

The relationship between health literacy and health-promoting behaviors among adults in Bushehr

ABSTRACT

Background and Objective: The skills that are required for understanding and applying health information to everyday life have been conceptualized as health literacy. Limited health-literate people have more health problems, given that health-promoting behaviors can play a protective role in people's health. Therefore, the purpose of this study was to determine the relationship between health literacy and health-promoting behaviors.

Materials and Methods: In this cross-sectional study, 402 individuals over 18 years of age referred to the health centers in the city of Bushehr (south of Islamic Republic of Iran). They completed the FCCHL scales and HPLP II for assessing health literacy and health-promoting behaviors, respectively. The sampling method in this study was two-stage cluster sampling. Multiple regression model was performed in the analysis using R software (version 3.3.2) to predict health literacy outcome.

Results: Functional, communicative and critical health literacy were related to some aspects of health-promoting behaviors but not to all. All the health literacy subscales were significant predictors of health responsibility and none of them predict interpersonal relations.

Conclusion: Health literacy plays an important role in successful health-promoting lifestyle behaviors, but the impact differs by context. These findings can be used in planning and the implementation of educational interventions to improve healthy lifestyles.

Paper Type: Research Article

Keywords: Health literacy, Health promotion, Healthy behavior, Healthy lifestyle.

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Introduction

The incidence rate of noncommunicable diseases has increased dramatically in both developed and developing countries in recent decades (1). Nowadays the total number of people dying from chronic diseases is twice as many as that of all infectious diseases, maternal and perinatal conditions, and nutritional deficiencies combined (2). A substantial number of these diseases and deaths can be attributed to lifestyle factors such as dietary habits, substance abuse (e.g., smoking), physical exercise, and sleeping quality (3, 4). Physical inactivity causes near 2 million deaths every year. An unhealthy diet is estimated to cause of the five gastrointestinal cases of cancer, about a third of coronary heart diseases, and 11% of strokes worldwide. Unhealthy diet and being physically inactive are the main contributors to obesity and overweight that kills millions of people each year (5). In this regard, lifestyle modification through advanced communication tools has been emphasized (6).

Health information has a key role as a resource for people to gain and understand what they need for managing their health condition (7). Although physicians have historically been the primary source for health and medical information, other sources are becoming more available to the general public. But nowadays on the basis of the internet, there is an ever-expanding amount of contents and media that are very accessible to the public. The challenge is the validity of this information and the ability of people to recognize the best fit information for them (8). Some skills are required for understanding and applying this information to real-life health issues. These skills are known as health literacy (HL) (9).

World Health Organization (WHO), defines HL as “the cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand, and use information

in ways which promote and maintain good health” (10). Based on this definition a model of HL has been proposed with three levels of functional, communicative, and critical literacy. Individuals may not be able to understand health information adequately because of limited health literacy so Individuals with inadequate HL are likely to adopt unhealthy lifestyles (1, 9) and these people experience 1.5 to 3.5 times more unpleasant health outcomes (11).

Appropriate health literacy can be a key healthy lifestyle determinant (12). Although there are limited studies done to assess the association between HL and healthy lifestyle and most of them are from developed countries or have not been considered health literacy in different aspects (13-17). Therefore, the information in this field is limited in undeveloped and developing countries. It is not clear whether in these countries a multidimensional factor such as health literacy plays a key role in adopting healthy behaviors and healthy lifestyles. Therefore, in this study, we want to describe the health-promoting lifestyle behaviors among people and attempt to find the answer to the question of ‘do people with higher health literacy have better health-promoting behaviors?’

Materials and Methods

This cross-sectional study was conducted with 402 adults in Bushehr district, south of Iran, in 2017. This study funded by the deputy of research and prior to recruiting participants and collecting data, we received ethical approval to conduct this study from Bushehr University of Medical Sciences in Iran (IR.BPUMS.REC.1395.124).

Study population and setting:

This study was conducted from February to June 2017. For this study based on the formula of correlation, considering $r=0.22$ (18), type I error $\alpha=0.05$ and power $1-\beta=0.9$, a sample of at least

213 were required. By adding the sampling design effect 402 people entered the study. The sampling method in this study was two-stage cluster sampling. That way a simple random sampling technique was applied to choosing the 5 centers from 10 health centers in Bushehr randomly and then adults referring to health care centers were recruited by convenience sampling. All participants were informed of the purpose of the study and were assured of confidentiality. During the study period, a total of 432 individuals referred to the health centers in the city of Bushehr (south of Islamic Republic of Iran), thirty people patients dropped out because they were not eligible and didn't agree to participate and returned the survey. Ultimately the final sample comprised of 402 adults. In this study the inclusion criteria were: (1) being over the age of 18 (2) having a proper physical condition and absence of disease or illness to be interviewed (3), the absence of cognitive problems and mental disease that hinder the interview, (4) willingness to participate in the study and, exclusion criteria were partially completed questionnaires.

Instrumentation:

Socio-demographic characteristics:

Socio-demographic attributes, including age, gender, marital status, educational, level and material circumstances were collected. Educational level was categorized into four: (1) illiterate (2) primary school (1–5 years of schooling), (3) secondary/high schooling (6–12 years of schooling) and (4) education above high school. Self-evaluation of the health status was categorized into four: (1) poor (2) average, (3) good and (4) excellent. The research questionnaires were collected through face-to-face interview with the subjects.

The multidimensional scale of Health Literacy:

To assess health literacy skills a Persian version of the multidimensional scale of Functional, Communicative and Critical Health Literacy (FCCHL)(8), developed by Ishikawa et al (19) was used. This 14-item tool measures all three dimensions of HL introduced by Nutbeam (20) (five items for functional HL, five items for communicative HL, and four for critical HL subscale). Responses to this measure rated on a four-step Likert ranging from 'never' to 'often'. For functional HL, scores were recorded (higher scores indicating higher levels of HL). To calculate the score of each dimension, the score is summed and then divided into the number of items in that dimension. In the original version of the scale the total Cronbach's α reported 0.78 and for the functional, communicative and, critical dimensions were = 0.84, 0.77 and 0.65 respectively. For the Persian version of the tool test–retest reliability coefficient was 0.85 ($p < 0.01$). This tool also showed satisfying internal consistency for total, functional, communicative and, critical dimensions with Cronbach's α = 0.82, 0.91, 0.80, 0.76 respectively.

Health-promoting lifestyle profile II:

A Persian version of the Health Promotion Lifestyle Profile II (HPLP-II) (21), an instrument providing a multidimensional assessment of health-promoting behaviors, developed by Walker et al (22), was used to assess the healthy lifestyle behaviors of individuals in this study.

This tool measures health-promoting lifestyles by concentrating on perceptions and behaviors that preserve or improve the level of wellness, self-actualization, and fulfillment of the individual. HPLP-II consists of 52-item in six subscales as follows: nutrition (9 items), physical activity (8 items), health responsibility (9 items), stress management (8 items), interpersonal relations (9 items), and spiritual growth (9 items).

“Health responsibility” includes attending to and accepting responsibility for one’s own health and being educated about health and seeking professional assistance when necessary. “Physical activity” is adhering to regular exercise patterns and nutritional habits include establishing meal patterns and making food choices. “Spiritual growth” includes attaining self-actualization and fulfillment. “Interpersonal relations” deal with the maintenance of relationships involving a sense of intimacy and closeness. “Stress management” includes both recognizing the sources of stress and taking action to control stress and achieve relaxation. The questionnaire asks respondents to indicate how often they adopt specific health-promoting behaviors or well-being habits on a 4-point Likert scale ranging from never (1), sometimes (2), often (3), and routinely (4). Therefore, the total questionnaire score ranges between 52 and 208. The HPLP-II has been used widely in health-promotion research and according to a series of studies have validity and reliability for use among various populations(21, 23-26).

Statistical analysis:

The data obtained from a total of 402 completed questionnaires. Descriptive statistics were used to examine the characteristics of the sample. The associations between health-promoting behaviors scores and quantitative variables were analyzed using the Pearson and Spearman correlation test. T-test and one-way ANOVA were used to examine the relationship between health-promoting behaviors scores and qualitative factors. Multiple linear regression model was also applied to assess the relationships between health-promoting behaviors scores and each of the variables after controlling for the presence of the others. All statistical analyses were performed using R statistical software (version 3.3.2). In all tests, the level of significance was <0.05.

Results

Description of the Sample

Table 1 presents the sample characteristics. The mean age of the participants was 37.05± 11.81 (minimum 15 and maximum 90) consisting of 58.5% females, 49.0% have more than high school education and 77.1% were married.

Table1. The Characteristics of the Respondents and Descriptive Findings

| Characteristics | Values |
|--------------------------------|--------------|
| Age, (Mean±SD) | 37.05± 11.81 |
| Range | 15-90 |
| Sex, No. (%) | |
| Male | 167(41.5) |
| Female | 235(58.5) |
| Education, No. (%) | |
| Illiterate | 17(4.2) |
| Primary Schooling | 20(5) |
| Secondary schooling | 47(11.7) |
| High school | 121(30.1) |
| Above high school | 197(49) |
| Socio-economic status, No. (%) | |
| low | 46(11.4) |
| Moderate | 225(56) |
| Good | 123(30.6) |
| Very good | 8(2) |
| Employment status No. (%) | |
| Employed | 449(86.8) |
| Unemployed | 53(13.2) |
| Health status No. (%) | |
| Poor | 14(3.5) |
| Moderate | 123(30.6) |
| Good | 221(55) |
| Excellent | 44(10.9) |

Study findings revealed that the mean and the standard deviation of the total score of health-promoting behaviors were 138.69 ± 21.53. The

highest through lowest mean scores were seen consecutively in spiritual growth (32.62±6.03 Individuals obtained 74.14% of the score in this subgroup), nutrition (20.73±4.26 obtained 74.05% of the score), interpersonal relations (23.29 ± 4.23 obtained 72.79% of the score), health responsibility (33.75 ± 7.24 obtained 64.91% of the score), stress management (13.88 ± 3.15 obtained 57.86% of the score) and physical activity (14.4 ± 5.28 obtained 51.43% of the score) (Table2).

Table 2. Means, Standard Deviations and possible range of Constructs and HPLP.

| Variables | Mean ± SD | Possible range |
|---|----------------|----------------|
| health responsibility | 33.75 ± 7.24 | 13-52 |
| physical activity | 14.4 ± 5.28 | 7-28 |
| nutrition | 20.73 ± 4.26 | 7-28 |
| spiritual growth | 32.62 ± 6.03 | 11-44 |
| interpersonal relations | 23.29 ± 4.23 | 8-32 |
| stress management | 13.88 ± 3.15 | 6-24 |
| Health-promoting life-style (Total score) | 138.69 ± 21.53 | 52-208 |

The mean scores for each HL subscale are shown in Table 3. The mean and the standard deviation of a total score of health-literacy were 3.2 ± 0.48 (possible range was 1-4). Among the HL subscales, communicative HL and critical HL were highly correlated (r = 0.631, p< 0.001).

Table 3. Means, Standard Deviations, and Correlations among health literacy subscales.

| Correlation coefficients | | | | |
|--------------------------|-------------|---------------|-------------------|-------------|
| | Mean ± SD | Functional HL | Communi-cative HL | Critical HL |
| Functional HL | 3.1 ± 0.74 | 1 | | |
| Communicative HL | 3.25 ± 0.59 | 0.111* | 1 | |
| Critical HL | 3.26 ± 0.66 | 0.156** | 0.631*** | 1 |

Pearson's correlation coefficients are shown. *p < 0.05; **p < 0.01; ***p < 0.001. The score range was 1-4 for HL.

Relationships between variables and different characteristics.

According to the results of this study, there was a significant relationship between age and level of functional (r= -0.263, P <0.001), communicational (r= 0.154, P = 0.002) and critical (r= -0.137, P = 0.006) health literacy. So that with increasing the age of the respondents, the mean score of the functional health literacy decrease and communicational and critical health literacy scores increase. The level of functional (P <0.001) and critical (P <0.01) health literacy were higher in people with higher education level. In this study, there was a significant relationship between gender and level of functional (P <0.05) and critical (P <0.05) health literacy. As women had more functional and critical health literacy compared to men. Also, in individuals who judged their economic status better, the level of health literacy was higher in functional health literacy (P =0.028) (Table 4).

Age (P <0.001) and socioeconomic status (P <0.001) were related to adherence to health-promoting behaviors as individuals with higher age, as well as those who judged their socioeconomic status better, had better compliance with health-promoting behaviors. In this study, gender and education level were not related to health-promoting behaviors.

health literacy and Health-promoting behaviors

Table 4 shows the results of the regression analyses to predict aspects of health-promoting behaviors by health literacy domains. Based on the results all the health literacy domains were predictors. Health literacy made small to moderate contributions (2–13%) to the variance in outcome measures when demographic characteristics were taken into account. In general, participants with better health literacy skills are thus more likely to exhibit better Health-promoting behaviors. Functional health literacy contributed to better health responsibility (β= 1.589, P < 0.01), stress management (β= 0.548, P < 0.05), and spiritual

Table 4. Bivariate relationships between sample characteristics and health literacy.

| Total HL score | | | Critical HL | | | Communicative HL | | | Functional HL | | | |
|----------------|-------|-------------|-------------|------|-------------|------------------|------|-------------|---------------|--------|-------------|---------------------------------|
| p | r | Mean± SD | p | r | Mean± SD | p | r | Mean± SD | p | r | Mean± SD | |
| <0.001 | 0.308 | | <0.001 | .137 | | <0.001 | .154 | | <0.001 | -0.263 | | Age |
| | | | | | | | | | | | | Sex |
| 0.007 | | 3.129±0.485 | 0.040 | | 3.182±0.646 | 0.083 | | 3.194±0.621 | 0.042 | | 3.011±0.686 | Male |
| | | 3.261±0.479 | | | 3.321±0.679 | | | 3.299±0.577 | | | 3.164±0.783 | Female |
| | | | | | | | | | | | | Educational Level |
| <0.001 | | 2.862±0.664 | 0.006 | | 3.456±0.863 | 0.191 | | 3.212±0.760 | <0.001 | | 1.918±1.042 | Illiterate |
| | | 3.115±0.506 | | | 3.525±0.405 | | | 3.320±0.529 | | | 2.500±0.912 | Primary Schooling |
| | | 3.006±0.555 | | | 3.021±0.840 | | | 3.115±0.663 | | | 2.881±0.702 | secondary schooling |
| | | 3.169±0.491 | | | 3.182±0.705 | | | 3.202±0.642 | | | 9.389±0.712 | High school |
| | | 3.317±0.409 | | | 3.329±0.578 | | | 3.319±0.538 | | | 3.302±0.579 | Above high school |
| | | | | | | | | | | | | Perceived Socio-economic status |
| 0.183 | | 3.267±0.476 | 0.830 | | 3.358±0.534 | 0.499 | | 3.086±0.696 | 0.028 | | 3.357±0.749 | low |
| | | 3.131±0.518 | | | 3.230±0.711 | | | 3.221±0.618 | | | 2.943±0.794 | Moderate |
| | | 3.228±0.458 | | | 3.266±0.651 | | | 3.270±0.576 | | | 3.149±0.705 | good |
| | | 3.288±0.516 | | | 3.318±0.683 | | | 3.332±0.619 | | | 3.213±0.770 | Very good |

growth ($\beta = 0.976$, $P < 0.05$). It means that every additional 1 point on the functional health literacy scores was associated with 1.589, 0.548 and 0.976 points in health responsibility, stress management, and spiritual growth scores respectively. Critical health literacy made a significant contribution to health responsibility ($\beta = 2.193$, $P < 0.001$), physical activity ($\beta = 1.273$, $P < 0.05$), and spiritual growth ($\beta = 1.732$, $P < 0.001$) and communicative health literacy showed the significant correlations with nutrition ($\beta = 1.273$, $P < 0.001$), and health responsibility ($\beta = 2.033$, $P < 0.01$). All aspect of health literacy were significant predictors of health responsibility and none of them predict interpersonal relations.

Discussion

In this study, our aim was to investigate the relationship between health literacy and

adherence to health-promoting behaviors. In fact, we were looking for an answer to the question of whether people with higher health literacy have a healthier lifestyle. Based on the findings of this study, the highest level of health literacy was related to critical health literacy and the least was related to functional health literacy. The Health literacy level of the participants in this study was generally similar to those reported in other studies of health literacy levels. As in Heijmans et al study(27), among the health literacy dimensions, critical literacy and communicational health literacy were approximately at the same level and had higher levels in comparison to functional health literacy. This result has coincided with a study that was don in Iranian population (28) and contrasted with another study (27).

According to Nutbeam, health literacy has

Table5: Results of multiple regression analysis to predict aspects of Health-promoting lifestyles.

| | nutrition | | physical activity | | health responsi- bility | | stress management | | spiritual growth | | interpersonal relations | | Health-promoting lifestyle (Total score) | |
|-------------------------------------|-------------------|-------------------|-------------------|-------------------|----------------------------|-------------------|----------------------|-------------------|--------------------|--------------------|----------------------------|--------------------|--|--------------------|
| | β Model1 | β Model2 | β Model1 | β Model2 | β Model1 | β Model2 | β Model1 | β Model2 | β Model 1 | β Model 2 | β Model 1 | β Model 2 | β Model 1 | β Model 2 |
| Step 1 | | | | | | | | | | | | | | |
| Age | 0.07*** | 0.06** | 0.02 | 0.02 | 0.09** | 0.05 | 0.03* | 0.03* | 0.05 | 0.03 | 0.05** | 0.04* | 0.34*** | 0.25** |
| Sex | | | | | | | | | | | | | | |
| Male | Referent | Referent | Referent | Referent | Referent | Referent | Referent | Referent | Referent | Referent | Referent | Referent | Referent | Referent |
| Female | 1.28** | 1.07* | -1.15* | -0.45** | 3.06*** | 2.18** | -0.31 | -0.46 | -0.87* | -1.42* | 0.19 | -0.05 | 2.19 | -0.14 |
| Educational Level | | | | | | | | | | | | | | |
| Illiterate | Referent | Referent | Referent | Referent | Referent | Referent | Referent | Referent | Referent | Referent | Referent | Referent | Referent | Referent |
| Primary Schooling | -0.34 | -0.33 | -0.99 | -1.62 | -1.57 | -3.03 | 0.73 | 0.31 | -0.32 | -1.23 | 0.96 | 0.64 | -1.53 | -5.26 |
| secondary school- ing | 0.41 | 0.67 | 2.58 | 2.11 | 1.29 | 0.02 | 1.49 | 1.00 | 0.27 | -0.38 | -0.56 | -0.78 | 5.50 | 2.64 |
| High school | -1.04 | -0.87 | 2.66 | 1.94 | 1.59 | -0.25 | 1.20 | 0.59 | -1.12 | -2.18 | -0.40 | -0.77 | 2.88 | -1.54 |
| Above high school | -1.62 | -1.62 | 1.58 | 0.59 | 1.51 | -1.08 | 0.78 | 0.04 | -1.03 | -2.55 | -0.31 | -0.89 | 0.90 | -5.52 |
| Perceived Socio- economic status | | | | | | | | | | | | | | |
| low | Referent | Referent | Referent | Referent | Referent | Referent | Referent | Referent | Referent | Referent | Referent | Referent | Referent | Referent |
| Moderate | 1.69* | 1.46* | 1.26 | 0.89 | 2.17 | 1.14 | 0.91 | 0.72 | 3.66*** | 3.01** | 0.66 | 0.38 | 10.37** | 7.62* |
| good | 1.94* | 1.46 | 2.56** | 2.02* | 2.78* | 0.91 | 1.70** | 1.40* | 6.52*** | 5.42*** | 1.54 | 0.99 | 17.07*** | 12.22** |
| Very good | 3.18* | 3.03 | 6.45** | 5.39** | 4.44 | 2.20 | 4.45*** | 3.88** | 6.65** | 5.13* | 2.97 | 2.46 | 28.17*** | 22.11** |
| Step 2 | | | | | | | | | | | | | | |
| Functional HL | | -0.19 | | 0.73 | | 1.58** | | 0.54* | | 0.97* | | 0.29 | | 3.93** |
| Communicative HL | | 1.20** | | -0.09 | | 2.03** | | -0.01 | | 0.86 | | 0.83 | | 4.83* |
| Critical HL | | 0.41 | | 1.27* | | 2.19*** | | 0.43 | | 1.73** | | 0.55 | | 6.60*** |
| Adjusted R2 | 0.09*** | 0.13*** | 0.05** | 0.08*** | 0.05*** | 0.18*** | 0.04** | 0.06*** | 0.09*** | 0.17*** | 0.03* | 0.06*** | 0.07*** | 0.18*** |

*** P<0.001. ** P<0.01. * P<0.05

a hierarchy in three dimensions: functional, communication, and critical. Therefore, according to him, the functional dimension usually has the highest level and critical dimension of health literacy has the lowest level in individuals(20). While in our study, on the contrary, critical health literacy had the highest and the functional health literacy had the lowest level. If we consider health literacy as a two-way concept, with the capability of individuals in one side and the qualities of provided health services in another

side can influence on it; therefore, one of the most important reasons to achieve this result (lower score of functional HL in comparison to critical HL), could be non-standardization of written educational materials that are available in health care system. In fact, the content of written materials that are available in health care settings are usually above the level of perception and understanding of their audience and may have jargons and technical terms. Therefore, sometimes even people with moderate and

high levels of reading abilities are incapable to understand its content. In this regard, the results of a study in Iran showed that educational media designed for diabetes had readability at the university level. That meant it was suitable for people who had completed the first and second years of the university (29). As a result, this condition can be a factor that influenced the answers of the respondents to the functional health literacy questions based on their ability to read and understand health information.

According to other findings of this study, with increasing age, the level of functional health literacy is reduced, and the communicational and critical health literacy is increased. Also, people who rated their socio-economic status better had a higher level of health literacy in the functional domain. Women and those with more years of education had better functional and communicative health literacy. These findings have also been reported in other studies. So, in line with the results of the study In a study by Bilgel et al., older people had a lower level of functional health literacy(30). Also, Heijmans et al. found that people with higher age, lower education, and low income had lower functional, communicative and critical health literacy and women had higher levels of health literacy. The results of this study regarding age and its relationship with functional health literacy were in line with the results of our study. As older people had lower functional health literacy, but contrary to our study people with higher age had less critical and communicational health literacy (27).

In the study of Tsai et al., In contrast to the current study, the lower level of functional health literacy was more prevalent among younger people. The researchers reported this was due to lack of awareness among younger people, from health issues and topics. In this study, in

line with the results of our study, low health literacy was more common in people with less education and low income (14).

In general, the relationship between the age and the level of health literacy has given different results in different studies, but what is most evident in the results of studies is that health literacy decreases with age. This situation is particularly true for functional health literacy. Because of the decline in some physical and cognitive abilities in individuals, especially at an older age, people's ability to read, comprehend, and calculate functional skills related to health literacy is diminished. But given that communicational HL that enables individuals to receive information from various communication channels or critical HL skills that enable individuals to analyze and use the information to better manage life events, could be a result of the experience that increases with age, so that these levels of health literacy can be expected in people of higher ages. However, due to the fact that in few studies the three levels of health literacy and their relationship with age have been evaluated, more research is needed to examine the relationship between age and health literacy levels.

In the present study, the mean score of health-promoting behaviors indicates that participants in this study had a moderate level of health-promoting behaviors. In the study by Acton et al., who evaluated the status of health-promoting behaviors using the same tools as the current study, the average score of health-promoting behaviors was very close to the results obtained in our study (31). In general, the rate of compliance with health-promoting behaviors in different studies and in terms of the characteristics of the samples studied has a different range. This amount in the Harooni et al., a study on elderly was more than the present study (32), and in the

study by Chenary et al., which was performed on chemical warfare veterans was less (33). The probable reason for this contradiction can be the specific characteristics of the study group in the research.

Along with other studies (34), the results of our study showed that older people had better health-promoting behaviors. Improvement in the status of adherence to health-promoting behaviors by increasing age has also been reported in other studies (35, 36). On the other hand, in some studies, there was no significant relationship between health-promoting behaviors and age(31). The results obtained in our study can indicate the positive impact of life experiences as a factor affecting the behavior of individuals. This means that young or middle-aged people are usually employed and are less likely to perform health-promoting behaviors due to less time and job fatigue. While older people who are not employed or retired, they have a greater chance of performing health-promoting behaviors. Other results of the present study indicated that those who assessed their socio-economic status higher did more health-promoting behaviors. These results were also found in the research by Acton et al (31). Based on this finding, consideration to lower-income individuals who are less likely to perform health-promoting behaviors is necessary for educational interventions.

In this study, the maximum and minimum scores of health-promoting behaviors was in spiritual growth and physical activity domains respectively. In a study conducted on patients with type II diabetes in Isfahan, Iran(37), the best performance belonged to spiritual growth and the weakest performance belonged to physical activity, which is consistent with the current study. Similar results reported in other studies(38). It seems that most of the people have not had accurate and comprehensive information about

advantages of regular exercise and may lack essential motivators for physical activity and it is necessary to pay attention to this issue in educational interventions.

The results of this study also showed that all areas of health literacy had a direct and meaningful relationship with health-promoting behaviors and also independently predicted health-promoting behaviors. In line with the results of this study, in Thai et al., (14) Taiwanese women with higher health literacy also had better compliance with their health-promoting behaviors. In a study by Wagner et al., There was a direct and significant relationship between health literacy and some healthy behaviors such as physical activity and consumption of at least 5 units of fruit and vegetable daily (13). In a study by Kolnik et al., students with higher health literacy levels, performed more healthy behaviors such as eating breakfast, adequate sleep, stress management, healthy eating, and preventive behaviors (39). Based on this, it seems that the development of comprehensive programs for improving the health literacy of the people as well as paying attention to the level of health literacy of people to develop and implement educational interventions to promote the lifestyle of individuals can have positive effects.

Based on the findings, among the different levels of health literacy, critical HL had more, and functional HL had a less predictive role of health-promoting behaviors. these findings are inconsistent with the results of Yang et al., study (40). as processing involved in functional and communicational health literacy does not involve as deeply with issues as critical health literacy, a lower effect of these two levels on health-promoting behaviors is rational. Making decisions about health issues requires evaluating obtained information. This evaluation is a part of critical health literacy as a more advanced

cognitive skill compares to the functional and communicative level. It seems that the reason for more influence of the critical health literacy on health-promoting behavior is related to the more deeply processing and evaluating health information by the individuals.

Other results of this study showed that although all three levels of health literacy were predictive of health responsibility, none of them had predicted interpersonal relationships as the areas of health-promoting behaviors. In our study, functional health literacy was identified as the most important predictors of health responsibility, stress management, and spiritual growth. Critical health literacy made a significant contribution to health responsibility, physical activity, and spiritual growth and communicative health literacy was an important and determinant factor in nutrition and health responsibility. These results have also been reported in other studies. However, according to the results of this study and other studies, all health-promoting behaviors cannot be related to the level of health literacy among individuals (41). Therefore, further studies are needed to confirm the link between health literacy and health-promoting behaviors.

Limitations

The present study had some limitations. First, the data were collected through a self-reporting method, possibly affecting the accuracy of the results. Second, by using nonprobability sampling methods (convenience), the generalizability of this study's findings is limited. Third, this was a cross-sectional study, and conclusions about causality health literacy and health-promoting behaviors cannot be drawn.

Conclusion

The results of this study revealed that individuals with higher critical health literacy engage better

in health-promoting behaviors. Therefore, health education and promotion intervention programs should focus on empowering people with critical health literacy skills to enhance the health-promoting behaviors of the population. This empowerment will happen throughout a well-designed multidimensional approach intervention that delivers health information tailored to the level of health literacy of the individuals in this manner, the potential of all three levels of the health literacy of individuals will be used to direct them to a better lifestyle.

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