Use of the "Minnesota Living With Heart Failure" Quality of Life Questionnaire in Spain

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Introduction and objectives. Quality of life is an important end point in heart failure studies, as is mortality or hospitalization rate. The Minnesota Living With Heart Failure Questionnaire is the instrument most widely used to evaluate quality of life in research studies. We used this questionnaire to evaluate quality of life in a general population attended to at a heart failure unit in Spain.

Patients and methods. The study subjects were 326 heart failure patients, all seen for the first time at our unit. Relationships were sought between questionnaire score and different clinical and demographic factors.

Results. The overall median score on the Minnesota Living With Heart Failure Questionnaire was relatively low (28). A strong correlation (P<.001) was found between score and functional class, sex (women had higher scores) and diabetes. A correlation was also found between questionnaire score and the number of hospital admissions in the previous year (P<.001), anemia (P<.001) and etiology (P=.01). A weak trend toward higher scores was seen with increasing age (P=.04). The highest scores were observed in patients with valve disease (43), the lowest in patients with alcoholic cardiomyopathy (20) and ischemic heart disease (24). No correlation was observed with time since disease onset or with left ventricular ejection fraction.

Conclusions. The questionnaire scores were relatively low in this experimental population. However, a strong correlation was found between questionnaire score and functional class, and with the number of hospital admissions in the previous year. These results suggest that the questionnaire adequately reflects the severity of the disease.

Key words: *Heart failure. Quality of life. Minnesota.*

Full English text available at: www.revespcardiol.org

Aplicación en España del cuestionario sobre calidad de vida «Minnesota Living With Heart Failure» para la insuficiencia cardíaca

Introducción y objetivos. La calidad de vida es, junto con la mortalidad y las hospitalizaciones, un objetivo importante en los estudios sobre insuficiencia cardíaca. El cuestionario «Minnesota Living With Heart Failure» es el instrumento más extensamente utilizado para valorarla en los trabajos de investigación. Nuestro objetivo ha sido conocer la calidad de vida mediante este cuestionario en una población general atendida en una unidad de insuficiencia cardíaca.

Pacientes y método. Se evaluó a 326 pacientes en la primera visita. Hemos analizado la correlación entre la puntuación obtenida y diversos factores clínicos y demográficos.

Resultados. La puntuación global fue relativamente baja (28). Encontramos una fuerte correlación (p < 0,001) con la clase funcional, el sexo (puntuaciones más altas en mujeres) y la diabetes. Hallamos también correlación con el número de ingresos durante el año previo (p < 0,001), la anemia (p < 0,001) y la etiología (p = 0,01), y una débil tendencia a aumentar con la edad (p = 0,04). Las puntuaciones más altas se observaron en pacientes valvulares (43) y las más bajas en pacientes con cardiopatía alcohólica (20) e isquémica (24). No hallamos correlación con el tiempo de evolución ni con la fracción de eyección de ventrículo izquierdo.

Conclusiones. La aplicación del «Minnesota Living With Heart Failure» a una población general con insuficiencia cardíaca ha mostrado puntuaciones relativamente bajas. A pesar de ello, hemos encontrado una correlación importante de la puntuación obtenida con la clase funcional y con el número de ingresos en el año previo, lo que sugiere que el cuestionario refleja correctamente el grado de severidad de la enfermedad.

Palabras clave: *Insuficiencia cardíaca. Calidad de vida. Minnesota.*

INTRODUCTION

Heart failure is a serious, chronic condition whose prevalence (0.2%-0.4% in the general population and up to 17% in people over 70 years of age)[1,2] continues to increase. The disease has important repercussions on healthcare provision, and it influences the prognosis

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ABBREVIATIONS

MLWHFQ: Minnesota Living With Heart Failure Questionnaire.
LVEF: left ventricular ejection fraction.

and lifestyle of those affected by it. The primary endpoints in the majority of clinical trials on heart failure have been effects on mortality and hospitalization, and ventricular function. However, it is becoming increasingly clear that, for many heart failure patients, quality of life is at least as important as these traditional variable–perhaps even more important than the benefit a pharmacological treatment may provide with respect to mortality. In fact, heart failure is one of the chronic diseases that most affects quality of life.[3] The physical condition of patients is compromised by dyspnea, fatigue and loss of muscular mass, and commonly by symptoms of the underlying cause of their condition (e.g., angina). When dietary restrictions, difficulties in performing one's normal work, difficulties in maintaining sexual relations, the progressive loss of self-reliance, the side effects of medication and recurrent hospitalization are also taken into account, it is easy to understand how the quality of life of these patients can be rather poor. For these reasons, more and more studies are taking quality of life into account. This variable is also a good predictor of mortality and the need for hospitalization.[4-7] It is therefore a very helpful tool when deciding on individualized therapy.

The instruments used to assess quality of life are either general health surveys or questionnaires designed for use with specific diseases.[8] The Minnesota Living With Heart Failure Questionnaire (MLWHFQ) is a specific questionnaire that was developed by Rector et al[9] in 1987 for evaluating the quality of life of patients with heart failure. Several studies[10-13] have validated it as a means of measuring responses to medical treatment, and its usefulness has been tested in several geographical settings and in different languages.[14,15] It has been used in many clinical trials that have included quality of life as a primary or secondary endpoint. Nonetheless, no articles have been published regarding its specific use with a general, Spanish population of heart failure patients.

This questionnaire was given to 326 patients attending the Heart Failure Unit at our hospital with the aim of documenting their quality of life. The results obtained were analyzed with respect to a number of demographic and clinical variables.

PATIENTS AND METHODS

The MLWHFQ contains 21 questions whose aim is to determine how heart failure affects the physical, psychological and socioeconomic condition of patients. This provides an individualized picture of a number of limiting situations associated with the syndrome. The questions refer to the signs and symptoms of heart failure, social relationships, physical and sexual activity, work and emotions. The answer for each question is chosen from a scale of 0 (none) to 5 (very much); the greater the score, the worse the quality of life. All patients attending our unit for the first time between August 2001 and February 2003 completed the questionnaire with the help of a nurse if necessary. The questions had been translated into Spanish and Catalan. The degree of help given by the nurse depended on each patient's ability to read, write and comprehend the questions. If a patient showed difficulty for whatever reason, the nurse read the questions aloud and wrote down the oral responses given.

Relationships were sought between the questionnaire score obtained and age, sex, functional class, ejection fraction, time since disease onset, the number of hospitalizations in the previous year, etiology, and the presence of diabetes and anemia. All statistical analysis was performed using SPSS version 10.0 software for Windows. Questionnaire score was understood to be a continuous variable, and its relationship with other such variables was analyzed by simple linear regression. Its relationship with dichotomic variables was examined using the Kruskal-Wallis test. Multiple linear regression (backward) was also performed using the variables found to be significant in univariate analysis; quality of life was the dependent variable. Significance was set at $P<.05$

RESULTS

The study subjects were 326 heart failure patients (235 men, 91 women) with a mean age of 65.3±10 years (range, 33-86 years). Table 1 shows their clinical and demographic characteristics. Overall MLWHFQ scores were low (median, 28; range, 0-88; P_{25}=16; P_{75}=43). A strong correlation ($P<.001$; r=0.57) was found between MLWHFQ score and functional class. The scores obtained were (Figure 1):

– Functional class I: median 9.5; P_{25}=3; P_{75}=17.5.
– Functional class II: median 17; P_{25}=11; P_{75}=31.
– Functional class III: median 38; P_{25}=25; P_{75}=46.
– Functional class IV: median 54; P_{25}=45; P_{75}=68.

The differences observed between the functional classes were always significant (between classes I and II, $P=.002$; between II and III, $P<.001$; between III

and IV, *P*=.001). A strong correlation (*P*<.001) was found between quality of life and sex, with women obtaining higher scores (median 39; P_{25}=24; P_{75}=49) than men (median 23; P_{25}=14; P_{75}=38) (Figure 2). MLWHFQ score was also closely related (*P*<.001) to having diabetes (Figure 3A) or anemia (Figure 3B), the number of hospitalizations in the previous year (*P*<.001; Figure 4) and (to a lesser degree) etiology (*P*=.01; Figure 5). The highest scores were obtained by patients with valve disease (median, 43; P_{25}=26; P_{75}=51), the lowest by those with alcoholic cardiomyopathy (median, 20; P_{25}=14; P_{75}=30) and ischemic heart disease (median, 24; P_{25}=14; P_{75}=41). The score obtained also showed a weak tendency to increase with age (*P*=.04; r=0.11). MLWHFQ score was not related, however, to time since disease onset, nor to left ventricular ejection fraction (LVEF). When patients with valve disease were excluded, however, an inverse relationship was observed between MLWHFQ score and LVEF (*P*=.02; r=0.13).

MLWHFQ score was worse among patients treated with loop diuretics (*P*=.003), and digoxin (*P*<.001), and among those not treated with angiotensin-converting enzyme inhibitors (ACE inhibitors; *P*=.001) and beta-blockers (*P*=.02). No correlation was found between MLWHFQ score and the taking of oral anticoagulants.

In multivariate analysis, age, sex, functional class, having diabetes, treatment with ACE inhibitors, and treatment with digoxin retained their statistical significance.

TABLE 1. **Baseline Characteristics**

Number of patients	326
Men/Women	235/91
Age, years	65.3±10
Etiology	
Ischemic heart disease	59%
Dilated cardiomyopathy	12%
Hypertensive heart disease	7%
Alcoholic cardiomyopathy	6%
Toxic cardiomyopathy	1%
Valve disease	7%
Others	8%
Time since disease onset, months	
Median	26
Range	0-288
NYHA functional class	
I	5%
II	45%
III	45%
IV	5%
Origin of patients	
Cardiology ward	28.5%
Internal medicine ward	12%
Cardiology outpatient dept.	48.5%
Internal medicine outpatient dept.	2%
Others	10%
Ejection fraction, mean	31±12%
Hospitalizations for heart failure in the previous year, n	
Mean	0.85
Range	0-15
Diabetes	40%
Anemia, Hb<12 g/L	31%

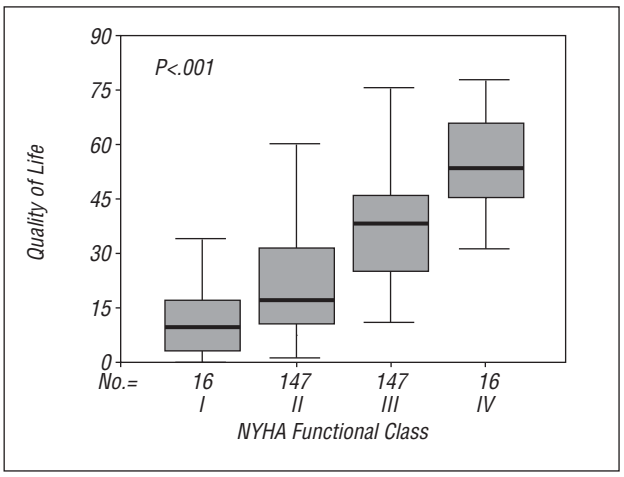

Fig. 1. Medians, 25th and 75th percentiles and extremes values for MLWHFQ scores for each functional class. NYHA indicates New York Heart Association; N, number of patients in each functional class; MLWHFQ, Minnesota Living With Heart Failure Questionnaire.

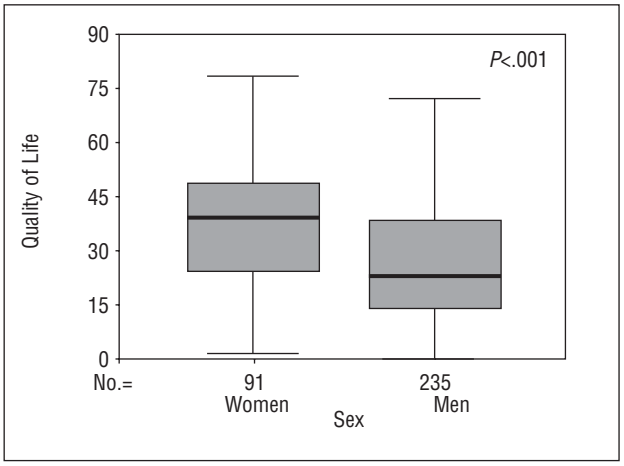

Fig. 2. Medians, 25th and 75th percentiles and extreme values for MLWHFQ scores for both sexes. N indicates number of patients of each sex; MLWHFQ, Minnesota Living With Heart Failure Questionnaire.

DISCUSSION

Quality of life is of enormous importance to heart failure patients: heart failure is one of the chronic diseases that most affects quality of life.[3] Indeed, in patients with advanced disease, relief from symptoms[16] and quality of life[17] are reported to be more important than actual duration of life. Evaluating the quality of life has been shown to be useful in

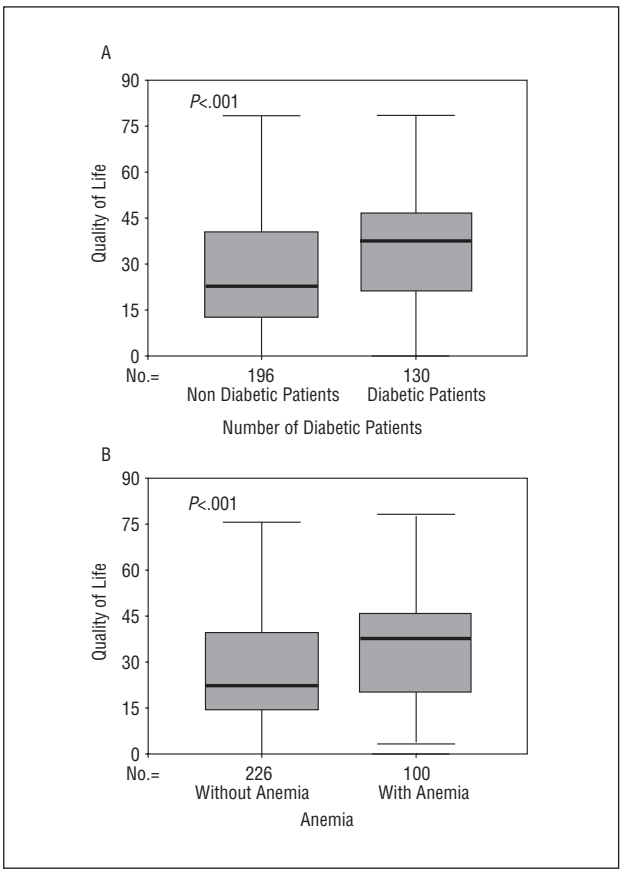

Fig. 3. Medians, 25th and 75th percentiles and extreme values for MLWHFQ scores. A: patients with and without diabetes. B: patients with and without anemia. No. indicates number of patients in each subgroup; MLWHFQ, Minnesota Living With Heart Failure Questionnaire.

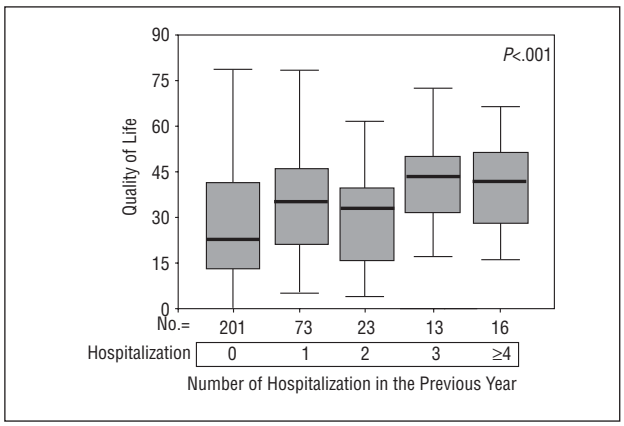

Fig. 4. Medians, 25th and 75th percentiles and extreme values for MLWHFQ scores with respect to number of hospitalizations in the previous year. No. indicates number of patients in functional class; MLWHFQ, Minnesota Living With Heart Failure Questionnaire.

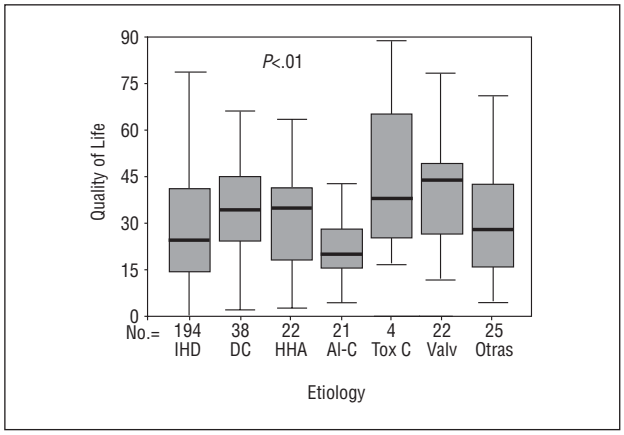

Fig. 5. Medians, 25th and 75th percentiles and extreme values for MLWHFQ scores with respect to heart failure etiology: IHD indicates ischemic heart disease; DC, dilated cardiomyopathy; No. number of patients in functional class; HHD, hypertensive heart disease; AI C, alcoholic cardiomyopathy; Tox C, toxic cardiomyopathy (adriamycin); Valv, valve disease.

arriving at a prognosis in terms of mortality and hospitalization,[4-7] although the present study provides no details (as yet) in this respect. For these reasons, an increasing number of studies are including quality of life as an endpoint.

General health and more disease-specific questionnaires are available for studying quality of life,[8] and several are available for use with heart failure patients.[9,18-22] The MLWHFQ[9] is a specific questionnaire developed for this purpose by Rector et al[9] in 1987. It is now the tool most commonly used in clinical trials in which quality of life is a primary or secondary end point.

Nonetheless, the literature contains no reports on the specific use of this questionnaire with general populations of Spanish heart failure patients. This paper is therefore the first such study. The overall scores obtained were relatively low (median, 28; range, 0-88; P_{25}=16; P_{75}=43). One explanation for this—which is probably a limitation of the use of this questionnaire with our population—could be the reduced importance given to sex-related and work-related features by a large number of our patients (41% were 70 years of age or over). These aspects had little effect on their sensation of well-being or quality of life. Further, perhaps because of cultural or economic reasons, certain leisure-related variables failed to discriminate between our patients. This suggests that the questionnaire might need some adjustment to better reflect their needs.

The scores obtained in the present study were only partly similar to those recorded for a subgroup of patients in the SOLVD study. In that study, the subjects in the "prevention" group (practically all those in functional class I) obtained a median score of 10 (P_{25}=5; P_{75}=25),[10] whereas the class I patients of the present study obtained a median score of 9.5 (P_{25}=3; P_{75}=17.5). The SOLVD "treatment" patients (74% in class II, the rest in class I) obtained a median score of

30 (P_{25}=15; P_{75}=50), whereas the class II patients of the present study obtained a median score of 17 (P_{25}=11; P_{75}=31). The class III patients of our study obtained a median score of 38 (P_{25}=25; P_{75}=46), lower than that recorded in the multicenter pimobendan study[13] in which 96% of patients were in class III (median, 47; P_{25}=28; P_{75}=61). Our class IV patients had a median score of 54 (P_{25}=45; P_{75}=68). The differences in score between consecutive functional classes in the present study were significant, even between classes III and IV (*P*=.001), something not seen by Riegel et al.[23] In addition, the MLWHFQ scores obtained by our patients were clearly related to aspects of their medical condition, such as the number of hospitalizations in the previous year and having diabetes or anemia. This score appears, therefore, to faithfully reflect disease severity. The relationship between quality of life and functional class has also been reported by Rector et al[9] (r=0.60) and Quittan et al[15] (r=0.53) (both values similar to the r value of 0.57 obtained in the present study).

Unlike other authors[15] who report a correlation between MLWHFQ score and LVEF (*P*=.01), we found no such relationship in our patients. However, when patients with heart failure due to valve disease were removed from the analysis, a weak correlation was seen (*P*=.02; r=0.13). Such a lack of correlation between MLWHFQ score and LVEF has been reported in a number of studies.[9,23,24]

With respect to differences between the sexes, the female patients in the present study reported a poorer quality of life than did the men. This has been recorded by other authors.[25,26] However, Riegel et al[27] recently observed that once their data were adjusted for marital status, age, LVEF and functional status, sex-related differences were no longer significant except with respect to emotional status.

It is understandable that patients receiving diuretics or digoxin should report a poorer quality of life since their prescription depends on functional status. With respect to digoxin, our results are not in conflict with those of the DIG studies (in which differences in quality of life were not found in patients randomly assigned to receive either digoxin or placebo)[28] since our subjects were not randomized. Those with atrial fibrillation or who were in a poor functional class with a poor LVEF received digoxin.

Patients treated with ACE inhibitors or beta-blockers had the lowest scores—these were younger and in a better functional class. Nonetheless, these drugs have been reported to provide a beneficial effect on quality of life in other studies[12,29] (although not consistently with respect to beta-blockers),[30] and such an influence cannot be discarded here. Surprisingly, no correlation was found between MLWHFQ score and the taking of oral anticoagulants, even though this treatment can be rather tiresome.

Limitations

Though the patients in this study came from the general heart failure population attended to at our specific, multidisciplinary heart failure unit, it is still a population selected from the total of all patients with heart failure. It is likely that the results obtained cannot be extrapolated to the entire heart failure population. The translations made into Spanish and Catalan have not been officially validated. Although the questionnaire ought to be completed by the patient, the characteristics of our population required that many receive help in this task from a nurse. This might limit the validation of the results, although similar steps have had to be taken in other studies with older persons.[31] Since this questionnaire is widely used in heart failure clinical trials, we did not analyze the contribution of the MLWHFQ with respect to less refined methods that only explore certain aspects of quality of life. We did not compare this questionnaire to any other. The possible effect that asking the patients to fill in the questionnaire might have on them (e.g., a sensation of satisfaction owing to a belief of being more thoroughly studied, offence by what might be perceived as excessive intrusion, even revulsion) was not recorded.

CONCLUSIONS

The MLWHFQ scores obtained were relatively low. Nevertheless, strong correlations were observed between score and functional class, the number of hospitalizations in the previous year, and having diabetes or anemia. This suggests there is a good correlation between MLWHFQ score and disease severity. Patients with valve disease obtained higher scores than those with heart failure of other etiology. Women had higher scores than men.

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