

<b>Access this article online</b>
Quick Response Code:

Website: <a href="http://www.jehp.net">www.jehp.net</a>
DOI: 10.4103/jehp.jehp_340_20

# Development of health literacy among postgraduate students: From information literacy perspective

Abolfazl Taheri, Mostafa Langarizadeh<sup>1</sup>, Jalil Ghani Dehkordi<sup>2</sup>, Omid Yousefianzadeh<sup>3</sup>

## Abstract:

**OBJECTIVES:** Involving the patients in health-related decisions requires high health literacy. Health literacy is related to the concept of information literacy through its emphasis on information skills. Hence, the aim of this study was to investigate the relationship between information literacy and health literacy.

**STUDY DESIGN:** We carried out an original research.

**MATERIALS AND METHODS:** This is an applied research that is carried out in a survey method. The statistical population of this study is MSc and PhD students at School of Health Management and Information Science in Iran University of Medical Sciences who were selected by stratified random sampling. A standard health literacy questionnaire including access dimensions, reading skills, comprehension, evaluation, decision-making, and application of health information was used to assess the health literacy status of the students. To measure information literacy, the questionnaire includes identifying information needs, locating information, organizing information, and evaluating information were used. The data were analyzed by tests of one-sample *t*-test, Pearson correlation, and simple linear regression with spss software version 18 produced by IBM located at New York.

**RESULTS:** The results showed that the level of information literacy among students was higher than the average level. The average of information literacy rate in the sample is 49.09. In this regard, the most frequent information is gained from the internet, interacting with friends, and asking practitioners and health workers. In addition, there is a positive and significant relationship between all dimensions of information literacy with health literacy and information literacy affects 35.4% of health literacy changes.

**CONCLUSIONS:** It can be said that information literacy is a predictor of health literacy. Furthermore, the pattern of people's health information has moved to new information environments and to improve health having sufficient information seeking and information literacy skills are essential.

## Keywords:

Health literacy, health promotion, information literacy, information skill, students

## Introduction

Health literacy is linked to literacy and entails people's knowledge, motivation and competencies to access, understand, appraise and apply health information to make judgments and take decisions in everyday life concerning health care, disease prevention, and health

promotion to maintain or improve quality of life.<sup>[1]</sup> The health literacy is a broad and complex concept that is defined in various ways. The U.S. Department of Health and Human Services defines health literacy as "the degree to which individuals have the capacity to obtain, process, and understand basic health information needed to make appropriate health decisions."<sup>[2]</sup> According to definitions, access, understanding,

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: [WKHLRPMedknow\\_reprints@wolterskluwer.com](mailto:WKHLRPMedknow_reprints@wolterskluwer.com)

**How to cite this article:** Taheri A, Langarizadeh M, Dehkordi JG, Yousefianzadeh O. Development of health literacy among postgraduate students: From information literacy perspective. *J Edu Health Promot* 2020;9:338.

PhD Candidate, Health information technology research center, Isfahan University of Medical Sciences, Isfahan, Iran, <sup>1</sup>Department of Health Information Management, School of Health Management and Information Sciences, Iran University of Medical Sciences, Tehran, Iran, <sup>2</sup>Social Determinants of Health Research Center, Shahrekord University of Medical Sciences, Shahrekord, Iran, <sup>3</sup>Department of Health Information Technology and Management, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran

## Address for correspondence:

Dr. Omid Yousefianzadeh, School of Public Health, Shahid Sadoughi University of Medical sciences, Yazd, Iran.  
E-mail: [o.yousefianzadeh@gmail.com](mailto:o.yousefianzadeh@gmail.com)

Received: 22-04-2020  
Accepted: 27-06-2020  
Published: 29-12-2020

decision-making, and behavior construct the main structure of health literacy. The positive outcomes of promoting health literacy include improved health situation and proper use of health services. The people with high health literacy cooperate with health-care providers, recognize and easily demand the health-care needs, and listen and execute health instructions.<sup>[3]</sup> In contrast, inadequate health literacy is associated with many negative health consequences, including lower disease knowledge, lower use of preventive services, higher mortality rates, and higher health-care costs.<sup>[4,5]</sup> One of the main features of health literacy is to provide the grounds for self-care decisions.<sup>[6]</sup>

Considering the importance and effective utility of health literacy in improving health services, therefore, it is important to identify the factors affecting it. There are several studies have examined the impact of various factors (such as education, age, gender, economic status, culture and ethnicity, employment, place of residence, and insurance situation) on improving health literacy of individuals.<sup>[7-9]</sup> The identification of other health literacy-promoting factors may help educational and executive planners to acquire knowledge at different levels to promote health programs and use appropriately from services. In this regard, the information literacy is one of the main factors that may promote health literacy of people. Information literacy translates to the ability to use available information to accommodate information needs in the best possible manner. This includes knowing where to find relevant information, evaluating its relevance and quality, and using it to suit purpose, for instance creating new knowledge or enhancing your own or other's understanding of something.<sup>[10]</sup> The information literate individuals identify their information needs to formulate questions, identify potential information resources, and develop successful search strategies, evaluate, organize, and make appropriate use of information for decision-making, and are ready for lifelong learning.

Accordingly, the individuals with information literacy are expected to seek health information better than others, better identify valid health sources, better distinguish correct information from inaccurate and incorrect information, better use their health information, and share them with others. In addition, the review of information literacy and health literacy definitions shows that both emphasize on the concept of information and the skills, which are needed to access, evaluate, and use information.

However, the investigation of research background and theoretical foundations of health literacy and information literacy showed that no research has been conducted on relationship between these two variables

among medical population, especially students. The promotion of information literacy and health literacy among paramedical students may help them to make proper decisions and have proper health behaviors. In general, the review of literature indicates that most studies on health literacy have focused on the situation of health literacy and impact of demographic and economic status on it. In addition, some ones reported that health information resources are low-qualified and unreadable.<sup>[11-13]</sup> However, other factors affecting health literacy should be identified and analyzed. Therefore, considering the importance of health literacy and information literacy and the relationship between these two variables, this study aims to investigate these two variables and the relationship between them among post-graduate students (master and Ph.D. students) at Faculty of Management and Information Science at Iran University of Medical Sciences.

## Materials and Methods

This was applied survey research. The population consisted of all post-graduate students (master and Ph.D. students) at Iran University of Medical Sciences ( $n = 354$ ). According to Morgan table, the sample size was determined to be 181 students. Using stratified random sampling method, 90 and 91 students were selected from among Ph.D. candidates and Master's students, respectively. The research tool included two questionnaires:

- a. Health Literacy Questionnaire: Montazeri *et al.*'s questionnaire was used to assess the health literacy of students. This questionnaire consists of 33 items in the form of 5-point Likert scale and measures five dimensions: access, reading, comprehension and perception, evaluation, and decision-making and behavior<sup>[14]</sup>
- b. Information Literacy Questionnaire: Davarpanah and Siamak's<sup>[15]</sup> Information Literacy Questionnaire was used to assess information literacy. It was developed based on standard of information literacy capabilities for higher education to measure students' basic and actual information literacy. This questionnaire consists of 55 questions and 5 standards: 12 questions related to standard 1; 15 questions related to standard 2; 10 questions related to standard 3; 8 questions related to standard 4; and 10 questions related to standard 5.

Although the validity and reliability of these questionnaires are confirmed in previous studies,<sup>[14,15]</sup> their content validity was investigated and confirmed by experts. To assess the reliability, 30 questionnaires were pre-tested among students of Iran University of Medical Sciences. The Cronbach's alpha coefficient of health literacy questionnaire and information literacy

questionnaire was determined to be 81% and 78%, respectively; these were acceptable. In addition, 165 questionnaires were returned from 181 distributed questionnaires. The return rate was 91%; this reflects the proper number of subjects in the process of collecting research data.

However, the inferential (one-sample *t*-test and simple linear regression) and descriptive (mean, standard deviation, and Pearson correlation test) statistics were used for analyzing the data. It should be noted that the results of Kolmogorov–Smirnov test showed that the distribution of health and information literacy data is normal.

### Ethical considerations

This study was approved by the Vice Chancellor for Research and Technology and Ethics Committee (code: IR. IUMS. REC 1395-28525) of IUMS. All participants completed and signed informed consent form, and they were free to discontinue participating in this study whenever they wished.

### Results

In terms of demographic characteristics, 62% of participants were female students. In addition, 56% was graduate students. The eight study fields at this faculty included: health services management, health information technology, medical library and information, health economics, health technology assessment, medical informatics, health policymaking, health at disasters.

Five dimensions were measured to investigate the students' health literacy situation: access, reading, comprehension, assessment and application, and decision skills. Table 1 shows the descriptive statistics of health literacy and one sample *t*-test results. As shown in Table 1, the mean of health literacy is equal to  $3.56 \pm 0.523$ . Among five dimensions, the reading (4.02) and comprehension (3.87) components had the highest mean and the application (decision-making) (2.8)

**Table 1: Health literacy situation of postgraduate students at faculty of management and information at Iran University of medical sciences**

Variable	Mean±SD	Determined mean=3	
		<i>t</i>	Significant level
Health literacy	3.56±0.523	13.93	0.001
Dimensions			
Reading	4.02±0.682	0.001	0.001
Understanding	3.87±0.729	0.001	0.001
Access	3.5±0.505	0.001	0.001
Evaluation	3.40±0.467	0.001	0.001
Application/ decision making	2.91±0.563	-2.016	0.045

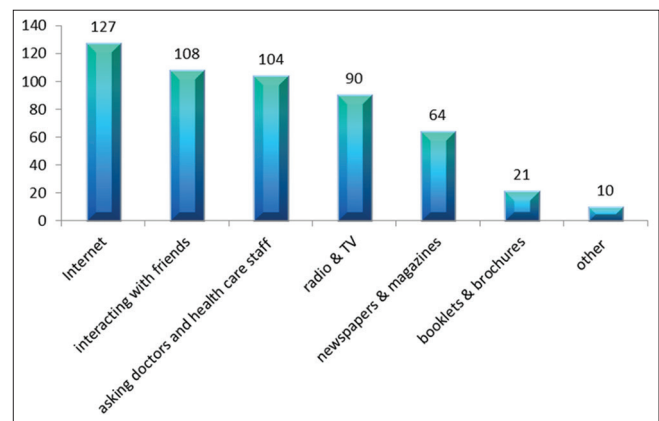
SD=Standard deviation

component had the lowest mean. The results of one-sample *t*-test showed that significance level of health literacy and all its components is  $<0.05$ ; so, the level of health literacy and its dimensions (other than application component) among students is higher than average.

In various researches, the health literacy level has been measured in a scale of 1–100 at three levels: inadequate ( $<59$ ), average (between 60 and 74), and adequate (more than 75). Converting health literacy data to this scale, the results showed that about 20% of students had inadequate health literacy, 34.5% had average literacy, and 46.1% had adequate literacy; in other words, less than half of the students who participated in this study had a good level of health literacy.

The students' information literacy situation was investigated by evaluating individuals' ability for identifying context and information needs, effective access, critical evaluation, targeted information use, and understand the legal and economic issues of application of information. As shown in Table 2, the mean of information literacy in sample was 49.09. From five dimensions, the mean of "effective access to information" (56.62) was more than other dimensions and the "ability to understand legal and economic factors of information usage" (40.92) had the lowest mean. The results of one-sample *t*-test indicated that the information literacy situation of graduate students at Faculty of Management and Information Science at Iran University of Medical Sciences is moderate.

Then, the information resources of students were investigated. In this regard, the students were asked: what are their sources of health information. Figure 1 shows the most common sources of health information among students at Faculty of Management and Information Science at Iran University of Medical Sciences. As shown in Figure 1, the internet, interacting



**Figure 1: Health information resources of students at faculty of management and medical information**

**Table 2: Information literacy level of postgraduate students at Faculty of Management and Information Science at Iran University of Medical Sciences**

Variable	Mean±SD	Determined mean=50	
		t	Significant level
Information literacy	49.09±20.68	-0.564	0.573
Dimension			
Standard 2: Effective access to information	56.62±24.42	3.48	0.001
Standard 3: Ability to evaluate information critically	53.24±21.42	1.94	0.054
Standard 4: Ability to use targeted information	47.52±22.07	-1.44	0.151
Standard 1: Ability to determine the scope and nature of information	45.64±20.09	-2.785	0.006
Standard 5: Ability to understand the legal and economic factors of applying information	40.92±20.73	-5.62	0.001

with friends, and asking doctors and health-care staff are the most common sources. In addition, they use resources such as booklets, brochures, and contact, too.

The Pearson correlation test was used to investigate the correlation between health literacy and information literacy. As shown in Table 3, the significance level of information literacy and all its dimensions is  $<0.05$ ; therefore, the research hypothesis is confirmed. There is positive and significant correlation between health literacy and information literacy and all its dimensions; i.e., the promotion of information literacy may promote health literacy, too. Among dimensions of information literacy, “the ability to determine scope and nature of information” has the highest correlation with health literacy. The lowest correlation coefficient is for “ability to understand the legal and economic factors of applying information.”

Since the correlation between health literacy and information literacy was confirmed, the simple linear regression test was used to examine the level of health literacy development through information literacy [Table 4]. The simple regression test coefficients showed that the information literacy explains 35.4% of health literacy variances; therefore, it may be said that the information literacy is a predictor of health literacy.

## Discussion

The findings showed that the higher education students at Faculty of Management and Information Sciences at Iran University of Medical Sciences had health literacy more than average and their information literacy is in moderate level. Among dimensions of health literacy, the highest mean and lowest mean are for reading and application, respectively. The findings indicated that most higher education students at Faculty of Management and Information at Iran University of Medical Sciences have an adequate level of health literacy. This is inconsistent with findings of Hashemi *et al.*<sup>[16]</sup> and Moghadam *et al.*<sup>[8]</sup> The level of inadequate health literacy was higher.<sup>[16]</sup> This was due to sample type; it is normal that the level of

health literacy of students to be more than other people in the community.<sup>[16]</sup> In addition, the sample was selected from university of Ministry of Health; they are more familiar with health and health issues and have passed some courses on them at bachelor degree. Other studies around the world generally showed inadequate health literacy level. Other studies (such as Peterson *et al.*,<sup>[17]</sup> and McNaughton *et al.*,<sup>[18]</sup>) showed that the individuals with inadequate health literacy are more likely to mortality or hospitalization than others. Thus, there is negative correlation between health literacy and probability of hospitalization or mortality.

Among information literacy dimensions, the mean of ability to effectively access information was above 4; this indicates that it has good situation. The “ability to determine scope and nature of information” and “ability to understand the legal and economic factors of information application” had the lowest mean. Compared to previous studies, Siamian and Hosseini consider finding and evaluating information as the main problems of information literacy among undergraduate medical science students.<sup>[19]</sup> Kinengyere<sup>[20]</sup> also found that Ugandan academic researchers are not familiar with using resources and do not have desired information literacy skills. Since information literacy is associated to health literacy, serious attention should be paid to increasing information literacy skills in academic contexts.

In addition, Manganello *et al.* indicated that increasing health literacy in individuals is related to their health information seeking experiences.<sup>[21]</sup>

The findings of examining health information resources among higher education students showed that they mostly use internet, interaction with friends and relatives, and asking questions from doctors and health staff. They are less likely use resources such as booklets, brochures, telephone, and even newspapers and magazines. In this regard, Zare and Gheisari showed that the most common health information resources of members of public libraries in Qazvin are watching



television and asking friends and relatives.<sup>[22]</sup> The high tendency to obtain information through internet is due to easy access to it and its wide technology infrastructures. In addition, due to confidence and familiar environment, the students prefer to acquire their needed information through interaction with their friends.

Regarding to the above paragraph, technology is considered as an essential factor in health literacy promotion. Mackert *et al.* mentioned the relationship between the literacy and technology acceptance. They had concluded that who have low health literacy, so not intended to use technology. Of course, they suggested more research to investigate how these variables effect each other.<sup>[23]</sup>

The results of hypothesis test showed that there is a positive and significant correlation between all dimensions of information literacy and health literacy. This means that with increasing information literacy, the students' health literacy also increases. The findings also showed that the information literacy explains about 35% of health literacy variance; this is mainly due to emphasis of both variables on information skills. In this regard, the studies Prussick *et al.*,<sup>[24]</sup> and Shipman *et al.*<sup>[25]</sup> reported that the information literacy and information services and programs of medical librarians have a significant impact on increase of patients and hospital staff's awareness and promotion of health literacy at community. In addition, Burcat and Waltman<sup>[26]</sup> concluded that health literacy initiatives, both for patients and for health-care providers, can increase effective health communication

and mitigate the information literacy barriers that contribute to health disparities.

## Conclusion

Over the past decade, the concerns about health and literacy skills have been a major warning to many primary health-care systems. Accordingly, educating and empowering community has become an important principle to prevent and treat diseases. In order to improve health literacy of different classes of society, the identification of effective and correlated factors is one of the important goals of health system. This study showed that the information literacy is correlated with promotion of health literacy; this is obviously due to information and knowledge nature of structures of these two variables. The pandemic use of information technology, internet, and search engines and databases has changed the tendencies of people in acquiring health information. The people meet their new health needs in these new setting. In general, the information literacy is considered to be necessary factor to promote health.

Finally, it is recommended that future studies examine the correlation and variation of these variables in other populations such as public library patrons, health consumers such as patients, pregnant women, elderly, and people with special health needs. Furthermore, native models of health literacy as well as sensitization of different sections of society toward health issues in the form of combined research should be developed.

The innovation of this research is that it eliminates the gap between the two concepts of information literacy and health literacy, both of which are based on informing skills. With the same solutions, the necessary skills for both concepts can be increased. Anyway, survey studies are limited in the number of variables, in this study, only two variables have been studied. The causal relationship and effect size of variables should be examined experimentally or structural equation modeling.

## Acknowledgment

This study was approved by the Vice Chancellor for Research and Technology at Iran University of Medical Sciences (code: 95-03-193-28525). The authors express their gratitude to the Vice Chancellor for Research and Technology of the IUMS. The authors also thank all the

**Table 3: Results of Pearson's correlation test in examining the correlation between information literacy and its dimensions and health literacy**

Variables	Correlation coefficient with health literacy
Information literacy	0.594**
Standard 1: Ability to determine the scope and nature of information	0.703**
Standard 2: Effective access to information	0.582**
Standard 4: Ability to use targeted information	0.581*
Standard 3: Ability to evaluate information critically	0.515*
Standard 5: Ability to understand the legal and economic factors of applying information	0.447*

\*\*Correlation at 99% level, \*Correlation at 95% level

**Table 4: Results of simple linear regression of health literacy based on information literacy**

R	R <sup>2</sup>	Adjusted R <sup>2</sup>	Durbin-Watson	Standardized Beta	t	Significant
0.595	0.354	0.35	1.122	0.595	9.896	0.000
Source	Sum of squares	df	Mean square	F	Significant	
Regression	32.604	1	32.604	97.934	0.000	
Residual	59.593	179	0.333			
Total	92.197	180	-			

study participants who made this study possible through their cooperation and support.

### Financial support and sponsorship

This study was financially supported by Iran University of Medical Sciences, Tehran, Iran.

### Conflicts of interest

There are no conflicts of interest.

## References

1. 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;12:80.
2. Prevention OOD, Health HPUDO, Services H. National Action Plan to Improve Health Literacy: US Department of Health and Human Services; 2010.
3. Peerson A, Saunders M. Health literacy revisited: What do we mean and why does it matter? *Health Promot Int* 2009;24:285-96.
4. Cutilli CC, Simko LC, Colbert AM, Bennett IM. Health literacy, health disparities, and sources of health information in US older adults. *Orthop Nurs* 2018;37:54-65.
5. Mantwill S, Monestel-Umaña S, Schulz PJ. The relationship between health literacy and health disparities: A systematic review. *PLoS One* 2015;10:e0145455.
6. Long AF, Gambling T. Enhancing health literacy and behavioural change within a tele-care education and support intervention for people with Type 2 diabetes. *Health Expect* 2012;15:267-82.
7. Raeisi M, Mostafavi F, Hasanzadeh A, Sharifirad G. Relation between health literacy and general health condition and sanitary behaviors in old people of Isfahan. *J Health Syst Res* 2011;7:469-80.
8. Moghadam MN, Parva S, Esmaeili MA. Health literacy and using health services in Kerman in 2011. *J Hyg Facult Yazd Univ Med Sci* 2012;11:123-34.
9. Karimi S, Keyvan Ara M, Hosseini M, Jafarian M. Health literacy, public health condition, using health services and the relation between the in adolescence. *J Health Inf Manag* 2013;10:862-75.
10. Lokse M, Lag T, Solberg M, Andreassen HN, Stenersen M. Teaching Information Literacy in Higher Education: Effective Teaching and Active Learning. Sawston: Chandos Publishing; 2017.
11. Khosravi A, Ahmadzadeh KH, Arastoo Por SH. Measuring relativity between health literacy and reading didactic resources available for diabetic patient referring to Shiraz hospital. *J Inf Librariansh* 2013;16:39-59.
12. Zhang Y, Sun Y, Xie B. Quality of health information for consumers on the web: A systematic review of indicators, criteria, tools, and evaluation results. *J Assoc Inf Sci Technol* 2015;66:2071-84.
13. Boyle J, Speroff T, Worley K, Cao A, Goggins K, Dittus RS, *et al.* Low health literacy is associated with increased transitional care needs in hospitalized patients. *J Hosp Med* 2017;12:918-24.
14. Montazeri A, Tavooosi M, Rakhshani F, Azin A, Jahangiri K, Ebadi M, *et al.* Designing and psychoanalytic an instrument for measuring health literacy of urban community of Iran. *Payesh J* 2014;13:589-99.
15. Siamak M. Designing and validating information literacy questionnaire for bachelor students. *Libr Inf Sci Q* 2009;12:119-46.
16. Hashemi AT, Amirkhani M, Doost AH, Alavian M, Fard HA. Factors impact on health literacy in 5 provinces of Iran. *J Dev Steps Med Educ* 2008;4:1-9.
17. Peterson PN, Shetterly SM, Clarke CL, Bekelman DB, Chan PS, Allen LA, *et al.* Health literacy and outcomes among patients with heart failure. *JAMA* 2011;305:1695-701.
18. McNaughton CD, Cawthon C, Kripalani S, Liu D, Storrow AB, Roumie CL. Health literacy and mortality: A cohort study of patients hospitalized for acute heart failure. *J Am Heart Assoc* 2015;4:e001799.
19. Siamian H, Hosseini S. Surveying the measure of information literacy and information discovery behavior of medical record students in Mazaderan University of medical science. *J Sci Commun* 2007;7:9-18.
20. Kinengyere AA. The effect of information literacy on the utilization of electronic information resources in selected academic and research institutions in Uganda. *Electron Libr* 2007;25:328-41.
21. Manganello J, Gerstner G, Pergolino K, Graham Y, Falisi A, Strogatz D. The relationship of health literacy with use of digital technology for health information: Implications for public health practice. *J Public Health Manag Pract* 2017;23:380-7.
22. Zare V, Gheisari E. Health Information discovery in Ghazvin public libraries memberships. *J Inf Public Libr Res* 2014;76:93-112.
23. Mackert M, Mabry-Flynn A, Champlin S, Donovan EE, Pounders K. Health literacy and health information technology adoption: The potential for a new digital divide. *J Med Internet Res* 2016;18:e264.
24. Prussick L, Tonelli S, Gottlieb AB, Joshipura D, Alomran A, Zancanaro P, *et al.* Improving health literacy and treatment understanding of hidradenitis suppurativa using group educational interventions. *J Dermatolog Treat* 2019;30:708-13.
25. Shipman JP, Kurtz-Rossi S, Funk CJ. The health information literacy research project. *J Med Libr Assoc* 2009;97:293-301.
26. Burcat K, Waltman L. Foundations of Health Literacy. Georgia International Conference on Information Literacy; 2020. Available from: <https://www.digitalcommons.georgiasouthern.edu/gaintlit/2020/2020/32>. [Last accessed on 2019 Nov 11].