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

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## 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  $8.92 \pm 1.82$  out of 16 and  $70.80 \pm 12.49$  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.<sup>[1]</sup> In particular, breast cancer is deemed as of the global health concerns<sup>[2]</sup> and the second leading cause to death worldwide.<sup>[3]</sup> 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.<sup>[4,5]</sup> 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.<sup>[1]</sup> In Iran, the reported percentage of breast cancer was 12.6%,<sup>[6]</sup> which is expected to increase by 50% in 2020, mainly in developing countries,<sup>[7]</sup> being

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the leading cause of cancer deaths among women.<sup>[1]</sup> 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.<sup>[8,9]</sup>

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.<sup>[10]</sup> Therefore, the best effective way to reduce the complications and mortality of breast cancer and increase the longevity of patients is the early diagnosis.<sup>[8]</sup> Early diagnosis of breast cancer involves breast self-examination, clinical examination, and mammography.<sup>[11]</sup> 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.<sup>[8]</sup>

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.<sup>[7]</sup> Health literacy is a dynamic and multidimensional concept<sup>[12]</sup> 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.<sup>[13,14]</sup> 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.<sup>[8]</sup> 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.<sup>[7]</sup>

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.<sup>[7]</sup> Mantwill and Schulz mentioned that people with low health literacy had spent more money for their health.<sup>[15]</sup> 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.<sup>[16]</sup> 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.<sup>[17]</sup> Women with insufficient health literacy had experienced more negative attitude toward mammography, as they felt stigmatized and could not tolerate the resulting pain.<sup>[18]</sup> Sentell *et al.* revealed that women with low health literacy significantly had lower rates of breast cancer screening in the United States.<sup>[17]</sup>

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.<sup>[19]</sup> Accordingly, identifying the factors influencing students' compliance with healthy behaviors and avoidance of risky ones is necessary.<sup>[20]</sup> Since students are a convenient representative of a healthy lifestyle in the society,<sup>[21]</sup> recruiting them to take part in this study was a top priority. Given the importance of early diagnostic methods in breast cancer prevention<sup>[8]</sup> 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<sup>[21]</sup> 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.<sup>[22]</sup> 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).<sup>[22]</sup> Furthermore, in the study of Panahi *et al.*, the validity and reliability of the aforementioned questionnaire were tested in a sample of students.<sup>[23]</sup> 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.<sup>[23]</sup>

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.<sup>[19]</sup> 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.<sup>[24]</sup> 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  $8.92 \pm 1.82$  out of 16 and  $70.80 \pm 12.49$  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	Marital status	Single
	Years 20-30		Married
	Higher than 30 years		Divorced
Academic years	First years	Residence	Qazvin
	Second year		County
	Third year		Village
	Forth year		Dormitory
Physical activity	Daily	Rate of income	Under 1 million
	Mostly		1-2 million
	Sometimes		2-3 million
	Rarely		Higher than 3 million
Employment status	No	Field of study	Technical engineering
	Yes		Agriculture
			Architecture
			Science research
			Literature
			Social sciences

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.*<sup>[25]</sup> and Montazeri *et al.*<sup>[22]</sup> However, the mean score of students' behavior in Didarloo *et al.* study was poor in relation to breast cancer.<sup>[13]</sup> 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.<sup>[26]</sup> Also revealed that less than half of Turkish nurses demonstrated low tendency to adopt preventive behaviors.<sup>[10]</sup> 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.<sup>[27-30]</sup>

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.*,<sup>[31]</sup> Vozikis *et al.*,<sup>[32]</sup> and Zhang and Cui<sup>[33]</sup> studies. Nevertheless, these results were not in line with the results of Farah *et al.*,<sup>[24]</sup> 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.*,<sup>[7]</sup> Sentell *et al.*,<sup>[17]</sup> Oldach and Katz,<sup>[16]</sup> Scott *et al.*,<sup>[34]</sup> Izadirad and Zareban,<sup>[30]</sup> and Panahi *et al.*<sup>[35]</sup> Peyman *et al.* also stated that there was a significant relationship between health literacy and breast cancer screening tests.<sup>[28]</sup> 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.<sup>[18]</sup> 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.<sup>[36]</sup> 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	0.069
	Higher than 30 years	2.343	0.306
Marital status	Single	Reference	0.997
	Married	1.033	0.934
	Divorced	0.000	0.999
Academic year	First year	Reference	0.401
	Second year	1.091	0.789
	Third year	0.814	0.584
	Forth year	1.700	0.240
Physical activity	Daily	Reference	0.000
	Mostly	1.391	0.577
	Sometimes	0.428	0.115
	Rarely	0.105	<0.001
	Never	0.100	0.001
Residence	Qazvin	Reference	0.728
	County	1.198	0.598
	Village	2.481	0.377
	Dormitory	1.324	0.382
Rate of income	Under 1 million	Reference	0.997
	1-2 million	0.948	0.911
	2-3 million	0.852	0.747
	Higher than 3 million	0.927	0.879
Field of study	Technical engineering	Reference	0.179
	Agriculture	1.173	0.797
	Architecture	1.982	0.168
	Science research	1.591	0.323
	Literature	0.628	0.266
	Social sciences	1.278	0.520
Employment status	No	Reference	0.111
	Yes	2.034	0.102
Health literacy	Inadequate	Reference	0.018
	Semi-adequate	0.786	0.701
	Adequate	1.802	0.033
	Very adequate	2.169	0.021
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.<sup>[7]</sup>

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.

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### Conflicts of interest

There are no conflicts of interest.

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