

# Translation and Cross-Cultural Adaptation of the Persian Version of Minnesota Living With Heart Failure Questionnaire (MLHFQ)

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**Abstract-** The Minnesota Living with Heart Failure Questionnaire (MLHFQ) has been developed to measure health-related quality of life (HRQoL) status of Heart Failure (HF) patients. The aim of this study was to translate MLHFQ into the Persian version and assess the validity and reliability of the translated version. We used a forward-backward procedure for translation. In a cross-sectional study, 105 HF patients and 50 healthy subjects were selected to assess the reliability and construct validity of the instrument. The face and content validity were used to assess the questionnaire validity. Validity was examined on the HF patients group, using the Persian version of the Short form-36 health survey (SF-36) Questionnaire. In order to assess the questionnaire's reliability, the Intraclass correlation coefficient (ICC) and Cronbach's alpha were calculated. Test-retest reliability was examined by re-administering the MLHFQ after 2 weeks. Test-retest results demonstrated that the Persian version has excellent reliability (ICC for all 2 domains were higher than 0.91,  $P \leq 0.000$ ). Internal consistency for Physical domain (PD), emotional domain (ED) and total scores using Cronbach's alpha were 0.90, 0.84 and 0.92, respectively. ICC for PD, ED and total scores were 0.95, 0.94, and 0.97, respectively. Good and very good Pearson's Correlation Coefficient was seen between MLHFQ and SF-36 ( $r = -0.47$  to  $-0.775$ ,  $P \leq 0.000$  for PD;  $r = -0.47$  to  $-0.65$ ,  $P \leq 0.000$  for ED). The Persian version of the MLHFQ had satisfactory reliability and validity for assessing HRQoL status of Iranian HF patients.

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**Keywords:** Heart failure; Health-related quality of life; Questionnaires; Reliability; Validity; Minnesota living with heart failure questionnaire (MLHFQ)

## Introduction

Congestive heart failure (CHF) is a prevalent disease that about 20 million people suffer from worldwide (1) and significantly affects people's quality of life. Additionally, considering that this disease cannot be cured, its chronic condition has long term effects on patients' lifestyles. Two main objectives of the treatment process are symptom control and pain reduction. In order to realize these objectives, health-related quality of life (HRQoL) instruments should be applied (2). Considering the high prevalence and mortality, and costly treatment process, CHF is one of the major problems of the health system (3).

In recent years, HRQoL provides essential information regarding Heart Failure (HF) patients'

evaluation and ways of treatment strategies improvement (4). HRQoL evaluations assess patients' conditions by using generic and specific instruments. Generic instruments provide general information about patients while specific instruments precisely investigate changes in various domains and injury details (2). Nowadays, researchers have an increased tendency regarding patients' self-reports. Common methods such as echocardiography or natriuretic peptide level (for measuring ventricular function), classification based on New York Heart Association (NYHA) criteria, six-minute walk test (for assessing patient's functional capacity) are not favorable due to lack of enough patient's condition data, being costly, and inaccessibility (5-8). To assess HRQoL in CHF patients both generic and specific instruments can be used. SF-36 (Short

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## Persian version of MLHFQ

form-36 health survey) is one of the most famous generic instruments in which its Farsi version has been validated (9-12). MLHF questionnaire can be mentioned among specific instruments.

The aim of this study was the translation, cultural adaptation, and assessment of the reliability and validity of the Farsi version of the MLHFQ questionnaire to evaluate the quality of life of CHF Iranian patients.

## Materials and Methods

This study is cross-sectional. Participants are CHF patients whom their disease has been confirmed by a cardiologist. Exclusion criteria were being younger than 30 years old, having mental disorders or malignant disease, not being proficient in Persian (Farsi) language, and change in patient's treatment plan during the follow-up.

### Instruments to measure the quality of life

SF-36 is a valid self-administered questionnaire. In this study, its Farsi version including 36 items in 8 health areas comprising physical function, role-physical, pain, general health, vitality, social function, role-emotional, and mental health, was put to use. It should be noted that in 2005 this questionnaire was translated to Farsi by Montazeri *et al.*, and its reliability and validity were assessed (12). Finally, obtained results were assessed in two general areas of physical and mental health. Scores of each area ranged from 0 (worst possible health) to 100 (best possible health), were calculated. Additionally, this questionnaire has high validity to assess the quality of life of CHF patients (13). MLHF questionnaire was designed in 1984 to evaluate the effect of heart failure and its treatments on patients' quality of life. This questionnaire shows the effect of heart failure and its treatment on physical, emotional, social, and mental components of quality of life without the need for executive procedures and extensive testing in clinics. CHF patients' response regarding the effect of the disease and comprehensive assessment of these responses by health care teams at Minnesota University lead to the preparation of an efficient questionnaire to assess CHF patients' quality of life. This questionnaire is composed of questions that assess the effect of constant physical symptoms such as shortness of breath, fatigue, peripheral edema, sleep disorders and psychiatric symptoms, anxiety, and depression.

This questionnaire investigates heart failure in terms of physical, emotional, social, and mental domains. Additionally, the effect of heart failure is evaluated on

physical and social performances such as walking, stair climbing, housekeeping, resting, working, going out, socializing with friends and family, marital relationships, eating, and emotional and mental performances such as memory, behavioral disorders, and harassment. Considering that the secondary effects of treatments could limit symptoms of disease and patient's performance, some items regarding secondary effects of drugs, staying in the hospital, and treatment cost was provided to evaluate the quality of life. In the final version, the questionnaire focuses on the effects of treatment instead of the effect of medication which reveals an increased use of non-drug treatments for heart failure. Patients are asked to choose among 0 (without any effect on the quality of life) to 5 (with the highest effect on the quality of life) to show how much each of 21 domains mentioned in the questionnaire prevents them from having a good life (19-14).

### Translation procedure

In order to translate the MLHF questionnaire, MAPI protocol ([www.mapi-research-inst.com](http://www.mapi-research-inst.com)) was used. For this purpose, forward translation was done independently by two translators which one of them had a medical background while the other person did not have any related background. Afterward, a team of cardiologists and physiotherapists combined these two translations and created a Farsi version. Then, back translation was done by a translator who was proficient in Farsi and English at a native level. Next, the English version was matched with the original version and then, for approval, it was sent to the questionnaire's authors and MAPI institute. In the next step, after approval, the final Farsi version was presented to 30 CHF patients (face validity). Based on patients' feedback to question number 18, necessary changes were made for a better understanding. Eventually, the final translated version of MLHF and SF-36 questionnaires were presented to 105 CHF patients to assess the Farsi version of the MLHF questionnaire's validity and reliability.

### Statistical analysis

The validity and reliability of the questionnaire were studied using the following analysis.

Acceptability of the questionnaire was assessed by investigating the questions which were not answered. The effects of the highest score and the lowest score obtained by patients were evaluated for each domain. Internal-consistency of the study was calculated using Cronbach's alpha. To assess Test-retest reliability of the questionnaire Intraclass Correlation Coefficient test was

used. This test was necessary to assess the reliability of patients' responses in a certain time interval. No changes in treatment procedure and patients' conditions based on NYHA classification and no deterioration of patients' conditions were the requirements to perform the test. Therefore, 50 patients were called up to answer the questionnaire again after two weeks.

The next step is to construct validity assessment. To determine the structural validity of the MLHF questionnaire, obtained results from the Farsi version were compared to Sf-36 questionnaire results. Considering the negative correlation between disability (physical and mental) and the quality of life, the structural validity of the MLHF questionnaire was determined based on the SF-36 questionnaire as divergent validity. Pearson's Correlation Coefficient test was performed to determine to construct validity. To evaluate discriminant validity, 50 healthy subjects were asked to fill the MLHF questionnaire. Then independent *t*-test was used to assess the correlation between healthy subjects' and patients' results. All statistical analysis was performed using SPSS V.16 and *P* was considered

less than 0.05.

## Results

In a cross-sectional study, 105 CHF patients and 50 healthy subjects over 30-year-old were selected to assess the reliability and construct validity of the questionnaire. The face and construct validity were used for the questionnaire validity. Validity was examined on a population of CHF patients, using the Persian version of the SF-36 questionnaire. In order to assess the questionnaire's reliability, the intraclass correlation coefficient and Cronbach's alpha were calculated. Test-retest reliability was tested by re-administering the MLHF after 2 weeks.

Patients' characteristics are summarized in table 1. The study sample included 105 patients (53 men and 52 women with a mean age of 60.57). Twenty-nine percent of patients were in NYHA class 2, whereas 70.47% were in NYHA class 3.

**Table 1. Demographic data of participants**

Age		Min=30y	Max=86 y	Mean=60.57±1.28 y
Gender	Men	N =53	50.5%	--
	Women	N =52	49.5%	--
Education	Below the high school diploma	N =43	41%	--
	High school diploma	N =27	25.7%	--
	Bachelor's	N=5	4.8%	--
	Master's and above	N =30	28.6%	--
NYHA	Class 2	N =31	29.53%	--
	Class 3	N =74	70.47%	--

### Acceptability

Patients answered all the questions and ambiguous questions in the Persian version of the MLHF questionnaire were assessed. Each of the questions was evaluated individually and in cases that more than 15% of subjects voted for the conceptual rewrite of a certain question, that question was reconsidered. Therefore, some changes were made in the translation of question number 18 of the MLHF questionnaire in order to

provide a better understanding of the term "loss of self-control." Three patients were excluded from the study due to age requirements.

### Internal consistency

Cronbach's alpha evaluation of different domains of the MLHF questionnaire revealed high internal consistency. The results are shown in Table 2.

**Table 2. Internal consistency using Cronbach's alpha and Test-Retest using an intraclass correlation coefficient**

MLHF	Cronbach's alpha		Intraclass correlation coefficient		
	Single measure	Lower bound	Upper bound	95% CI	
Physical Domain	0.92	0.92	0.83	0.96	
Emotional Domain	0.95	0.95	0.90	0.97	
Total	0.97	0.97	0.94	0.98	

**Test-retest reliability**

Obtained results of the intraclass Correlation coefficient (ICC) test of MLHF questionnaire in physical domain, mental and emotional domain, and the

total of both domains after two weeks were 0.92, 0.95, and 0.97, respectively. These results revealed high repeatability of the Persian version of the MLHF questionnaire. The results are shown in Table 3.

**Table 3. The correlation coefficient(r) of the physical domain between MLHF and SF-36 questionnaire in the first and second sessions of completion of the questionnaire**

	PD <sub>1</sub> (n=105)	P <sub>1</sub>	PD <sub>2</sub> (n=30)	P <sub>2</sub>
<b>PF</b>	-0.775	0.000	-0.77	0.000
<b>RP</b>	-0.47	0.000	-0.38	0.034
<b>GH</b>	-0.51	0.000	-0.26	0.153

PD<sub>1</sub>= Physical dimension in MLHF at first completion, PD<sub>2</sub>= Physical dimension in MLHF at second completion, PF= Physical Functioning in SF-36, RP= Role Physical in SF-36, GH= General Health in SF-36

**Construct validity**

Considering the negative correlation between the amount of disability (physical and mental) and the quality of life, the construct validity of the MLHF questionnaire based on the SF-36 questionnaire was determined in the form of divergent validity. Pearson's Correlation Coefficient test was used to determine to construct validity. Results are shown in tables 4 and 5. Total scores of questions 2, 3, 4, 5, 6, 7, 12, and 13 and total scores of questions 17, 18, 19, 20, and 21 are considered as the scores of physical dimension and emotional dimension, respectively. Obtained correlation values of above-mentioned tests are determined as

follows:

$1 \leq r \leq 0.81$  excellent correlation,  $0.61 \leq r \leq 0.80$  very good correlation,  $0.41 \leq r \leq 0.60$  good correlation.

**Discriminate validity**

Independent t-test was used to compare scores of the MLHF questionnaire of 50 healthy subjects and CHF patients, and no significant correlation was observed between healthy and patient groups. It represents a high discriminate validity of the MLHF questionnaire to distinguish between a healthy subject and a CHF patient (Table 5).

**Table 4. The correlation coefficient (r) of the emotional domain between MLHF and SF-36 questionnaire in the first session of completion of the questionnaire**

	ED <sub>1</sub> (n=105)	P	ED <sub>2</sub> (n=30)	P
<b>SF</b>	-0.56	0.000	-0.57	0.001
<b>RE</b>	-0.48	0.000	-0.40	0.025
<b>MH</b>	-0.65	0.000	-0.68	0.000

ED<sub>1</sub>= Emotional dimension in MLHF at first completion, ED<sub>2</sub>= Emotional dimension in MLHF at second completion, SF= Social Functioning in SF-36, RE= Role Emotion in SF-36, MH= Mental Health in SF-36

**Table 5. Results of independent t-test between healthy and patient groups**

Domain	t	Mean (SD)	Sig
<b>Physical</b>	-6.75	-2.80 (13.75)	0.000
<b>Emotional</b>	-8.23	-1.49 (6.00)	0.000
<b>Total</b>	-7.98	-4.29 (17.81)	0.000

**Factor analysis**

Obtained results of exploratory factor analysis categorized questions into two groups. Group 1 consisted of all questions related to the physical domain (factor 1), and Group 2 consisted of all questions related

to the emotional domain (factor 2). Among questions in the original version which did not belong to any domains, question 1 and question 11 were categorized into physical (factor 1) and emotional (factor 2) domain, respectively (Table 6).

**Table 6. Factor analysis results of the MLHF questionnaire**

Question	Factor 1	Factor 2
Q1 <sup>b</sup>	0.58	0.49
Q2 <sup>b</sup>	0.73	0.23
Q3 <sup>b</sup>	0.83	0.2
Q4 <sup>b</sup>	0.87	0.13
Q5 <sup>b</sup>	0.75	0.13
Q6 <sup>b</sup>	0.70	0.25
Q7 <sup>b</sup>	0.51	0.25
Q8 <sup>a</sup>	0.4	0.28
Q9 <sup>a</sup>	0.42	0.15
Q10 <sup>a</sup>	0.04	0.42
Q11 <sup>c</sup>	0.28	0.82
Q12 <sup>b</sup>	0.68	0.11
Q13 <sup>b</sup>	0.8	0.27
Q14 <sup>a</sup>	0.19	0.16
Q15 <sup>a</sup>	0.25	0.36
Q16 <sup>a</sup>	0.05	0.31
Q17 <sup>c</sup>	0.16	0.64
Q18 <sup>c</sup>	0.21	0.79
Q19 <sup>c</sup>	0.26	0.72
Q20 <sup>c</sup>	0.29	0.66
Q21 <sup>c</sup>	0.34	0.7

<sup>an</sup> Item not belonging to any factor; <sup>b</sup> Item belonging to physical factor; <sup>c</sup> Item belonging to the emotional factor

## Discussion

The Persian version of the MLHF questionnaire was translated using systematic methods and its validity and reliability were assessed. MLHF questionnaire is a specific tool to evaluate the CHF patients' quality of life. This questionnaire has been translated into more than 32 languages (14,20-22).

In the present study, only 3 out of 105 participants did not answer question 10 which was related to the patient's sexual activities. The rest of the questions were all answered. It should be noted that this question was not in any of the two main domains (physical and emotional) of the original questionnaire and was only calculated in the total score. Therefore, obtained results revealed high feasibility and intelligibility of the Persian version of the MLHF questionnaire.

Cronbach's alpha was calculated 0.97 for the Persian version of the MLHF questionnaire which was similar to reported results of Greek (0.97), Portuguese (0.95), and Chinese (0.97) versions. It represents the high internal consistency of the questionnaire (23-25). On the other hand, the calculated Cronbach's alpha for German and Brazilian versions was reported 0.80 and 0.85, respectively. The difference in Cronbach's alpha among different versions can relatively be indicative of the cultural difference in studied communities.

The comparison of healthy subjects and CHF patients' scores show no significant difference in any domains of MLHF questionnaire between these two groups which indicates the high capability of this questionnaire to distinguish between healthy and patient subjects. The result of the ICC test after two weeks was 0.97 in the range of 0.92 to 0.95 which in comparison with the ICC of the Spanish version of the questionnaire (0.97 in the range of 0.74 to 0.83) represents high repeatability of the Persian version of the MLHF questionnaire.

The validity of the questionnaire was assessed by evaluation of the correlation between this questionnaire and SF-36 questionnaire and the results were acceptable. The physical dimension of the MLHF questionnaire had well to very good correlation (-0.47 to -0.775) with PF, RP, and GH dimensions of SF-36 questionnaire which revealed an acceptable construct validity of the MLHF questionnaire. Additionally, good to very good correlation (-0.48 to -0.65) was reported for the emotional dimension of the MLHF questionnaire with SF, RE, and MH dimensions of the SF-36 questionnaire.

The high score in the MLHF questionnaire indicates a low quality of life while the high score in the SF-36 questionnaire indicates a good quality of life-related to the health status of the patient. There is an inverse correlation between these two, and the Pearson

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## Persian version of MLHFQ

correlation coefficient is negative. During the second completion of questionnaires, although the correlation coefficient between PD in MLHF questionnaire and PF and RP dimensions in SF-36 questionnaire was less than the first session, their values were good and very good (-0.38 and -0.77 respectively).

This coefficient in ED of MLHF questionnaire and RE, SF, and MH dimensions of SF-36 questionnaire was low but it was acceptable (-0.40 to -0.68). Also, explanatory factor analysis, similar to the original version of the questionnaire, categorized questions into two general dimensions. Evaluative features of the Persian version of the MLHF questionnaire are consistent with the original version. The Persian version of the MLHF questionnaire due to its simplicity, being short, and ease of use, is a useful tool to evaluate the quality of life of CHF patients in daily clinical practice and research. The results of the present study showed that the Persian version of the MLHF questionnaire is a reliable and valid tool that is consistent with Iranian culture to assess the quality of life of CHF patients.

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