Original Article

Validity and reliability properties of the Persian version of perceived health competence scale among patients with cardiovascular diseases

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Abstract:

BACKGROUND: Cardiovascular diseases are among progressive diseases that begin in childhood and are manifested mainly in adulthood. This study was assessed the validity and reliability testing of the Persian version of the Perceived Health Competence Scale (PHCS) among patients with cardiovascular diseases referred to Shahid Rajaie Heart center in Tehran, Iran.

METHODS: In this cross-sectional study, a convenience sample of 700 patients with cardiovascular diseases referring to Shahid Rajaie Heart center in Tehran were recruited (response rate = 100%; n = 700). Content validity was established using translation and back-translation procedure and getting views of the expert panel. The content validity of the questionnaire was measured using content validity ratio (CVR) and content validity index (CVI). Reliability was ascertained using Cronbach's alpha. The stability was confirmed using intra-class correlation coefficients.

RESULTS: In this study, CVI = 0.81 and CVR = 0.72 were calculated. Scale reliability was sufficient (α = 0.78; range = 0.73–0.77). Furthermore, reliability based on the stability of the whole scale was 0.75.

CONCLUSIONS: The PHCS-Persian confirmed as a valid and reliable instrument to measure perceived health competence. The PHCS-Persian scale could be a useful, comprehensive, and culturally sensitive scale for assessing perceived health competence.

Keywords:
Cardiovascular, competency, reliability, standard scale, validity

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Introduction

Health is not just a goal; rather, it is a source of daily life to achieve other goals that ultimately lead to an increased sense of well-being and self-discovery.[1]

Perceived health competence as a part of individual beliefs, in which the general health status is assessed. It is a mental and perceptual concept that may reflect one's beliefs and feelings more than one's actual physical health.[2] Perceived health competence is one of the most common mental health determinants; it can examine different aspects of health, including physical health, anxiety, depression, and social functioning.[3,4]

Cardiovascular diseases are the leading causes of death globally; causing 17 million deaths per year (one death out of three).[5] Most of the developing countries' medical budgets are allocated to treat and manage cardiovascular diseases.[6] In patients with chronic coronary artery disease, healing of the disease is considered unrealistic and unattainable. The disease is both disabling and progressive, with multiple external and internal factors affecting its exacerbation and improvement. These characteristics

also affect the quality of life of patients;[7] and impose enormous costs on the health systems of countries. If patients with cardiovascular diseases have positive perceived health, they will also have high perceived health competencies and high quality of lives. To gain a clear picture of perceived health competence among patients with cardiovascular diseases, a validated scale is needed. This study was designed to assess the validity and reliability of the Persian version of the perceived health competence scale (PHCS).

Methods

This was a cross-sectional study to examine the validity and reliability of the PHCS Persian version among patients with cardiovascular diseases referring to Shahid Rajaie Heart Center in Tehran, Iran. A convenience sampling method was conducted to recruit 700 patients with cardiovascular diseases referring to Shahid Rajaie Heart center in Tehran. The sample size was calculated based on the number of observed and latent study variables and Gini correlation with 1-β: 80% and α = 0.05. Data were collected from May 2019 to December 2019. This study was approved ethically by Tehran University of Medical Sciences (Ethics code: IR.TUMS.SPH.REC.1397.122) inclusion criteria had any kind of cardiovascular disease, any confirmation of phycological disorders based on physician advice and willingness to participate in the study. The study purpose was informed to the participants, and written informed consents were obtained. Confidentiality was assured by ensuring the participants that information recorded was used for research purposes only and that no personal details would be recorded or produced on any documentation related to the study.

A questionnaire package including a cover letter, questions about related sociodemographics, the 8-PHCS items designed by Smith *et al*.[4] and 12-question quality-of-life scale (for criterion validity) were given to those who consented. Demographic questions included age, job status, level of education, disease history, family income status, and smoking status (13 items). The second part, PHCS standardized questionnaire, was evaluated using the Likert-type scale (totally agree to totally disagree). The questions number 7, 6, 2, 3 were scored reversely. The higher score of PHCS, the greater the perceived health competency. This part of the questionnaire was first translated into Persian by two separate experts and then back translated into English. Then, two versions were matched, and finally, the English version was matched to the original version by two experts in the field of health education and promotion and cardiology. Based on the mentioned method, the preliminary Persian version was obtained.

The PHCS questionnaire's validity and reliability were measured. Validity assessment included content and criterion validities. Content validity of the questionnaire was measured using content validity ratio (CVR) and content validity index (CVI). To determine the content validity ratio, 10 experts (cardiology, epidemiology, and health education and promotion specialists) were consulted on the necessity or nonnecessity of each item and determined the CVI. The criteria of relevance, clarity, and simplicity of each item were assessed. Content validity is related to the degree that the items included in a scale are suitable to measure the outcome under investigation on the target population, without sacrificing the ease of use. In this case, CVI = 0.81 and CVR = 0.72 were calculated. Face validity refers to whether a scale appears to measure what is proposed to measure.[8] In the present study, the translation of the PHCS showed that the Persian wording was clear, unambiguous, and easy to understand based on the patients' preview. After achieving preliminary validation, the criterion validity was evaluated. Criterion validity describes assessing the validity of a scale by comparing and observing its performance against the existing gold standard.[8] In this study, 12-item Short-Form Health Survey (SF-12) used to test the criterion validity of the PHCS questionnaire.

Based on the reviewed theoretical background, SF quality of life had the greatest relationship with the perceived health competence. In a study by Bachmann *et al*.,[9] it was reported that perceived health competence was directly associated with positive healthy behaviors, and thus, represented an important construct that added to the understanding of psychosocial predictors of adverse outcomes in hospitalized patients with cardiovascular diseases especially, in the context of depression. The 12-question quality of life was developed by Ware *et al*.[10] in 1996; Montazeri *et al*. examined the validity and reliability of this scale in Iran. The Iranian version of the SF-12 questionnaire includes 12 questions, eight scales, and two physical and mental health dimensions. The scales included physical functioning, role limitations due to physical problems, bodily pain, general health, vitality, social functioning, role limitations due to emotional problems, and perceived mental health. The two physical health and mental health dimensions are obtained as follows: physical health is the sum of the scales of physical functioning, role limitations due to physical problems, bodily pain, and general health. Mental health is a subset of the scales of vitality, social functioning, role limitations due to emotional problems, and perceived mental health.[11]

The reliability of PHCS questionnaire was assessed using Cronbach α through filling the questionnaire in two different times (baseline and after two weeks) using 30 patients who excluded from the study.

Reliability (78%) was calculated using the Cronbach's alpha coefficient. Reliability based on stability for the whole questionnaire was 0.75.

Data were analyzed using IBM SPSS Statistics 24 using descriptive and inferential tests. The significance level was set at $P < 0.05$. The reliability was tested for internal consistency with Cronbach's alpha value. The intercorrelation between items was tested using the Pearson correlation coefficient and was determined by measuring the intra-class correlation coefficient (ICC) to assess the inter-rater consistency of the raters. The benchmark for the ICC was as follows: More than 0.75; excellent; between 0.40 and 0.75: Moderate; <0.40: Poor as Stone *et al*. addressed in their study[12] .The internal consistency of the questionnaire was examined through the determination of the Cronbach's alpha value, inter-correlation between the scales. The Cronbach's alpha value for the entire questionnaire was 0.78 (0.73–0.77).

Results

Results showed that the mean ± standard deviation of the age of participants was 56 ± 14-years old. Seven hundred respondents participated in the study, with the overall response rate of 100%. Accordingly, the majority of reviewers identified the general shape of the questionnaire as organized, well-arranged, and easy for clarity and understanding. On an average, patients had at least a history of one disease. Mean body mass index among participants was 27.08 ± 4.32, and the mean score of perceived health competence among the studied patients was 66.07 ± 19.20. Demographic information is shown in Table 1.

The study results revealed that Cronbach's alpha based on internal consistency for each question ranged from 0.73 to 0.77, and the total alpha value of the questionnaire was 0.78. Minimum alpha level of 0.7 is recommended.[13] Furthermore, the reliability based on the stability of the whole questionnaire was 0.75 and the acceptable intra-class correlation was 0.4[14] [Tables 2 and 3]. The content validity of the questionnaire was measured using CVR and CVI. The CVI = 0.81 and CVR = 0.72 were calculated. CVR values >0.62 were accepted based on the Lawch table.[15] To determine the CVI, the criteria of relevance, clarity and simplicity of each item were evaluated, and values >0.79 were accepted.

Pearson's correlation coefficient showed that all perceived health competence questions had a statistically significant relationship with the physical ($r = 0.296$, $P < 0.001$) and mental ($P = 0.343$, $P < 0.001$) dimensions of quality of life [Table 4]. Factor analysis was performed to identify questions that overshadow the

Table 1: Demographic characteristics of patients with cardiovascular disease participated in the study

Variables	Options	*n* (%)
Sex	Female	387 (55.3)
	Male	313 (44.7)
Marital status	Unmarried	86 (12.3)
	Married	614 (87.7)
Jobs	Household	340 (48.6)
	Public employee	167 (23.9)
	Private employee	80 (11.4)
	Retired	97 (13.9)
	Student	9 (1.3)
	Worker	4 (0.6)
	Unemployed	3 (0.4)
Level of education	Up to diploma	373 (53.3)
	Diploma	179 (25.6)
	Higher	148 (21.1)
Family income	Low income	161 (23)
	Moderate income	535 (76.5)
	High income	4 (0.6)
Type of treatment	Lifestyle modification	24 (3.4)
	Medication plus Lifestyle modification	676 (96.6)
Smoking	Yes	79 (11.3)
	No	621 (88.7)
Physical activity	Sometimes	240 (34.3)
	Regularly	50 (7.1)
	Never	410 (58.6)
Past medical history	Yes	362 (51.7)
	No	338 (48.3)
Living alone	Yes	86 (12.3)
	No	614 (87.7)

overall internal correlation. No questions were removed from the PHCS.

Discussion

The purpose of this study was to test the validity and reliability of the perceived health competence of patients with cardiovascular diseases, referring to Shahid Rajaie Heart center. This study examined important components of psychometric properties (validity and reliability) of PHCS among patients.

The purpose of validity is to determine the ability of a scale to measure what it is designed.[16] One method of determining validity is to determine the criterion validity. The perceived health questionnaire was measured by the standard 12-question quality of life instrument.[11] The results of the criterion validity showed that all questions of perceived health competence were significantly related to physical and mental dimensions of quality of life. The results of this study showed that the PHCS had appropriate reliability. The reliability of a scale indicates the accuracy or correctness of the measurement.[13]

Table 2: Reliability based on Cronbach's alpha of the Perceived Health Competence Scale after back translation among patients with cardiovascular disease (*n*=700)

PHCS items	Cronbach α
1. I handle myself well with respect to my health	0.75
2. No matter how hard I try, my health just doesn't turn out the way I would like	0.76
3. It is difficult for me to find effective solutions to the health problems that come my way	0.77
4. I succeed in the projects I undertake to improve my health	0.73
5. I'm generally able to accomplish my goals with respect to my health	0.73
6. I find my efforts to change things I don't like about my health are ineffective	0.77
7. Typically, my plans for my health don't work out well	0.77
8. I am able to do things for my health as well as most other people	0.74
Total questions	0.78

PHCS=Perceived Health Competence Scale

Table 3: Reliability based on stability of the Perceived Health Competence Scale after back translation among cardiovascular patients (*n*=700)

Perceived health competence items	Lower bound	Upper bound	ICC 95%	*P*
	0.71	0.79	0.75	‹0.001

ICC=Intraclass Correlation Coefficient

Table 4: Correlation Coefficient Matrix between Perceived Health competence and the physical and mental dimension of quality of life among patients with cardiovascular disease (*n*=700)

PHCS	1	2	3	Mean±SD
Perceived health competence scale	1			66.07±19.20
Physical dimension	0.296**	1		13.56±2.73
Mental dimension	0.343**	0.513**	1	19.63±4.11

**Level correlation 0.01, SD=Standard deviation, PHCS=Perceived Health Competence Scale

The study results showed that perceived health competence instrument had strong reliability (0.78). In a study conducted by Dempster and Donnelly,[17] they examined the psychometric properties of the PHCS in a UK context, and provided strong evidence for the validity of the PHCS in that setting. They concluded that the PHCS was a useful addition to measures of global self-efficacy and measures of self-efficacy regarding specific behaviors in the toolkit of health psychologists.

In a study conducted by Togari *et al*.,[18] the authors reported that the Japanese version of PHCS had Cronbach coefficient of 0.83 and was considered reliable. Consistent with our study, Polchert[19] stated that the PHCS had been shown to be reliable and valid. The PHCS was positively correlated to health status and coping abilities. The study examined the PHCS in three Midwestern samples:

African–American elders, which revealed two separate factors in PHCS; Native Americans who evaluated the PHCS as a single construct; and a Spanish speaking sample. In the latter sample, findings suggested health competence might be a multi-dimensional construct.

A study conducted by Marks and Lutgendorf[20] on 97 older adults stated that after controlling for health status and education, higher levels of PHCS predicted greater exercise and dietary, seeking health-related behaviors information responded to questionnaires assessing health status, personality, PHCS, and level of engagement in certain health behaviors. That was in line with our study results that showed a correlation between perceived health competence with quality of life.

The results of our study showed that all perceived health competency questions had significant statistical relationships with physical and mental dimensions of quality of life.

Another study by Bachmann *et al*.[9] reported that patients with low perceived health competence might be at risk for decline in health-related quality of life after hospitalization; and perceived health competence predicts health behavior and health-related quality of life in patients hospitalized with cardiovascular diseases, as well as changes in health-related quality of life after discharge. These findings were consistent with our findings. Given the importance of the suffering situation caused by cardiovascular disease, achieving a healthy quality of life, and well-perceived health competence is a comprehensive matter so, health decision makers must provide teamwork in all health aspects in the early disease stages or before the disease onset. At risk, people should be planned comprehensive, simple, understandable, and appropriate training programs in accordance with healthy lifestyle methods to improve the quality of life. Educational interventions based on the quality of life and its dimensions and its effectiveness on the perceived health competence be considered recommended for future studies. Using self-reporting questionnaire was the study limitations. To the best of our knowledge, this is the first study conducting on primary health care (PHC) among patients with cardiovascular disease in Iran.

Conclusions

The results of this study confirmed the reliability and validity of PHCS among the studied population. Validated PHC scale in this study can help Iranian health behavior professional to work on attitudes of patients with cardiovascular diseases to improve adherence to treatment. Furthermore, planners and policymakers can take an effective step in developing cardiovascular

health assessment skills by developing comprehensive, simple, and understandable educational programs using this scale. The findings of this study showed that PHCS was completely consistent with the original instrument, and the Cronbach's alpha coefficient for the whole instrument was satisfactory. This scale was very simple, and its generalization depends on the sample size and characteristics of the participating population.

Conflicts of interest

There are no conflicts of interest.

References

1. Bahrami M, Amiri A, Montazeralfaraj R, Dehghan H. The relationship between social capital dimensions and perceived health in Yazd Urban Society, 2013. J Tolooebehdasht 2016;15(3):67-77.
2. McDowell I. Measuring Health: A Guide to Rating Scales and Questionnaires. USA: Oxford University Press; 2006.
3. Movahed M, Jahanbazian S, Abbasi Shavazi MT. The study of self-assessed health among elderly women in Shiraz and Yasuj cities. Elderly Health J 2016;2(1):27-32.
4. Smith MS, Wallston KA, Smith CA. The development and validation of the Perceived Health Competence Scale. Health Educ Res. 1995;10(1):51-64. doi: 10.1093/her/10.1.51.
5. Sharifirad G, Mohebbi S, Matlabi M. The relationship of physical activity in middle age and cardiovascular problems in old age in retired people in Isfahan, 2006. J Horizon Med Sci 2007;13(2):57-63.
6. Aminian Z, Mohammadzadeh S, Eslami Vaghar M, Fesharaki M. Effectiveness of teaching ways to deal with stress on quality of life in patients with acute coronary syndrome admitted to hospitals of Tehran University of Medical Sciences in 2013. Med Sci J Islamic Azad Univ Tehran Med Branch 2014;24(3):168-74.
7. Fall M, Baranowski A, Elneil S, Engeler D, Hughes J, Messelink E. Guía clínica sobre el dolor pélvico crónico. Williams, A D C. 2010, p. 749-756.
8. Charalambous C, Koulori A, Vasilopoulos A, Roupa Z. Evaluation of the Validity and Reliability of the Waterlow Pressure Ulcer Risk Assessment Scale. Med Arch. 2018;72(2):141-144. doi: 10.5455/medarh.2018.72.141-144.
9. Bachmann JM, Goggins KM, Nwosu SK, Schildcrout JS, Kripalani S, Wallston KA. Perceived health competence predicts health behavior and health-related quality of life in patients with cardiovascular disease. Patient Educ Couns. 2016;99(12):2071-2079. doi: 10.1016/j.pec.2016.07.020.
10. Ware J Jr, Kosinski M, Keller SD. A 12-Item Short-Form Health Survey: construction of scales and preliminary tests of reliability and validity. Med Care. 1996;34(3):220-233. doi: 10.1097/00005650-199603000-00003.
11. Montazeri A, Vahdaninia M, Mousavi SJ, Omidvari S. The Iranian version of 12-item Short Form Health Survey (SF-12): Factor structure, internal consistency and construct validity. BMC Public Health 2009;9:341. doi.org/10.1186/1471-2458-9-341.
12. Stone AT, Bransford RJ, Lee MJ, Vilela MD, Bellabarba C, Anderson PA, *et al*. Reliability of classification systems for subaxial cervical injuries. Evid Based Spine Care J 2010;1(13):19-26. doi: 10.1055/s-0030-1267064.
13. Mohammadbeigi A, Mohammadsalehi N, Aligol M. Validity and reliability of the instruments and types of measurements in health applied researches. J Rafsanjan Univ Med Sci 2015;13(12):1153-70.
14. Najafi F, Kheiry B. Investigating the impact of country of origin on customer behavior: Investigation of the moderating roles of product involvement and product familiarity on product evaluation and customer behavioral intentions. Int J Phys Soc Sci 2013;7(17):37-60.
15. Lawshe CH. A quantitative approach to content validity. J Personnel psychol 1975;28(4):563-75.
16. Ghazanfari Z. The effectiveness of a theory-based behavior change intervention to increase and maintain physical activity in female diabetic patients in Tehran, Iran [dissertation]. Tehran: Faculty of Medical Sciences, Tarbiat Modares University; 2010.
17. Dempster M, Donnelly M. Validity of the perceived health competence scale in a UK primary care setting. Psychol Health Med. 2008;13(1):123-127. doi: 10.1080/13548500701351984.
18. Togari T, Ikezaki S, Yamazaki Y, Ito M, Zenko A, Taguchi R. The development of perceived health competence scale (PHCS) Japanese version. Japanese J Healt Human Ecol 2004;70(5):184-95. doi.org/10.3861/jshhe.70.184.
19. Polchert MJ. Cross cultural exploration of the perceived health competence scale. Open J Nurs 2015;05(07):632-40. doi: 10.4236/ojn.2015.57067.
20. Marks GR, Lutgendorf SK. Perceived health competence and personality factors differentially predict health behaviors in older adults. J Aging Health 1999;11(2):221-39. doi.org/10.1177/089826439901100205.