

Translation, Cultural Adaptation, Validation, and Reliability of Persian-Revised Heart Failure Compliance Questionnaire

Mehrbod Vakhshoori, MD¹, Niloofar Bondariyan, Pharm D², Farbod Khanizadeh, PhD³, Sayed Ali Emami, MD¹, Sima Azish, MD⁴, Najmeh Rabbanipour, PhD¹, Davood Shafie, MD^{1*}

¹Heart Failure Research Center, Cardiovascular Research Institute, Isfahan University of Medical Sciences, Isfahan, Iran.

²Department of Clinical Pharmacy, School of Pharmacy, Shiraz University of Medical Sciences, Shiraz, Iran.

³Insurance Research Center, Tehran, Iran.

⁴Cardiac Rehabilitation Research Center, Cardiovascular Research Institute, Isfahan University of Medical Sciences, Isfahan, Iran.

Received 04 January 2022; Accepted 11 August 2022

Abstract

Background: Compliance with health-related behaviors is a dilemma among heart failure (HF) patients. The present study aimed to assess the validity and reliability of a Persian translation of the revised heart failure compliance questionnaire (RHFCQ) in Iranian HF sufferers.

Methods: This methodological study was performed on outpatient HF individuals referred to a heart clinic in Isfahan, Iran. The forward-backward translation method was used for translation. Twenty subjects were invited to express their opinions on the provided items concerning simplicity and understandability. Twelve experts were invited to rate the items regarding the content validity index (CVI). Cronbach's α was used to evaluate internal consistency. The patients were asked to complete the questionnaire for the second time after 2 weeks to investigate test-retest reliability using the intraclass correlation coefficient (ICC).

Results: There were no obvious difficulties during the translation and assessment of the simplicity and comprehensiveness of the questionnaire items. The CVI of the items ranged from 0.833 to 1.000. Totally, 150 patients (age: 64.60 ± 15.00 y, males: 58.0%) filled in the questionnaire twice with no missing data. The highest and lowest compliance rates were attributed to alcohol and exercise domains, respectively ($83.00 \pm 7.70\%$ and $45.55 \pm 12.00\%$, respectively). Cronbach's α was 0.629. After the omission of 3 items related to smoking and alcohol cessation, Cronbach's α rose to 0.655. The ICC showed an acceptable value of 0.576 (95% CI, 0.462 to 0.673).

Conclusion: The modified Persian RHFCQ is a simple and meaningful tool with acceptable moderate reliability and good validity for assessing compliance in Iranian HF patients.

J Teh Univ Heart Ctr 2022;17(4):186-194

This paper should be cited as: Vakhshoori M, Bondariyan N, Khanizadeh F, Emami SA, Azish S, Rabbanipour N, et al. Translation, Cultural Adaptation, Validation, and Reliability of Persian-Revised Heart Failure Compliance Questionnaire. J Teh Univ Heart Ctr 2022;17(4):186-194.

Keywords: Heart failure; Quality of life, Validation study; Surveys and questionnaires; Psychometrics; Reproducibility of results; Iran

*Corresponding Author: Davood Shafie, Assistant Professor of Cardiology, Heart Failure Research Center, Cardiovascular Research Institute, Isfahan University of Medical Sciences, Chamran Hospital, 2nd Moshtagh Street, Isfahan, Iran. 81583-88994. Tel: +98 031 3260 0961. E-mail: d.shafie87@gmail.com.



Introduction

Heart failure (HF) is one of the most common noncommunicable diseases predominantly observed among old persons. This disorder accounts for the highest percentage of hospitalization among elderly patients. It has been reported that 25% and 50% of HF patients were readmitted 1 and 6 months after their first hospitalization, respectively.¹ Although HF prevalence is 1%–3% in developed nations, this percentage is consistently raised with increasing age, such that at least 10% of patients above 75 years suffer from HF.^{2–4} The 5-year mortality rate of HF has been reported to be 50%–75%.⁵ The annual cost of HF hospitalization ranges from \$3780 to \$34233 and increases as the clinical condition worsens.⁶ In addition to the introduction of different prognostic and therapeutic interventions in HF care, the proper management of this disease requires interplay between pharmacologic and non-pharmacologic factors, including alcohol and smoking cessation, daily weighing, fluid and sodium restriction, and performing physical activity^{7–11} (Heidarpour M, Sourani Z, Vakhshoori M, Bondariyan N, Emami SA, Fakhrolmubasher M, Seyedhossaini S, Shafie D. Prognostic Utility of Shock Index and Modified Shock Index on Long-Term Mortality in Acute Decompensated Heart Failure; Persian Registry of Cardiovascular Disease/Heart Failure (Prove/Hf) Study. *Acta Cardiol* 2022;1-10.). Despite the proper adjustment of the aforementioned factors, patient compliance is the cornerstone in this regard.¹² The academic definition of compliance is the extent to which a patient's behavior is consistent with the prescribed medical advice.¹⁴ Noncompliance prevalence rises with age, with different compliance rates for each category of the previously proven effective factors for HF management. For instance, adherence to medication usage as well as fluid and sodium-restricted diets ranges from 10%–99% and 23%–70% to 13%–75%, respectively.^{13–15} Therefore, the proper assessment of patient adherence remains essential. Until now, several relevant assessment tools have been introduced. The heart failure compliance questionnaire (HFCQ) is a tool designed to evaluate multiple dimensions of health recommendations among HF patients. The revised version of the HFCQ (RHFCQ) has been validated previously by Evangelista et al.¹⁶ This version is a 21-item questionnaire assessing different categories of compliance. However, the utility of this questionnaire in different patients with variable language and cultural beliefs might be questionable.

In this study, we aimed to evaluate the validity and reliability of a Persian-translated RHFCQ in Iranian patients with HF.

Methods

The RHFCQ was developed to assess the multidisciplinary compliance status of HF patients.¹⁷ This questionnaire

contains 6 main sections: follow-up appointments, medications, diet, exercise, smoking, and alcohol cessation. Patients report the importance of each health-related behavior on a 5-point Likert scale (0: not at all, 1: somewhat important, 2: important, 3: very important, and 4: highly important). Another type of question is related to the degree of difficulty adhering to healthy activities (1: no difficulty, 2: a little difficulty, 3: moderate difficulty, and 4: great difficulty). Finally, patients estimate their degree of compliance with each domain of health-related activities (1: none of the time, 2: very seldom, 3: about half the time, 4: most of the time, and 5: all of the time). Except for the first domain (follow-up appointments) assessing compliance during the preceding 3 months, other sections assess compliance during the preceding week. Total scores in each section and the total score of all sections are calculated and linearly converted into a 0–100 scale where 0 indicates poor compliance and 100 denotes the highest compliance.

Formal permission was obtained from the questionnaire designers for the use of the questionnaire to assess its validity and reliability among Iranian individuals. The forward-backward method was applied in 5 stages for translation.^{18,19} First, 2 independent bilingual translators who were native Farsi speakers and fluent in English were officially invited to translate the questionnaire from English into Persian. One of the translators was not familiar with medical terms. Both were requested to use simple and easily understandable words during the translation and avoid the use of complicated medical terms. Problematic phrases and terms were highlighted and reported. A final consensus was reached on the first translated version in the second step. Then, a backward translation of the questionnaire into English was done through the invitation of a third independent bilingual translator who was not familiar with medical terms. The translator was asked to translate the prior version of the Persian-translated questionnaire into English using simple terms. In the fourth phase, an official meeting was held by the investigator with the participation of the translators and methodologists to discuss the pre-final draft of the questionnaire. Finally, this self-administered translated questionnaire was distributed among 20 HF patients referred to an outpatient heart clinic in a governmental hospital in Isfahan, Iran, to be completed in the presence of the investigator. The eligibility criteria for selection were the same as the inclusion criteria for recruiting the final total sample size. The respondents were free to ask any questions about the items and comment in this regard. The team reviewed all their opinions for possible alterations to the questionnaire.

Twelve experts, consisting of 4 cardiologists, 4 nurses, 2 general practitioners, 1 statistician, and 1 pharmacist, were officially invited to assess the validity of the questionnaire. They were requested to declare their opinions regarding each item in terms of understandability and relevance. The

Davis method was utilized to measure the content validity index (CVI), such that each questionnaire item had a 4-item scale for response (1: not suitable, 2: suitable in terms of readapting prepositions, 3: suitable but some adaptations are required, and 4: very suitable). The CVI was calculated through the division of the number of experts who chose the latter 2 answers over the total number of experts.²⁰ The terms “appropriate”, “needs for re-evaluation”, and “candidate for deletion” were defined to attribute to each item if the CVI was ≥ 0.790 , $0.700-0.790$, and ≤ 0.700 , respectively.

Internal consistency was determined through the measurement of Cronbach's α with the following classifications (excellent: 0.900, good: 0.800–0.900, acceptable: 0.700–0.790, questionable: 0.600–0.690, poor: 0.500–0.590 and unacceptable: <0.500).²¹ All enrolled patients were invited to fill in the final version of the translated questionnaire for the second time approximately 2 weeks apart. This time interval has been reported to be acceptable to assess test-retest reliability, and the intraclass correlation coefficient (ICC) was used to measure test-retest reliability.²² ICC values of ≤ 0.400 , $0.400-0.750$, and ≥ 0.750 were considered poor, good, and excellently reliable, respectively.^{21,23}

Floor and ceiling effects assess the respondents' answers across the extreme ends of a measuring scale. Higher effects are associated with probable response bias and measurement inaccuracy. Floor and ceiling effects were defined if at least 15.0% of participants got the lowest and highest possible scores in each domain, respectively.²⁴

The inclusion criteria were composed of documented stable HF, a minimum age of 18 years, and willingness to participate in the study. Illiteracy and unwillingness to fill in the questionnaire were considered the exclusion criteria. Prior to the completion of the questionnaire, the study aims were explained by the principal investigator, with all the participants being reassured that they were completely free to leave the study anytime without any consequences. Each patient had enough time to complete the questionnaire, and any questions related to the questionnaire were thoroughly answered. Finally, 150 stable HF patients were randomly selected to complete the questionnaire between March 2021 and May 2021.

All statistical analyses were conducted using the Statistical Package for Social Sciences (SPSS) version 26 (IBM Corp, Armonk, NY, USA). Frequencies (percentages) were used to report the distribution of the participants' answers. The total scores were reported as the mean \pm the standard deviation (SD).

The current study was approved by the Ethics Committee of Isfahan University of Medical Sciences (IUMS) (IR.MUI.MED.REC.1400.171). The study's main aim was fully explained to all the participants, who were allocated sufficient time to ask any questions with respect to the measuring tool. They were also reassured that all their personal information

would be confidentially kept. Finally, all the participants signed a written informed consent form.

Results

The mean age of the participants was 64.60 ± 15.00 years, with males representing 58.0% of the study population. All the participants completed the Persian RHFCQ twice at approximately 2-week intervals. Table 1 reveals the distribution of the patients' answers during the first and second times of completion. The distribution of the participants' scores based on each domain after completing the questionnaire twice is shown in Table 2. Our findings showed that the highest and lowest compliance scores were related to alcohol use and exercise sections, respectively, during the 2 questionnaire completions.

Twenty patients were selected to express their opinions on each item of the Persian draft of the questionnaire. Most of them announced that they had completely understood all the questions and provided answers. No major comments were collected; thus, no additional alterations were made to the questionnaire. The final version of the translated RHFCQ, plus its original form, is depicted in Figure 1.

The data of each item CVI are shown in Table 3. All items showed acceptable previously defined CVI. The lowest CVI was 0.833 for items 4, 8, 9, 11, 15, and 18, while the highest CVI was 1.000 for items 2, 6, 12, 13, 14, 16, 17, and 19.

The first Cronbach's α of all 21 included items was 0.629. Due to the negative impact of item 15 on the reliability index of the total questionnaire, this item was omitted, resulting in the elevation of Cronbach's α to 0.635. Two questions (items 20 and 21) related to alcohol consumption were also discarded because of the same issue, leading to the increase of Cronbach's α to the final point of 0.655. After the second completion, the ICC value was 0.576 (95% CI, 0.462 to 0.673). The reliability indices of each questionnaire item after the omission of the undesirable questions are provided in Table 4. The minimum and maximum corrected item-total correlations were 0.014 and 0.426, respectively. The final modified Persian version of the RHFCQ is shown in Supplemental Appendix 1.

No floor and ceiling effects were observed in each domain.

We performed the current study to evaluate the compliance of HF patients with different lifestyle domains, including follow-up appointments, medication consumption, eating habits, regular exercising, and smoking and alcohol cessation. Our findings revealed that after the omission of 3 items (1 question from the smoking cessation section and 2 questions from the alcohol cessation section), Cronbach's α rose to 0.655, indicating the moderate reliability of this instrument. Due to the high prevalence of HF around the globe, this questionnaire might be useful in clinical practice to collect information regarding different health aspects



Table 1. Distribution of the respondents' answers during the first and second completions of the revised heart failure compliance questionnaire (RHFCQ) (n=150)*

Questions	First Time					Second Time				
	Not at all	Somewhat important	Important	Very important	Highly important	Not at all	Somewhat important	Important	Very important	Highly important
Item 1	0	1 (0.7)	3 (2.0)	146 (97.3)	0	0	3 (2.0)	4 (2.7)	143 (95.3)	0
Item 4	1 (0.7)	0	8 (5.3)	141 (94.0)	0	1 (0.7)	2 (1.3)	11 (7.3)	136 (90.7)	0
Item 7	2 (1.3)	1 (0.7)	10 (6.7)	137 (91.3)	0	0	1 (0.7)	9 (6.0)	140 (93.3)	0
Item 8	1 (0.7)	5 (3.3)	9 (6.0)	135 (90.0)	0	0	3 (2.0)	11 (7.3)	136 (90.7)	0
Item 9	0	2 (1.3)	11 (7.3)	137 (91.4)	0	0	2 (1.4)	12 (8.0)	136 (90.6)	0
Item 12	2 (1.3)	1 (0.7)	1 (0.7)	146 (97.3)	0	1 (0.7)	6 (4.0)	0	142 (94.6)	1 (0.7)
Item 15	1 (0.7)	1 (0.7)	5 (3.3)	143 (95.3)	0	3 (2.0)	1 (0.7)	11 (7.3)	135 (90.0)	0
Item 16	1 (0.7)	4 (2.7)	4 (2.7)	141 (94.0)	0	1 (0.7)	3 (2.0)	11 (7.3)	135 (90.0)	0
Item 19	2 (1.3)	1 (0.7)	11 (7.3)	133 (88.7)	3 (2.0)	2 (1.3)	1 (0.7)	15 (10.0)	129 (86.0)	3 (2.0)

Questions	First Time				Second Time			
	No difficulty	A little difficulty	Moderate difficulty	Great difficulty	No difficulty	A little difficulty	Moderate difficulty	Great difficulty
Item 2	141 (94.0)	3 (2.0)	6 (4.0)	0	143 (95.4)	5 (3.3)	2 (1.3)	0
Item 5	122 (81.3)	11 (7.3)	16 (10.7)	1 (0.7)	127 (84.7)	11 (7.3)	10 (6.7)	2 (1.3)
Item 10	53 (35.4)	45 (30.0)	50 (33.3)	2 (1.3)	94 (62.7)	26 (17.3)	27 (18.0)	3 (2.0)
Item 13	5 (3.3)	20 (13.3)	77 (51.4)	48 (32.0)	7 (4.7)	21 (14.0)	75 (50.0)	47 (31.3)
Item 17	138 (92.0)	1 (0.7)	8 (5.3)	3 (2.0)	140 (93.4)	2 (1.3)	8 (5.3)	0
Item 20	147 (98.0)	2 (1.3)	1 (0.7)	0	147 (98.0)	2 (1.3)	1 (0.7)	0

Questions	First Time					Second Time				
	Not applicable	None of the time	Very seldom	About half of the time	Most of the time	All of the time	Not applicable	None of the time	Very seldom	About half of the time
Item 3	-	0	0	2 (1.3)	14 (9.3)	134 (89.4)	-	0	0	1 (0.7)
Item 6	-	1 (0.7)	4 (2.7)	5 (3.3)	24 (16.0)	116 (77.3)	-	5 (3.3)	1 (0.7)	7 (4.6)
Item 11	-	0	6 (4.0)	84 (56.0)	34 (22.7)	26 (17.3)	-	0	4 (2.7)	37 (24.6)
Item 14	-	12 (8.0)	51 (34.0)	71 (47.3)	15 (10.0)	1 (0.7)	-	13 (8.7)	36 (24.0)	83 (55.3)
Item 18	6 (4.0)	7 (4.7)	1 (0.7)	2 (1.3)	134 (89.3)	0	6 (4.0)	7 (4.7)	1 (0.7)	2 (1.3)
Item 21	2 (1.3)	2 (1.3)	0	0	146 (97.4)	0	1 (0.7)	1 (0.7)	0	0

*Data are presented as n (%).

of HF patients with a view to improving the quality of management.

The first version of the compliance questionnaire about HF was developed to assess the degree of HF patients' compliance with different activities via questions concerning HF compliance plus 5 extra instruments on social support and psychosocial status.¹⁷ Nonetheless, due to low internal consistency and a longer required time (~30 min) for completion, the revised version was introduced.

The translation process in our current study was done without any apparent difficulty. We used the forward-backward translation method, which is often compared with the dual-panel method. Still, some differences should be taken into account. The dual-panel network consists of 2 groups: bilingual and lay panels. The first group contains bilingual speakers who are competent in their native language and fluent in English. The principal responsibility of this panel is to provide the initial translation of

Table 2. Distribution of the respondents' scores during the first and second completions of the revised heart failure compliance questionnaire (RHFCQ) (n=150)

	Total score (mean±SD)			Total score (mean±SD)	
	First Time	Second Time		First Time	Second Time
Health maintenance	81.61±5.60	81.94±4.40	Exercise	45.55±12.00	46.61±12.40
Item 1			Item 12		
Item 2			Item 13		
Item 3			Item 14		
Medications	78.33±11.20	78.22±10.70	Smoking	71.87±10.50	72.62±10.00
Item 4			Item 15		
Item 5			Item 16		
Item 6			Item 17		
Diet	58.16±9.20	63.23±9.40	Item 18		
Item 7			Alcohol use	83.00±7.70	83.61±6.40
Item 8			Item 19		
Item 9			Item 20		
Item 10			Item 21		
Item 11					

SD, Standard deviation

Table 3. Validity indices of the Persian version of the revised heart failure compliance questionnaire (RHFCQ)

Questions	Content validity index	Questions	Content validity index
Item 1	0.916	Item 12	1.000
Item 2	1.000	Item 13	1.000
Item 3	0.916	Item 14	1.000
Item 4	0.833	Item 15	0.833
Item 5	0.916	Item 16	1.000
Item 6	1.000	Item 17	1.000
Item 7	0.916	Item 18	0.833
Item 8	0.833	Item 19	1.000
Item 9	0.833	Item 20	0.916
Item 10	0.916	Item 21	0.916
Item 11	0.833		

Table 4. Reliability indices of the Persian version of the revised heart failure compliance questionnaire (RHFCQ)

Questions	Corrected item-total correlation	Cronbach's α if the items deleted	Questions	Corrected item-total correlation	Cronbach's α if the items deleted
Item 1	0.096	0.655	Item 11	0.358	0.625
Item 2	0.014	0.663	Item 12	0.248	0.647
Item 3	0.268	0.643	Item 13	0.237	0.645
Item 4	0.343	0.640	Item 14	0.274	0.640
Item 5	0.240	0.643	Item 16	0.160	0.651
Item 6	0.269	0.639	Item 17	0.426	0.618
Item 7	0.236	0.645	Item 18	0.357	0.628
Item 8	0.397	0.633	Item 19	0.118	0.655
Item 9	0.216	0.648			
Item 10	0.382	0.621			

the desired questionnaire. Monolingual subjects with different socioeconomic and educational backgrounds are members of the lay panel assessing the appropriateness of the translated version in terms of understandability and comprehensiveness.²⁵ Despite reports that this translation method has fewer missing items, the higher dedicated time for implementation and the need for combining backward

translation prompted us to utilize the forward-backward method.²⁶ Furthermore, our participants declared that the items were easy to understand, and the total questionnaire had enough question length. The mean required time by the respondents to complete the questionnaire was about 5 minutes, significantly lower than that of the first original version.¹⁷



Health Maintenance

مراقبت از سلامت

1. How important do you think it is to keep your appointments with your doctor?

- 1) Not at all 2) Somewhat important 3) Important 4) Very important 5) Highly important

۱. به نظر شما چقدر اهمیت دارد که سر موقع به ملاقات پزشکتان بروید؟

- ۱) اصلا اهمیتی ندارد. ۲) تا حدی مهم است. ۳) مهم است. ۴) خیلی مهم است. ۵) خیلی زیاد مهم است.

2. How much difficulty have you had keeping your appointments with your doctor?

- 1) No difficulty 2) A little difficulty 3) Moderate difficulty 4) A lot of difficulty

۲. برای ملاقات با پزشک تان چقدر دچار مشکل شده اید؟

- ۱) مشکلی نیست. ۲) قدری مشکل است. ۳) مشکلات متوسطی دارد. ۴) مشکلات زیادی دارد.

3. In the last 3 months, would you estimate you have kept your doctor's appointments?

- 1) None of the time 2) Very seldom 3) About half of the time 4) Most of the time 5) All of the time

۳. در سه ماه گذشته تخمین می زنید که چقدر به زمان ملاقات هایتان با پزشک تان پایبند بوده اید؟

- ۱) هیچ وقت. ۲) خیلی به ندرت. ۳) حدود نیمی از موارد. ۴) اغلب اوقات. ۵) همیشه.

Medications

داروها

4. How important do you think it is to take your medications regularly?

- 1) Not at all 2) Somewhat important 3) Important 4) Very important 5) Highly important

۴. به نظر شما چقدر اهمیت دارد که داروهای خود را به صورت منظم استفاده کنید؟

- ۱) اصلا اهمیتی ندارد. ۲) تا حدی مهم است. ۳) مهم است. ۴) خیلی مهم است. ۵) خیلی زیاد مهم است.

5. How much difficulty have you had with taking your medications?

- 1) No difficulty 2) A little difficulty 3) Moderate difficulty 4) A lot of difficulty

۵. چقدر استفاده از دارو هایتان برایتان مشکل است؟

- ۱) مشکلی نیست. ۲) قدری مشکل است. ۳) مشکلات متوسطی دارد. ۴) مشکلات زیادی دارد.

6. In the past week, would you estimate you have taken your medications?

- 1) None of the time 2) Very seldom 3) About half of the time 4) Most of the time 5) All of the time

۶. در هفته گذشته به صورت تخمینی مصرف دارو هایتان را چطور انجام داده اید؟

- ۱) هیچ وقت. ۲) خیلی به ندرت. ۳) حدود نیمی از موارد. ۴) اغلب اوقات. ۵) همیشه.

Diet

رژیم غذایی

7. How important do you think it is to weigh yourself daily?

- 1) Not at all 2) Somewhat important 3) Important 4) Very important 5) Highly important

۷. فکر می کنید که وزن کردن روزانه تان چقدر مهم است؟

- ۱) اصلا اهمیتی ندارد. ۲) تا حدی مهم است. ۳) مهم است. ۴) خیلی مهم است. ۵) خیلی زیاد مهم است.

8. How important do you think it is to limit your fluid intake?

- 1) Not at all 2) Somewhat important 3) Important 4) Very important 5) Highly important

۸. فکر میکنید محدود کردن مصرف مایعات چقدر برای شما مهم است؟

- ۱) اصلا اهمیتی ندارد. ۲) تا حدی مهم است. ۳) مهم است. ۴) خیلی مهم است. ۵) خیلی زیاد مهم است.

9. How important do you think it is to limit your salt to 2 grams or less?

- 1) Not at all 2) Somewhat important 3) Important 4) Very important 5) Highly important

۹. فکر میکنید چقدر مهم است که مصرف نمک را به دو گرم یا کمتر در روز محدود کنید؟

- ۱) اصلا اهمیتی ندارد. ۲) تا حدی مهم است. ۳) مهم است. ۴) خیلی مهم است. ۵) خیلی زیاد مهم است.

10. How much difficulty have you had keeping your dietary recommendations?

- 1) No difficulty 2) A little difficulty 3) Moderate difficulty 4) A lot of difficulty

۱۰. چقدر دنبال کردن توصیه های غذایی داده شده برای شما مشکل بوده است؟

- ۱) مشکلی نیست. ۲) قدری مشکل است. ۳) مشکلات متوسطی دارد. ۴) مشکلات زیادی دارد.

11. In the past week, would you estimate you have followed your dietary recommendations?

- 1) None of the time 2) Very seldom 3) About half of the time 4) Most of the time 5) All of the time

۱۱. در هفته گذشته به صورت تخمینی دنبال کردن رژیم غذایی تان را چطور انجام داده اید؟

- ۱) هیچ وقت. ۲) خیلی به ندرت. ۳) حدود نیمی از موارد. ۴) اغلب اوقات. ۵) همیشه.

Exercise

ورزش

12. How important do you think it is to exercise regularly?

- 1) Not at all 2) Somewhat important 3) Important 4) Very important 5) Highly important

۱۲. به نظر شما ورزش منظم چقدر اهمیت دارد؟

- ۱) اصلا اهمیتی ندارد. ۲) تا حدی مهم است. ۳) مهم است. ۴) خیلی مهم است. ۵) خیلی زیاد مهم است.

13. How much difficulty have you had with exercising as recommended?

- 1) No difficulty 2) A little difficulty 3) Moderate difficulty 4) A lot of difficulty

۱۳. انجام ورزش به گونه ای که به شما توصیه شده است را چقدر مشکل می بینید؟

- ۱) مشکلی نیست. ۲) قدری مشکل است. ۳) مشکلات متوسطی دارد. ۴) مشکلات زیادی دارد.

14. In the past week, would you estimate you have exercised as recommended?

- 1) None of the time 2) Very seldom 3) About half of the time 4) Most of the time 5) All of the time

۱۴. در هفته گذشته به صورت تخمینی دنبال کردن توصیه های ورزشی تان را چطور انجام داده اید؟

- ۱) هیچ وقت. ۲) خیلی به ندرت. ۳) حدود نیمی از موارد. ۴) اغلب اوقات. ۵) همیشه.

Smoking

سیگار کشیدن

15. How important do you think it is to not smoke?

- 1) Not at all 2) Somewhat important 3) Important 4) Very important 5) Highly important

۱۵. به نظر شما سیگار نکشیدن چقدر اهمیت دارد؟

- ۱) اصلا اهمیتی ندارد. ۲) تا حدی مهم است. ۳) مهم است. ۴) خیلی مهم است. ۵) خیلی زیاد مهم است.

16. How important do you think it is to limit exposure to second hand smoke?

- 1) Not at all 2) Somewhat important 3) Important 4) Very important 5) Highly important

۱۶. به نظر شما چقدر اهمیت دارد که در معرض دود سیگار بودن اشخاص دیگر را محدود کنید؟

- ۱) اصلا اهمیتی ندارد. ۲) تا حدی مهم است. ۳) مهم است. ۴) خیلی مهم است. ۵) خیلی زیاد مهم است.

17. How much difficulty have you had with smoking cessation?

- 1) No difficulty 2) A little difficulty 3) Moderate difficulty 4) A lot of difficulty

۱۷. چقدر با ترک سیگار مشکل داشته اید؟

- ۱) مشکلی نیست. ۲) قدری مشکل است. ۳) مشکلات متوسطی دارد. ۴) مشکلات زیادی دارد.

18. In the past week, would you estimate you have stopped smoking?

- 1) Not applicable 2) None of the time 3) Very seldom 4) About half of the time 5) Most of the time 6) All of the time

۱۸. در هفته گذشته، به صورت حدودی ترک مصرف سیگار تان به چه شکل بوده است؟

- ۱) غیر مرتبط. ۲) هیچ وقت. ۳) خیلی به ندرت. ۴) حدود نیمی از موارد. ۵) اغلب اوقات. ۶) همیشه.

Alcohol use

مصرف الکل

19. How important do you think it is to limit alcohol use?

- 1) Not at all 2) Somewhat important 3) Important 4) Very important 5) Highly important

۱۹. به نظر شما چقدر اهمیت دارد که مصرف الکل را محدود کنید؟

- ۱) اصلا اهمیتی ندارد. ۲) تا حدی مهم است. ۳) مهم است. ۴) خیلی مهم است. ۵) خیلی زیاد مهم است.

20. How much difficulty have you had with limiting alcohol use?

- 1) No difficulty 2) A little difficulty 3) Moderate difficulty 4) A lot of difficulty

۲۰. چقدر با محدود کردن استفاده از الکل مشکل داشته اید؟

- ۱) مشکلی نیست. ۲) قدری مشکل است. ۳) مشکلات متوسطی دارد. ۴) مشکلات زیادی دارد.

21. In the past week, would you estimate you have stopped using alcohol?

- 1) Not applicable 2) None of the time 3) Very seldom 4) About half of the time 5) Most of the time 6) All of the time

۲۱. در هفته گذشته، به صورت حدودی آیا مصرف الکل را متوقف کرده اید؟

- ۱) غیر مرتبط. ۲) هیچ وقت. ۳) خیلی به ندرت. ۴) حدود نیمی از موارد. ۵) اغلب اوقات. ۶) همیشه.

Figure 1. Persian and original revised heart failure compliance questionnaire

We assessed reliability as an index indicating the capability of an instrument to measure intended factors accurately. Although the first Cronbach's α of all 21 included items was low, the omission of 3 items increased the degree of internal consistency to 0.655. The 2 items omitted in the final questionnaire were related to alcohol consumption. Because alcohol consumption is illegal in Iran, these 2 items might negatively affect the reliability of the questionnaire. Chiming in with the first version of the questionnaire, this value yielded a Cronbach's α of 0.680.¹⁷ A previous study reported the internal consistency value of the RHFCQ to be 0.768 with an ICC of 0.362.²⁷ The ICC value of the currently translated questionnaire with all the included items was higher than that mentioned above. Likewise, a prior investigation used the 3 questions of RHFCQ and reported a Cronbach's α of 0.600, with each item's ICC value ranging from 0.355 to 0.618.²⁸ The results of the internal consistency of the mentioned study were quite similar to ours. This low internal reliability might be predicted by the different levels of compliance in each category of healthy activities provided in the questionnaire. The presence of cultural sensitivities, especially in terms of alcohol usage and smoking, might explain this low internal consistency.

Our findings revealed that the Persian format of the questionnaire enjoyed good validity. The acceptable content validity of the first version of the compliance questionnaire was established by 7 experts and 10 patients, with a 100% satisfaction score.¹⁷

To the best of our knowledge, the current study is the first in the literature to investigate the validity and reliability of the Persian RHFCQ in Iranian patients suffering from HF. We recruited a considerably large sample. Additionally, all the participants filled in the questionnaire twice without any missing data.

Some limitations are attributable to the research. This study was implemented in a single center, and caution should be exercised to generalize our outcomes to other cities. The presence of recall bias should be considered in questions evaluating health-related activities in which individuals must remember their activities. Although we did our utmost to discard the fewest possible number of variables to increase the reliability of the questionnaire, we had to omit 3 items (1 question regarding smoking and 2 questions regarding alcohol consumption) due to their significant negative impacts on the reliability value of the translated questionnaire in spite of their acceptable CVI. Finally, we did not assess the educational and socioeconomic status of the participants.

Conclusion

Our results indicate that the modified Persian version of the RHFCQ could be used as a moderately reliable tool

for assessing compliance with different aspects of health-related activities in Iranian HF sufferers. Further studies are warranted to investigate the reliability and validity of this questionnaire among other nations.

Acknowledgments

The authors wish to thank all the study's participants. This study was approved and supported by Isfahan University of Medical Sciences, Isfahan, Iran.

References

1. Dharmarajan K, Rich MW. Epidemiology, Pathophysiology, and Prognosis of Heart Failure in Older Adults. *Heart Fail Clin* 2017;13:417-426.
2. McMurray JJV, Stewart S. The Burden of Heart Failure. *Eur Heart J Suppl* 2002;4(suppl_D):D50-D58.
3. Ponikowski P, Anker SD, AlHabib KF, Cowie MR, Force TL, Hu S, Jaarsma T, Krum H, Raštogi V, Rohde LE. Heart Failure: Preventing Disease and Death Worldwide. *ESC Heart Fail* 2014;1:4-25.
4. Sahle BW, Owen AJ, Mutowo MP, Krum H, Reid CM. Prevalence of Heart Failure in Australia: A Systematic Review. *BMC Cardiovasc Disord* 2016;16:32.
5. Hobbs FR, Roalfe AK, Davis RC, Davies MK, Hare R. Prognosis of All-Cause Heart Failure and Borderline Left Ventricular Systolic Dysfunction: 5 Year Mortality Follow-up of the Echocardiographic Heart of England Screening Study (Echoes). *Eur Heart J* 2007;28:1128-1134.
6. Shafie AA, Tan YP, Ng CH. Systematic review of economic burden of heart failure. *Heart Fail Rev* 2018;23:131-145.
7. Heidarpour M, Bashiri S, Vakhshoori M, Heshmat-Ghahdarjani K, Khanizadeh F, Ferdowsian S, Shafie D. The association between platelet-to-lymphocyte ratio with mortality among patients suffering from acute decompensated heart failure. *BMC Cardiovasc Disord* 2021;21:454.
8. Amirpour A, Vakhshoori M, Zavar R, Zarei H, Sadeghi M, Yavari B. The Effect of 3-Month Growth Hormone Administration and 12-Month Follow-Up Duration among Heart Failure Patients Four Weeks after Myocardial Infarction: A Randomized Double-Blinded Clinical Trial. *Cardiovasc Ther* 2021;2021:2680107.
9. Yadollahi Farsani A, Vakhshoori M, Mansouri A, Heidarpour M, Nikouei F, Garakyaraghi M, Sarrafzadegan N, Shafie D. Relation between Hemoconcentration Status and Readmission Plus Mortality Rate Among Iranian Individuals with Decompensated Heart Failure. *Int J Prev Med* 2020;11:163.
10. Rahimi F, Vakhshoori M, Heidarpour M, Nouri F, Heshmat-Ghahdarjani K, Fakhrolmobarsheri M, Shafie D. Metolazone Add-On Therapy in Heart Failure: A Cohort Study from Persian Registry of Cardiovascular Disease/Heart Failure (PROVE/HF). *Crit Care Res Pract* 2021;2021:3820292.
11. Bondariyan N, Vakhshoori M, Sadeghpour N, Shafie D. Prognostic Value of Shock Index, Modified Shock Index, and Age-Adjusted Derivatives in Prediction of In-Hospital Mortality in Patients with Acute Decompensated Heart Failure: Persian Registry of Cardiovascular Disease/ Heart Failure Study. *Anatol J Cardiol* 2022;26:210-217.
12. Ponikowski P, Voors AA, Anker SD, Bueno H, Cleland JG, Coats AJ, Falk V, Gonzalez-Juanatey JR, Harjola V-P, Jankowska EA. 2016 Esc Guidelines for the Diagnosis and Treatment of Acute and Chronic Heart Failure: The Task Force for the Diagnosis and Treatment of Acute and Chronic Heart Failure of the European



- Society of Cardiology (Esc) Developed with the Special Contribution of the Heart Failure Association (Hfa) of the Esc. *Eur Heart J* 2016;37:2129-2200.
13. Jankowska-Polańska B, Świątoniowska-Lonc N, Sławuta A, Krówczyńska D, Dudek K, Mazur G. Patient-Reported Compliance in Older Age Patients with Chronic Heart Failure. *Plos one* 2020;15:e0231076.
 14. van der Wal MH, Jaarsma T. Adherence in Heart Failure in the Elderly: Problem and Possible Solutions. *Int J Cardiol* 2008;125:203-208.
 15. Dontje ML, van der Wal MH, Stolk RP, Brügemann J, Jaarsma T, Wijtvlit PE, van der Schans CP, de Greef MH. Daily Physical Activity in Stable Heart Failure Patients. *J Cardiovasc Nurs* 2014;29:218-226.
 16. Evangelista L, Doering LV, Dracup K, Westlake C, Hamilton M, Fonarow GC. Compliance behaviors of elderly patients with advanced heart failure. *J Cardiovasc Nurs* 2003;18:197-206; quiz 207-208.
 17. Evangelista LS, Berg J, Dracup K. Relationship between psychosocial variables and compliance in patients with heart failure. *Heart Lung* 2001;30:294-301.
 18. Beaton DE, Bombardier C, Guillemin F, Ferraz MB. Guidelines for the process of cross-cultural adaptation of self-report measures. *Spine (Phila Pa 1976)* 2000;25:3186-3191.
 19. Tsang S, Royse CF, Terkawi AS. Guidelines for developing, translating, and validating a questionnaire in perioperative and pain medicine. *Saudi J Anaesth* 2017;11(Suppl 1):S80-S89.
 20. Zamanzadeh V, Ghahramanian A, Rassouli M, Abbaszadeh A, Alavi-Majd H, Nikanfar AR. Design and Implementation Content Validity Study: Development of an instrument for measuring Patient-Centered Communication. *J Caring Sci* 2015;4:165-178.
 21. Eghbali-Babadi M, Feizi A, Khosravi A, Nouri F, Taheri M, Sarrafzadegan N. Development and evaluation of the psychometric properties of a hypertension self-care questionnaire. *ARYA Atheroscler* 2019;15:241-249.
 22. Keszei AP, Novak M, Streiner DL. Introduction to Health Measurement Scales. *J Psychosom Res* 2010;68:319-323.
 23. Koh YLE, Lua YHA, Hong L, Bong HSS, Yeo LSJ, Tsang LPM, Ong KZ, Wong SWS, Tan NC. Using a Web-Based Approach to Assess Test-Retest Reliability of the "Hypertension Self-Care Profile" Tool in an Asian Population: A Validation Study. *Medicine (Baltimore)* 2016;95:e2955.
 24. Terwee CB, Bot SD, de Boer MR, van der Windt DA, Knol DL, Dekker J, Bouter LM, de Vet HC. Quality criteria were proposed for measurement properties of health status questionnaires. *J Clin Epidemiol* 2007;60:34-42.
 25. Gomes JL, Águeda AF, Heaney A, Duarte C, Lopes C, Costa T, Marona J, Rodrigues-Manica S, Maia S, Costa M, Branco JC, McKenna SP, Barcelos A, Pimentel-Santos FM. Translation, cross-cultural adaptation and validation of the Osteoarthritis Quality of Life (OAQoL) questionnaire for use in Portugal. *Rheumatol Int* 2019;39:715-722.
 26. Maneesriwongul W, Dixon JK. Instrument Translation Process: A Methods Review. *J Adv Nurs* 2004;48:175-186.
 27. Jankowska-Polańska B, Kuśnierz M, Dudek K, Jaroch J, Uchmanowicz I. Impact of Cognitive Function on Compliance with Treatment in Heart Failure. *J Educ Health Sport* 2017;7:392-414.
 28. Black G, PhD BAD, Kim Heathcotte RN B, Nikki Mitchell RN B, Sanderson C. The Relationship between Spirituality and Compliance in Patients with Heart Failure. *Prog Cardiovasc Nurs* 2006;21:128-133.

Supplemental appendix 1

پرسشنامه اصلاح یافته پایبندی در نارسایی قلب

مراقبت از سلامت

۱. به نظر شما چقدر اهمیت دارد که سر موقع به ملاقات پزشکتان بروید؟
- | | | | | |
|-----------------------|--------------------|-------------|------------------|-----------------------|
| (۱) اصلا اهمیتی ندارد | (۲) تا حدی مهم است | (۳) مهم است | (۴) خیلی مهم است | (۵) خیلی زیاد مهم است |
|-----------------------|--------------------|-------------|------------------|-----------------------|
۲. برای ملاقات با پزشک تان چقدر دچار مشکل شده اید؟
- | | | | |
|----------------|-------------------|------------------------|-----------------------|
| (۱) مشکلی نیست | (۲) قدری مشکل است | (۳) مشکلات متوسطی دارد | (۴) مشکلات زیادی دارد |
|----------------|-------------------|------------------------|-----------------------|
۳. در ۳ ماه گذشته تخمین می زنید که چقدر به زمان ملاقات های تان با پزشک تان پایبند بوده اید؟
- | | | | | |
|-------------|------------------|------------------------|----------------|-----------|
| (۱) هیچ وقت | (۲) خیلی به ندرت | (۳) حدود نیمی از موارد | (۴) اغلب اوقات | (۵) همیشه |
|-------------|------------------|------------------------|----------------|-----------|

داروها

۴. به نظر شما چقدر اهمیت دارد که داروهای خود را به صورت منظم استفاده کنید؟
- | | | | | |
|-----------------------|--------------------|-------------|------------------|-----------------------|
| (۱) اصلا اهمیتی ندارد | (۲) تا حدی مهم است | (۳) مهم است | (۴) خیلی مهم است | (۵) خیلی زیاد مهم است |
|-----------------------|--------------------|-------------|------------------|-----------------------|
۵. چقدر استفاده از دارو های تان برایتان مشکل است؟
- | | | | |
|----------------|-------------------|------------------------|-----------------------|
| (۱) مشکلی نیست | (۲) قدری مشکل است | (۳) مشکلات متوسطی دارد | (۴) مشکلات زیادی دارد |
|----------------|-------------------|------------------------|-----------------------|
۶. در هفته گذشته به صورت تخمینی مصرف دارو های تان را چطور انجام داده اید؟
- | | | | | |
|-------------|------------------|------------------------|----------------|-----------|
| (۱) هیچ وقت | (۲) خیلی به ندرت | (۳) حدود نیمی از موارد | (۴) اغلب اوقات | (۵) همیشه |
|-------------|------------------|------------------------|----------------|-----------|

رژیم غذایی

۷. فکر می کنید که وزن کردن روزانه تان چقدر مهم است؟
- | | | | | |
|-----------------------|--------------------|-------------|------------------|-----------------------|
| (۱) اصلا اهمیتی ندارد | (۲) تا حدی مهم است | (۳) مهم است | (۴) خیلی مهم است | (۵) خیلی زیاد مهم است |
|-----------------------|--------------------|-------------|------------------|-----------------------|
۸. فکر میکنید محدود کردن مصرف مایعات چقدر برای شما مهم است؟
- | | | | | |
|-----------------------|--------------------|-------------|------------------|-----------------------|
| (۱) اصلا اهمیتی ندارد | (۲) تا حدی مهم است | (۳) مهم است | (۴) خیلی مهم است | (۵) خیلی زیاد مهم است |
|-----------------------|--------------------|-------------|------------------|-----------------------|
۹. فکر میکنید چقدر مهم است که مصرف نمک را به دو گرم یا کمتر در روز محدود کنید؟
- | | | | | |
|-----------------------|--------------------|-------------|------------------|-----------------------|
| (۱) اصلا اهمیتی ندارد | (۲) تا حدی مهم است | (۳) مهم است | (۴) خیلی مهم است | (۵) خیلی زیاد مهم است |
|-----------------------|--------------------|-------------|------------------|-----------------------|
۱۰. چقدر دنبال کردن توصیه های غذایی داده شده برای شما مشکل بوده است؟
- | | | | |
|----------------|-------------------|------------------------|-----------------------|
| (۱) مشکلی نیست | (۲) قدری مشکل است | (۳) مشکلات متوسطی دارد | (۴) مشکلات زیادی دارد |
|----------------|-------------------|------------------------|-----------------------|
۱۱. در هفته گذشته به صورت تخمینی دنبال کردن رژیم غذایی تان را چطور انجام داده اید؟
- | | | | | |
|-------------|------------------|------------------------|----------------|-----------|
| (۱) هیچ وقت | (۲) خیلی به ندرت | (۳) حدود نیمی از موارد | (۴) اغلب اوقات | (۵) همیشه |
|-------------|------------------|------------------------|----------------|-----------|

ورزش

۱۲. به نظر شما ورزش منظم چقدر اهمیت دارد؟
- | | | | | |
|-----------------------|--------------------|-------------|------------------|-----------------------|
| (۱) اصلا اهمیتی ندارد | (۲) تا حدی مهم است | (۳) مهم است | (۴) خیلی مهم است | (۵) خیلی زیاد مهم است |
|-----------------------|--------------------|-------------|------------------|-----------------------|
۱۳. انجام ورزش به گونه ای که به شما توصیه شده است را چقدر مشکل می بینید؟
- | | | | |
|----------------|-------------------|------------------------|-----------------------|
| (۱) مشکلی نیست | (۲) قدری مشکل است | (۳) مشکلات متوسطی دارد | (۴) مشکلات زیادی دارد |
|----------------|-------------------|------------------------|-----------------------|
۱۴. در هفته گذشته به صورت تخمینی دنبال کردن توصیه های ورزشی تان را چطور انجام داده اید؟
- | | | | | |
|-------------|------------------|------------------------|----------------|-----------|
| (۱) هیچ وقت | (۲) خیلی به ندرت | (۳) حدود نیمی از موارد | (۴) اغلب اوقات | (۵) همیشه |
|-------------|------------------|------------------------|----------------|-----------|

سیگار کشیدن

۱۵. به نظر شما چقدر اهمیت دارد که در معرض دود سیگار بودن اشخاص دیگر را محدود کنید؟
- | | | | | |
|-----------------------|--------------------|-------------|------------------|-----------------------|
| (۱) اصلا اهمیتی ندارد | (۲) تا حدی مهم است | (۳) مهم است | (۴) خیلی مهم است | (۵) خیلی زیاد مهم است |
|-----------------------|--------------------|-------------|------------------|-----------------------|
۱۶. چقدر با ترک سیگار مشکل داشته اید؟
- | | | | |
|----------------|-------------------|------------------------|-----------------------|
| (۱) مشکلی نیست | (۲) قدری مشکل است | (۳) مشکلات متوسطی دارد | (۴) مشکلات زیادی دارد |
|----------------|-------------------|------------------------|-----------------------|
۱۷. در هفته گذشته، به صورت حدودی ترک مصرف سیگار تان به چه شکل بوده است؟
- | | | | | | |
|---------------|-------------|------------------|------------------------|----------------|-----------|
| (۱) غیر مرتبط | (۲) هیچ وقت | (۳) خیلی به ندرت | (۴) حدود نیمی از موارد | (۵) اغلب اوقات | (۶) همیشه |
|---------------|-------------|------------------|------------------------|----------------|-----------|

مصرف الکل

۱۸. به نظر شما چقدر اهمیت دارد که مصرف الکل را محدود کنید؟
- | | | | | |
|-----------------------|--------------------|-------------|------------------|-----------------------|
| (۱) اصلا اهمیتی ندارد | (۲) تا حدی مهم است | (۳) مهم است | (۴) خیلی مهم است | (۵) خیلی زیاد مهم است |
|-----------------------|--------------------|-------------|------------------|-----------------------|