

Development and validation of cardiac patient competence questionnaire, Iranian version

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Original Article

Abstract

BACKGROUND: The aim was to translate and develop a patient competence (PC) questionnaire in the context of cardiology and test its validity and reliability.

METHODS: In total, 148 cardiac patients who have inclusion criteria of the study were completed cardiac PC (CPC) questionnaire. Hospital Anxiety and Depression Scale and self-administered instrument European quality of life 5-dimensions were used to further validate the CPC questionnaire. The CPC was translated according to the recommended methodology for translating questionnaires, and psychometric properties including internal consistency, factor analysis, discriminant validity, construct validity, and concurrent criterion validity were tested.

RESULTS: Five domains in problem-focused task including search for information, self-regulation, being assertive, independent decision-making, and looking for social services, and three domains in emotion-focused task including stress management, confronting the threat, and avoidance were obtained by factor analysis. The standardized Cronbach's α of all domains were statistically significant ($P < 0.001$) and internal consistency for all domains was acceptable. Significant intercorrelations of CPC domains also indicated good criterion validity. As there were no cross-loadings, the domains have demonstrated good construct validity and discriminant validity.

CONCLUSION: The results of this study show that the Persian version of the CPC is a reliable and valid questionnaire. Although further improvement of this measure is clearly required, it suggests being a potential basis for investigating the determinants and health effects of CPC.

Keywords: Patient Competence, Cardiology, Reliability and Validity

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Introduction

Research evidences reveal that involving patients in healthcare decisions has positive effect on healthcare outcomes.¹⁻³ Accordingly, patients should have skills, knowledge, and ability to make decisions.⁴

A review of the many scientific uses of the terms "competence" shows a variety of meanings: (a) all performance abilities and skills; (b) specific prerequisites necessary for acquiring primary knowledge systems; (c) learned knowledge and skills; (d) individual needs for effectiveness; (e) subjective evaluation of the self; and (f) the entire set of cognitive, motivational and social prerequisites for successful action.⁵ Consequently,

patient competence (PC) may be identified as patients' abilities or skills that enable them to solve tasks arising in the context of their illness and its treatment.⁶

To date, the concept of patient competencies have been rarely conceptualized in greater details. Although Giesler and Weis clarified a reliable instruments measuring PC in the oncological context that was contained problem and emotion-focused tasks of dealing with cancer,⁷ measuring PC in other medical fields has not been concerned comprehensively.

According to the burden of cardiac disease, leading life-threatening conditions, reduced quality of life (QOL), variation in provision of types of

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medical treatment, and effects of emotions, feelings and social contexts,^{8,9} patients with cardiac disease encounter several alternatives in their treatment process; thereby having ability and knowledge to make decisions on medical treatments and coping with cardiac disease are required.

Researches and practical experiences indicate that patients with chronic disease have become key decision makers in the treatment process. When patients have skill and knowledge about their condition, they will take some responsibilities for their disease management and get greater control on their lives.¹⁰

Thus, we want to clarify patient competencies construct conceptually and develop a questionnaire measuring patient competencies within a cardiology context and test its validity and reliability.

Materials and Methods

The translation and cross-cultural adaptation process for cardiac patient competence (CPC) were performed in agreement with best-practice methodology,¹¹ and the guideline for cross-cultural adaptation of self-report measures by Beaton et al.¹² and Paulsen et al.¹³ and van den Akker-Scheek et al.¹⁴

An English 57-item self-rating measure of PC in oncology was translated into Persian by two independent Iranian native speakers who were fluent in English. A synthesis of the two questionnaires obtained was performed by an expert committee consist of two cardiologists and one psychiatrist. The expert committee revised the resulting Persian questionnaire based on cardiovascular parameters, some items such as "I am looking for information about signs and symptoms of cardiovascular disease," "I have a good deal of information about the importance of urgently going to the hospital when chest pain occurs," were added and some others revised based on these parameters for example, "I regularly check my weight and blood pressure myself," "I watch my healthy diet," "I have sought information on financial support and/or facilities that might be available for angioplasty and open-heart surgery," then questionnaire was back-translated into English by a bilingual English-native translator and the questionnaire obtained was evaluated by a new expert panel to determine cross-cultural adaptation, item relevancy, and content validity. Finally, a 63-item questionnaire was established in the context of cardiology.

The Persian version of CPC questionnaire was tested in fourteen patients who have at least 1-year diagnosis of acute coronary syndrome (ACS) and

referred to cardiovascular clinics for treatment follow-up. After completing the questionnaire, the respondents were asked on the specific wording of each item, any difficulties in understanding the questions and their experience in answering the questionnaire. All respondents reported that the questions were understandable without any ambiguities, so the questionnaire did not require any indispensable changes.

Totally, 148 patients were enrolled in this study. They have at least 1-year diagnosis of ACS¹⁵ (defined as acute myocardial infarction based on the World Health Organization Expert Committee and unstable angina by typical chest pain and dynamic electrocardiogram change confirmed by a cardiologist as ACS. The inclusion criteria were being 30-60 years of age and having no pregnancy or post-partum < 3 months, diabetes mellitus, arrhythmias, cardiac pacemakers, and heart failure.

To determine validity, three questionnaires were sent to all participants [CPC questionnaire, hospital anxiety and depression scale (HADS) and self-administered instrument European QOL 5-dimensions (EQ-5D)].

The CPC questionnaire was a 63-item, 5-point Likert scale with scores ranging from "not true at all" (1) to "completely true" (5). Factor analysis was prepared with principal component analysis (PCA), and the results were reviewed by an expert panel to determine item relevancy and content validity. Finally, 63-item questionnaire with 8 domains was established. The 63 items originally meant to describe the constructs of CPC questionnaire. All items were subjected to a principal components analysis with varimax rotation. Statistical criteria guiding the decision of a final component structure were the scree plot, eigenvalues > 1.0, percent of variance explained, and component loadings > 0.40.¹⁶

HADS was used for assessing depression and anxiety level of patients. It consists of seven items for anxiety and seven items for depression with scores ranging from 0 to 21. The higher scores indicate more intensity in anxiety or depression level. Scores > 7 in both domains indicate that participants are likely to be depressed or suffer from anxiety.^{17,18} EQ-5D was used for detecting contributors QOL. Mobility, self-care, usual activity; pain/discomfort, and anxiety/depression were evaluated by this instrument. Three level of severity presented for each domain as 1 (no problems), 2 (some problems), and 3 (extreme problems). Global QOL score of participants was defined by the

combinations of dimensions' score. Higher EQ-5D scores indicate poor QOL.¹⁹

Data collection will be administrated by trained interviewer through face to face interview method. For this purpose, interviewer has been trained well, so that she is familiarized with how to fill the questionnaires and the ways of interviewing to prevent some of the common bias. Interviewer should be trained to make sure that the questionnaire is administered in a uniform way.

The study was approved by the Ethical Committee of Isfahan University of Medical Sciences, Iran, (grant number 191177). An informed written consent was taken from each participant.

Content validity of CPC questionnaire was confirmed by expert panel.

In addition for discriminant validity, the comparison group test was composed of depressed/non-depressed and anxious/non-anxious groups defined by HADS score. It was important to know whether the questionnaire could discriminate the population with depression and anxiety level. The two sample t-test was used for the comparison of depression and anxiety levels between depressed/non-depressed and anxious/non-anxious groups. To gain evidence for relationships between domains of CPC scale were tested using the Pearson correlation coefficient. Adequate factor discriminant validity is achieved when items relate more strongly to their own factor than to other factors. When testing the association of an item with its corresponding factor, a correlation coefficient > 0.7 indicates undesired shared variance between factors.²⁰ Discriminant validity of the questionnaire were between 0.4 and 0.6 for all domains. The correlation between domains of questionnaire and total score of HADS and EQ-D5 confirmed concurrent criterion validity.

For reliability, internal consistency was examined. With regard to internal consistency, the homogeneity of the question items in each domain was evaluated using Cronbach's α coefficient. A coefficient of 0.7 or higher is preferred for a questionnaire to be internally consistent.^{21,22} The deletion of any single item did not meaningfully impact alpha. The 95% confidence interval was declared for Cronbach's α . The factor analysis in the construct validity confirmed the internal consistency. Data were analyzed using SPSS software for Windows (version 15, SPSS Inc., Chicago, IL, USA).

Results

In this study, 148 of the total completed questionnaire were useable. Of the all participants, 79 (53.4%) were male and 69 (46.6%) were female. The mean age of them was 53.63 ± 5.15 . 123 (83.1%) were married. The mean year of education was 7.18 ± 5.71 . Of all participants, 31 (20.9%), 59 (39.9%), and 58 (39.2%) were employer, housewife, and retired, respectively.

At first, factor analysis was prepared with PCA, to cluster questions in defined groups and the results were reviewed by expert panel. Five factors referring problem-focused and three factors referring emotion-focused aspects of CPC were extracted by factor analysis that had allocated themselves the 45.93% of variance. According to the content of questions, we named each derived factors that adjusted to our presumptions. It confirmed construct validity.

In problem-focused aspect, there were 11 items under the search for information domain, 14 items under the self-regulation domain, 7 items under the being assertive domain, 7 items under the Independent decision-making domain, and 2 items under the looking for social services domain. In the aspect of emotion-focused, 10 items under the stress management domain, 6 items under the confronting the threat domain, and 6 items under the avoidance domain were exist (Table 1).

The mean score of stress management search for information, self-regulation, and confronting the threat domains were significantly higher in the non-depressed group. In a non-anxious group, stress management and self-regulation mean scores were significantly higher. It has been carried out for discriminant construct validity (Table 2).

According to the findings, search for information domain was statistically correlated with other domains of CPC questionnaire except stress management. Correlation of other domains of CPC questionnaire has been shown in table 3.

Concurrent criterion validity of the CPC questionnaire was computed by correlating the total scores of each domain with HADS and EQ-D5. According to the results shown in table 4, some domains of CPC questionnaire had significantly negative relation with depression, anxiety, and QOL. Cronbach's α coefficient ranged from 0.554 to 0.831 for each domain indicating acceptable internal consistency. The deletion of any single item did not meaningfully impact alpha. Table 5 shows the Cronbach's α of all domains.

Table 1. Factor analysis of cardiac patient competence (CPC) questionnaire

Number	Item	Loading factor
1. Stress management (10 items) (eigenvalue = 8.45, accounted for 13.42% of variance)		
PC42	I can cope with feelings of helplessness	0.763
PC43	I am confident it all ends well	0.535
PC44	I can overcome my fears of disease	0.692
PC45	I can cope with stress of undergoing angiography or angioplasty	0.614
PC46	I can ignore thoughts of recurrence of my disease	0.675
PC47	I can cope with problems arising from my disease	0.749
PC48	I can cope with disabilities caused by my disease	0.754
PC49	I can manage emotions like sorrow, fear and anger arising from disease	0.557
PC50	When I am stressed by thoughts of my disease, I manage to distract myself by other thoughts	0.392
PC51	I think of my disease and say "things could have been worse"	0.777
2. Search for information (11 items) (eigenvalue = 6.46, accounted for 10.25% of variance)		
PC1	I am looking for information about diagnostic methods	0.810
PC2	I am looking for information about side effects of invasive diagnostic methods	0.761
PC3	I am looking for information about treatment in brochures, books, etc.	0.677
PC4	I have prepared myself for stressful diagnostic procedures in the future	0.363
PC5	I am looking for information about prevention of cardiovascular diseases, such as a healthy diet, adequate physical activity, smoking cessation, and stress management techniques	0.397
PC6	I have asked doctors about various therapeutic methods and the differences between them	0.588
PC7	I am looking for information about recurrence and survival of cardiovascular disease	0.743
PC8	I have obtained comprehensive information about positive and negative aspects of various therapeutic methods and medications	0.673
PC9	I am looking for information about signs and symptoms of cardiovascular disease	0.672
PC10	I have a good deal of information about the importance of urgently going to the hospital when chest pain occurs	0.626
PC11	I have obtained enough information about doing my personal tasks following cardiovascular disease such as driving, back to work, etc.	0.720
3. Self-regulation (14 items) (eigenvalue = 2.85, accounted for 4.53% of variance)		
PC12	I am sure others can help me	0.617
PC13	I talk to my family and loved ones about the extent of support I need	0.785
PC14	It's easy for me to ask for other's support	0.671
PC15	I draw comfort from the attention my loved ones pay to my disease	0.582
PC16	I am looking for ways of coping with stress and problems of daily living	0.415
PC17	I watch my healthy diet	0.803
PC18	I take care to get enough rest enough and stay stress-free	0.580
PC19	I regularly check my weight and blood pressure myself	0.370
PC20	There's always time in my life for contemplation	0.478
PC21	I watch out for signs and signals from my body	0.396
PC22	I have sought information on things which are harmful for my disease and I should avoid	0.445
PC23	I see my doctor for regular check-ups	0.692
PC24	I am looking for ways to help me stop smoking cigarettes, hookah, and substance	0.764
PC25	I try to get enough exercise	0.462
4. Being Assertive (7 items) (eigenvalue = 2.58, accounted for 4.10% of variance)		
PC26	I find it difficult to accurately describe my problems to physicians (reverse scoring)	0.355
PC27	I openly speak to my doctor about treatment methods I dislike	0.746
PC28	I usually get my doctor to agree to my preferences on how to go about having a treatment	0.749
PC29	I tell my doctor when I am not happy with the treatment method he/she has suggested	0.762
PC30	When my doctor says something I do not understand, I ask for clarification	0.716
PC31	I manage to ask my doctor all my questions	0.630
PC32	I find it difficult to discuss my thoughts and ideas with my doctor (reverse scoring)	-0.742
5. Independent decision-making (7 items) (eigenvalue = 2.40, accounted for 3.80% of variance)		
PC33	I have dedicated some time to finding the best treatment method	0.497
PC34	I succeeded in arriving at a decision that was right for me	0.453
PC35	I have consulted other doctors and sought their opinion in making treatment decisions	0.613
PC36	I was skeptical about treatments suggested by physicians	0.705
PC37	I left decisions concerning my treatment to the physicians	0.545
PC38	I have sought information on unconventional therapies (alternative medicine/traditional medicine)	0.737

Table 1. Factor analysis of cardiac patient competence (CPC) questionnaire (Continue)

Number	Item	Loading factor
PC39	I have spoken to an alternative medicine specialist (Homeopathy, Chinese medicine, and vegetarianism) about my disease	0.787
6. Looking for social services (2 items) (eigenvalue = 2.25, accounted for 3.58% of variance)		
PC40	I have sought information on financial support and/or facilities that might be available for angioplasty and open-heart surgery	0.765
PC41	I have sought financial and/or insurance support in relation to my disease	0.755
7. Confronting the threat (6 items) (eigenvalue = 2.01, accounted for 3.19% of variance)		
PC52	I confront symptoms of recurrence and exacerbation of my disease head on	0.409
PC53	I think of what my disease means for my future	0.709
PC54	I think that death is always a possibility in my situation	0.671
PC55	I try to take good care of myself	0.752
PC56	I know how to deal with exacerbation of my disease symptoms	0.569
PC57	I can cope with my physical and movement disabilities	0.391
8. Avoidance (6 items) (eigenvalue = 1.93, accounted for 3.06% of variance)		
PC58	I find it hard to discuss my needs and requirements with others	0.560
PC59	I feel I must radically change my life based on my disease	0.356
PC60	I find it hard to come to terms with my disease	0.681
PC61	I won't allow others to know how I feel	0.734
PC62	I participate in various activities to forget my disease	0.670
PC63	I comfort myself by thinking of people who are worse off than myself	0.510

PC: Patient competence

Table 2. Scores of all domains of the cardiac patient competence (CPC) based on depression and anxiety level

Domain	Depression		P	Anxiety		P
	Depressed	Non-depressed		Anxious	Non-anxious	
Search for information	26.91 ± 9.84	30.45 ± 9.85	0.040	28.81 ± 10.34	29.27 ± 9.72	0.790
Self-regulation	51.26 ± 8.94	55.94 ± 7.24	0.001	52.23 ± 8.92	55.58 ± 7.49	0.020
Being assertive	20.31 ± 5.40	20.65 ± 4.63	0.690	20.90 ± 5.34	20.17 ± 4.66	0.380
Independent decision-making	18.14 ± 5.41	19.31 ± 5.51	0.210	19.34 ± 5.68	18.47 ± 5.31	0.340
Looking for social services	5.91 ± 2.58	6.18 ± 2.19	0.500	5.74 ± 2.52	6.39 ± 2.16	0.090
Stress management	31.96 ± 9.30	40.96 ± 6.34	< 0.001	32.83 ± 8.97	40.97 ± 6.91	< 0.001
Confronting the threat	21.24 ± 5.18	23.36 ± 4.28	0.009	21.85 ± 5.19	23.16 ± 4.19	0.090
Avoidance	18.65 ± 4.28	17.76 ± 4.16	0.220	18.73 ± 4.34	17.69 ± 4.07	0.140

Table 3. Pearson's correlations of the cardiac patient competence (CPC) questionnaire domains

Domain	1	2	3	4	5	6	7	8
1. Search for information	1							
2. Self-regulation	0.407**	1						
3. Being assertive	0.216**	0.145	1					
4. Independent decision-making	0.552**	0.203*	0.244**	1				
5. Looking for social services	0.269**	0.037	0.105	0.240**	1			
6. Stress management	0.019	0.283**	-0.004	-0.013	0.046	1		
7. Confronting the threat	0.275**	0.515**	0.119	0.136	0.218**	0.374**	1	
8. Avoidance	0.254**	-0.009	0.041	0.091	0.124	-0.084	0.260**	1

* Correlation is significant at the 0.05 level (2-tailed); ** Correlation is significant at the 0.01 level (2-tailed)

Table 4. Pearson's correlation coefficients (r) between the cardiac patient competence (CPC) questionnaire domains and European quality of life 5-dimensions (EQ-5D) and hospital anxiety and depression scale (HADS) questionnaires score

Domain	Quality of life	Depression	Anxiety
Search for information	-0.169*	-0.174*	0.072
Self-regulation	-0.176*	-0.296**	-0.227**
Being assertive	-0.054	-0.049	0.053
Independent decision-making	-0.097	-0.111	0.105
Looking for social services	-0.091	-0.203*	-0.074
Stress management	-0.397**	-0.515**	-0.630**
Confronting the threat	-0.211*	-0.225**	-0.215**
Avoidance	-0.015	0.019	0.181*

* Correlation is significant at the 0.05 level (2-tailed); Correlation is significant at the 0.01 level (2-tailed)

Table 5. Internal consistency of the cardiac patient competence (CPC) questionnaire

Domain	Cronbach's alpha*
Search for information	0.831
Self-regulation	0.796
Being assertive	0.744
Independent decision-making	0.694
Looking for social services	0.554
Stress management	0.803
Confronting the threat	0.792
Avoidance	0.687

*P < 0.001

Discussion

This study attempted to clarify patient competencies construct conceptually and develop a questionnaire measuring patient competencies within a cardiology context and test its validity and reliability. As data analysis shows different domains of CPC in problem and emotion - focused tasks were derived.

Since patients dealing with the problems related to life-threatening illness such as cardiovascular disease need information, those who often lack knowledge about their condition and prognosis may contribute to depression, poor drug adherence, unplanned admissions, and less decision-making involvement.²³ Thus, searching information about their disease is considered to promote their understanding of the recommended therapies and behavior changes²⁴ and make sure that they know the risk and are informed about how to reduce it.²⁵

Effective regulation may facilitate one's ability to concentrate and solve illness problems. Accordingly, self-regulation has been identified as a healthy psychological asset that enables individuals to regulate what they feel and do. We have some evidence in hand that effective self-regulation reduces chronic distress and enhances positive emotional experience.²⁶

The assertive aspects of extraversion that prompt individuals to seek and retain social dominance might, therefore, increase cardiovascular morbidity, possibly via the psychosocial stress associated with maintaining dominant social relations.^{27,28}

In order to patients have a right to achieve their goals, be satisfied and adhere to treatment, independent decision making can help them to reach what they want and await²⁹ and contribute to a better state of health.³⁰

According to the result of some study, treatment and control of the disease are lower among uninsured adults. Increasing the portion of insured individuals may be progress the treatment and

control of cardiovascular disease risk factors and make a reduction in health disparities.³¹

Additionally, patients are concerned of their future life, dealing with disease symptoms, coping with disease complication, and difficulties on expressing their feelings. These are emotional aspect of CPCs. Due to an important role of emotion as a trigger for acute coronary events.^{32,33} There have been several prospective studies of stress and emotion as probable risk factors for cardiovascular disease. This new understanding is in agreement with the view that emotional processes are risk factors for cardiovascular disease.^{9,34} Consequently, managing stress, confronting with the threat of disease and using the way of expressing feelings will have been required.

In short, the first Persian version of the self-rating measure of PC in the context of cardiology is reliable and valid, and provides a basis for future research. Although some improvement is needed, we are expecting that enhancing reliability and construct validity of this questionnaire will finally tend to appear tools for measuring patients' strength and weaknesses in dealing with cardiology, help to better make decision and design and evaluate interventions to enhancing it.

The limitation of our study was that we do not have a gold questionnaire for comparison of our CPC questionnaire. The CPC was developed in Persian, since it does not contain items that are specifically related to Iranian culture, it could be translated and used internationally.

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Conflict of Interests

Authors have no conflict of interests.

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