

Design and Standardization of Tools for Assessing the Perceived Heart Risk and Heart Health Literacy in Iran

Abstract

Objectives: The aim is to achieve the standard tools for heart health, the present study aimed to design, develop, and standardize the two questionnaires of perceived heart risk scale (PHRS) and heart health literacy scale (HHLS). **Methods:** The present study was a methodological research conducted on the residents of Kermanshah Province, Iran, using the multi-stage cluster sampling. Further, considering the scientific methods in the psychometric field, the design of the research questionnaires was conducted. In addition, the viewpoints of experts in different domains were qualitatively and quantitatively included to assess the validity of the questionnaires. To assess the reliability of the questionnaires, a sample including 31 subjects was first selected and studied within a fortnight's interval. Then, the reliability and validity of the scales were assessed using factor analysis and Cronbach's alpha in a sample of 771 subjects. **Results:** After reviewing the viewpoints of experts, the items were adjusted and implemented in the first sample at two stages. The results were indicative of the stability and acceptability of the Cronbach's alpha. In addition, the validity and reliability of the questionnaires were confirmed in the second sample too. **Conclusion:** According to the results of the present study, it can be concluded that the two questionnaires of PHRS and HHLS had acceptable reliability and validity.

Keywords: Cardiovascular diseases, health literacy, perceived risk, reliability, validity

Introduction

Cardiovascular diseases (CVDs) are the leading cause of death and disability worldwide,^[1] and considering the significant rises in the growth of this disease, it is predicted that the number of its mortalities would rise from 7.1 million in 1999 to 11.1 million in 2020.^[2] According to the available statistics, the number of mortalities from CVDs in Iran is in the vicinity of 150,000/year.^[3] In addition, the reported number of mortalities from CVDs in Iran is 25%–45% and the incidence of ischemic heart disease in the country has been reported to be high.^[4] Moreover, treating such diseases is costly.^[5] The risk factors of CVDs fall into two categories: controllable and uncontrollable. Furthermore, the uncontrollable factors include inheritance, gender, and age.^[6] High blood cholesterol, overweight and obesity, inappropriate diet, high blood pressure, high blood sugar, smoking, nutritional misconceptions, and low levels of physical activity are among the controllable factors that pose serious health risks.^[7,8] Evidence

suggests that lifestyle interventions can alleviate these risk factors.^[9]

Research has it that the reason for the growing incidence of these diseases is the occurrence of changes in diet, physical inactivity and sedentary lifestyle, smoking, inappropriate diet, obesity, and stress.^[10-15] It is essential for anyone to be aware of the risk factors of CVDs, whereby one can make informed decisions about the continuation of certain behaviors that increase the risk of the disease.^[16] More importantly, one's perception of the risk of a disease affects his or her health functions. Risk perception can be described as an attribute, which assesses the probability of particular incidents and the severity of their negative consequences.^[17] Low-risk perception is considered as a deterrent to involvement in specific behaviors such as high-risk behaviors. For example, smoking and unhealthy food are considered as high-risk behaviors in studies conducted about heart issues.^[18] Those who do not understand the risk of this behavior have low-risk perceptions. Although many programs have tried to raise awareness

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about the risk factors of CVDs in Iran and other countries, the World Health Organization (WHO) reports indicate that the number of people with this disease is on the rise by each passing day. Furthermore, since the risk of CVDs is positively associated with willingness to change risky behaviors,^[19] addressing this issue can contribute to more comprehensive planning to prevent these diseases.

The role of health literacy in cardio-related behaviors has been addressed by some researchers.^[20] Health literacy embodies one's capacity to acquire, interpret and understand basic information on health services that are required for appropriate decision-making.^[21] Those with higher health literacy are possessed of skills that enable them to get accurate and scientific information from the existing sources to understand one's situation fully, resulting in behaviors consistent with one's health.^[22] In addition, health literacy includes factors such as reading ability, counting skills, ability to understand health guidelines (medicine) to navigate healthcare systems and he ability to search health information online and offline.^[23,24] Today, health literacy has been introduced as a global issue in the 21st Century. Accordingly, the WHO has recently introduced health literacy as one of the greatest determinants of health. Moreover, at a global conference on health promotion in Mexico, WHO introduced health literacy as a cognitive and social skill that determines the motivation and ability of individuals to access, understand, and use information toward health maintenance and improvement.^[25]

To prevent the occurrence of CVDs, understanding the causes of the formation of unhealthy behaviors in people is of the essence. Therefore, building a reliable tool for measuring the psychological factors associated with heart health is a major requirement. Accordingly, to investigate such topics whose dimensions are not well-understood, the present study aimed to design, develop, and standardize the two questionnaires of perceived heart risk scale (PHRS) and heart health literacy scale (HHLS).

Methods

The present study was a methodological research conducted on the residents of Kermanshah Province, Iran. Further, considering the scientific methods in the psychometric field, the design of the research questionnaires was conducted. First, according to the available literature and conducted studies,^[26-28] 30 items were written for each of the constructs. Then, the qualitative and quantitative methods were employed to assess the content validity of the questionnaires. The content validity determination in the present study was based on experts' reviews and opinions (Lawsheh's proposed method). The experts' opinions in the fields of biostatistics, psychology, cardiology, nutrition, psychiatry, health education, sociology, social welfare, and Persian language and literature were used, thereby making some alterations to the items. In this part of the work, the experts' opinions

were collected based on the criteria such as grammar, using proper words, necessity, importance, proper phrasing, and appropriate scoring. Moreover, to quantitatively evaluate the content validity, the content validity ratio (CVR) index was used. To this end, 15 experts were requested to select each item based on a three-part spectrum. In addition, to determine the minimum value of CVR, the items whose numerical value was higher than 0.49 remained, otherwise they were eliminated.^[29] Determining the sample size in exploratory analysis follows the general principle of sampling knowledge (i.e., the number of subjects must always exceed the number of items in the questionnaire),^[30] where a range from 5 to 20 participants is considered for each item.^[31] For this reason, according to the Stevens' theory and the number of items in each questionnaire, a sample of 800 (771 acceptable questionnaires) subjects were considered.

To assess the reliability of the questionnaires, the two methods of internal consistency and stability were used. In addition, the Cronbach's alpha was applied to measure the internal consistency, and the stability was tested using test-retest. To this end, a sample consisting of 31 subjects were first selected and studied within a fortnight's interval. Moreover, the Pearson correlation test was used for reliability assessment. Further, the validity of the questionnaires was assessed using factor analysis, and 771 residents of Kermanshah Municipality were selected based on the statistical blocks of the census in 2013. The sampling method was the multi-stage cluster sampling technique. Three out of the seven urban divisions were randomly selected and then 265 subjects were chosen in each region based on the statistical blocks of the census in 2013.

After adjusting the questionnaires and selecting subjects, they were distributed among the subjects. Furthermore, the instructions on how to complete the questionnaires were supplied by the research team, and the participants were requested to ask for more clarification in case of encountering problems filling out the questionnaires. Then, the participants were assured that their information would remain confidential, and their informed consent was taken. Moreover, the questionnaires were completed individually and collectively in the presence of one of the members of the research team.

Results

After studying literature and interviews with experts, 30 items were written for each of the PHRS and HHLS using the brainstorming method, respectively. The extracted items in interviews were examined by experts, and those with overlapping concepts were merged. In addition, the incorrect items, incompatible with cultural issues, were removed or corrected. At the end of this stage, 25 and 28 items were considered for the PHRS and HHLS as the primary questionnaires. For the HHLS, the items were on a six-point Likert scale (zero = never, one = very low,

two = low, three = to some extent, four = high, five = very high). As for the PHRS, the items were on a five-point Likert scale (zero = absolutely disagree, one = disagree, two = to some extent, three = agree, four = absolutely agree). In the next stage, the questionnaires were given to the experts, and after collecting their comments and calculating the CVR index, a number of items were deleted. Then, 26 and 20 items remained for the HHLS and PHRS, respectively [Appendices 1 and 2].

After this stage, the questionnaires were distributed to a sample of 31 volunteers who collaborated with the research team. The sample included 14 women and 17 men with an average age of 46.92 ± 4.82 . In addition, they were asked to complete the questionnaires individually, and they were guaranteed that the results would remain confidential. Furthermore, the selected subjects were requested to write code that only they knew about them. These codes were for comparing the results with the second stage, which was carried out after 2 weeks from the first one. The results of this section are about the reliability of the questionnaires (internal consistency and stability). Moreover, to measure the internal consistency, the Cronbach's alpha was employed, and the test-retest was conducted to assess the stability of the questionnaires.

As for the HHLS, the results of examining the reliability demonstrated that there was a correlation coefficient of 0.81 between the first and second stages of the test-retest, and the Cronbach's alpha measured 0.88 [Table 1]. Moreover, the confirmatory and exploratory factor analyses were used to examine the validity of the items. Therefore, the validity and reliability of this questionnaire were confirmed. The results of assessing the reliability of the PHRS indicated that there was a correlation coefficient of 0.80 between the first and second stages of the test-retest, and the Cronbach's alpha measured 0.86 [Table 2]. In addition, the confirmatory and exploratory factor analyses were employed to examine the validity of the items. Therefore, the validity and reliability of this questionnaire were confirmed.^[32]

As already mentioned, the data of 771 subjects were detected useful (57% female). Moreover, the Cronbach's alpha was used to check the reliability of the questionnaires in this volume of sample. The results in Table 2 show that both questionnaires possessed acceptable reliability. The exploratory factor analysis was conducted for the HHLS, and the KMO measured 0.843. In addition, the Bartlett's

Test of Sphericity measured 7053.27, which was significant at the level of 0.001, thereby justifying the application of factor analysis based on the correlation matrix [Table 2]. As shown in Table 2, four items were extracted from the HHLS: (a) reading materials, (b) comprehension, (c) assessment, and (d) decision-making. The exploratory factor analysis showed that other than items 19 and 21, the other ones had the required factor load (above 0.40). After this stage, the confirmatory factor analysis test was carried out, which confirmed the factors.

The exploratory factor analysis was conducted for the PHRS, and the KMO measured 0.853. In addition, the Bartlett's Test of Sphericity measured 4324.07, which was significant at the level of 0.001, thereby justifying the application of factor analysis based on the correlation matrix [Table 3]. As outlined in Table 3, two items were extracted from the PHRS: (a) thought and (b) action, respectively. The exploratory factor analysis showed that, other than the second item, the other ones had the required factor load. After this stage, the confirmatory factor analysis test was carried out, which confirmed the factors. Finally, the correlation coefficients between factors are shown in Table 4.

Discussion and Conclusion

Given that the existence of a tool for measurement and research into any variable is an essential requirement as well as the lack of reliable and stable tools in the field of CVDs in Iran, the present study aimed to design, develop and standardize the two questionnaires of PHRS and HHLS. The results of the present study indicated that four items could be extracted from the HHLS: reading materials, comprehension, assessment, and decision-making. The exploratory factor analysis showed that other than items 19 and 21, the other ones had the required factor load. A national research in Iran was conducted to examine the HHLS, whose results confirmed the applicability of this questionnaire in the Iranian urban population. This 33-item questionnaire was on a five-point Likert scale, and its extracted factors were accessibility, comprehension, reading, assessment, decision-making, and behavior.^[33] Another similar study was carried out in Iran, which had similar results.^[34] Another study was conducted in which the health literacy questionnaire was examined for psychometric evaluation, and the results were indicative of the confirmation of a 33-item and 5-factor questionnaire.^[35] In a systematic study, Tavousi *et al.* reviewed the health literacy tools over 1993–2012. The results of their survey showed that 23 questionnaires were developed for assessing health literacy.^[36] Various forms of the health literacy questionnaire have been made in different countries.^[28,37-41] Some of the existing questionnaires only focus on measuring the basic reading skills, and concepts such as understanding and decision-making have been neglected.^[36]

Table 1: The results of internal consistency and stability analysis

Variable	Stability (Cronbach's alpha)		Internal consistency		Cronbach's alpha (total)	P
	r	P	Step 1	Step 2		
HHLS	0.81	0.001	0.88	0.81	0.88	0.001
PHRS	0.80	0.001	0.86	0.84	0.86	0.001

HHLS: Heart health literacy scale, PHRS: Perceived heart risk scale

Table 2: The results of analysis for the heart health literacy scale

Serial number	Cronbach's alpha if item deleted	Correlation with total score	Reading materials	Comprehension	Assessment	Decision-making
1	0.869	0.574**	0.725			
2	0.871	0.503**		0.783		
3	0.870	0.492**	0.742			
4	0.870	0.529**		0.685		
5	0.870	0.506**		0.741		
6	0.873	0.418**			0.407	
7	0.875	0.391**			0.641	
8	0.872	0.453**			0.676	
9	0.869	0.592**				0.631
10	0.869	0.562**			0.476	
11	0.870	0.553**				0.574
12	0.869	0.574**			0.658	
13	0.873	0.472**			0.668	
14	0.874	0.432**			0.650	
15	0.870	0.524**				0.596
16	0.867	0.610**			0.501	
17	0.875	0.392**				0.594
18	0.872	0.462**				0.468
19	0.880	0.198**			0.16	
20	0.868	0.562**			0.462	
21	0.874	0.411**				0.34
22	0.869	0.547**			0.640	
23	0.873	0.428**			0.552	
24	0.870	0.526**				0.568
25	0.874	0.376**			0.447	
26	0.873	0.455**				0.419

***P*<0.001. Cronbach's alpha used for the analyses

On the other hand, the studies conducted in this subject area have primarily focused on knowledge and attitudes toward heart diseases and have often been one-dimensional.^[22] It should be noted that these tools have been used in specific groups, but the present study focused on all people. In addition, there were no comprehensive studies about the health literacy construct associated with heart diseases in Iran.

The results of the present study showed that the second item of the HHLS (It is easy for me to understand the words and instructions of health practitioners and professionals about the heart health) had the highest factor weight (0.783). In addition, the results of the present study indicated that two items could be extracted from the PHRS, which were named “thought” and “action,” respectively.

The exploratory factor analysis showed that, other than the second item, the other ones had the required factor load. In previous studies, different perspectives have been dominant for measuring risk perceptions, such as the one-factor view for probabilistic assessment,^[42,43] the perspective of measuring concern and vulnerability,^[44,45] and the eight-factor perspective, which is risk cognitive assessment, in which factors such as chance of infection, feeling vulnerable, thought about risk, and so on, are taken

into consideration.^[46,47] However, in none of these studies, no attention has been paid to the perception of the risk of heart diseases. It should be noted that in previous studies, the risk perception construct has been implemented only in a limited group,^[32,48] but in the present study, a more extensive sample has been investigated. In this research, risk perception denoted one's understanding of CVDs. In other words, risk perception means the extent to which a person feels the risks. In the present study, the CVR Index was used to quantitatively evaluate the content validity. In many studies, only the qualitative method has been used, and the strength of this study is the application of the hybrid quantitative–qualitative method.

Since a subject such as heart disease has a wide range of social, psychological and medical aspects, the present study aimed to use a wide range of experts' opinions. In the present study, in addition to the expert's viewpoints, the open polling method was used to quantify their views because the possibility of exchanging views and expressing the views of experts becomes limited in quantitative methods. After collecting the experts' opinions and calculating the CVR index, some items were eliminated. Then, 20 and 26 items remained for the heart health literacy and the perception of risk of heart

Table 3: The results of analysis for the perceived heart risk scale

Serial number	Cronbach's alpha if item deleted	Correlation with total score	Thought	Action
1	0.847	0.531**	0.471	
2	0.864	0.174**	0.101	
3	0.849	0.525**	0.492	
4	0.849	0.528**	0.700	
5	0.844	0.663**		0.714
6	0.846	0.586**		0.628
7	0.850	0.498**	0.521	
8	0.847	0.597**	0.423	
9	0.845	0.628**		0.540
10	0.853	0.439**		0.759
11	0.849	0.527**		0.674
12	0.845	0.627**	0.480	
13	0.855	0.411**		0.775
14	0.853	0.413**		0.562
15	0.852	0.464**		0.406
16	0.854	0.403**	0.414	
17	0.854	0.401**	0.425	
18	0.845	0.611**	0.605	
19	0.850	0.521**	0.490	
20	0.847	0.601**	0.505	

**P<0.001

Table 4: The correlation coefficients between factors

Variable	1	2	3	4	5	6	7
Reading materials	1						
Comprehension	0.74	1					
Assessment	0.40	0.36	1				
Decision-making	0.40	0.44	0.74	1			
H HLS (total)	0.63	0.63	0.92	0.87	1		
Thought	0.42	0.39	0.67	0.70	0.74	1	
Action	0.42	0.41	0.5	0.61	0.60	0.66	1
PHRS (total)	0.47	0.45	0.66	0.74	0.75	0.94	0.88

All P<0.001. H HLS: Heart health literacy scale, PHRS: Perceived heart risk scale

disease scale (PRHDS) questionnaires, respectively. After this stage, the questionnaires were given to a sample of 771 subjects. The subjects were tested in two stages. Further, the results of the correlation between the two stages of the test indicated that the results were reliable. Therefore, these questionnaires were usable in the Iranian society. It can be expressed that the designed questionnaires in the present study possessed appropriate validity and reliability. Therefore, the designed questionnaires can be used to measure these variables. Moreover, these tools can be used by all researchers, psychologists, and psychiatrists and all those who are interested in CVDs. These tools were designed in Iran. Hence, it is suggested that the validity and reliability of the questionnaires be re-evaluated in other societies once again. In addition, it is suggested to add items on diabetes and alcohol consumption in these studies.

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Conflicts of interest

There are no conflicts of interest.

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Appendices

Appendix 1: Heart health literacy scale	
Item	Description
1	It is easy for me to read and understand the educational materials about the heart health
2	It is easy for me to understand the words and instructions of health practitioners and professionals about the heart health
3	I can easily get the necessary information about coronary diseases through magazines, books, and websites
4	I can understand the doctors' explanations for coronary diseases
5	I can easily understand whatever is broadcast about heart health in the media
6	I know that high salt intake affects heart health
7	Smoking has adverse effects on the health of heart
8	Smoking may have some disadvantages, but it does not harm the heart
9	I should be careful about my blood pressure, because it damages my heart health
10	Physical activity and exercise are harmful to heart health
11	You should watch your weight, because it will cause heart diseases
12	Blood lipid control is beneficial for heart health
13	The consumption of fatty foods is good for regulating the heart function
14	Sweets are useful for adjusting your blood pressure and heart rate
15	We must be careful not to catch heart diseased from others
16	Kissing and hugging a person with heart disease causes the disease to spread
17	Stress is not bad for heart health
18	Food is a not such an important factor in controlling heart diseases
19	Cardiac disease may be inherited
20	We should try to have more walking
21	You should not miss the pleasure of consuming salty foods
22	Work stress can put the heart health at risk
23	Chest pain is one of the symptoms of heart disease
24	The consumption of vegetables is not good for heart health
25	The consumption of red meat regulates how our heart functions
26	To have fruits in your diet leads to a healthy heart

Appendix 2: The perceived heart risk scale	
Item	Description
1	Everyone is at risk of heart diseases
2	I will never get heart diseases
3	Heart disease treatment is expensive and hard
4	Heart disease is the cause of many people's death
5	Heart disease should be taken more seriously
6	Salt consumption is very dangerous
7	It is a myth that cigarettes hurt heart health
8	You should not miss the pleasure of eating sweet and fatty foods because of fear of heart diseases
9	I do not want to get information and knowledge about heart diseases
10	I try to inform others about the dangers of fatty foods
11	I would like to point out to my friends and family that salty foods are harmful
12	Exercise is an important factor in reducing the risk of heart diseases
13	I use too much salt
14	I usually eat fatty foods excessively
15	I am not interested in thinking about weight control
16	Doctors warn too much about heart diseases
17	Heart diseases are easily treatable
18	It is not necessary to spend too much budget on the construction and equipping specialized hospitals for heart diseases
19	People should be made more aware of heart diseases by the media
20	A daily consumption of one cigarette is okay