (0)	3 (7.3)	15 (36.6)	13 (31.7)	10 (24.4)

E-Health Literacy Level of Non-Clinical M.Sc. Students of Tabriz University of Medical Sciences

The highest levels of e-health literacy were dedicated to items "Reliable health information on the Internet" (33.1 percent at a good level and 22.3 percent at a very good level), "The level of familiarity with the use of the Internet to answer health questions" (41.3 percent at a good level and 10.7 percent at a very good level) and "The level of familiarity with the way of using the Internet resources and retrieved health information" (38.8 percent at a good level and 11.6 percent in very good). The lowest level of literacy was also referred to the item "familiarity with a variety of available health resources available on the Internet" (19.5% was poor and 24.4% was moderate). Therefore, the level of M.Sc. students' familiarity with e-health literacy skills was at the "moderate" level (Table 2).

Table 2: E-Health Literacy Level of M.Sc. Non-Clinical Students of Tabriz University of Medical Sciences

Item	Very weak Frequency (percent)	Weak Frequency (percent)	Moderate Frequency (percent)	Good Frequency (percent)	Very good Frequency (percent)
The level of familiarity with a variety of health resources available on the Internet	11 (9.1)	16 (13.2)	57 (47.1)	29 (24)	8 (6.6)
The level of familiarity with the health resources available on the Internet	6 (5)	18 (14.9)	54 (44.6)	36 (29.8)	7 (5.8)
The level of familiarity with the way of searching for useful health resources on the Internet	4 (3.3)	12 (9.9)	56 (46.3)	39 (32.2)	10 (8.3)
The level of familiarity with the way of learning how to use the Internet to answer health questions	1 (0.8)	12 (9.9)	45 (37.2)	50 (41.3)	13 (10.7)
The level of familiarity with the way of using the resources and health information retrieved from the Internet	4 (3.3)	10 (8.3)	46 (38)	47 (38.8)	14 (11.6)

The level of familiarity with the skills necessary to assess the resources and health retrieved from the Internet	4 (3.3)	24 (19.8)	49 (40.5)	33 (27.3)	11 (9.1)
The ability to diagnose high-quality resources from low-quality or poor health resources	3 (2.5)	26 (21.5)	49 (40.5)	31 (25.6)	12 (9.9)
The level of confidence in the health information available on the Internet	4 (3.3)	15 (12.4)	35 (28.9)	40 (33.1)	27 (22.3)

E-Health Literacy in Non-Clinical M.Sc. Students of Tabriz University of Medical Sciences

Table 3 shows that the level of e-literacy for most Ph.D. and M.Sc. students (56.8%) is "moderate". The level of e-Health literacy level in 16.7% and 3.1% of students was in the "good" and "very good" levels, respectively. Meanwhile, 21% of students had "poor" e-health literacy level and 2.5% had a "very poor" level of e-health literacy.

Table 3: E-Health Literacy in Non-Clinical M.Sc. Students of Tabriz University of Medical Sciences

Level	Frequency	Percentage
Very good	5	3.1
Good	27	16.7
Moderate	92	56.8
Weak	34	21
Very weak	4	2.5

Independent T-test results in line with the degree of e-health literacy of Ph.D. and M.Sc. students

The results of Table 3 show that there is a significant difference between the level of health literacy between the two groups of M.Sc. and Ph.D. students ($p < 0.5$).

Table 3: The result of independent t-test on the degree of e-health literacy of M.Sc. and Ph.D. students

Education level	Mean	Standard deviation	T	df	P Value
Ph.D.	21.3171	5.24614	2.798	160	0.006
M.Sc.	18.4959	5.68642			

Discussion

Based on the findings of the research, the level of e-health literacy in most of the participants in the study (Ph.D. and M.Sc. (56.8%)) was moderate. E-health literacy of 23.5% of the studied population was at a low level and only 19.8% of them had a high level of e-health literacy. The results of Tubaishat and Habiballah research also showed an average level of e-health literacy among nursing students (29). Ph.D. students had a higher level of e-health literacy than M.Sc.

students, which confirms the results of this study in a study by Ghazi Mirsaeed and Ghaemizade (26). The results of Ivanitskaya et al. and Redmond's research showed that students in higher education level have better understanding and skills in relation to e-health literacy (30, 31), which can be attributed to their exposure to electronic resources and training courses considered to be in their educational curriculum. Hanik in his study examined the e-health literacy of undergraduate students and concluded that the average e-health literacy of most members of the community was below the desired level. His research results showed that there is a positive relationship between education stage and e-health literacy, and the final year students have more e-health literacy than first-year students (32), which reinforces the conclusions of the present study. Mitsutak et al. in their research concluded that adults have lower e-health literacy than teenagers and people with high e-health literacy have more information about their health (33). Perhaps the results of the current research can be attributed to the difference between young and older generations, and the availability of up-to-date technology and facilitating the acquisition of health information among younger generations.

Among the Ph.D. students, the highest and lowest levels of literacy were dedicated to "Understanding how to use the resources and health information retrieved from the Internet" and "the familiarity with the skills needed to evaluate health resources retrieved from the Internet." Among M.Sc. students, the highest and lowest levels of literacy were allocated to "the degree of confidence in the health information available on the Internet" and "the level of familiarity with the various types of health resources available on the Internet" items. However, given the passing of academic years among Ph.D. students, they are expected to be more skilled at evaluating health and resources retrieved from the Internet. Based on the results of the research, the skill of undergraduate students was higher than the Ph.D. students in line with confidence in the health information on the Internet. Perhaps the reason for this issue is the high sensitivity of Ph.D. students to the evaluation and selection of retrieved health resources in terms of gaining more experience and knowledge in their academic years than M.Sc. students. In both groups, the respondents also had a high level of familiarity with the skill of "how to use the Internet to answer health questions" and "how to use the resources and health information retrieved from the Internet".

In general, it can be said that several studies show that individuals in different groups have the skills to find information about the field of health on the Internet (29, 32) and the failure to find health-related information (32) is due to the lack of knowledge and skills about the types of health resources and the right place of health information on the Internet, which confirms the results of this study.

Conclusions

Participants in the study use the Internet to retrieve and use health resources, but their level of e-health literacy is "moderate (relatively desirable)". While it is expected that the level of e-health literacy among educated people in the community - especially those with graduate education - be in a better position than those with low education levels or illiterate people. Perhaps the reason

for this should be searched in the educational system or to accept the fact that in Iran, access to online health information is not readily understandable and easy for audiences. While in foreign countries, this aspect of health information is well-considered, and some health associations and organizations such as the Medical Library Association, the British Medical Association (BMA), etc. (34-38), have introduced valid and high-quality health information websites in this field. While there are various evaluation checklist available that have been arranged and presented by relevant associations and organizations such as the Department of Health, the National Health System (NHS), the British Medical Association, the Medical Library Association, the HON Code of Conduct for medical and health Web sites and DISCERN for the evaluating and training of web-based health information, (34-38) this issue has been neglected in Iran. Due to the need to keep pace with the global medical community, using e-health tools is indispensable. The findings of this study indicate the relative readiness of the educated people in dealing with e-health and the results of the research indicate the strengths and weaknesses of the level of e-health literacy of respondents and indicators that by means of strengthening them in the community the efficiency of the e-health system can be increased. Accordingly, informing in this field by authorities, such as the Ministry of Health and Medical Education, will not be ineffective in raising the level of health literacy and e-health literacy among different sections of society. The findings of this study are applicable to health policy makers in implementing e-health infrastructure in the country.

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Conflicts of Interest

We declare that there is no conflict of interest with other parties in pursuing and conducting the research and reporting the results of study.

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