Assessment of quality of life and anxiety in heart failure outpatients

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Abstract

Introduction: Heart failure (HF) is a chronic disease associated with increased morbidity and mortality. HF prevalence is expected to expand enormously, largely due to population ageing, rising incidence of HF risk factors and increased survival after cardiovascular events. The aim of the study was to assess levels of quality of life (QOL) and anxiety in HF outpatients and the associated factors as well as to explore the impact of anxiety on QOL.

Material and methods: One hundred HF outpatients were enrolled in the study. Data collection was performed by completion of the Minnesota Living with Heart Failure Questionnaire (MLHFQ), the Self-rating Anxiety Scale (SAS) and a questionnaire including patients’ characteristics.

Results: Of the 100 HF outpatients, 64% were men and 66% above 70 years old. Regarding QOL, at least 50% of patients scored above 68 (median) in the total score of MLHFQ and in terms of anxiety, 50% scored above 46 (median) in the SAS. These values indicate a large impact of HF on QOL and a moderate impact of HF on anxiety. Furthermore, a statistically significant correlation was observed between QOL and anxiety in HF outpatients (rho > 0.6, p < 0.001). An increase in anxiety score by one unit implies a statistically significant increase in QOL by 1.22 points (95% CI: 0.91–1.52, p < 0.001), after adjustment for potential confounders.

Conclusions: The present findings emphasize the importance of alleviating the emotional burden of anxiety, thus improving patients’ QOL.

Key words: heart failure, quality of life, anxiety.

Introduction

Heart failure (HF) is a chronic and progressive clinical syndrome that has turned out to be a major health problem worldwide. According to estimates, HF is expected to grow largely due to increased life expectancy of these patients, which is mainly attributed to early and more accurate diagnosis as well as to the improved medical treatment including new pharmacological agents [1–3].

The HF affects more than 26 million people globally [1, 2], while in the UK the number of newly diagnosed individuals increased by 12% from 2002 to 2014 [4]. The HF patients’ profile remains diverse, but they are mostly elderly, male, with multiple comorbidities and of low socio-eco-
nomic status [5]. This debilitating disease is associated with high mortality which progressively increases with advancing age. In the USA, mortality rates after HF diagnosis are up to 10% at 30 days, 20–30% at 1 year and 45–60% over 5 years of follow-up. Similarly, in Europe, mortality rates reach 11% and 41% at 1 year and 5 years of follow-up, respectively [6]. Likewise, a recent study in Greece (2017) showed an annual mortality rate of 24.3% for hospitalized HF patients and 7.7% for outpatients [7]. Strikingly more, HF imposes enormous health care costs which in the USA reached around $31 billion (£22.5 billion) in 2012 [1]. In Greece, the mean annual economic burden per HF patient is estimated at €4411 ±4764, of which two thirds are attributed to hospital care. It is noteworthy that the annual HF re-hospitalization rate is 42.9% for those having a prior hospitalization and 19.2% for outpatients [7]. Nowadays, there is observed a growing effort to improve quality of life (QOL) among HF patients and alleviate the symptom burden, thus having as the ultimate goal to minimize health care expenditures and decrease hospital re-admissions. Therefore, multidisciplinary outpatient management of HF is essential to improve clinical outcomes. The QOL is a wide concept concerning whether a disease limits individuals' ability to fulfill normal roles [8–10]. Several factors can be held responsible for diminished QOL in this vulnerable group such as HF exacerbations, coexisting symptoms, frequent readmissions, gloomy prognosis, poor self-care, low-socio-economic status, limited family or social support and knowledge deficits about disease management [8, 9]. According to patients' perspectives, the most important QOL-related issues involve independence in daily living, physical and cognitive impairment, symptom management, psychological status and hospitalizations [11].

Depression is the most widely explored determinant of QOL in HF patients. However, anxiety not only precedes or coexists with depression but also overlaps in symptoms, particularly those of physiological nature [12]. Specifically more in HF, anxiety disorders range between 8% and 18% and clinically significant anxiety ranges between 17% and 28.8% [12]. Anxiety in HF is associated with adverse clinical outcomes mainly through behavioral and physiologic pathways [12, 13]. The main sources of anxiety in HF include progressive physical symptoms, complex therapeutic regimen, comorbidities, failure of coping mechanisms, social isolation, frustrations with a complicated healthcare system, financial worries, fear of death, hopelessness and loss of control [14].

Research regarding QOL and anxiety in HF outpatients is limited. Indeed, despite advances in HF management, the association between anxiety and QOL in HF outpatients still remains an obscure issue which needs to be addressed in order to provide holistic care to this sensitive population. The aim of the present study was to: a) assess levels of anxiety and QOL in HF outpatients, b) explore associated factors with QOL and anxiety, c) explore the correlation between QOL and anxiety and d) evaluate the impact of anxiety on QOL.

Material and methods

Study population

The study sample consisted of 100 HF outpatients (64 men and 36 women). The study was cross-sectional and the sample was a convenience one. The present study enrolled 100 HF patients visiting outpatient clinics in two public hospitals of Athens in Greece from February 2017 to June 2017. In the present study only 100 patients were eligible because they visited outpatient clinics to monitor HF and not due to other co-existing disease or surgery.

Criteria for patients' inclusion in the study were as follows : i) age over 18 years old, ii) diagnosis of HF as it was assessed by the cardiologist and written in the medical record, iii) ability to write, read and understand Greek language, iv) ability to read and sign the consent form, and v) administration of conservative therapy. The exclusion criteria were as follows: i) HF patients with major psychiatric disorder, ii) HF patients with impaired cognition and eye or hearing problems, iii) HF patients waiting in outpatient clinics to be treated for some other disease (already co-existing or not), and iv) HF patients following additionally some other medical treatment (e.g. cardiac implanted device) apart from conservative therapy. In the present study there was no intervention group since this research was cross sectional and merely recorded levels of anxiety and QOL and the associated factors and the correlation between anxiety and QOL. For this reason, we used the Minnesota Living With Heart Failure Questionnaire, which is the most widespread instrument to measure QOL in HF.

Data collection lasted approximately 15 min and took place when patients were waiting for their routine follow-up in the outpatient clinic of two public hospitals in Athens.

Data – variables

Data collected for each patient included: i) socio-demographic characteristics e.g. gender, age, marital status, educational level, occupation, place of residence, living alone, and ii) clinical characteristics e.g. co-existing diseases, degree of information about the state of their health, years from HF onset, prior hospitalization due to HF and
the stage of disease according to the New York Heart Association Classification system (NYHA). This classification (NYHA), which is nowadays the most widely used in the clinical area for HF patients, was proposed in 1928 and since then it has been revised several times, most recently in 1994. Participants were classified according to NYHA as follows [15]:
- NYHA I: Patients had cardiac disease but without resulting limitations of physical activity.
- NYHA II: Patients had cardiac disease resulting in slight limitation of physical activity. They are comfortable at rest.
- NYHA III: Patients had cardiac disease resulting in marked limitation of physical activity. They are uncomfortable at rest.
- NYHA IV: Patients had cardiac disease resulting in inability to carry on any physical activity without discomfort. Symptoms of cardiac insufficiency or of the anginal syndrome may be present even at rest.

Ethical considerations
Patients who met the entry criteria were informed by the researcher about the purposes of the study and participated only after they had given written consent. Participation in the study was on a voluntary basis and anonymity was preserved. Furthermore, all participants were informed of their rights to refuse or to discontinue their participation, according to the ethical standards of the Helsinki Declaration of 1983.

Anxiety assessment
The Self-rating Anxiety Scale (SAS)-Zung was used to assess anxiety in HF outpatients. The SAS scale consists of 20 questions that assess how respondents felt during the previous week. Respondents have the ability to answer each question on a Likert type scale. In each question scores of 1–4 were attributed. Reversed scores are necessary in five questions. The scores attributed to each question are summed leading to a total score. Higher scores indicate higher levels of anxiety [16].

Quality of life assessment
The Minnesota Living With Heart Failure scale was used to assess QOL of HF outpatients. This scale was proposed in 1986 by the University of Minnesota. The Minnesota scale consists of 21 questions that evaluate QOL in the last month (4 weeks). Respondents have the ability to answer each question on a Likert-grade scale (with scores of 0–5). In the Minnesota scale, there are two subgroups of questions evaluating: a) the physical state, and b) the mental state. The scores attributed to the questions are summed up separately for physical state, mental state and all together to a total score, leading to three scores in the range 0–40, 0–25, and 0–105, respectively. Higher scores indicate worse QOL [17, 18].

Statistical analysis
Categorical data are presented in absolute and relative (%) frequencies. Kruskal-Wallis and Mann-Whitney tests were used to evaluate the association between scales and patients’ characteristics. Spearman's rho correlation coefficient was used to evaluate the association between QOL and anxiety. In addition, multiple linear regression was performed to evaluate the impact of anxiety on QOL after adjustment for potential confounders. Results are presented as β-coefficients and 95% confidence intervals (CI). The observed significance level was set to 5%. All statistical analyses were performed with SPSS version 20.

Results

Descriptive characteristics
Of the 100 patients enrolled in the study, men accounted for 64%, 66% were above 70 years old, 56% were married, 50.5% had primary school education, 70% were pensioners, 69.7% lived in Attica and 19.4% were living alone. In terms of clinical characteristics, 96.9% of the sample had a co-existing disease, 9 patients were unaware of their health problems, 30% had suffered from HF 11–15 years, 79.1% reported to have a prior hospitalization due to HF and finally, 41.8% were of stage NYHA IV (Tables I and II).

Levels of anxiety and QOL
Table III presents the results concerning QOL and anxiety. Regarding QOL, at least 50% of the patients scored above than 68 in the Minnesota total score while 50% of patients scored above 33 and 15 for physical and mental state in QOL, respectively. In terms of anxiety, at least 50% of the patients scored above than 33 in the SAS total score while 50% of patients scored above than 68 in the Minnesota scale. These values indicate a large impact of HF on QOL and moderate impact of HF on anxiety.

Characteristics associated with anxiety and QOL
Table IV shows the associations between QOL and anxiety with patients’ characteristics. In terms of anxiety, a statistically significant association was observed between anxiety score and gender (p < 0.001) and NYHA classification (p < 0.001). More specifically, women had higher anxiety (median: 50) than men (median: 43) and patients with NYHA IV had higher anxiety (median 52) than those with NYHA I–III (median: 43).
Total QOL score was statistically significantly associated with NYHA classification \( (p < 0.001) \). Patients with NYHA IV had statistically significantly higher scores (median: 76) than those with NYHA I-III (median: 61.5), which means they had worse QOL.

Physical state was statistically significantly associated with gender \( (p = 0.011) \), marital status \( (p = 0.055) \) and NYHA classification \( (p < 0.001) \). More specifically, women (median: 35) had a worse physical state than men (median: 32). Single/divorced/widowed patients (median: 34.5) also had a worse physical state than married ones (median: 32). In addition, patients with NYHA IV had a worse physical state (median: 36) than patients with lower classification (median: 29).

### Table I. Patients’ basic characteristics

| Parameter       | N (%)          |
|-----------------|----------------|
| Gender:         |                |
| Male            | 64 (64.0)      |
| Female          | 36 (36.0)      |
| Age [years]:    |                |
| 30–40           | 4 (4.0)        |
| 41–50           | 4 (4.0)        |
| 51–60           | 10 (10.0)      |
| 61–70           | 16 (16.0)      |
| > 70            | 66 (66.0)      |
| Marital status: |                |
| Married         | 56 (56.0)      |
| Single          | 8 (8.0)        |
| Divorced        | 6 (6.0)        |
| Widowed         | 28 (28.0)      |
| Living together | 2 (2.0)        |
| Education:      |                |
| Primary school  | 50 (50.5)      |
| Secondary school| 27 (27.3)      |
| University      | 19 (19.2)      |
| MSc/PhD         | 3 (3.0)        |
| Job:            |                |
| Unemployed      | 5 (5.0)        |
| Private employee| 7 (7.0)        |
| Freelancer      | 9 (9.0)        |
| Household       | 5 (5.0)        |
| Pensioner       | 70 (70.0)      |
| Other           | 4 (4.0)        |
| Residence:      |                |
| Attica          | 69 (69.7)      |
| Capital city    | 11 (11.1)      |
| Small town      | 4 (4.0)        |
| Village         | 15 (15.2)      |
| Living alone:   |                |
| Yes             | 19 (19.4)      |

### Table II. Patients’ clinical characteristics

| Parameter                        | N (%)          |
|----------------------------------|----------------|
| Other disease:                   |                |
| No                               | 3 (3.1)        |
| Yes                              | 95 (96.9)      |
| Degree of information of the state of health: |      |
| High                             | 33 (33.3)      |
| Enough                           | 35 (35.4)      |
| A little                         | 22 (22.2)      |
| Not at all                       | 9 (9.1)        |
| Years having the heart problem:  |                |
| < 2                              | 6 (6.0)        |
| 2–5                             | 22 (22.0)      |
| 6–10                            | 20 (20.0)      |
| 11–15                           | 30 (30.0)      |
| > 15                            | 22 (22.0)      |
| Previous hospitalization due to HF: |                |
| No                               | 19 (20.9)      |
| Yes                              | 72 (79.1)      |
| NYHA:                            |                |
| I                                | 2 (2.0)        |
| II                               | 19 (19.4)      |
| III                              | 36 (36.7)      |
| IV                               | 41 (41.8)      |

### Table III. Levels of anxiety and QOL in HF patients

| Variable                          | Median (IQR) |
|-----------------------------------|--------------|
| Total Score Minnesota Quality of life (range: 0–105) | 68 (58–77)   |
| Physical State (range: 0–40)      | 33 (28–36)   |
| Mental State (range: 0–25)        | 15 (10–18)   |
| Anxiety – Zung (range: 20–80)     | 46 (39–54)   |
| Parameter                  | Anxiety | P-value | Total | P-value | Physical State | P-value | Mental State | P-value |
|---------------------------|---------|---------|-------|---------|----------------|---------|--------------|---------|
| Gender:                   |         |         |       |         |                |         |              |         |
| Male                      | 43 (34–52) | < 0.001 | 66 (53–78) | 0.079 | 32 (24–35) | 0.011 | 14 (8–18) | 0.110 |
| Female                    | 50 (47–54) |         | 69 (63–76.5) |     | 35 (31.5–37) |       | 15.5 (13–18.5) |    |
| Age (years):              |         |         |       |         |                |         |              |         |
| ≤ 70                      | 45 (36–50) | 0.174 | 62 (56–72) | 0.194 | 31 (25–35) | 0.085 | 14 (9–17) | 0.201 |
| > 70                      | 48 (41–54) |         | 68 (61–78) |     | 33.5 (29–37) |       | 15 (11–19) |       |
| Marital status:           |         |         |       |         |                |         |              |         |
| Married                   | 45 (36–52) | 0.241 | 67 (56–76) | 0.205 | 32 (26–35) | 0.055 | 14 (9–17) | 0.047 |
| Single/divorced/widowed   | 48 (43–54) |         | 68.5 (61–78) |     | 34.5 (30–37) |       | 16.5 (11–20) |     |
| Education:                |         |         |       |         |                |         |              |         |
| Primary school            | 48.5 (43.5–54.5) | 0.127 | 69 (60–76) | 0.699 | 33 (29–37) | 0.348 | 16 (13–18) | 0.254 |
| Secondary school          | 45 (34–53) |         | 68 (51–77) |     | 34 (26–36) |       | 14 (8–17) |       |
| University/MSc, PhD       | 43.5 (39–51) |         | 63 (54–78) |     | 31 (27–35) |       | 14 (5–19) |       |
| Job:                      |         |         |       |         |                |         |              |         |
| Unemployed                | 45 (43–46) | 0.306 | 72 (67–77) | 0.303 | 32 (31–36) | 0.160 | 16 (9–17) | 0.205 |
| Employee                  | 40 (31–54) |         | 60 (41–72) |     | 27 (18–35) |       | 11 (4–16) |       |
| Pensioner                 | 47 (39–54) |         | 68 (60–78) |     | 33.5 (29–37) |       | 15 (12–20) |     |
| Residence:                |         |         |       |         |                |         |              |         |
| Attica                    | 45 (38–54) | 0.396 | 66 (57.5–77.5) | 0.202 | 33 (28–36) | 0.250 | 14 (9–18) | 0.142 |
| Capital city              | 49 (45–56) |         | 73 (68–81) |     | 36 (28–37) |       | 17 (14–21) |       |
| Small town                | 47 (40–52) |         | 68 (57–77) |     | 32 (25–34) |       | 17 (13–18) |       |
### Table IV. Cont.

| Parameter                                | Anxiety Zung Median (IQR) | P-value | Total Minnesota Median (IQR) | P-value | Physical State Minnesota Median (IQR) | P-value | Mental State Minnesota Median (IQR) | P-value |
|------------------------------------------|---------------------------|---------|-------------------------------|---------|---------------------------------------|---------|------------------------------------|---------|
| **Living alone:**                        |                           |         |                               |         |                                       |         |                                    |         |
| No                                       | 46 (38–53)                | 0.931   | 66 (56–77)                    | 0.228   | 32.5 (27–35)                          | 0.128   | 14 (9–17)                          | 0.220   |
| Yes                                      | 45 (40–52)                |         | 70 (62–78)                    |         | 35 (28–37)                            |         | 16 (11–20)                         |         |
| **Degree of information about health:**  |                           |         |                               |         |                                       |         |                                    |         |
| Very                                     | 47.5 (33.5–54.5)          | 0.216   | 68 (56–78)                    | 0.901   | 33 (27–35)                            | 0.791   | 13 (4–17)                          | 0.228   |
| Enough                                   | 45 (39–52)                |         | 68 (59–78)                    |         | 32 (27–37)                            |         | 14 (12–19)                         |         |
| A little/Not at all                      | 49 (42–55)                |         | 67 (57–76)                    |         | 33 (29–36)                            |         | 17 (10–19)                         |         |
| **Years having the heart problem:**     |                           |         |                               |         |                                       |         |                                    |         |
| < 6                                      | 48.5 (40–52)              | 0.520   | 68 (60–73)                    | 0.530   | 33 (27–36)                            | 0.731   | 15 (11–17)                         | 0.661   |
| 6–10                                     | 47.5 (41–54.5)            |         | 65.5 (60.5–73.5)              |         | 33.5 (29.5–36)                       |         | 15.5 (9.5–17.5)                    |         |
| 11–15                                    | 43 (36–53)                |         | 63.5 (50–79)                  |         | 32 (26–36)                            |         | 14 (7–19)                          |         |
| > 15                                     | 45 (39–56)                |         | 71 (62–79)                    |         | 33.5 (31–37)                          |         | 15.5 (13–21)                       |         |
| **Prior hospitalization due to HF:**    |                           |         |                               |         |                                       |         |                                    |         |
| No                                       | 45 (34–50)                | 0.318   | 62 (43–69)                    | 0.077   | 30 (18–36)                            | 0.142   | 14 (9–17)                          | 0.195   |
| Yes                                      | 47 (40–54)                |         | 68 (58.5–78)                  |         | 33 (28–36)                            |         | 15 (10–19.5)                       |         |
| **NYHA:**                                |                           |         |                               |         |                                       |         |                                    |         |
| I–III                                    | 43 (36–50)                | < 0.001 | 61.5 (52–69)                  | < 0.001 | 29 (24–33)                            | < 0.001 | 13.5 (6.5–17)                      | < 0.001 |
| IV                                       | 52 (45–56)                |         | 76 (66–81)                    |         | 36 (34–38)                            |         | 17 (13–21)                         |         |
Mental state was statistically significantly associated with marital status ($p = 0.047$) and NYHA classification ($p < 0.001$). The single/divorced/widowed patients (median: 16.5) had a worse mental state than married ones (median: 14). In addition, patients with NYHA IV had a worse mental state (median: 17) than patients with NYHA I–III (median: 13.5).

**Association between QOL and anxiety**

A statistically significant association was found between QOL and anxiety in HF outpatients ($p < 0.001$) as well as between anxiety and sub-scales of QOL (physical and mental state), $p < 0.001$ and $p < 0.001$, respectively. The correlation coefficients ($\rho > 0.6$) show a strong positive association. This indicates that the more anxiety patients had, the worse their QOL was (Table V).

**Impact of anxiety on QOL**

Multiple linear regression was performed to evaluate the impact of anxiety on QOL of HF patients, adjusting for potential confounders. Factors that were statistically associated univariately with the QOL were introduced as independent variables. Results are presented in Table VI.

We conclude that a one point increase in anxiety score implies a statistically significant increase in QOL score (worsening) by 1.22 points (95% CI: 0.91–1.52, $p < 0.001$), after adjustment for potential confounders. In addition, patients with NYHA IV have 6.73 points worse QOL than patients with NYHA I–III (95% CI: 1.05–12.41, $p = 0.021$).

Similarly, one point increase in anxiety score implies a statistically significant worsening in the physical and mental state by 0.57 (95% CI: 0.42–0.72, $p < 0.001$) and 0.39 (95% CI: 0.27–0.51, $p < 0.001$) points respectively. Finally, patients with NYHA IV have 3.34 points worse physical state than patients with NYHA I–III (95% CI: 0.69–5.98, $p = 0.014$).

**Limitations**

This study has some limitations. Convenience sampling is one of the principal limitations since this method is not representative of all population with HF living in Greece, thus limiting the generalizability of the results. Other limitations are related to the study design, which was cross-sectional and not longitudinal, thus not permitting investigation for a causal relation between anxiety and QOL. Finally, other limitations are: a) the sample size which was relatively small, although many significant associations were observed, b) absence of another measurement that would allow evaluation of possible changes in anxiety and QOL over time, c) comparison with HF hospitalized patients, and d) absence of a control group.

**Discussion**

The present results showed large impact of HF on QOL and moderate impact on anxiety. Interestingly, this clinical syndrome is associated with substantial impairment of QOL by reducing patients’ ability to undertake prior daily activities or by deteriorating psychosocial state [19–21]. The HF patients define QOL as their ability to perform physical and social activities, to meet their needs, to maintain happiness and fulfill relationships with others [21].

The results also revealed that women had higher anxiety and worse QOL in physical state. QOL and anxiety in HF women represent a growing concern.

**Table V. Association between QOL and anxiety**

| Variable            | Anxiety – Zung Spearman’s rho | $P$-value |
|---------------------|-----------------------------|-----------|
| Total Quality of Life | 0.657                       | $< 0.001$ |
| Physical State      | 0.672                       | $< 0.001$ |
| Mental State        | 0.641                       | $< 0.001$ |

**Table VI. Impact of anxiety on QOL life (adjusted for confounders)**

| Parameter            | Total QOL  | Physical state | Mental state |
|----------------------|------------|----------------|--------------|
|                      | $\beta$ coef. (95% CI) | $P$-value | $\beta$ coef. (95% CI) | $P$-value | $\beta$ coef. (95% CI) | $P$-value |
| Anxiety              | 1.22 (0.91–1.52)   | $< 0.001$     | 0.57 (0.42–0.72)   | $< 0.001$     | 0.39 (0.27–0.51)   | $< 0.001$     |
| Gender:              |             |               |               |               |               |               |
| Male                 | –           | Ref. Cat.     | –             |               |               |               |
| Female               | –           | 0.04 (–2.7 – 2.87) | 0.977       | –             |               |               |
| Status:              |             |               |               |               |               |               |
| Single/divorced/widowed | –       | Ref. Cat.     | Ref. Cat.     |               |               |               |
| Married              | –           | –2.26 (–4.8 – 0.3) | 0.084   | –1.17 (–3.2 – 0.9) | 0.264   |               |               |
| NYHA                 |             |               |               |               |               |               |
| I–III                | Ref. Cat.   | Ref. Cat.     | Ref. Cat.     |               |               |               |
| IV                   | 6.73 (1.05–12.41) | 0.021       | 3.34 (0.69–5.98) | 0.014       | 1.67 (–0.54 – 3.8) | 0.136       |
patients who confess themselves as anxious may affect and loss of self confidence [31, 32]. Cardiac fluid restrictions, undesired pharmacological effects in life expectations with advancing age [30].

In the present study, the results revealed that NYHA IV was associated with QOL (physical and mental state) and anxiety. Moser et al. [30] found that functional capacity and anxiety predicted poor quality of life in 603 patients in four age groups (≤53, 54–62, 63–70 and ≥71 years). The researchers also observed better QOL among older HF patients, which may be partially attributed to changes in life expectations with advancing age [30].

In terms of anxiety, the results revealed a moderate impact of anxiety on HF patients. Relevant studies in Greece demonstrated 24.7% and 32.6% moderate and high levels of anxiety, respectively, in 190 hospitalized HF patients [8] and high levels of both trait and state anxiety in 231 Greek HF outpatients with mean age 66.1 ±10.1 years [13]. Needless to say, anxiety as a normal response to stress is associated with alcohol drinking, brain natriuretic peptide, and low social support [36].

In conclusion, the present results showed a large impact of HF on patients’ QOL and a moderate impact on patients’ anxiety. More specifically, physical state in QOL was associated with gender, marital status, and NYHA classification while mental state was associated with marital status and NYHA classification. Also, the results showed that a one point increase in anxiety score implied an increase in QOL score (worsening) by 1.22 points. Anxiety needs to be addressed since it is associated with higher re-admission rates, which in turn indicate poor QOL [35]. Moreover, anxiety needs to be addressed since it is associated with alcohol drinking, brain natriuretic peptide, and low social support [36].

Conflict of interest

The authors declare no conflict of interest.

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