Original Article

# The Relationship between Health Literacy Dimensions and Perceived Risk of Cardiovascular Disease in Middle-Aged Iranian Women

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## Abstract

**Background:** The purpose of the study was to investigate the relationship between health literacy dimensions and the perceived risk of cardiovascular disease in middle-aged Iranian women. **Materials and Methods:** This is a descriptive-correlational study in which 280 women aged 40–60 years were investigated by random cluster sampling out of seven health centers in Yazd city in 2018. Data collection tools included predesigned demographic information from a standard Health Literacy for Iranian Adults (HELIA), and a standard perceived susceptibility and perceived risk components of the preventive behaviors of cardiovascular disease questionnaire. The data were analyzed using one-way ANOVA, independent t-test, Kruskal-Wallis, and Mann Whitney tests. **Results:** A significant relationship was identified between demographic information and health literacy ($p < 0.001$). The mean (SD) scores of the perceived risk of cardiovascular disease and health literacy appeared to be 30.71 (5.10) and 35.62 (15.32), respectively. The perceived risk of cardiovascular disease in the participants turned out to be significantly correlated with the accessibility dimension of health literacy ($r = 0.31$, $p < 0.001$), but it failed to have any significant relationship with demographic information, especially obesity. **Conclusions:** As there is a significant relationship between health literacy and perceived risk of cardiovascular disease, hence increasing the health literacy of middle-aged women, especially in persons with high body mass index through the media and health centers, considered as an important source of health information, can be an appropriate task to augment the perceived risk of cardiovascular diseases.

**Keywords:** *Cardiovascular diseases, health literacy, Iran, middle aged*

## Introduction

Cardiovascular disease is the world's leading cause of death. According to the World Health Organization's 2020 report, in 2019, 8.9 million people worldwide died of heart disease[1] and "According to Global Burden of Diseases (GBD)'s previous reports in 2010 and 2015, cardiovascular disease was the first leading cause of mortality and disability-adjusted life years (DALYs) that led to 46% of all deaths and 20%–23% of the burden of diseases in Iran."[2] Most people are unaware of the risk factors that contribute to cardiovascular disease and may thus experience some irreversible cardiovascular events. Based on the findings of several investigations, it has been proven that primary and secondary preventions play a critical role in reducing the risk of cardiovascular disease. In this regard, the effective role of health literacy as an important component in the management of chronic diseases such as cardiovascular disease has been identified to decrease the relevant risk factors.[3,4] Health literacy is described by the Institute of Medicine as "the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions."[4]

Studies have shown that low levels of health literacy are directly related to old age, low income, and less academic education.[5,6] Moreover, low health literacy reduces people's participation in educational programs held in the health centers as well as the use of the services. In addition, a lack of preventive behaviors can delay the early diagnosis of disease and increase morbidity and mortality resulting from chronic diseases.[7] In several studies, health literacy levels of different age groups have been investigated the results of which represent health literacy standing lower in



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middle-aged and elderly than in other age groups.[8] On the basis of the investigations conducted by the United States Health Care Center, 56.20 percent of middle-aged people bear poor health literacy, and 60 percent of people in Canada have inadequate health literacy.[9] While numerous studies have addressed the issue of health literacy and its impact on diseases, a score of studies have identified reading skill as a major factor in triggering this capacity. However, reading skills are only one component of health literacy; other health literacy skills should also be taken into consideration.[10,11]

In this study, middle-aged women (according to the definition of the World Health Organization, women aged 45 to 60 years)[12] were selected because after menopause and by the disappearance of the protective effect of estrogen and lack of a healthy lifestyle in postmenopausal women, the risk of cardiovascular disease increases, so that changing behaviors and lifestyle patterns seem to be necessary for these women.[13] "A health belief model can be used to assess the perceived risk of these individuals. This model is one of the models that can be used at the individual level to change behavior, which is used to identify behavior and create new behaviors in society. According to this model, if people see themselves as prone and sensitive to a situation (perceived sensitivity) and believe that the situation is potentially dangerous for them and can have a negative consequence (perceived severity) and are also on the conviction that by doing a number of steps they can reduce these risks, and also think that following this steps (benefits perceived) will outweigh the barriers to showing that behavior (such as time and cost) (perceived barriers), they will demonstrate risk prevention behavior.[14] And, as we failed to find any study to tap the impact of health literacy dimensions on cardiovascular risk perception and in regard to the importance of the issue in women, this study was designed to investigate the relationship between health literacy dimensions and perceived risk of cardiovascular disease in middle-aged women.

## Materials and Methods

This is a cross-sectional study conducted in January–March 2018 on 280 women aged 40–60 years in Yazd, Iran. Initially, seven health centers were selected by cluster random sampling out of 28 health centers of Yazd city, and then 40 middle-aged women were opted from each health center. To select samples, with the help of the Samane-sib (The system for accessing clients' information in Iranian health centers), the list of middle-aged women was first accessed, and by systematic random sampling, the selected individuals were contacted, and the samples were then invited to the centers to complete a questionnaire. All the subjects completed the questionnaire, that is, there was no missing data. All the participants also signed the informed consent form after receiving an explanation of the objectives of the study. Finally, according to the formula and based on a published article by Meshki *et al*.[15] the sample size was determined to equal 230 with 95% confidence, 80% power, 20% correlation coefficient, and 20% drop rate; however, for obtaining a higher precision, 280 people were finally studied.

Inclusion criteria comprised the ability to read and write, no vision problems, no history of congenital cardiovascular disease (based on what the subjects expressed), and the use of related medications. Three questionnaires were used for data collection: 1- predesigned demographic information form including questions about age, education, occupation, marital status, height and weight, and way of accessing health information. 2- a standard Health Literacy for Iranian Adults (HELIA) questionnaire (18-65 years old) containing 33 questions in 5 domains (reading range comprising 4 questions with a score of 4-20, accessibility domain containing 6 questions with a score of 6-30, perception including 7 questions with a score of 7-35, evaluation containing 4 questions with a score of 4-20, decision making and behavior consisting of 12 questions with a score of 12–60. Totally, the minimum score leveled at 33 and the maximum at 165. To calculate the total score, the following procedure was used: Subscale scores (based on a range of 0 to 100) summed over and then was divided by the number of subscales. In this formula, the raw score obtained – minimum possible raw score divided by the maximum possible score – minimum possible score × 100 was used to obtain the subscale score. The total health literacy scores were as the following: 0-50 as inadequate, 50.10–66 as not well adequate, 66.10-84 as sufficient, and 84.10–100 as excellent health literacy. The questionnaire was designed by Montazeri *et al*., and the validity and reliability of this questionnaire were confirmed by the same researchers. Cronbach's alpha coefficients appeared to be 0.72 to 0.89[16] 3- The section on perceived susceptibility and perceived severity from the standard questionnaire on Preventive Behaviors of Cardiovascular Disease was designed by Meshki *et al*.[15] The questions related to the constructs of the Health Belief Model contain six domains (perceived susceptibility, perceived severity, perceived benefits, perceived barriers, practice guide, and behavior, each comprising 6, 5, 6, 4, 2, and 5 questions, respectively). Perceived susceptibility and perceived severity sections of the questionnaire were used to collect information concerning the perceived risk of cardiovascular diseases. The rating of the questionnaire is as the following: In terms of perceived susceptibility and perceived severity, the completely opposite perspective receives score 1; disagree, score 2; agree, score 3; and strongly agree, score 4. According to the questionnaire, the perceived heart disease risk score range is 11-44: low risk perception, 11-22; moderate to high risk, 22-33; and high-risk perception, 33 to 44. Additionally, the reliability and validity of the questionnaire have been confirmed by some health education specialists in Meshki's *et al*. study in which Cronbach's alpha coefficient for perceived susceptibility and severity questions was

0.70 and 0.79, respectively.[15] The data were analyzed using SPSS-16 (SPSS Inc, Chicago, IL). Normal distribution of the data was evaluated using the Kolmogorov Smirnov test, and health literacy data were of normal distribution ($p > 0.05$); however, the data on perceiving cardiovascular disease risk failed to be normally distributed. One-way ANOVA and independent t-test were used for normal distribution of the data, whereas Kruskal-Wallis and Mann Whitney test were applied for non-normal data.

### Ethical considerations

The study was approved by the ethics committee of Shahid Sadoughi University of Medical Sciences in Yazd, Iran (code: IR.SSU.SPH.REC.1397.106). All the participants signed the informed consent form.

## Result

By studying 280 middle-aged women in Yazd city who had obtained the inclusion criteria, it was revealed that most of the subjects were in the age range of 40–45 years, holding diploma (second level in high school), were married, housewife, and overweight based on body mass index, and their source for receiving health information included health practitioners at health centers (46.41%) as well as the media (television, radio, etc.) (45.42%). The mean (SD) score of health literacy was 35.62 (15.32), i.e., it was in the inadequate range. However, health literacy scores were higher in older people, housewives, lower educated individuals, and those with BMI <20 [Table 1]. The mean perceived risk of cardiovascular diseases in the participants was 30.71 (5.10), which showed to be low in 27 (9.64%) participants, moderate in 189 (67.50%), and excellent in 64 (22.85%).

The perception of cardiovascular disease risk, unlike health literacy, was not associated with any of the demographic variables. There was a significant relationship between health literacy and the perceived risk of heart disease. According to the Pearson test, the positive state of the correlation coefficient can be indicative of a weak direct relationship between the variables ($r = 0.20$).

**Table 1: Comparison of the mean score of health literacy and perceived risk of heart disease based on demographic information**

| Variable | no (%) | Health literacy score | | | | | Cardiovascular risk perception score | |
|---|---|---|---|---|---|---|---|---|
| | | Mean (SD) | *p* | *F* | *t* | df | Mean (SD) | *p* |
| Age | | | <0.001* | 5.96 | - | 3 | | 0.971*** |
| 40-45 | 91 (32.50) | 31.55 (14.34) | | | | | 30.43 (5.62) | |
| 46-50 | 77 (27.51) | 35.44 (15.79) | | | | | 30.71 (4.68) | |
| 51-55 | 59 (21.07) | 35.98 (14.71) | | | | | 30.95 (5.25) | |
| 56-60 | 53 (18.92) | 42.45 (14.87) | | | | | 30.96 (4.82) | |
| Education level | | | <0.001* | 12.96 | - | 3 | | 0.067*** |
| Elementary | 74 (26.43) | 42.60 (16.30) | | | | | 30.68 (4.50) | |
| Guidance school | 74 (26.43) | 36.86 (13.89) | | | | | 32.11 (4.42) | |
| Diploma | 77 (27.50) | 33.92 (13.99) | | | | | 29.86 (5.51) | |
| University | 55 (19.64) | 26.94 (12.96) | | | | | 30.11 (5.94) | |
| Occupation | | | <0.001** | 0.04 | -4.66 | 278 | | 0.425**** |
| Employed | 44 (15.72) | 26.08 (14.77) | | | | | 29.82 (6.05) | |
| Housewife | 236 (84.28) | 37.40 (14.78) | | | | | 30.89 (4.93) | |
| Marital status | | | 0.313** | 0.00 | 1.01 | 278 | | 0.417**** |
| Married | 268 (95.72) | 35.81 (15.36) | | | | | 30.78 (4.90) | |
| Single | 12 (4.28) | 31.25 (14.43) | | | | | 29.25 (8.94) | |
| Body Mass Index (BMI) | | | 0.039* | 2.83 | - | 3 | | 0.632*** |
| <20 (Underweight) | 4 (1.43) | 48.22 (16.75) | | | | | 33 (3.55) | |
| 25-20 (normal) | 67 (23.93) | 32.14 (14.91) | | | | | 29.54 (5.96) | |
| 25.1-30 (overweight) | 118 (42.14) | 35.35 (16.62) | | | | | 31.14 (4.97) | |
| 30 (obese) | 91 (32.50) | 37.98 (16) | | | | | 30.93 (4.63) | |
| Sources of receiving health information | | | 0.015* | 3/13 | - | 4 | | 0726*** |
| Ask doctor and health care staff | 130 (46.41) | 36.53 (14.67) | | | | | 30.86 (4.31) | |
| Internet, satellite networks, telephone, radio, and television | 128 (45.42) | 33.80 (15.82) | | | | | 30.41 (5.81) | |
| Newspapers, magazines, booklets, pamphlets, educational brochures | 6 (2.29) | 28.39 (13.10) | | | | | 28.17 (6.67) | |
| Ask friends and acquaintances | 13 (4.69) | 42.90 (11.14) | | | | | 33.31 (4.71) | |
| I do not know how to get the information I need | 3 (1.19) | 56.62 (19.48) | | | | | 31.67 (2.08) | |

*ANOVA, **Independent sample *t*-test, ***Kruskal-Wallis one-way analysis of variance, ****Mann-Whitney *U*

The results of the Pearson test demonstrated a direct and significant correlation between all dimensions of health literacy; the highest relationship appeared between accessibility and perception ($r$ = 0.60), accessibility and reading ($r$ = 0.60) as well as, comprehension and reading ($r$ = 0.60) [Table 2]. The results also exhibited the perception of cardiovascular risk in individuals being significantly correlated with the accessibility dimension of health literacy ($r$ = 0.31) [Table 3]. The findings illustrate the capacity of the constructs mentioned to predict 13.20% of cardiovascular disease risk perception ($R^2$ = 0.13).

## Discussion

This study aimed to determine the relationship between health literacy dimensions and the perceived risk of cardiovascular disease in middle-aged women in Yazd. The findings demonstrated the majority of subjects bearing inadequate health literacy (83.60%) and moderate perceived risk of cardiovascular disease (67.50%). The results of most studies on the level of health literacy in the adults' group indicate an inadequate level of health literacy in these people thus being in line with those of ours.[17,18] The results of a systematic review of 60 studies on adults revealed a low level of health literacy in these individuals.[19] According to our results, with increasing age, the mean perceived risk score for cardiovascular disease also increases, but not showing statistical significance. In a study, the presence of high cholesterol level in the age range at which the risk of heart disease increases was mentioned as an effective factor in augmenting the perceived

risk of cardiovascular disease and thus inducing healthy changes in life.[20] On the basis of these findings, it can be said that with increasing age, the level of experience related to people's health accelerates. However, as the mean health literacy score in subjects was inadequate, the impact of other critical factors such as access to health resources and using health information to improve the perceived risk of cardiovascular disease should also be taken into consideration.

In terms of education level, the results did not project a statistically significant relationship between the level of education and the mean perceived risk score for cardiovascular disease. However, a statistically significant relationship was observed between increasing the level of education and lower health literacy of the individuals, that is, bearing a higher level of education, evaluating information, and making better health decisions can assist in elevating health literacy. Many studies have highlighted the importance of the issue and its effective relevance.[21,22] However, in the present study, this relationship was found to be inverse; the result of our study is in line with a study reporting that although most of the subjects were highly educated, health literacy was reported to be inadequate, stating that health literacy fails to accord with education despite a strong correlation with it. This means that daily study in the field of work or study in leisure time can have a positive effect on health literacy, and this shows that habits related to increasing information in daily life can help health literacy and compensate for the low level of education.[23] In this study, it appears that the presence of housewives at home and the use of television as a source of health information as well as more contact of housewives with health center staff must have contributed to these outcomes.

However, the mean health literacy score of housewives was higher than that of working women, and this finding can be due to the greater number of housewives in the sample size,

**Table 2: Coefficient correlation* of health literacy dimensions and perceived risk of cardiovascular disease**

| Variables | Reading | Accessibility | Perception | Evaluation | Decision Making and Behavior | Cardiovascular disease risk perception |
|---|---|---|---|---|---|---|
| Reading | 1 | 0.60 | 0.60 | 0.40 | 0.35 | 0.27 |
| Accessibility | 0.60 | 1 | 0.60 | 0.47 | 0.42 | 0.31 |
| Perception | 0.60 | 0.60 | 1 | 0.57 | 0.45 | 0.27 |
| Evaluation | 0.40 | 0.47 | 0.57 | 1 | 0.45 | 0.27 |
| Decision making and use of health information | 0.35 | 0.42 | 0.45 | 0.45 | 1 | 0.23 |
| Cardiovascular disease risk perception | 0.27 | 0.31 | 0.27 | 0.27 | 0.23 | 1 |

*Pearson correlation coefficient

**Table 3: Predictive structures of health literacy for perception cardiovascular disease risk (Multiple linear regression analysis)**

| Constructs | β coefficient | 95% confidence interval for β coefficient | Standard error | *p* |
|---|---|---|---|---|
| Reading | 0.02 | 0.01-0.08 | 1.10 | 0.27 |
| Accessibility | 0.03 | 0.01-0.16 | 2.10 | 0.03 |
| Perception | 0.00 | 0.02-0.02 | 0.26 | 0.79 |
| Evaluation | 0.02 | 0.01-0.12 | 1.69 | 0.09 |
| Decision making and use of health information | 0.02 | 0.02-0.06 | 1.03 | 0.30 |
| Total regression model | 26.39 | - | 35.02 | <0.000 |

more opportunities to participate in training sessions and classes, use of television (TV) educational programs, and the like,[24] but this health literacy failed to contribute to a greater perceived risk of cardiovascular disease in the subjects.

The majority of the participants were married and had a higher mean score of health literacy and perceived risk of cardiovascular disease than single individuals, but no statistically significant difference was observed between the two groups. The results of another study are also consistent with those of ours.[25]

In the present study, 74.60% of people were overweight and obese, and the mean score of the perceived risk of cardiovascular disease was not related to body mass index, but there was a significant relationship between health literacy and lower body mass index [Table 1]. Other studies have pointed to the direct relationship between health literacy and reduced body mass.[26,27] In another study, with an increasing level of knowledge, body mass decreased, and the perceived risk of heart disease accelerated.[26] Unfortunately, although obesity is a major risk factor for cardiovascular disease, it seems that due to low health literacy levels, participants in this study do not have a good perceived awareness of their high-risk situation and thus fail to act properly. Also, it seems that the existence of a mediating factor such as lack of access to sports clubs at a suitable time for women, lack of access to walking areas, or the use of high-calorie diet and consumption of sweets in Yazd city has played an effective role in not using people's health knowledge. Awareness of the importance of lifestyles such as nutrition and physical activity training, behavior therapy, and motivational interviewing is essential to strengthening health literacy and weight loss. Therefore, the need for self-care education becomes obvious to people.[28]

In the present study, the mean score of health literacy was significantly associated with sources of health information, and also the source of health information for the majority of the subjects was first the doctor and staff of health centers and then the media (television, radio, etc.), which can show the importance of health centers and the media in increasing people´s health literacy. With regard to the fact that most of the women surveyed were housewives, thus television education programs appeared to be a good source of information. Nowadays, with the advancement of technology and increasing use of mass media, using these facilities is becoming more popular among health care organizations. With the help of these technologies, health organizations can create communication channels to provide people with the health and health information they need. Moreover, they can train their clients in the skills of searching information in virtual space and media and express educational content in a simple and understandable way so that people with lower levels of education can obtain information.[29]

In the present study, a positive significant relationship was detected between health literacy and perceived risk of heart disease. No study was found concerning the association of health literacy with the perceived risk of cardiovascular disease; however, in a review study, a direct relationship was identified between health literacy and adequate information on heart failure as well as salt intake in heart deficient patients.[30] Still in another study, adequate health literacy was associated with greater knowledge of heart failure and greater confidence in hospitalized patients.[31] thus being consistent with the results of ours. Various studies have reported that patients with insufficient literacy levels most often bear difficulty understanding educational materials, reading pamphlets and medication recommendations, and understanding the oral advice of a health care provider hence hindering them to gain sufficient information about their illness and to seek and receive adequate care. All of these factors can influence disease management and accordingly escalate morbidity and mortality.[31,32] Additionally, the perceived risk of cardiovascular disease was significantly correlated with access to health information. It follows that naturally people with a high level of education and a high perception of the concepts still fail to obtain desired health literacy without the necessary information and support resources.[33] Therefore, bearing support and information resources including mass media, health providers and family can lower this impact in individuals.

Other health literacy dimensions failed to be correlated with the perceived risk of cardiovascular disease. Health literacy is a set of skills, abilities, and capacities in various dimensions that are variant in individuals, comprising the acquisition, reading, understanding, processing and interpretation, decision making, and employing medical and health information that can lead to the perceived risk of cardiovascular disease. In other words, in this group, the accessibility of information resources was a more pivotal factor than other skills on increasing the perceived risk.

The main limitation of this study was the fact that in addition to health literacy, various other factors such as cultural, economic, and social elements can affect the perceived risk of cardiovascular disease. Unfortunately, we were not able to address all these factors.

## Conclusion

Owing to the inadequate level of health literacy and moderate perceived risk of cardiovascular disease in the participants, especially in persons with high body mass index, it seems that special programs must be considered for promoting health literacy and perceived risk of cardiovascular diseases in health centers and mass media as some of the most vital sources of health information.

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## Conflicts of interest

Nothing to declare.

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