






## ANALYSIS OF THE QUALITY OF LIFE OF PATIENTS WITH ADVANCED HEART FAILURE CANDIDATES OR NOT FOR HEART TRANSPLANTATION

ANÁLISE DA QUALIDADE DE VIDA DE PACIENTES COM INSUFICIÊNCIA CARDÍACA AVANÇADA CANDIDATOS OU NÃO AO TRANSPLANTE CARDÍACO

ANÁLISIS DE LA CALIDAD DE VIDA DE LOS PACIENTES CON INSUFICIENCIA CARDÍACA AVANZADA, CANDIDATOS O NO A TRASPLANTE DE CORAZÓN

-  Wágner do Nascimento Carvalho <sup>1</sup>
-  Karla Cordeiro Gonçalves <sup>2</sup>
-  Gustavo dos Santos Alves Maria <sup>1</sup>
-  Anna Letícia Miranda <sup>1</sup>
-  Maria da Consolação Vieira Moreira <sup>3</sup>

<sup>1</sup> Universidade Federal de Minas Gerais - UFMG, Faculdade de Medicina. Belo Horizonte, MG - Brazil.

<sup>2</sup> UFMG, Hospital das Clínicas. Belo Horizonte, MG - Brazil.

<sup>3</sup> UFMG, Faculdade de Medicina, Hospital das Clínicas. Belo Horizonte, MG - Brazil.

### Corresponding author:

Wágner do Nascimento Carvalho  
E-mail: wagnernascarvalho@gmail.com

### Author's Contributions:

**Conceptualization:** Wágner N. Carvalho, Maria C. V. Moreira; **Data Collect:** Wágner N. Carvalho, Karla C. Gonçalves, Gustavo S. A. Maria, Anna L. Miranda; **Investigation:** Wágner N. Carvalho, Maria C. V. Moreira; **Methodology:** Wágner N. Carvalho, Maria C. V. Moreira; **Original Draft Preparation:** Wágner N. Carvalho, Maria C. V. Moreira; **Project Management:** Wágner N. Carvalho, Maria C. V. Moreira; **Statistical Analysis:** Wágner N. Carvalho, Maria C. V. Moreira; **Writing - Writing - Review and Editing:** Wágner N. Carvalho, Maria C. V. Moreira; **Supervision:** Maria C. V. Moreira.

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## ABSTRACT

**Introduction:** heart Failure (HF) is a serious health problem. Patients with an advanced stage of HF present, besides low life expectancy, a change in the Quality of Life (QoL) level. **Objective:** to analyze the QoL level of advanced HF patients, candidates or not for Heart Transplantation (HT). **Method:** a cross-sectional study carried out in a Brazilian university hospital, in which patients were submitted to QoL evaluation by the Minnesota Living With Heart Failure Questionnaire (MLHFQ). **Results:** 76 patients participated in the study. The main etiology of HF was chagasic (25 patients). The most frequent functional classes were NYHA II (26 patients) and III (33 patients). Patients under evaluation for HT and those in the queue for HT did not show a statistically significant difference in the evaluation of the QoL level. The score of the patients according to the dimensions assessed in the MLHFQ were the following: physical dimension with a median of 28.5; emotional, 13; other questions, 21; and, in the total score, 61. The final model in the multivariate analysis showed that QoL is associated with variables such as HF functional class, number of using medications, number of comorbidities and household occupation. **Discussion and Conclusion:** HF is a serious disease that negatively impacts survival and QoL. In this study, the patients' QoL level was associated with the HF functional class - NYHA, to the number of using medications and to the household occupation. Actions that may stimulate and favor adherence to optimal treatment should be encouraged. **Keywords:** Heart Failure; Heart Diseases; Quality of Life; Heart Transplantation.

## RESUMO

**Introdução:** a insuficiência cardíaca (IC) é um grave problema de saúde. Pacientes com IC em estágio avançado apresentam, além de baixa expectativa de vida, alteração no nível de qualidade de vida (QV). **Objetivo:** analisar o nível de QV de pacientes com IC avançada, candidatos ou não ao transplante cardíaco (TC). **Método:** estudo transversal realizado em um hospital universitário brasileiro, em que os pacientes foram submetidos à avaliação da QV pelo Minnesota Living With Heart Failure Questionnaire (MLHFQ). **Resultados:** participaram do estudo 76 pacientes. A principal etiologia da IC foi a chagásica (25 pacientes). As classes funcionais mais frequentes foram NYHA II (26 pacientes) e III (33 pacientes). Pacientes em avaliação para TC e aqueles em fila para TC não apresentaram diferença estatisticamente significativa na avaliação do nível de QV. A pontuação dos pacientes segundo as dimensões avaliadas no MLHFQ foram: dimensão física com mediana 28,5; emocional, 13; outras questões, 21; e, no escore total, 61. O modelo final na análise multivariada demonstrou que a QV está associada a variáveis como classe funcional da IC, número de medicações em uso, número de comorbidades e a ocupação do lar. **Discussão e Conclusão:** a IC é doença grave, que impacta negativamente na sobrevivência e na QV. Neste estudo, o nível de QV

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*dos pacientes esteve associado à classe funcional da IC - NYHA, ao número de medicações em uso e à ocupação do lar. Ações que estimulem e favoreçam a adesão ao tratamento otimizado devem ser incentivadas.*

**Palavras-chave:** *Insuficiência Cardíaca; Cardiopatias; Qualidade de vida; Transplante de Coração.*

## RESUMEN

**Introducción:** *la insuficiencia cardíaca (IC) es un problema de salud grave. Los pacientes con IC avanzada tienen, además de baja esperanza de vida, alteraciones en su calidad de vida (CV). Objetivo:* *analizar la calidad de vida de pacientes con IC avanzada, candidatos o no para trasplante de corazón (TC). Método:* *estudio transversal realizado en un hospital universitario brasileño, en el que los pacientes se sometieron a una evaluación de calidad de vida mediante el cuestionario Minnesota Living With Heart Failure Questionnaire (MLHFQ). Resultados:* *76 pacientes participaron en el estudio. La etiología principal de la insuficiencia cardíaca fue mal de Chagas (25 pacientes). Las clases funcionales más frecuentes fueron NYHA II (26 pacientes) y III (33 pacientes). Los pacientes bajo evaluación para TC y aquellos en fila de espera para TC no mostraron diferencias estadísticamente significativas en la evaluación del nivel de calidad de vida. Las puntuaciones de los pacientes según las dimensiones evaluadas en el MLHFQ fueron: dimensión física con promedio de 28,5; emocional, 13; otros asuntos, 21; y, en el puntaje total, 61. El modelo final en el análisis multivariado demostró que la calidad de vida está asociada con variables como la clase funcional de IC, la cantidad de medicamentos en uso, la cantidad de comorbilidades y la ocupación dueña de casa. Discusión y conclusión:* *la insuficiencia cardíaca es una enfermedad grave que afecta negativamente la supervivencia y la calidad de vida. En este estudio, el nivel de calidad de vida de los pacientes se asoció con la clase funcional de IC - NYHA, la cantidad de medicamentos en uso y la ocupación dueña de casa. Deben fomentarse acciones que estimulen y favorezcan la adherencia al tratamiento optimizado.*

**Palabras clave:** *Insuficiencia Cardíaca; Cardiopatias; Calidad de Vida; Trasplante de Corazón.*

## INTRODUCTION

Heart Failure (HF) is chronic and progressive. In its advanced stage, it is associated with high morbidity and mortality rates, constituting a serious public health problem in progress.<sup>1</sup> HF is the main cause of hospitalization in the Unified Health System (Sistema Único de Saúde, SUS) for cardiovascular diseases and the third leading cause of death among these diseases.<sup>2,3</sup> Patients with HF require optimized therapeutic measures, aiming at improving functional capacity, life expectancy and Quality of Life (QoL). When refractory, the patients can be evaluated for a possible Heart Transplantation (HT).<sup>4-6</sup>

Identifying the response of the QoL levels of the treatment is as important as its optimization. There are general questionnaires

that make it possible to evaluate the QoL level of HF patients, but specific questionnaires - such as the **Minnesota Living With Heart Failure Questionnaire** (MLHFQ) - are most commonly used.<sup>7,8</sup>

Characterizing the QoL level in patients with HF is an important strategy. That makes it possible to evaluate the efficacy of QoL-associated therapeutic measures, especially those aimed at patients in advanced stages of the disease since QoL is the guiding clinical outcome for therapeutic interventions aimed at increasing survival.<sup>8,9</sup> Therapeutic measures that do not promote the improvement of symptoms, improvement in QoL or increased survival are therefore not justified.<sup>5,6,8,9</sup> This study, carried out in a highly complex Brazilian cardiovascular care center, aimed to analyze the level of QoL of patients with advanced HF, candidates or not to HT.

## MATERIAL AND METHODS

A cross-sectional study, approved by the Ethics in Research Committee under CAAE Opinion: 82075717.2.0000.5149, performed in a Brazilian university hospital with patients seen at the HF and HT outpatient clinic from March 2018 to February 2019.

Factors such as referral of patients via the SUS central regulation and the possibility of HT directly interfere in the number of patients seen in the outpatient clinic; for this reason, it was not possible to determine the number of patients to perform the sample calculation. The sampling technique of the study was non-probabilistic sampling.

Patients aged 18 years old or older who were under evaluation or on a waiting list for HT and who signed the informed consent form participated in the study. Diagnosis of dementia, cognitive deficit or mental confusion reported in medical records were defined as exclusion criteria, but there was no patient who fit them.

77 patients were invited to participate in the study, of which 76 accepted. Those who agreed to participate in the study were interviewed in a room reserved for research by one of the four researchers responsible for the interviews. Before the research began, the researchers met for training, discussion on the documents used, and standardization of the interview process. Before the interviews began, the patients were informed that they could use the time they needed to answer the questions and ask questions when they did not understand the meaning of them. A clinical form elaborated by the authors was used as a source of data collection, which contained fields to fill in with the social and clinical data of the patients. These data were collected during the interview with the patient and in the available medical records.

The QoL level was evaluated by the MLHFQ, which is a specific questionnaire to evaluate the QoL level of patients with HF, translated and validated for use in Brazil. It consists of 21 questions, which must be answered using the last month as a reference. The questions are related to limitations caused by the HF, which prevent

people from living as they would like. Each question is answered on a scale from zero - to represent that there was no limitation - to five, which represents maximum limitation. The questions are grouped into physical aspects' dimension (1 to 7, 12 and 13), emotional aspects' dimensions (17 to 21) and other questions (8 to 11, and 14 to 16), which encompass financial aspects, medication side effects, sexuality, and lifestyle. The sum of all dimensions of the questionnaire generates a total score that can range from zero to 105, and the lower the score, the better the QoL level.<sup>8</sup>

The categorical variables were analyzed by absolute and relative frequencies. The continuous variables did not present normal distribution by the Shapiro-Wilk test and were, therefore, presented by a median, first and third quartiles. The Spearman test was used to verify the linear correlation hypothesis between two continuous variables. The comparisons of medians between two groups were made using the Mann-Whitney test; for comparisons between three or more groups, the Kruskal-Wallis test was used. The variables that were associated with QoL in the univariate analysis ( $p$ -value  $<0.20$ ) were evaluated in the multivariate analysis by adjusting the linear regression model. The selection of the variables for the final model was carried by removing one by one until obtaining a model with all the statistically significant variables ( $p < 0.05$ ). The significance level of the multivariate analysis was 0.05. The Statistical Package for the Social Sciences (IBM SPSS Statistics, USA) software, version 18.0, was used for data analysis.

## RESULTS

A total of 76 patients participated in the study. The median age for both genders was 52 years old (43.5-57.7) and the median of people in the family nucleus was three (2-4). Among the patients, 50 (65.8%) were male; 45 (59.2%) were brown-skinned; 43 (56.6%) were married; 38 (50%) were retired; 59 (72.4%) had schooling less than or equal to eight years of study; 49 (64.5%) had a *per capita* income below a minimum wage; and 57 (75%) were under evaluation for HT.

The main etiologies of HF were chagasic (25 patients, 32.95%) and idiopathic dilated cardiomyopathy (21 patients, 27.6%). Most of the patients were in FC II (26 patients, 34.2%) and III (33 patients, 43.4%). The median left ventricle ejection fraction (LVEF) was 25.5% (20%-31.5%). In total, 19 (25%) patients were in the queue for HT. The median waiting time in the queue was 348 (63-434) days, and the median number of hospitalizations in the last year was one (1-2); the median number of comorbidities was three (2-4); and the median number of using drugs was six (5-8). The patients were asked what they thought could improve QoL, considering the disease they were facing; 51 (67.1%) said it would be the HT (Table 1).

Patients under evaluation for HT and those in the queue for HT showed no statistically significant difference ( $p < 0.05$ ) in the

assessment of the QoL level through the MLHFQ. This result was repeated in the physical aspects' dimension ( $p=0.9$ ), and emotional dimension ( $p=0.3$ ), other questions ( $p=0.5$ ) and total score ( $p=0.6$ ). For this reason, patients with advanced HF, candidates or not to HT, were analyzed in a single group.

The patients' scores obtained during the QoL evaluation are shown in Figure 1. Its median in the physical dimension was 28.5 points (19.2-35.7); in the emotional, 13 (7-18.7); in other questions, 21 (17-25); and in the total score, 61 (42.5-77.7).

During the univariate analysis, an association between QoL and variables such as gender, occupation, etiology of HF, LVEF, CF of HF - NYHA, number of comorbidities and number of using drugs was identified. Variables such as age, income, and waiting time in the queue did not present a statistically significant association with QoL, as shown in Table 2.

All the variables that had statistical significance in the univariate analysis were tested in the multivariate analysis, both in the dimensions evaluated in the QoL questionnaire and in the total score. The final model, according to Table 3, shows that QoL in patients in this study was influenced - and is statistically associated - by variables such as HF's FC, number of using medications, number of comorbidities and household occupation.

## DISCUSSION

Most of the patients in this study were middle-aged, male adults (65.8%) who had chagasic heart disease as the main causes of HF (32.9%) and idiopathic dilated cardiomyopathy (27.6%). In the world scenario, most of the patients are also male but it differs with this study regarding age, because they are elderly and have, as one of the main etiologies of HF, ischemic heart disease.<sup>10-13</sup>

By analyzing the socioeconomic and clinical variables, it is possible to infer that the patients are typical of a developing country, in lower social classes, with low educational levels and they are, in most cases, victims of endemic diseases such as Chagas disease. HF is at an advanced stage, FC III and IV; for it, patients make use of optimized drug therapy and believe that HT is the best alternative to improve QoL.

Patients with HF in developed countries have more access to mechanical circulatory assistance devices. They can be implanted when the patient has no indication for an HT or when the waiting can be long and he has more risk of death. There is evidence in the literature that these devices, besides increasing the survival of patients, can also improve QoL.<sup>14-17</sup> However, they are not routinely implanted in Brazil, and the alternative for patients is almost always clinical treatment. Those with indication and without contraindication can be included in the HT queue.

QoL involves a complex, multifactorial and subjective concept, which can be achieved through personal, professional and social

Table 1 - Social and clinical characteristics of patients with advanced heart failure, candidates or not for heart transplantation, seen in a Brazilian center

Variable	Descriptive
Gender	
Male	50 (65.8)
Female	26 (34.2)
Age	52 (44 - 57.5)
Skin color	
Brown	45 (59.2)
White	15 (19.8)
Black	13 (17.1)
Others	3 (3.9)
Marital status	
Married	43 (56.6)
Stable union	11 (14.5)
Divorced	8 (10.5)
Single	8 (10.5)
Widow/Widower	6 (7.9)
Schooling	
Illiterate	4 (5.2)
< 8 years	36 (47.4)
8 full years	19 (25)
11 full years	11 (14.5)
Higher education	6 (7.9)
Occupation	
Retired	38 (50)
Away from work due to health problems	25 (32.9)
Housewife	6 (7.9)
Others	7 (9.2)
Number of members in the family	3 (2 - 4)
Per capita income	
Less than 1 minimum wage (MW)	49 (64.5)
1 MW	17 (22.4)
2 MWs	8 (10.5)
6 to 8 MWs	1 (1.3)
More than 10 MWs	1 (1.3)
Etiology of the heart failure	
Chagasic heart disease	25 (32.9)
Idiopathic dilated cardiomyopathy	21 (27.6)
Ischemic heart disease	16 (21.1)
Others	14 (18.4)
Main comorbidities	
Atrial fibrillation	27 (35.5)
Systemic Arterial Hypertension	25 (32.9)
Dyslipidemia	18 (23.7)
Hypothyroidism	18 (23.7)
Diabetes <i>mellitus</i>	14 (18.4)
Obesity	12 (15.8)
Previous heart surgery	11 (14.5)

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Table 1 - Social and clinical characteristics of patients with advanced heart failure, candidates or not for heart transplantation, seen in a Brazilian center

Variable	Descriptive
Number of comorbidities	3 (2 - 4)
Number of medications	6 (5 - 8)
Main classes of medications in use	
Antiarrhythmic	14 (18.4)
Beta blockers	75 (98.7)
Angiotensin receptor blockers	29 (38.1)
Loop diuretic	75 (98.7)
Potassium-saving diuretic	60 (78.9)
Thiazide diuretic	20 (26.3)
Angiotensin-converting enzyme inhibitors	33 (43.4)
Oral anticoagulant	27 (35.5)
Left ventricle ejection fraction	25.5 (20 - 31)
Functional class (NYHA)	
I	2 (2.6)
II	26 (34.2)
III	33 (43.4)
IV	15 (19.7)
Number of hospitalizations in the last year	1 (1 - 2)
Status	
Evaluation for heart transplantation	57 (75)
In the queue for heart transplantation	19 (25)
Queue waiting time (days)	348 (63 - 434)
Weight	68 (61 - 80)
Height	1.65 (1.59 - 1.71)
BMI	25.5 (22.4 - 28.3)
Patients' responses on what could improve their quality of life	
Hepatic transplant	51 (67.1)
Clinical improvement	21 (27.6)
Satisfied with current quality of life	1 (1.3)
Others	3 (3.9)

Frequency (%); Median (1st quartile - 3rd quartile)

achievement. Besides, it can also be dependent on an individual's self-perception and be influenced by cultural factors, expectations, goals, physical health, psychological state, values, concerns, and relationships with characteristics of the environment.<sup>18</sup>

Facing such a broad concept that suffers interference from several factors, especially those related to psychological aspects, assessing QoL in patients with severe diseases such as HF is a difficult and necessary task. They require optimized, high-cost therapeutic measures that aim for better QoL rather than more survival.<sup>19-21</sup>

In this study, the patients under evaluation for HT and those queued for transplantation did not differ statistically significantly

in relation to the QoL level. This fact can be justified because the patients in both groups were in an advanced stage of the disease, and this is the factor that impacts most significantly negatively on QoL and on the issues assessed by MLHFQ.<sup>8</sup>

The etiology of HF did not have a statistically significant impact on QoL of patients during multivariate analysis; this result corroborates the Carvalho *et al.*<sup>8</sup> study, who also evaluated the QoL of patients with HF using the MLHFQ. FC was a clinical variable that interferes with the patient's functional capacity and was associated with the QoL level. This demonstrates how much it interferes with the patient's life habits and, consequently, the QoL, as also identified in other studies.<sup>22</sup>

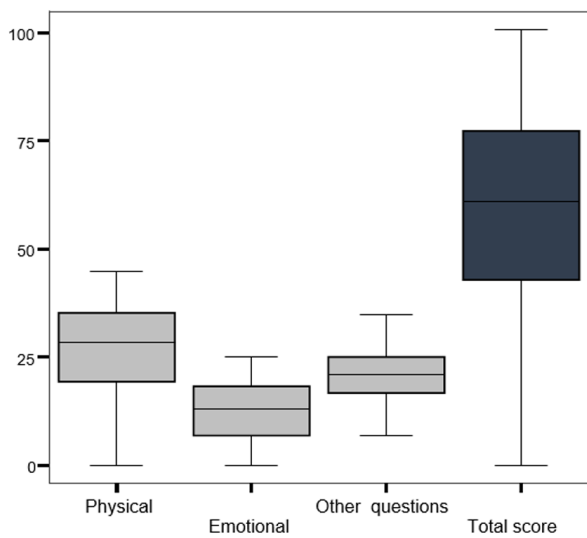


Figure 1 - Score of patients with advanced heart failure candidates or not for heart transplantation in the MLHFQ quality of life questionnaire according to the dimension and total score.

In this analysis, patients had a median on the total QoL score of 61 (42.5-77.7) points. International studies have already established cut-off points in the total score for assessing the QoL level through MLHFQ, assigning good QoL level to score below 24 points, moderate, from 24 to 45 and bad above 45.<sup>23,24</sup> This relationship was not attributed in this study, as no validation study of this cutoff point was identified in Brazil. However, when analyzing the median and interquartile intervals in the total QoL

score, the clinical severity and the limitation in QoL imposed by HF in the patients' lives are clear.

Patients with HF demand optimized clinical treatment to try to maintain clinical stability, improve their QoL level and increase survival. However, a serious disease such as HF demands that the patient receive specialized attention and be able to follow the guidelines and change life habits. These actions should be encouraged and demonstrate positive results through health education programs, promoting fatigue relief, reducing the number of hospitalizations and emergency care, better treatment adherence, and improvement of QoL.<sup>12,25</sup>

This study had as a limitation the cross-sectional methodology, which performed at a given time the evaluation of the patients' QoL level. It is considered pertinent to perform prospective studies to monitor the evolution of the QoL level of patients undergoing advanced HF stage.

## CONCLUSION

HF is a serious disease that negatively impacts survival and QoL. Adherence to optimized clinical treatment can maintain clinical stability, independence for self-care and/or improvement in QoL and survival. The FC of HF, the number of medications in use and the household occupations were associated with the QoL level in the multivariate analysis. However, variables such as age, socioeconomic level, income, etiology of HF and queue waiting time had no significant association with QoL level in this study. The analysis of QoL suffers interference from several factors related to the disease stage and even the culture in which the patient is

Table 2 - Univariate analysis for the quality of life outcome of patients with advanced heart failure, candidates or not for heart transplantation, in the MLHFQ quality of life assessment questionnaire according to dimension and total score

Variable	Physical	Emotional	Other questions	Total score
Gender <sup>1</sup>	0.045*	0.015*	0.680	0.106*
Age <sup>2</sup>	0.760	0.578	0.897	0.917
Marital status <sup>1</sup>	0.642	0.952	0.719	0.768
Schooling	0.248	0.492	0.486	0.770
Occupation <sup>1</sup>	0.139*	0.070*	0.503	0.131*
Number of family members <sup>2</sup>	0.216	0.466	0.159*	0.211
Per capita income <sup>1</sup>	0.471	0.669	0.546	0.953
Etiology of HF <sup>1</sup>	0.068*	0.006*	0.006*	0.015*
Number of comorbidities <sup>2</sup>	0.040*	0.208	0.003*	0.015*
HF Functional Class – NYHA <sup>1</sup>	0.001*	0.012*	0.001*	< 0.001*
LVEF <sup>2</sup>	0.129*	0.030*	0.026*	0.035*
Number of medications in use <sup>2</sup>	0.001*	0.032*	0.004*	0.001*
Number of hospitalizations <sup>2</sup>	0.412	0.839	0.189*	0.323
Time in the queue <sup>2</sup>	0.756	0.270	0.494	0.856

<sup>1</sup>Mann Whitney's Test; <sup>2</sup>Spearman's test \* p-value<0.20.

Table 3 - Multivariate analysis for the quality of life outcome of patients with advanced heart failure, candidates or not for heart transplantation, in the MLHFQ quality of life assessment questionnaire, according to dimension and the total score (n=76)

Variable	$\beta$ (95% CI)	p-value	R <sup>2</sup>
<b>Physical dimension</b>			
Functional class II	11.622 (5.965 - 17.278)	< 0.001	0.932
Functional class III	23.301 (16.993 - 29.609)	< 0.001	
Functional class IV	27.945 (20.992 - 34.898)	< 0.001	
Housekeeper	6.731 (0.059 - 13.403)	0.048	
Number of medications in use	0.958 (0.162 - 1.753)	0.019	
<b>Emotional dimension</b>			
Functional class III	3.838 (0.448 - 7.229)	0.027	0.815
Functional class IV	5.400 (1.211 - 9.588)	0.012	
Housekeeper	6.313 (0.831 - 11.795)	0.025	
Number of medications in use	1.187 (0.802 - 1.573)	< 0.001	
<b>Other questions</b>			
Functional class II	11.382 (7.992 - 14.772)	< 0.001	0.922
Functional class III	17.787 (14.222 - 21.352)	< 0.001	
Functional class IV	19.268 (15.097 - 23.440)	< 0.001	
Number of comorbidities	1.260 (0.379 - 2.142)	0.006	
<b>Total score</b>			
Functional class II	30.073 (17.737 - 42.410)	< 0.001	0.925
Functional class III	49.235 (34.917 - 63.552)	< 0.001	
Functional class IV	55.023 (39.190 - 70.856)	< 0.001	
Housekeeper	21.473 (6.609 - 36.337)	0.005	
Number of medications in use	2.341 (0.512 - 4.171)	0.013	

inserted. Actions that encourage better living habits should be encouraged in health care programs since HF is a serious public health problem in both developed and developing countries. Moreover, TH is not a treatment that can be offered to all patients, due to the possibility of contraindications and, mainly, to the shortage of donors.

## ACADEMIC CONNECTION

This article is part of a master's research developed at the *Universidade Federal de Minas Gerais (UFMG)*.

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