Depression Is a Major Determinant of Quality of Life in Patients With Chronic Systolic Heart Failure in General Practice

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ABSTRACT

Background: Quality of life (QoL) is severely restricted in patients with chronic heart failure (CHF). Patients frequently suffer from depressive comorbidity. It is not clear, to what extent sociodemographic variables, heart failure severity, somatic comorbidities and depression determine QoL of patients with CHF in primary care.

Methods and Results: In a cross-sectional analysis, 167 patients, 68.2 ± 10.1 years old, 68.9% male, New York Heart Association (NYHA) functional class II-IV, Left ventricular ejection fraction (LVEF) ≤40%, were recruited in their general practitioner's practices. Heart failure severity was assessed with echocardiography and N-terminal brain natriuretic peptide (NT-proBNP); multimorbidity was assessed with the Cumulative Illness Rating Scale (CIRS-G). QoL was measured with the Short Form 36 Health Survey (SF-36) and depression with the depression module of the Patient Health Questionnaire (PHQ-9). Significant correlations with all SF-36 subscales were only found for the CIRS-G ($r = -0.18$ to -0.36; $P < .05$) and the PHQ-9 ($r = -0.26$ to -0.75; $P < .01$). In multivariate forward regression analyses, the PHQ-9 summary score explained the most part of QoL variance in all of the SF-36 subscales ($r^2 = 0.17-0.56$). LVEF and NT-proBNP did not have significant influence on QoL.

Conclusions: Depression is a major determinant of quality of life in patients with chronic systolic heart failure, whereas somatic measures of heart failure severity such as NT-proBNP and LVEF do not contribute to quality of life. Correct diagnosis and treatment of depressive comorbidity in heart failure patients is essential. (*J Cardiac Fail 2007;13:818–824*)

Key Words: Heart failure, quality of life, depression, primary care.

Chronic heart failure (CHF) is common with rising age.[1] It is associated with severe limitations of quality of life (QoL),[2,3] repeated hospital admissions,[4] and a bad prognosis.[5] Many patients suffer from depressive symptoms[6,7] with additional negative impact on prognosis.[8,9] Although QoL worsens with rising New York Heart Association (NYHA) functional class,[2] somatic indicators of CHF severity only explain a small part of QoL variance, while psychosocial factors account for notable amounts of variance, when considered.[2,10] A simultaneous analysis of objective measures of heart failure severity, somatic comorbidities, and psychosocial factors, notably depression, on QoL variance in patients from general practice has not been conducted, so far. Moreover, most studies evaluating QoL in CHF have been conducted with patients from special clinical facilities, whereas the majority of CHF patients are treated in the primary care setting, being older and suffering primarily from ischemic or hypertensive heart disease.[11] Therefore the aim of this study was to assess the influence of sociodemographic variables, objective measures of heart failure severity, somatic comorbidities, and depressive comorbidity on the variance of QoL in a cross-sectional analysis in patients with CHF treated in primary care.

Methods

The study was conducted as a cross-sectional analysis of baseline data as part of the "train the trainer" study. The train the trainer study is a cluster-randomized intervention study with the aim of improving the QoL of patients with chronic systolic heart

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failure by implementing an interdisciplinary didactic training course for general practitioners (GPs) treating these patients. It was part of the Competence Network of Heart Failure (www.knhi.de), a research association funded by the German Ministry of Education and Research. Ethical approval for the study was obtained from the institutional review boards of the medical faculty of the University of Heidelberg and of the medical association of the state of Baden-Württemberg. The study was registered at www.controlled-trials.com (ISRCTN08601529).

GP and Patient Selection

Thirty-seven GPs from the region of Northern Baden, Germany, took part in the study. Each GP was instructed to identify patients with the following inclusion criteria: age ≥40 years; stable, chronic systolic or biventricular heart failure; NYHA functional Class II-IV; left ventricular ejection fraction (LVEF) ≤40% confirmed by recent echocardiography not older than 6 months. All patients gave written informed consent.

Collection of Clinical Data

A comprehensive clinical status, including medication and medical history concerning cardiovascular risk factors, was assessed according to the Basic Clinical Dataset of the Competence Network of Heart Failure. Multimorbidity was evaluated by the GPs using the Cumulative Illness Rating Scale (CIRS-G).[12,13] Blood was taken for determination of N-terminal brain natriuretic peptide (NT-proBNP) and for the Central Biomaterial Bank. The latter is a project of the Competence Network of Heart Failure, which provides a central facility to collect all biomaterial (blood, plasma, serum, and DNA) from each patient enrolled in 1 of the network's clinical trials for the purposes of several ongoing and future scientific projects. NT-proBNP was determined using the Elecsys 2010 Kit from Roche Diagnostics, Germany.

Collection of Psychosocial Data

A sociodemographic dataset was obtained from all patients, including family status, professional training, and income.

Generic QoL was measured using the Short Form 36 Health Survey (SF-36) that was originally developed for the Medical Outcomes Study.[14,15] As a generic questionnaire, comparison data of patients with other chronic diseases and population norms are available.[14,16] Although the SF-36 is not as specific to heart failure as disease-specific questionnaires such as, for example, the Kansas City Cardiomyopathy Questionnaire,[17] it covers a wider range of QoL domains. The SF-36 is a well-validated instrument that has been used in a number of studies with cardiac patients.[2,10,18] The SF-36 is a multidimensional instrument consisting of 8 multi-item subscales representing physical functioning (the extent to which health limits physical activities, such as self-care, walking, climbing stairs); physical role functioning (the extent to which physical health interferes with work or other daily activities); bodily pain (the intensity of pain and the effect of pain on normal work); general health perception (personal evaluations of current health, health outlook, and resistance to illness); vitality (feeling full of energy rather than tired and worn out); social functioning (the extent to which physical health or emotional problems interfere with normal social activities); emotional role functioning (the extent to which emotional problems interfere with work or daily activities); and mental health (general mental health including depression, anxiety, behavioral-emotional control, and general positive affect). SF-36 subscales were transformed onto a scale ranging from 0 to 100, a higher score indicating better QoL.

Depression was assessed using the depression module of the Patient Health Questionnaire (PHQ-9).[19,20] This questionnaire comprises 9 items, each of which describes 1 symptom corresponding to 1 of the 9 DSM-IV diagnostic A-criteria for major depressive disorder.[21,22] The stem question is, ''Over the last 2 weeks, how often have you been bothered by any of the following problems?'' Response options for each item are as follows: ''not at all,'' ''several days,'' ''more than half the days,'' or ''nearly everyday,'' scored 0, 1, 2, and 3, respectively. A summary score ranging from 0 to 27 points is thus possible.

One continuous and 2 categorical algorithms were applied for analyses in this study: As shown in several studies,[23–25] the continuous PHQ-9 summary score is indicative of depression severity. In accordance with DSM-IV diagnostic criteria and PHQ coding algorithms, major depressive syndrome was diagnosed when at least 5 of the 9 depressive symptoms, including at least 1 of the 2 main diagnostic symptoms for major depressive disorder (loss of interest or depressed mood), were endorsed by the patient. In diagnosing major depressive disorder, this categorical algorithm has a sensitivity of 83% and a specificity of 90%.[23,24]

The second categorical analysis applied was the use of the recommended screening cutoff score of ≥9, which allows for the diagnosis of any depressive disorder with a sensitivity of 87% and a specificity of 76%.[24]

Data Analyses

Sociodemographic and comorbidity data are reported using frequency analyses for categorical data and descriptive analyses for continuous data. Comparisons between the study sample and a general population sample for QoL were carried out using *t*-tests. Because NT-proBNP had a skewed distribution, logarithmic transformation was performed. An approximation to a normal density was achieved by $t = 2^{*}\log_{10}(B+10) - 2$, where B denotes the raw NT-proBNP value.[26] Pearson correlation coefficients were calculated for analyses of relationships between potential predictor variables and the single subscales of the SF-36. Univariately significant variables were entered into multiple regression analyses using the forward selection algorithm (P value to enter was .05). We included the continuous PHQ-9 summary score into the regression analysis instead of the categorical diagnosis of major depressive syndrome or the cutoff point of ≥9 to prevent losing of variance.[27] In linear forward regression analyses, the variable with the greatest significant regression coefficient with regard to explanation of variance of the respective subscale of the SF-36, was entered first. To compare QoL-scores of patients with high versus low NT-proBNP values, median tests between the highest and the lowest quartile of NT-proBNP with the 8 subscales of the SF-36 as dependent variables were computed. Because the assumptions for conducting the median test were not met in the subscale emotional role functioning, the Jonckheere-Terpstra test for differential trends across categories was applied. All calculations were conducted using SPSS 14.0.

Results

Patient Characteristics

A total of 167 patients fulfilled inclusion criteria and participated in the study. Their characteristics are summarized in Table 1. The population was predominantly male with an