

# Research Paper: The Relationship Between Disease Severity and Quality of Life in Patients With Heart Failure Based on Kansas City Questionnaire



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**Citation:** Tamartash H, Attarbashi Moghadam B, Hosseini K, Musavi Sh. The Relationship Between Disease Severity and Quality of Life in Patients With Heart Failure Based on Kansas City Questionnaire. Journal of Modern Rehabilitation. 2017; 11(3):161-166.



## Article info:

Received: 03 Dec. 2016

Accepted: 01 May 2017

## Keywords:

Quality of life, Heart failure disease, New York Heart Association classification information, Clinical HF Questionnaire, Kansas City Cardiomyopathy Questionnaire

## ABSTRACT

**Introduction:** The present study aimed to determine the relationship between New York Heart Association (NYHA) classification and disease characteristics on the quality of life scores and the distribution of the scores at different stages of Heart Failure (HF).

**Materials and Methods:** A total of 150 patients with HF participated in this cross-sectional study. The method of data collection was interview based on NYHA classification and using the validated Persian version of the Kansas City Cardiomyopathy Questionnaire (PKCCQ).

**Results:** According to NYHA classification, 10% of patients were classified as mild HF, 16% as moderate HF, 63% as severe HF, and 11% as very severe HF. Significant differences were observed for total score and the component scores of PKCCQ among four stages of the disease ( $P < 0.001$ ). By comparing the PKCCQ total score and three domains in male and female groups, it was revealed that sex cannot affect quality of life based on PKCCQ total score and its functional areas ( $P = 0.18$ ).

**Conclusion:** Distribution of the quality of life scores in patients with different stages of HF showed that quality of life scores overlap in the severe and very severe stages. Classifying the disease using NYHA classification cannot distinct patients with HF according to impairments in their health status between severe and very severe stages. In addition, the degree of education is the factor that may affect the quality of life.

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## 1. Introduction

Heart Failure (HF) can be characterized as a disorder in the structure or function

of the cardiovascular system, resulting in impaired delivery of oxygen to tissues [1]. HF is generally known as a syndrome with symptoms such as respiratory distress, oedema and swelling of the ankles, fatigue, blood

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pressure disorders, and so on [2, 3]. On average, around 1%-2% of adult patients in the developing countries suffer from HF, in people over 70 years of age this rate is over 10% [4]. Recently, a rising interest is observed in the development and use of tools for assessing health care outcomes from the patient's point of view. Also, as one of the characteristics of chronic heart failure is its failure for recovery, or even in some cases disease progress, improving the patients' performance and quality of life becomes the basic treatment goal [5]. One of the main consequences of patient's health assessment is health status (including health-related quality of life and functional status). Health-related quality of life is indicative of individual's subjective experience of the disease on his or her quality of life and health status [6].

Given that HF treatment is directly related to lower mortality rate, fewer admissions to hospital, and increased welfare and general health status of the patients [7], researchers' interests have escalated towards patients' reports regarding their own health status as one of the ways to assess their health status [8]. Health status of patients with HF is usually examined by objective methods such as ventricular function (by echocardiography or natriuretic peptide levels) or functional capacity (6-minute walk test or fitness test by analyzing the gas exchange) [1]. However, these common indicators have a weak relationship with patients' perception of their own situations; let alone their high cost and unavailability [9].

On the other hand, Health-Related Quality of Life (HRQOL) provides direct information regarding patient's perception about his health status and how his welfare and daily activities has been affected after HF. The HRQOL measures compared to clinical or functional traditional methods provide more accurate information regarding health status of patients with HF. HRQOL questionnaires allow therapists to not only consider clinical condition, but also find activity limitations, emotional problems, and functional needs of the patient. In the present study, quality of life and its different aspects in various stages of HF is reviewed and assessed by Persian version of Kansas City Cardiomyopathy Questionnaire (PKCCQ). The purpose of the present study was to determine the relationship between New York Heart Association (NYHA) classification and disease characteristics on the quality of life scores and investigating the distribution of the scores at different stages of HF disease.

## 2. Materials and Methods

This cross-sectional study was conducted on 150 patients with HF (83 males, 67 females) aged  $\geq 30$  years

who were hospitalized in specialized heart centers in Tehran City, from October 2015 to February 2016. The number of studied patients (diagnosed by a cardiologist) was determined according to the results of similar studies and guidelines. The patients with other underlying medical conditions, including any malignancy, dementia, mental and cognitive problems were excluded. A demographic questionnaire was used to collect information including age, sex, degree of education, duration of disease, stage of disease (according to the New York Heart Association classification) and job exposure to risk factors. The Persian version of KCCQ was used to determine the quality of life scores.

KCCQ assesses the health status of patients with HF [10]. The original questionnaire was introduced in English in 2000 and has been validated and translated into more than 60 languages so far. KCCQ is the first practical and clinical tool presented for evaluation and clinical control (symptoms, physical limitations, efficacy and quality of life) in patients with HF [11]. Localization and determining the validity and reliability of the PKCCQ (the Persian version of KCCQ) was done by the authors of this article which showed acceptable and significant evaluative specifications (face validity, discriminate validity, construct validity, and reliability). Translation and cultural adaptation of the questionnaire was done using the standard method of forward- and back-translation as well as interacting with the original developers of the questionnaire by conducting it on 30 patients (face validity).

To assess the internal consistency of the questions in the questionnaire, the Cronbach alpha coefficient was calculated as 0.98. Test-retest method was used to assess the reproducibility of the questionnaire (ICC=0.98). Validated Persian version of the KCCQ comprised of 4 domains and 15 questions, including physical limitations field (question 1), symptoms including frequency (questions 3, 5, 7, and 9), intensity (questions 4, 6, and 8), changes over time (question 2), self-efficacy and patient information (questions 11 and 12), and quality of life (question 13 to 15). It takes about 2 minutes to complete this questionnaire. Five or 6 points can be assigned to each question, the total score is calculated by dividing the sum of the scores of all questions by 15 (number of questions). It is also possible to calculate the scores of each individual domain. PKCCQ total score and score of any of 4 fields vary between 0 to 5-6. Scores of 5-6 indicate a very good health status and score of 0 indicates a very poor health status [10].

During the sampling process, all participants were informed about the study objectives and they filled out and

signed the informed consent form before participating in the study. Everyone was assured that his information and the obtained results remain confidential and are solely used for research purposes. SPSS (version 16) was used to analyze the results. Distribution of age, total score, and the scores of the four domains of PKCCQ were normal. The relationship between the two sets of data was calculated using the Pearson correlation coefficient. One-way ANOVA was used to compare the mean total score and the mean component score of the PKCCQ among patients in different stages of the disease, also it was used to evaluate and compare the mean total score and the mean component score of the PKCCQ and educational level. To compare the mean total score and the mean component score of the PKCCQ between men and women, the independent t test was used. The significance level was set at 0.05.

### 3. Results

Table 1 shows the demographic information of the patients and Table 2 shows the education level of the study participants. Distribution of total score and the component scores of PKCCQ at different stages of the disease are presented in Table 3. The differences in means of quality of life scores among the patients during different stages of the disease were compared using 1-way ANOVA. The results showed significant differences between the mean quality of life indicators in different domains

(physical limitations, symptoms, self-efficacy, and quality of life) and the total score at different stages of the disease ( $P < 0.001$ ). Least squares distance post test results (with 0.05 significance level) showed that the mean total score and the quality of life component of PKCCQ were significant at all stages of the disease ( $P < 0.001$ ). Regarding the domains of symptoms, physical limitations, self-efficacy, and patient's data, the differences were significant for different stages of the disease ( $P < 0.001$ ) except for severe and very severe stages in which the difference was not significant ( $P = 0.25$ ). The Pearson correlation test results showed no significant difference between total score of quality of life domain and the patient's age ( $P = 0.25$ ) and also between total score of quality of life and the disease duration ( $r = -0.09$ ) ( $P = 0.24$ ). Furthermore, the Independent t test showed no significant difference between mean total score and the mean of quality of life domain of PKCCQ in two groups of men and women ( $P = 0.18$ ) ( $t = 0.157$ ). Additionally, no significant difference was observed among the scores of symptoms, physical limitations, self-efficacy and patient's data domains between men and women ( $P = 0.25$ ).

### 4. Discussion

In this study, quality of life of 150 patients with HF and score distribution of PKCCQ at different stages of the disease and also the relationship between quality of life and patients classification based on New York

Table 1. Demographic data of the participants

Gender	Frequency	Mean±SD Age, y
Male	83	55.15±9.02
Female	67	55.67±8.10
Total	150	55.38±8.60

Table 2. Level of education of participants

Level of Education	Percent
Below high school diploma	16
High school diploma	20
Bachelor degree	32
Above bachelor degree	32

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**Table 3.** Component mean±SD score distribution of Persian version of KCCQ in different stages of HF disease

	Mild	Moderate	Severe	Very Severe	Total
Number of patients	14	24	95	17	150
Symptom	3.25±0.32	3.71±0.66	3.17±0.44	3.29±0.30	3.40±0.63
Self-efficacy	4.16±0.46	3.31±0.60	3.05±0.53	3.17±0.64	3.20±0.63
Physical limitation	4.33±0.53	3.68±0.65	3.16±0.47	3.31±0.35	3.37±0.61
Quality of life	4.33±0.42	3.63±0.57	3.19±0.44	3.44±0.50	3.39±0.58

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Heart Association classification were investigated. The results showed that quality of life of patients with HF, even in mild stages of the disease, is affected and even more involved by disease progression in severe stages. The findings of this study indicate that, except for severe and very severe stages, in various domains of the questionnaire, there is a significant correlation between the severity of the disease and the mean scores of different domains. The reason is likely due to the small sample size of the patients in the very severe group.

Effect of the age on the quality of life in patients with HF is disputable. In 2004, Rumsfeld et al. investigated the effect of age on quality of life of patients with HF using KCCQ. Final results showed no strong correlation between age and quality of life and even elderly patients with HF had a better quality of life than younger ones in many aspects [12]. In another study by Nan Hou et al. in 2004, the relationship between age and gender in patients with HF was investigated; the results showed that the quality of life in people under 65 years of age, particularly in women, was lower after developing HF [13]. In another study in 2008, Lesman-Leege et al. investigated the effects of aging on the quality of life and depression in patients with HF. The results showed that the quality of life decreases by aging [14]. Ortega et al. in 2008 showed in his study that KCCQ features adequate psychometric properties. KCCQ offers several advantages over other questionnaires because it quantifies symptoms (frequency, severity, and stability) and is much more sensitive to change, even when compared with the SF-36 [15]. In another study, Sauser et al. showed that KCCQ could be used during acute HF hospitalizations and demonstrates sensitivity to acute changes, but score changes during hospitalization did not predict 30-day readmission [16].

Three variables of age, sex, and education level were examined in this study. It was observed that the quality of life is improved by increasing education level;

however, age and sex showed no significant correlation with the quality of life score which is in agreement with Rumsfeld's study results. Higher scores of the quality of life in HF patients with higher level of education could be due to their economic power and their social environment and attitudes. Generally, the findings of this study showed that variables such as education level and stage of the disease influence the quality of life score. The strong link between New York Heart Association classification and the quality of life score indicates high reliability of the Persian version of KCCQ.

In the current study, consumed drugs by patients and the length of their stay in hospital were not assessed; therefore, we cannot rule out any relationship between age and sex and the score of quality of life. For further studies, we suggest to investigate the effect of body mass index on the quality of life in patients with HF.

### Acknowledgments

This research was extracted from the MSc. thesis of the first author in Department of Physiotherapy, School of Medical Sciences, Tarbiat Modares University of Tehran,. This study was financially supported by School of Rehabilitation, Tehran University of Medical Sciences.

### Conflict of Interest

The authors declared no conflicts of interest.

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