

Evaluation of health literacy and its associated factors in paramedical students

Faezeh Rahmani¹, Fateme Moghbeli¹, Atefeh Khoshkangin^{1,2}, Mohammad Reza Mazaheri Habibi^{1*}

¹Department of Health Information Technology, Varastegan Institute for Medical Sciences, Mashhad, Iran

²Department of Medical Informatics, School of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran

Article Info

Article type:

Research

Article History:

Received: 2023-02-21

Accepted: 2023-03-12

Published: 2023-03-15

* Corresponding author:

Mohammad Reza Mazaheri Habibi

PhD in Medical Informatics,
Assistant Professor, Department of
Health Information Technology,
Varastegan Institute for Medical
Sciences, Mashhad, Iran

Email: MazaheriM@varastegan.ac.ir

Keywords:

Health Literacy
Health Promotion
Public Health

ABSTRACT

Introduction: Low levels of health literacy lead to reduced health, increased length of hospital stays, and increased use of emergency services in patients and impose higher medical costs on individuals. Considering the effect of paramedical students' health literacy on community health promotion, this study aimed to determine the level of health literacy and its associated factors in paramedical students.

Material and Methods: This cross-sectional study was performed on 310 paramedical students during a two-month period from January to March 2021. The data collection tool was the Health Literacy for Iranian Adults (HELIA) questionnaire. Due to the COVID-19 pandemic, the questionnaire was designed online, and its link was provided to students.

Results: Among the participants, 247 (79.7%) cases were female, and 63 (20.3%) cases were male with a mean age of 21.16 ± 1.97 years. According to the results, 3.9% of the students had inadequate health literacy, 37.3% had not so adequate health literacy, 46.6% had adequate health literacy, and 12.2% had excellent health literacy. The results of ANOVA and t-test showed a significant association between the mean total health literacy score of students and their age, gender, and semester ($P < 0.05$).

Conclusion: This study findings showed that more than half of the participating students had adequate and excellent levels of health literacy. Since paramedical students are promoters of health in the community, more attention should be paid to the education of these individuals. Therefore, it is necessary to empower them in the field of health literacy.

Cite this paper as:

Rahmani F, Moghbeli F, Khoshkangin A, Mazaheri Habibi MR. Evaluation of health literacy and its associated factors in paramedical students. *Front Health Inform.* 2023; 12: 131. DOI: [10.30699/fhi.v12i0.406](https://doi.org/10.30699/fhi.v12i0.406)

INTRODUCTION

Health literacy refers to the ability of individuals to acquire, process, understand, and use health information and services needed to make appropriate decisions about health care [1]. Health literacy is not necessarily related to years of study or general reading ability, it refers to a set of abilities as follows: understanding medication instructions, medical education brochures, and consent forms; ability to benefit from sophisticated medical systems; reading, listening, analyzing, and decision-making skills; and ability to apply these skills in health-related situations [2].

The World Health Organization (WHO) has recently introduced health literacy as one of the main

determinants of health. This organization has also recommended to all countries around the world to establish a group of people involved in this issue to coordinate and monitor strategic activities to promote health literacy in different communities [3], as recent research has shown that low levels of health literacy lead to reduced health, increased length of hospital stay, and increased use of emergency services in patients and impose higher medical costs on individuals [4]. In addition, inadequate health literacy leads to less self-care behaviors, misuse of medications, less cooperation in deciding on the type of treatment, difficulty in verbally communicating with healthcare providers, and poor health status [5].

On the other hand, studies have shown that patients play an important role in controlling their health and

therefore should be sufficiently involved in their health decisions as an informed individual [6]. In a study conducted in the United States, the rate of adequate and not so adequate health literacy among people was reported to be 20 and 25%, respectively. Williams et al. showed that the rate of inadequate health literacy among elderly patients with diabetes and hypertension was 44 and 49%, respectively [7]. In another study by Zhang and Cui, the overall health literacy level of Xi'an University students in China was reported to be low. Vozikis also showed that the overall health literacy level of students in Greece was moderate [8, 9].

Several studies have also been conducted in this field in Iran. In a study conducted by Tehrani et al. in five provinces of the country, 56.6% of people had low levels of health literacy [10]. Azimi et al. also showed that 26.4 and 31.2% of medical students had inadequate and adequate health literacy, respectively [11]. In another study conducted on dormitory students of Shahid Beheshti University of Medical Sciences, 36.8% of students had inadequate and not so adequate health literacy [12]. Also, in a study conducted by Mohammadi Farah et al. among students of Hamadan University of Medical Sciences, 31.6% of students had inadequate health literacy; since medical students are considered as promoters of health culture, this level of health literacy is undesirable [2].

Given the significant increase in the student population in Iran in recent years, it is important to identify effective factors that could familiarize students with healthy behaviors and keep them away from risky behaviors [13]. Identifying these factors could assist health planners and executives to further improve health promotion programs and make optimal use of health services [1]. One of the reasons for choosing students as the target group in this study was their optimal age for curriculum learning as well as their role as a model for promoting a healthy lifestyle in the community, and medical students who are considered as role models and promoters of public health, had a high priority for this purpose [2, 12]. Therefore, the present study aimed to determine the level of health literacy and its associated factors in paramedical students.

MATERIAL AND METHODS

This cross-sectional study was performed at Varastegan Institute of Medical Sciences in Mashhad on 310 paramedical students during a two-month period from January to March 2021. The sample size was considered to be 300 people based on similar studies [1, 2, 12]. Finally, 310 paramedical students who were willing to participate in this study were selected by available sampling method and entered

the study. The data collection tool was the standard Health Literacy for Iranian Adults (18 to 65 years old) (HELIA) questionnaire. This questionnaire had several advantages such as covering different aspects of health literacy and using simple sentences. In a study, the design and psychometrics of this questionnaire were evaluated, and this tool was reported to have a desirable validity and acceptable reliability (Cronbach's alpha coefficient of items ranged from 0.72 to 0.89) [14]. This questionnaire consisted of two parts. The first part included five questions that assessed the demographic characteristics of the respondents, including gender, age, field of study, semester, and total grade point average (GPA), while the second part consisted of 33 main items that assessed the ability of individuals in different health literacy dimensions, including reading skills, access, understanding, assessment, decision-making, and using health information.

The scoring scale of this questionnaire was based on a 5-point Likert scale. In questions related to reading skills, the scores 1 to 5 were assigned to the "quite difficult", "difficult", "neither easy nor difficult", "easy", and "quite easy" options, respectively. Regarding the other four dimensions of health literacy, the scores 1 to 5 were assigned to the "never" or "not at all", "rarely", "sometimes", "more often", and "always" options, respectively. The scoring method was such that the raw score of each person in each dimension was first obtained from the total score. Then the following formula was used to convert this score to a range of zero to 100: the difference between the obtained raw score and the minimum possible score was divided by the difference between the maximum possible score and the minimum possible score. To calculate the total score, the scores of all health literacy dimensions in the range of zero to 100 were added together and divided by the number of dimensions (number 5). The students' health literacy level was then determined as follows: scores in the range of zero to 50 were considered as inadequate health literacy, 50.1 to 66 as not so adequate health literacy, 66.1 to 84 as adequate health literacy, and 84.1 to 100 as excellent health literacy.

Due to the COVID-19 pandemic, the questionnaire was designed online, and its link was provided to students. After explaining the nature and purpose of the research, all students were asked to answer the questionnaire questions with complete honesty. They were also assured that all answers given to the questionnaire questions would be strictly confidential.

Data analysis was performed using SPSS software Version 24 by employing descriptive statistics, including mean and standard deviation, and inferential statistics, including ANOVA, independent t-test, and Spearman correlation coefficient. The

confidence level in all calculations was 95%, and the significant limit was 0.05.

RESULTS

Among the participants, 247 (79.7%) cases were female, and 63 (20.3%) cases were male. The mean age of participants was 21.16 ± 1.97 years, ranging from 18 to 30 years. In terms of grade point average (GPA), 203 (65.5%) students had a total GPA above 17, and the rest had a total GPA below 17. Table 1 shows the frequency distribution of demographic characteristics of the study participants. Fig 1 shows the general health literacy status of the students participating in the study. Overall, 3.9% of the students had inadequate health literacy, 37.3% had not so adequate health literacy, 46.6% had adequate health literacy, and 12.2% had excellent health literacy.

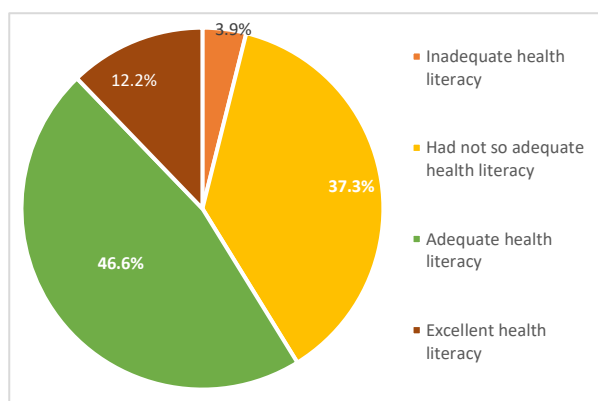


Fig 1: General status of students' health literacy level

Table 1: Frequency distribution of demographic characteristics of the study participants

Demographic Characteristics	Group	Frequency (%)
Gender	Male	63 (20.3)
	Female	247 (79.7)
Semester	1	55 (17.8)
	2	19 (6.1)
	3	70 (22.6)
	4	24 (7.7)
	5	72 (23.2)
	6	22 (7.1)
	7	30 (9.7)
	8	18 (5.8)
Field of study	Laboratory sciences	66 (21.3)
	Nutrition sciences	64 (20.6)
	Health information technology	139 (44.8)
	Public health	13 (4.2)
	Midwifery	2 (0.7)
	Nursing	26 (8.4)

In general, the mean total health literacy score of students was 69.33 ± 12.43 . Table 2 compares the mean scores of different dimensions of students' health literacy. According to this table, the highest

score was related to the understanding dimension with an average score of 75.92 ± 14.09 , and the lowest score was related to the decision-making and behavior dimension with an average score of 60.92 ± 16.64 . Overall, the scores of all five dimensions were relatively favorable.

Table 2: Comparing the mean scores of different dimensions of students' health literacy

Dimensions of Health Literacy	Mean \pm SD
Reading	64.22 ± 18.22
Access	74.54 ± 16.32
Understanding	75.92 ± 14.09
Assessment	71.03 ± 16.82
Decision-making & behavior	60.92 ± 16.64
Total health literacy score	69.33 ± 12.43

Also, independent t-test showed a significant difference between the mean total health literacy scores of male and female students ($P < 0.05$) so that the mean total health literacy score of female students was higher than that of male students (Table 3). This result indicates that there is a significant association between the mean total health literacy score of students and their gender. In addition, the present study results showed that the highest mean total health literacy score belonged to public health students. However, ANOVA test results showed no significant difference regarding the mean total health literacy score between different fields of study. The lowest and highest mean total health literacy scores based on the semester belonged to first and eighth semester students, respectively. ANOVA test results also showed that the mean total health literacy scores of students in different semesters were significantly different ($P < 0.05$); this result indicates that there is a significant association between the mean total health literacy score of students and their semester. Table 3 shows the mean total health literacy scores of students based on their gender, field of study, and semester. Table 4 shows the correlation between the mean total health literacy score of students with their age and total GPA. According to this table, there was a positive correlation between the mean total health literacy score and age of students ($P < 0.001$). Also, there was a negative correlation between the mean total health literacy score and total GPA of students, which was not significant ($P > 0.05$).

DISCUSSION

According to the WHO, health literacy plays a pivotal role in determining health inequalities in developed and developing countries [12]. Therefore, the present study was conducted to investigate the level of health literacy and its associated factors in paramedical students in 2021. According to the results of HELIA questionnaire in this study, 46.6% of the students had adequate health literacy, and 37.3% had not so adequate health literacy. Consistent with this study

results, Sajadi et al. also showed that 46.4% of students had adequate health literacy, and 32.3% had not so adequate health literacy [15].

Table 3: Mean total health literacy scores of students based on gender, field of study, and semester

Demographic Variables		Mean \pm SD	P-value
Gender	Female	70.07 \pm 12.51	.036
	Male	66.40 \pm 11.76	
Field of study	Laboratory sciences	70.61 \pm 10.38	.187
	Nutrition sciences	68.81 \pm 13.86	
	Health information technology	68.01 \pm 12.41	
	Public health	72.66 \pm 11.00	
	Nursing	71.65 \pm 13.83	
	Midwifery	72.30 \pm 4.5	
Semester	1	65.64 \pm 8.9	<.001
	2	65.98 \pm 12.10	
	3	66.85 \pm 12.33	
	4	69.68 \pm 12.37	
	5	70.10 \pm 10.55	
	6	74.06 \pm 12.54	
	7	74.30 \pm 12.16	
	8	77.04 \pm 13.84	

Table 4: Correlation between the mean total health literacy score with age and total GPA

Variable	Mean Total Health Literacy Score		
	Spearman correlation coefficient R	P-value	Result
Age	0.236	<.001	There is a positive significant correlation.
Total GPA	- 0.63	.268	There is a negative insignificant correlation.

On the other hand, Zhang et al. in their study reported an overall low health literacy level for Xi'an University students in China [8]. Also, in another study, the overall health literacy level of most students at Ferdowsi University of Mashhad was reported to be inadequate and not so adequate [16].

These results are not consistent with the present study results, which may be due to differences in the target groups because in the present study, only students of different disciplines of medical sciences participated, while in the mentioned studies, students of non-medical disciplines also participated.

By comparing the mean scores of different dimensions of students' health literacy, it was found that the highest mean score was related to the understanding dimension, and the lowest mean score was related to the decision making and behavior dimension, these results are in line with the results of similar studies conducted on medical students in Tehran and Hamedan [2, 12]. However, in a study by Mahmoudi et al., the highest mean score was related to the access dimension, and the lowest mean score was related to the assessment dimension [16].

In addition, the present study results also showed a positive association between the mean total health literacy score of students and their age so that with increasing age, their total health literacy score also increased. Consistent with this result, Rahmanian et al. also showed that with increasing diabetic patients' age, their health literacy level also increased [17]. Afshari et al. in their study examining adult health literacy in Tuyserkan also found an association between higher health literacy level and older age [18]. Therefore, it seems that with increasing age, people gain more information and more appropriate experiences on issues such as health and disease due to more exposure to these issues. In contrast, Tol et al. found an association between higher health literacy level and younger age, which contradicts the present study finding [19].

The present study results also showed a significant association between the mean total health literacy score of students and their gender so that the mean total health literacy score of female students was higher than that of male students. In line with this result, other studies have also shown that there is a significant difference between the mean total health literacy scores of men and women [8, 16]. This could be due to more observance of health issues and adherence to medical advice in women because women are more interested in learning and obtaining health information, and this issue also affects their health literacy level. In contrast, Tehrani et al. showed no significant association between participants' gender and health literacy level [10]. Reisi et al. also reported higher health literacy levels among men compared to women, which contradicts the present study result [20].

This study results also showed a significant association between the mean total health literacy score of students and their semester so that students who were studying in higher semesters had higher health literacy scores. This could be due to the relevance of medical science courses to health and

disease issues, as well as reading more courses in the field of health and obtaining more information. Therefore, the semester seems to be an effective factor in elevating the health literacy level of medical students. In line with this study result, Rafiezadeh et al. in their study also showed a significant relationship between health literacy level and education level [21].

Although other studies have shown that the field of study may affect the health literacy level of the target groups, no significant relationship was found in the present study between the mean total health literacy score of students and their field of study. Ziapoor et al. reported a significant association between the field of study and the mean total health literacy score of students, this means that students' health literacy level varies according to their field of study [22]. This result is not consistent with the present study finding.

The limitation of the present study was that because this study was conducted only among undergraduate students of a university, the obtained results could not be generalized to all students in other parts of the country.

CONCLUSION

This study showed that more than half of the participating students had adequate and excellent levels of health literacy. According to the results, the variables of gender, age, and semester were directly related to the health literacy level of students. Since students are promoters of health in the community, more attention should be paid to the education of these individuals; therefore, it is necessary to design and implement appropriate interventions by considering the demographic characteristics of each group of students to empower them in the field of

health literacy.

ACKNOWLEDGMENTS

This study was supported by Varastegan Institute for Medical Sciences. The experimental protocols were approved by Varastegan Institute for Medical Sciences Ethics Committee. The Ethical approval number is IR.MUMS.REC.1401. 289. Informed consent was obtained from all subjects and/or their legal guardian(s). All experiments were performed in accordance with relevant guidelines and regulations.

We thank all students for the collaboration in this study.

AUTHOR'S CONTRIBUTION

FR: Acquisition, analysis, and interpretation of data, drafting the work; FM: Analysis, and interpretation of data, revising it critically for important intellectual content; AK: Drafting the work, revising it critically for important intellectual content; MRMH: Design of the work, revising it critically for important intellectual content.

All authors contributed to the literature review, design, data collection and analysis, drafting the manuscript, read and approved the final manuscript.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest regarding the publication of this study.

FINANCIAL DISCLOSURE

No financial interests related to the material of this manuscript have been declared.

REFERENCES

1. Mahdizadeh F, Tatari M, Sheykhotayefeh M. Study of health literacy and its related factors in Torbat Heydarieh students of medical sciences in 2019. *Journal of Health Literacy*. 2019; 4(2): 44-8.
2. Mohammadi Farah S, Saati Asr MH, Kavivani Manesh A, Barati M, Afshari M, Mohammadi Y. Health literacy level and its related factors among college students of Hamadan university of medical sciences, Hamadan, Iran. *Journal of Education and Community Health*. 2017; 4(2): 11-7.
3. Khodabandeh M, Avarasin SM, Nikniaz L. The relationship between health literacy, perceived self-efficacy and self-care performance of female senior high school students in health promoting schools of Miyaneh, 2016-2017. *Journal of Health Literacy*. 2017; 2(3): 164-76.
4. Bailey SC, McCormack LA, Rush SR, Paasche-Orlow MK. The progress and promise of health literacy research. *J Health Commun*. 2013; 18(Suppl 1): 5-8. PMID: 24093339 DOI: 10.1080/10810730.2013.830042 [PubMed]
5. Keleher H, Hagger V. Health literacy in primary health care. *Australian Journal of Primary Health*. 2007; 13(2): 24-30.
6. Just what did the doctor order? Addressing low health literacy in North Carolina [Internet]. 2007 [cited: 5 Jan 2023]. Available from: <https://nciom.org/what-did-the-doctor-order-addressing-low-health-literacy-in-north-carolina/>
7. Williams MV, Parker RM, Baker DW, Parikh NS, Pitkin K, Coates WC, et al. Inadequate functional health literacy among patients at two public hospitals. *JAMA*. 1995; 274(21): 1677-82. PMID: 7474271 [PubMed]
8. Zhang Q, Cui G. Investigation and analysis of Xi'an college students' health literacy. *International Conference on Human Health and Biomedical Engineering*. IEEE; 2011.
9. Vozikis A, Drivas K, Milioris K. Health literacy among

- university students in Greece: Determinants and association with self-perceived health, health behaviours and health risks. *Arch Public Health*. 2014; 72(1): 15. PMID: 24987522 DOI: 10.1186/2049-3258-72-15 [[PubMed](#)]
10. Tehrani Banihashemi SA, Haghdoost AA, Amirkhani MA, Haghdoost AA, Alavian SM, Asgharifard H, et al. Health literacy and the influencing factors: A study in five provinces of Iran. *Strides in Development of Medical Education*. 2007; 4(1): 1-9.
 11. Ramezankhani A, Rakhshani F, Ghaffari M, Ghanbari S, Azimi S. Comparison of health promoting behaviors in the first and fourth year students of Shahid Beheshti university of medical and non-medical sciences in the academic year 92-93. *Jorjani Biomedicine Journal*. 2014; 2(1): 47-55.
 12. Panahi R, Ramezankhani A, Tavousi M, Osmani F, Ghazanfari E, Niknami S. Evaluation of health literacy and its influencing factors on dormitory students of Shahid Beheshti university of medical sciences in Tehran. *Journal of Education and Community Health*. 2016; 3(3): 30-6.
 13. Sharif Moghadam H, Shakiba E, Salami M. Comparison of health literacy of medical and dentistry students of rafsanjan university of medical sciences in 2016. *Journal of Health Literacy*. 2017; 2(2): 73-80.
 14. Montazeri A, Tavousi M, Rakhshani F, Azin SA, Jahangiri K, Ebadi M, et al. Health Literacy for Iranian Adults (HELIA): Development and psychometric properties. *Payesh*. 2014; 13(5): 589-99.
 15. Sajadi FA, Sajadi HS, Panahi R. Health literacy of university students and its influential factors: A case study at Isfahan university. *Journal of Education and Community Health*. 2020; 7(1): 23-8.
 16. Mahmoudi H, Taheri A. Relation between information literacy and health literacy of students in Ferdowsi University of Mashhad. *Human Information Interaction*. 2015; 2(2): 31-41.
 17. Rahmanian M, Ghaffari Targhi M. A survey on health literacy of referred diabetic patients to Yazd diabetes research center. *Tolooebehdasht*. 2016; 15(3): 176-86.
 18. Afshari M, Khazaei S, Bahrami M, Merati H. Investigating adult health literacy in Tuyserkhan city. *Journal of Education and Community Health*. 2014; 1(2): 48-55.
 19. Tol A, Pourreza A, Tavasoli E, Foroshani R. Determination of knowledge and health literacy among women with type 2 diabetes in teaching hospitals of TUMS. *Journal of Hospital*. 2012; 11(3): 45-52.
 20. Javadzade SH, Sharifirad G, Radjati F, Mostafavi F, Reisi M, Hasanzade A. Relationship between health literacy, health status, and healthy behaviors among older adults in Isfahan, Iran. *J Educ Health Promot*. 2012; 1: 31. PMID: 23555134 DOI: 10.4103/2277-9531.100160 [[PubMed](#)]
 21. Rafieezadeh GS, Tabarsy B, Hassanjani S, Razavi M, Amjady M, Hojjati H. Relationship between the health literacy with self-efficacy of the diabetic patient's type 2 referred to Gorgan city clinic in 2014. *Journal of Diabetes Nursing*. 2015; 3(2): 30-42.
 22. Ziapoor A, Kianipoor N. Predicting health literacy of students in Kermanshah university of medical sciences in 2016: The role of demographic variables. *Journal of Health Literacy*. 2016; 1(3): 182-90.