

Access this article online
Quick Response Code:

Website: www.jehp.net
DOI: 10.4103/jehp.jehp_313_20

Department of Health Education and Health Promotion, School of Medical Sciences, Tarbiat Modares University, Tehran, Iran, ¹Department of Emergency Medicine, Emergency Medicine Specialist, Metabolic Disease Research Center, Qazvin University of Medical Science, Qazvin, Iran, ²Social Determinants of Health Research Center, Research Institute for Prevention of Non-Communicable Diseases, School of Nursing and Midwifery, Qazvin University of Medical Sciences, Qazvin, Iran, ³Department of Occupational Health, School of Public Health and Institute of Public Health Research, Tehran University of Medical Sciences, Tehran, Iran

Address for correspondence:

Msc. Leila Dehghankar, Social Determinants of Health Research Center, Research Institute for Prevention of Non-Communicable Diseases, School of Nursing and Midwifery, Qazvin University of Medical Sciences, Qazvin, Iran
E-mail: Dehghan247@gmail.com;
L.dehghankar@qums.ac.ir

Received: 05-04-2020
Accepted: 26-05-2020
Published: 28-09-2020

Association between health literacy and adopting preventive behaviors of breast cancer in Iran

Rahman Panahi, Peyman Namdar¹, Fatemeh Samiei Siboni², Somayeh Fallah², Mohammad Anbari³, Leila Dehghankar², Leili Yekefallah², Mahya Shafaei²

Abstract:

BACKGROUND: Health literacy plays an important role in adopting preventive behaviors. Considering the relatively high prevalence of breast cancer in women, this study aimed to assess the association between health literacy and adopting the preventive behavior of breast cancer in Iran.

METHODS: This was a descriptive, cross-sectional study, in which 375 female students at Imam Khomeini International University in Qazvin in the academic year of 2018–2019 were selected through a stratified random sampling method. Demographic and background questionnaire, the standard questionnaire of Health Literacy for Iranian Adults in addition to another questionnaire for measuring breast cancer preventive behaviors, were used for collecting data. Data were analyzed using SPSS 22 using descriptive statistics and logistic regression.

RESULTS: The mean of the breast cancer preventive behaviors and health literacy were 8.92 ± 1.82 out of 16 and 70.80 ± 12.49 out of 100. Regression results showed that there was a statistically significant association between the adoption of breast cancer preventive behaviors and physical activity ($P < 0.001$) and health literacy ($P < 0.018$). Accordingly, the chance for adopting the preventive behaviors in good level among students with rare and without physical activity was 0.105 and 0.100 times, respectively, more than students who had been doing physical activity on a daily basis. Moreover, the same chance among students with adequate and very adequate health literacy was 1.802 and 2.169 times more than students with inadequate health literacy.

CONCLUSION: The results indicated that students with lower levels of health literacy and less physical activity had shown less tendency to adopt preventive behaviors of breast cancer. Therefore, special attention should be paid to health literacy (HL), particularly physical activity, application of health information, and assessment in students when designing educational programs to prevent breast cancer.

Keywords:

Breast cancer, health literacy, preventive behavior

Introduction

Cancer is a major burden of disease in any health system.^[1] In particular, breast cancer is deemed as one of the global health concerns^[2] and the second leading cause to death worldwide.^[3] In 2015, death estimates attributed to noncommunicable diseases according to the World Health Organization were 2,166,000 people/

year, accounting for nearly 60% of total mortalities in the Eastern Mediterranean Region, where breast cancer comprises 23% of all cancers in women.^[4,5] According to the Iranian Ministry of Health and Medical Education, breast cancer accounts for 16% of cancer cases, in which it is the primary cause in 7600 women.^[1] In Iran, the reported percentage of breast cancer was 12.6%,^[6] which is expected to increase by 50% in 2020, mainly in developing countries,^[7] being

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: reprints@medknow.com

How to cite this article: Panahi R, Namdar P, Siboni FS, Fallah S, Anbari M, Dehghankar L, *et al.* Association between health literacy and adopting preventive behaviors of breast cancer in Iran. *J Edu Health Promot* 2020;9:241.

the leading cause of cancer deaths among women.^[1] Due to the physical, sex, and physiological differences between women and men, women are at a high risk of experiencing menstrual severe pains, iron-deficiency anemia, breast cancer and cervical cancer, and death at young age.^[8,9]

In their studies, Rosenberg and Levy-Schwartz found that although breast cancer can likely be detected in older women, clinical evidences suggest that the mortality rate in young patients experiencing breast cancer is higher due to late diagnosis.^[10] Therefore, the best effective way to reduce the complications and mortality of breast cancer and increase the longevity of patients is the early diagnosis.^[8] Early diagnosis of breast cancer involves breast self-examination, clinical examination, and mammography.^[11] In the study of Naghibi *et al.*, 48.1% of teachers had carried out breast self-examination, 24.8% had a history of clinical examination, and 9.3% had been checked using mammography at least for once.^[8]

Controlling cancer in early stages is the most essential component of the primary health-care system. Health education is one of the most critical at the preventive three levels of breast cancer including planned learning environment and opportunities, in order to improve health literacy in the community.^[7] Health literacy is a dynamic and multidimensional concept^[12] encompassing the ability of individuals to achieve the goal, communicate, and understand basic health information and services needed for proper decision-making in health care.^[13,14] Researchers believe that people with poor health literacy know little about their health, receive less preventive services, suffer weaker physical and mental health functions, moreover, controlling chronic diseases among those people is challenging.^[8] Limited health literacy is not only a problem to patients but also to health-care providers and health system. Hence, the first step in most circumstances is to measure health literacy among population in the community.^[7]

The relationship between low health literacy and undesirable health consequences had been concluded by relevant studies in the literature. For example, less knowledge about health conditions led to lower utilization of preventive services and higher risk of treatment refusal.^[7] Mantwill and Schulz mentioned that people with low health literacy had spent more money for their health.^[15] Based on its results, Oldach and Katz study in 2014 indicated that there was an association between inadequate health literacy and low rates of cancer screening.^[16] Low health literacy was also accompanied by low level of awareness regarding cancer screenings, failure to conduct cancer screenings, and poor access to care. Although previous studies stated that inadequate health literacy may reduce the rate of cancer

screenings, no comprehensive study had been conducted in this regard.^[17] Women with insufficient health literacy had experienced more negative attitude toward mammography, as they felt stigmatized and could not tolerate the resulting pain.^[18] Sentell *et al.* revealed that women with low health literacy significantly had lower rates of breast cancer screening in the United States.^[17]

Given the health of society as a whole, all efforts and reforms should be devoted to promote the health of upcoming new generations since childhood.^[19] Accordingly, identifying the factors influencing students' compliance with healthy behaviors and avoidance of risky ones is necessary.^[20] Since students are a convenient representative of a healthy lifestyle in the society,^[21] recruiting them to take part in this study was a top priority. Given the importance of early diagnostic methods in breast cancer prevention^[8] and the lack of studies on the relationship between health literacy and preventive behaviors of breast cancer among students, our study was conducted to determine the effect of health literacy on adopting preventive behavior of breast cancer in Iran.

Methods

This was a cross-sectional descriptive-analytic study, in which 375 female students at Imam Khomeini International University in Qazvin in the academic year of 2018–2019 were selected using a stratified random sampling method. The students selected per faculty were determined in proportion to the total number of undergraduate students in that faculty (as a class). Based on the different majors in each faculty, a randomized quota sampling method was also used considering the ratio between students' numbers in each major. For students in the same major, a simple random sampling method had been applied through a lottery, and then, a questionnaire had been handed over to the selected participants. Since the percentage of poor health literacy among students in Panahi *et al.* study^[21] was 36.8%, we adopted this value for P in the Cochran sample size formula ($p = 36.8$, $d = 0.05$, and $Z = 1.96$). Accordingly, the calculated sample size was 357, which was increased to 375 assuming a probable 5% as dropout.

$$n = \frac{Z^2 \cdot pq}{d^2} \quad n = \frac{1.96^2 \times 0/368 (1 - 0/368)}{0.05^2} = 357$$

Inclusion/exclusion criteria

Iranian undergraduate female students at Imam Khomeini International University who have been willing to participate in the study based on the informed consent have been included. Whereas, those students who have been experiencing physical and mental illness according to Fred's own remarks, having a history

of breast-related problems and disorders (e.g., mass, abnormal discharge from the breast, or cyst), having a history of breast cancer or one of the first-degree relatives (i.e., mother, sister, aunt), or/and who have not completed the questionnaire have been excluded.

A questionnaire consisting of three parts was used to collect data. The first part was related to demographic and background information including age, marital status, academic year, employment status, physical activity per week, residence, monthly income of the family, and field of study. The second part was about Health Literacy for Iranian Adults (18–65 years old) (HELIA) in urban areas including 33 questions aimed to measure six main dimensions on a 5-point Likert scale: reading, access, understanding, assessment, decision-making, and application of health information. For reading dimension, 5 on its scale indicated that reading is quite easy for the student, while 1 meant that reading is absolutely difficult. Regarding the other 4 dimensions of health literacy, the scale was as follows: (1 = never, 2 = rarely, 3 = sometimes, 4 = mostly, and 5 = daily).

At last, the total score was calculated when the scores of all dimensions (based on the range from 0 to 100) were aggregated and divided by the number of dimensions (i.e., 5). Scores (0–50) indicated inadequate health literacy, scores (50.1–66) reflected semi-adequate health literacy, scores (66.1–84) referred to adequate health literacy, and scores (84.1–100) indicated very adequate health literacy.^[22] In their study, Montazeri *et al.* designed and psychometrically tested this questionnaire for validity and reliability (Cronbach's alpha was between 0.72 and 0.89 for each item).^[22] Furthermore, in the study of Panahi *et al.*, the validity and reliability of the aforementioned questionnaire were tested in a sample of students.^[23] Drawing on the results of confirmatory factor analysis, this questionnaire was desirable fit. Furthermore, in the present study, the Cronbach's alpha coefficient was as follows: reading dimension: 0.84, access: 0.85, understanding: 0.90, assessment dimension: 0.77, decision-making: 0.86, health information application: 0.86, and for the entire questionnaire was 0.94. Overall, the results of the study showed that the HELIA questionnaire could be used for university students.^[23]

Measuring tools for the preventive behaviors of breast cancer was a questionnaire included four questions, and the scoring method was (always = 4, often = 3, sometimes = 2, and never = 1), thus, the minimum score was 4, and the maximum score was 16. Based on the mean scores, the mean percentages < 50%, 50%–75%, and 75%–100% indicated poor, moderate, and excellent preventive behavior, respectively. According to researchers, the rate of preventive behaviors was classified into two

levels: poor (<50%) and good (50%–100%), and this had been used in logistic regression.^[19] The content validity and reliability of this tool were acceptable, as stated in Farmanfarma *et al.* study as their values were 0.79 and Cronbach's alpha coefficient 0.76.^[24] Data were analyzed using SPSS ver 22. IBM Corporation, Armonk, NY and the applied analyses were descriptive statistics and logistic regression.

Ethical considerations

Ethical approval was obtained from the Deputy of Research and Technology at Qazvin University of Medical Sciences, which holds the code (IR.QUMS.REC.1397.193). An introductory letter was presented to Imam Khomeini International University, in which the nature and purpose of the study were described. Afterward, the questionnaires were distributed and completed.

Results

Among the 375 students recruited to this study (100% response rate), 48.5% were in the age group (20–30 years old), 31.5% were freshman (i.e., new student), and 85.1% were single. Table 1 shows the other demographic and background characteristics of the students.

The rate of adoption of breast cancer preventive behaviors among 150 students (40%) was poor, but it was moderate among 206 students (54.9%) and good among 19 students (5.1%). The mean and standard deviation of the overall scores for the breast cancer preventive behaviors and health literacy in the students were 8.92 ± 1.82 out of 16 and 70.80 ± 12.49 out of 100, respectively. Moreover, 129 students (34.4%) had limited health literacy, while 246 (65.6%) students had desirable health literacy.

Table 2 illustrates the factors associated with the adoption of breast cancer preventive behaviors among students according to logistic regression. There was a statistically significant association between the adoption of breast cancer preventive behaviors and physical activity ($P < 0.001$); hence, the chance of adopting of preventive behaviors was good among the students who never have been doing physical activity or those who have been doing it rarely. Adoption of breast cancer preventive behaviors among the abovementioned students was more than those students who have been doing physical activity on daily basis by 0.105 and 0.100 times, respectively.

In addition, there was a statistically significant relationship between the adoption of breast cancer preventive behaviors and health literacy ($P < 0.018$). Students with adequate and very adequate health literacy

Table 1: Sociodemographic characteristics of the study participants

Characteristics		n (%)	Characteristics		n (%)
Age	Under 20 years	181 (48.3)	Marital status	Single	319 (85.1)
	Years 20-30	182 (48.5)		Married	54 (14.4)
	Higher than 30 years	12 (3.2)		Divorced	2 (0.5)
Academic years	First years	118 (31.5)	Residence	Qazvin	124 (33.1)
	Second year	117 (31.2)		County	104 (27.7)
	Third year	86 (22.9)		Village	6 (1.6)
	Forth year	54 (14.4)		Dormitory	141 (37.6)
Physical activity	Daily	32 (8.5)	Rate of income	Under 1 million	35 (9.3)
	Mostly	88 (23.5)		1-2 million	138 (36.8)
	Sometimes	126 (33.6)		2-3 million	106 (28.3)
	Rarely	106 (28.3)		Higher than 3 million	95 (25.3)
Employment status	Never	23 (6.1)	Field of study	Technical engineering	61 (16.3)
	No	324 (86.4)		Agriculture	22 (5.9)
Yes	51 (13.6)	Architecture		41 (10.9)	
	Science research	56 (14.9)			
	Literature	84 (22.4)			
	Social sciences	111 (29.6)			

showed their willingness to adopt preventive behaviors of breast cancer 1.802 and 2.169 times, respectively, more than students with inadequate health literacy [Table 2]. There was no significant relationship between the adoption of breast cancer preventive behaviors and other variables ($P > 0.05$).

Discussion

This study aimed to determine the association between health literacy and the adoption of breast cancer preventive behaviors among female students at Imam Khomeini International University in Qazvin.

The results of the present study and those of previous studies were contradictory, which is going to be articulated in this section. The results of this study showed that the rate of adoption of breast cancer preventive behaviors among students was moderate. This result was consistent with the results of Dafei *et al.*^[25] and Montazeri *et al.*^[22] However, the mean score of students' behavior in Didarloo *et al.* study was poor in relation to breast cancer.^[13] Furthermore, in Akhtari-Zavare *et al.* study (2014), the mean score of breast cancer preventive behavior was poor, as reported by the majority of participating Malaysian students.^[26] Also revealed that less than half of Turkish nurses demonstrated low tendency to adopt preventive behaviors.^[10] The difference between the results of these studies and the present study can be attributed to the use of diverse tools for measuring the behavior and different geographical areas, in addition to the cultural conditions of the participants. Regarding the level of adoption of breast cancer preventive behaviors in this study, it should be noted that it was expected to be moderate

when considering the moderate levels of health literacy among the students and the relationship between health literacy and the adoption of preventive behaviors.^[27-30]

Moreover, the results of this study showed that the health literacy of the participants was moderate, and this was consistent with the results of Sajadi *et al.*,^[31] Vozikis *et al.*,^[32] and Zhang and Cui^[33] studies. Nevertheless, these results were not in line with the results of Farah *et al.*,^[24] so that the level of health literacy in the present study was lower than the two aforementioned studies. This contradiction can be associated with the fact that only undergraduate students were recruited to take part in this study, while a blend of undergraduate and graduate students represented the participants in the previous studies.

In the present study, there was a significant relationship between health literacy and the adoption of breast cancer preventive behaviors. Our results were consistent with the results of Mahdavi *et al.*,^[7] Sentell *et al.*,^[17] Oldach and Katz,^[16] Scott *et al.*,^[34] Izadirad and Zareban,^[30] and Panahi *et al.*^[35] Peyman *et al.* also stated that there was a significant relationship between health literacy and breast cancer screening tests.^[28] The findings of Davis *et al.* showed that inadequate health literacy is one of the most important factors influencing the diagnosis and prevention of breast cancer, which led to low participation in cancer screening programs.^[18] Therefore, it can be said that health literacy might motivate people to more decide about their health issues and pay more attention to their health status. It was discovered that health literacy played a substantial role in improving the responsibility of individuals in maintaining their health.^[36] In other words, health literacy can be deemed

Table 2: Factors related to the adoption of breast cancer preventive behaviors among students in the logistic regression

Variable	Levels	Chance ratio	P
Age	Under 20 years	Reference	0.082
	Years 20-30	0.584	
	Higher than 30 years	2.343	
Marital status	Single	Reference	0.997
	Married	1.033	
	Divorced	0.000	
Academic year	First year	Reference	0.401
	Second year	1.091	
	Third year	0.814	
	Fourth year	1.700	
Physical activity	Daily	Reference	0.000
	Mostly	1.391	
	Sometimes	0.428	
	Rarely	0.105	
	Never	0.100	
Residence	Qazvin	Reference	0.728
	County	1.198	
	Village	2.481	
	Dormitory	1.324	
Rate of income	Under 1 million	Reference	0.997
	1-2 million	0.948	
	2-3 million	0.852	
	Higher than 3 million	0.927	
Field of study	Technical engineering	Reference	0.179
	Agriculture	1.173	
	Architecture	1.982	
	Science research	1.591	
	Literature	0.628	
	Social sciences	1.278	
Employment status	No	Reference	0.111
	Yes	2.034	
Health literacy	Inadequate	Reference	0.018
	Semi-adequate	0.786	
	Adequate	1.802	
	Very adequate	2.169	
Constant		2.34	0.023

as one of the crucial factors in the adoption of these behaviors through raising the awareness of people about the benefits associated with diagnostic and preventive behaviors among women.^[7]

The results of this study indicated a statistically significant association between the adoption of breast cancer preventive behaviors with the physical activity.

Due to the possible reasons for this relationship, the two variables can be mentioned as being homogeneous. Furthermore, doing their physical activity is a kind of preventive behavior.

The current study was only carried out among students at Imam Khomeini International University in Qazvin, which in turn limited the generalizability of these results across the country. Therefore, it is suggested that this study be undertaken on a larger scale of students across the country, especially among medical students, and also comparing its results with nonmedical students. Overlooking other dimensions of health literacy such as self-efficacy, communication, and calculation were additional limitations in this study, as in the presence of these dimensions, a broader and more comprehensive assessment of the relationship between the dimensions of health literacy and the adoption of breast cancer preventive behaviors would be possible. Moreover, undermining cultural background and skills such as speaking, listening, and the knowledge of individuals were limitations as well. Nonetheless, these skills have been neglected not only in this tool but also in other tools. The relatively small sample size, the lack of access to students who have been in academic leave, the few relevant studies in the literature, and the self-reported data collection have also limited this study. On the other hand, motivating students to raise awareness about early-stage breast cancer prevention behaviors and preventative behaviors such as self-examination were substantial strengths. Studying the association between health literacy and breast cancer prevention behaviors in students was an unprecedented novelty merit of this study.

Conclusion

The results of this study showed less adoption of breast cancer preventive behaviors among students with lower levels of health literacy and less physical activity. On the other hand, it is necessary to focus on students to achieve health goals, and then, university officials should pay more attention to the promotion of health literacy in order to improve the adoption of breast cancer preventive behaviors, through designing educational programs. It is suggested that more extensive studies can be conducted to clarify the effect of health literacy on the adoption of breast cancer preventive behaviors. Special attention should be paid to health literacy and physical activity, when designing educational programs to prevent breast cancer.

Acknowledgments

We would like to thank the Deputy of Research and Technology at Qazvin University of Medical Sciences and Imam Khomeini International University in Qazvin

for their unsparing assistance. In addition, we highly appreciate the cooperation of the female students at this university.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

- Karimi SE, Rafiey H, Sajjadi H, Nosrati Nejad F. Identifying the social determinants of breast health behavior: A qualitative content analysis. *Asian Pac J Cancer Prev* 2018;19:1867-77.
- Abdul Hadi M, Hassali MA, Shafie AA, Awaisu A. Knowledge and perception of breast cancer among women of various ethnic groups in the state of Penang: A cross-sectional survey. *Med Princ Pract* 2010;19:61-7.
- Roh S, Burnette CE, Lee YS, Jun JS, Lee HY, Lee KH. Breast cancer literacy and health beliefs related to breast cancer screening among American Indian women. *Soc Work Health Care* 2018;57:465-82.
- Nafissi N, Saghafinia M, Motamedi MH, Akbari ME. A survey of breast cancer knowledge and attitude in Iranian women. *J Cancer Res Ther* 2012;8:46-9.
- Banegas MP, Bird Y, Moraros J, King S, Prapsiri S, Thompson B. Breast cancer knowledge, attitudes, and early detection practices in United States-Mexico border Latinas. *J Womens Health (Larchmt)* 2012;21:101-7.
- Azizi F, Hatami H, Janghorbani M. *Epidemiology and Control of Common Diseases in Iran*. Tehran: Khorasavi Publisher; 2011. p. 542-57.
- Mahdavi Z, Ramezankhani A, Ghanbari S, Khodakarim L. Relationship between Health Literacy and female cancers preventive behaviors. *Payesh J* 2017;17:613-25. Available from: <http://payeshjournal.ir/article-1-84-en.html>. [Last accessed on 2018 Oct 06].
- Naghbi SA, Jamshidi P, Rostami F. Identification of factors associated with breast cancer screening based on the PEN-3 model among female school teachers in Kermanshah. *Iran J Health Educ Health Promotion* 2016;4:58-64.
- Tehrani H, Majlessi F, Shojaeizadeh D, Sadeghi R, Hasani Kabootarkhani M. Applying socioecological model to improve women's physical activity: A randomized control trial. *Iran Red Crescent Med J* 2016;18:e21072.
- Rosenberg R, Levy-Schwartz R. Breast cancer in women younger than 40 years. *Int J Fertil Womens Med* 2003;48:200-5.
- Didarloo A, Shorkhabi Z, Pourali R. Survey of knowledge, worry and screening behavior towards breast cancer among female students of Urumia University of Medical Sciences in 2014. *Urmia Nurs Midwifery Fac* 2016;14:201-12. Available from: <http://unmf.umsu.ac.ir/article-1-2715-en.html>. [Last accessed on 2019 Sep 09].
- Guo S, Davis E, Yu X, Naccarella L, Armstrong R, Abel T, et al. Measuring functional, interactive and critical health literacy of Chinese secondary school students: Reliable, valid and feasible? *Glob Health Promot* 2018;25:6-14.
- Halverson JL, Martinez-Donate AP, Palta M, Leal T, Lubner S, Walsh MC, et al. Health literacy and health-related quality of life among a population-based sample of cancer patients. *J Health Commun* 2015;20:1320-9.
- Panahi R, Ramezankhani A, Tavousi M. Health literacy and preventive behaviors. *J Res Health* 2018;8:93-4.
- Mantwill S, Schulz PJ. Low health literacy associated with higher medication costs in patients with type 2 diabetes mellitus: Evidence from matched survey and health insurance data. *Patient Educ Couns* 2015;12:625-1630. DOI: 10.1016/j.pec.2015.07.006.
- Oldach BR, Katz ML. Health literacy and cancer screening: A systematic review. *Patient Educ Couns* 2014;94:149-57.
- Sentell TL, Tsoh JY, Davis T, Davis J, Braun KL. Low health literacy and cancer screening among Chinese Americans in California: A cross-sectional analysis. *BMJ Open* 2015;5:e006104.
- Davis TC, Williams MV, Marin E, Parker RM, Glass J. Health literacy and cancer communication. *CA Cancer J Clin* 2002;52:134-49.
- Panahi R, Dehghankar L, Hossei N, Hasannia E. Factors Related to Adoption of Osteoporosis Preventive Behaviors among Females' High School Students; a Case Study of Qazvin City. *J Educ Community Health* 2020;7:105-12.
- Farah SM, 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. *J Epidemiol Community Health* 2017;4:11-7.
- 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. *J Educ Community Health* 2016;3:30-6.
- Montazeri A, Tavasousi M, Rakhshani F, Azin SA, Jahangiri K, Ebadi M, et al. Health literacy for Iranian Adults (HELIA): Development and psychometric properties. *J Payesh* 2014;13:589-99. Available from: <http://payeshjournal.ir/article-1-279-en.html>. [Last accessed on 2019 Jul 10].
- Panahi R, Ramezankhani A, Tavousi M, Haeri Mehrizi A, Niknami S. The psychometric properties of health literacy for Iranian adults (HELIA) in medical sciences students. *J Res Health* 2020;10:53-8.
- Farmanfarma KK, Zareban I, Jalili Z, Shahrakipour M, Lotfi B. The effect of education on condition of knowledge, attitude and preventive behaviors of breast cancer in female teachers at guidance schools in Zahedan. *J Torbat Heydariyeh Univer Med Sci* 2013;1:65-73. Available from: <http://jms.thums.ac.ir/article-1-49-en.html>. [Last accessed on 2019 May 05].
- Dafei M, Dehghani A, Momeni Z, Kalan Farmanfarma K, Koohgardi M, Jalali M, et al. Study of breast cancer knowledge, attitude, and preventive behaviors among women referring to health-treatment centers in Yazd, Iran, 2015. *Poultry Sci J* 2017;15:46-53.
- Akhtari-Zavare M, Muhamad HJ, Rosliza AM, Salmiah MS. Knowledge on breast cancer and practice of breast self-examination among selected female university students in Malaysia. *Med Health Sci* 2011;7:49-56.
- Javadzade SH, Sharifirad GR, Radjati F, Mostafavi F, Reisi M, Hasanazade A. The relationship between health literacy, health status and healthy behaviors among elderly in Isfahan. *J Educ Health Promot* 2012;1:31. [doi: 0.4103/2277-9531.100160].
- Peyman N, Amani M, Esmaily H. The relationship between health literacy and the theory of planned behavior on breast cancer screening programs among rural women in Roshtkhar, Iran 2015. *Iran J Breast Dis* 2016;9:60-9. Available from: <http://ijbd.ir/article-1-561-en.html>. [Last accessed on 2020 Feb 15].
- Fernandez DM, Larson JL, Zikmund-Fisher BJ. Associations between health literacy and preventive health behaviors among older adults: Findings from the health and retirement study. *BMC Public Health* 2016;16:596.
- Izadirad H, Zareban I. The relationship of health literacy with health status, preventive behaviors and health services utilization in Baluchistan, Iran. *J Educ Community Health* 2016;2:43-50.
- Sajadi FA, Sajadi HS, Panahi R. Health literacy of university students and its influential factors: A case study at Isfahan university. *J Educ Community Health* 2020;7:23-8.
- Vozikis A, Drivas K, Miliotis K. Health literacy among university students in Greece: Determinants and association with self-perceived health, health behaviours and health risks. *Arch*

- Public Health 2014;72:15.
33. Zhang Q, Cui G, editors. Investigation and analysis of Xi'an college students' health literacy. International Conference on 2011. HHBE; 2011. p. 994-7. Available from: <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6028991&isnumber=6027878>. [Last accessed on 2019 Aug 20].
 34. Scott TL, Gazmararian JA, Williams MV, Baker DW. Health literacy and preventive health care use among Medicare enrollees in a managed care organization. *Med Care* 2002;40:395-404.
 35. Panahi R, Yekefallah L, Shafaei M, Dehghankar L, Anbari M, Hosseini N, *et al.* Effect of health literacy among students on the adoption of osteoporosis-preventive behaviors in Iran. *J Edu Health Promot* 2020;9:191.
 36. Panahi R, Ramezankhani A, Tavousi M, Niknami S. Health literacy and smoking. *J Res Health* 2018;8:1-2.