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ORIGINAL RESEARCH

Anxiety and depression predicted quality of life among patients with heart failure

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Purpose: Anxiety and depression are prevalent among patients with heart failure. However, their effect on the quality of life (QoL) is not well investigated in developing countries**.** Therefore, the purpose of this study was to test the effect of anxiety and depression on QoL among Jordanian patients with heart failure.

Patients and methods: Two hundred patients with a confirmed diagnosis of heart failure from 1 governmental and 1 private hospital in Amman, Jordan, were recruited between March and August, 2017. A descriptive, cross-sectional design was used. Anxiety and depression were measured using the Arabic version of the Hospital Anxiety and Depression Scale. QoL was measured using the Arabic version of the Short Form-36.

Results: Patients reported poor QoL in both physical component summary (M ± SD; 35.8±9.6) and mental component summary (M ± SD; 41.5±11.3). Prevalence rates for anxiety and depression were 62% and 65%, respectively. In stepwise regression analysis, anxiety and depression were independent predictors for poor QoL in both summaries, $p<0.001$.

Conclusion: Patients with heart failure have poor QoL and high anxiety and high depression prevalence rates. Inclusion of routine assessment and management of anxiety and depression in heart failure protocols is highly recommended.

Keywords: anxiety, depression, heart failure, quality of life, Jordan

Introduction

For many decades, cardiovascular disease (CVD) has been the number one killer worldwide.[1] Globally, 80% of CVD deaths take place in low- and middle-income countries. Heart failure (HF) is one of the most common CVDs, since 26 million adults worldwide are living with HF.[2] Projections show that the prevalence of HF is increasing. For instance, it is estimated that the prevalence will increase in US by 46% from 2012 to 2030, resulting in >8 million people ≥18 years of age suffering from HF.[3]

In developing countries, HF is a critical health problem similar to the developed countries.[4] In Jordan, a developing Arabic country, the extrapolated prevalence of HF is 99,021 cases. Based on an estimated small population of 5.61 million, the incidence is 8,251 cases annually.[5] On the other hand, highly populated Arabic countries (ie, Egypt, Sudan, and Saudi Arabia) have extrapolated prevalences of 1,343,248, 690,849, and 455,222 cases, respectively.[5]

Acute exacerbation of HF is the most common reason for HF admissions to the hospitals.[6,7] HF affects cardiovascular, neurological, and endocrine functions, resulting in dangerous outcomes. Dyspnea, pitting edema, fluid retention, pulmonary edema,

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fatigue, sleep disturbance, and loss of energy are common signs and symptoms in patients with HF.[8–10] These symptoms influence patients' ability to perform activities of daily living, socialization, functional status, and their quality of life (QoL).[8–11] Therefore, different studies have been conducted to test the effect of HF on QoL. Mostly, authors have concluded that patients with HF have poor QoL even with conventional treatment.[2,9,11–13]

Many sociodemographic, physiological, and psychological factors have been shown to affect the QoL in patients with HF. These factors include but are not limited to age, gender, marital status, social support, education, and culture.[4,9,11] Left ventricular ejection fraction (LVEF), New York Heart Association classification (NYHA class), time since HF diagnosis, other comorbidities, insomnia, anxiety, and depression were also considered as predictors of QoL.[14,15]

Anxiety and depression are common among patients with HF.[7,8,12] The prevalence rates of anxiety and depression in patients with HF are 4–5 times more than that in the general population.[7,8,12] The prevalence rate of anxiety in patients with HF ranged between 11% and 70%,[7,8,12,13,16,17] and the prevalence rate for depression ranged between 9% and 96.1%.[2,7,8,12,13,17] The difference in the prevalence rates among studies is due to different assessment methods, the definition and categorization of anxiety and depression, and the severity of the cases included in each study.[13,18] Moreover, some signs and symptoms of HF (ie, insomnia, fatigue, and loss of appetite) are shared with depression and anxiety.[13,19]

Poor QoL is one of the most important characteristics of HF.[20,21] Most studies showed that anxiety and depression were associated with poor QoL in patients with HF.[2,6,7,13,17,22–25] However, other studies did not show this relationship.[13,26–28] Some researchers concluded that these factors have equal or even more negative consequences than traditional risk factors such as diabetes mellitus (DM), hypertension (HTN), smoking, and hypercholestermia.[29,30] For these reasons, HF management guidelines recommended routine assessment of depression and anxiety in patients with HF.[31,32] However, these recommendations are not transferred into practice.[20] For example, in a study[6] checking the effect of anxiety and depression on QoL for patients with HF and hypertension, the authors found that anxiety and depression were rarely detected or correctly treated by physicians. Moreover, only 2 patients (0.01%) of the sample had previous contact with psychiatric clinics.[6]

Most of the previous studies assessing the effect of HF on QoL and the effect of anxiety and depression on QoL in patients with HF were performed in developed countries. In developing countries, there are some studies testing the effect of HF on QoL.[9,11] However, studies assessing the effect of anxiety and depression on QoL in patients with HF are lacking. Therefore, the purpose of this study was to analyze the effect of anxiety and depression on QoL for patients diagnosed with HF in Jordan.

Materials and methods

Research hypotheses

1) Anxiety scores will be an independent predictor of QoL (physical component summary [PCS] and mental component summary [MCS]), in patients with HF after controlling for sociodemographic and clinical variables, 2) Depression scores will be an independent predictor of QoL (PCS and MCS) in patients with HF after controlling for sociodemographic and clinical variables.

Design, sample, and setting

A descriptive, cross-sectional correlational design was used. A convenience sampling technique was used to recruit patients between March and August, 2017. Patients who met the following inclusion criteria were recruited from 1 governmental and 1 private hospital in Amman, Jordan: 1) a confirmed diagnosis of HF by a cardiologist, 2) 18 years or older, 3) able to read and write Arabic, 4) signed an informed consent, 5) not on antianxiety or antidepressant medications, and 6) free from any chronic disease that might affect QoL (ie, cancer, chronic kidney disease, and liver failure). Sample size was calculated using an online a priori Sample Size Calculator for Multiple Regression.[33] The assumptions were as follows: medium effect size of 0.15, a power of 0.9, 10 predictors, and an α of 0.01. Based on these assumptions, the necessary sample size to achieve the desired power was 192 participants. Two hundred and seventy five participants were screened according to the inclusion and exclusion criteria. Among them, 25 did not meet the criteria, 30 did not agree to participate, and 20 had missing data. All of them (75 participants) were excluded from the sample. Therefore, the final sample consisted of 200 participants; 100 from each hospital.

Ethical considerations

The principal investigator presented the study to the Institutional Review Board (IRB) committee at the Applied Science Private University, Amman, Jordan. The Dean of the college then issued the IRB approval letter based on the committee recommendation; (IRB#: Faculty 021). Then, the principal investigator submitted this letter to the medical directors of the selected hospitals where data collection took place.

Prior to data collection, medical directors accepted the IRB approval letter from the university, and the study was approved by the hospital boards.

Procedure

Patients who met the inclusion criteria during their visit to the outpatient clinic were contacted by research assistants. Purpose, risks, and benefits of the study were informed to participants verbally and in written form. Patients who agreed to participate after this explanation were asked to sign an informed consent. Patients were asked to fill the Hospital Anxiety and Depression Scale (HADS), Short Form 36, and their sociodemographic characteristics in a quiet place at the hospital. Research assistants obtained patients' LVEF, NYHA class, and information about other comorbidities from patients' medical records.

Measurement of variables

QoL

This was measured using the Arabic version of the Short Form 36. This tool consisted of 36 multiple response questions with 8 domains, namely, physical functioning (10 items), role physical functioning (4 items), role emotional functioning (3 items), vitality (4 items), mental health (5 items), social functioning (2 items), body pain (2 items), and general health (5 items).[34] Scores for each domain ranged from 0 to 100. Higher scores indicated better QoL in each domain. Two major summaries can be calculated: PCS, which is composed of physical functioning, role physical functioning, body pain, and general health, and MCS, which is composed of role emotional functioning, vitality, mental health, and social functioning. In this study, these 2 summaries will be reported as reported by recent studies.[9,11] Patients were considered to have poor QoL in these subscales if their scores were below 47.[9,11] The psychometric properties of the Arabic version showed that the minimum Cronbach's α for general health was 0.71, and the highest was for physical functioning, at 0.94.[9,11,35]

Anxiety and depression

This was measured by the Arabic version of the HADS. This instrument assesses anxiety and depression without investigating somatic symptoms. It is composed of 14 items, 7 for anxiety and 7 for depression. The participants rated their levels on a 0–3 scoring system, with a range of 0–21 for each subscale. Higher scores indicate higher symptoms frequency and severity. Scores were classified as follows: 0–7, normal; 8–10, mild; 11–14, moderate; and 15–21, severe anxiety/depression.[36] Previous studies[36–40] showed the following coefficients regarding the psychometric properties of the Arabic version of the HADS: the Cronbach's α for anxiety and depression subscales were 0.78 and 0.87, respectively.[36–40]

Sociodemographic and clinical characteristic

These data were collected either by administering a questionnaire or by medical records review. The following sociodemographic and clinical data were collected: age, gender, level of education, marital status, job status, NYHA class, LVEF, history of HTN, DM, and time since HF diagnosis. For clarification, NYHA class is described as follows: class I, no limitation of physical activity; class II, slight limitation of physical activity; class III, marked limitation of physical activity; and class IV, unable to perform physical activity without symptoms of cardiac insufficiency.[6]

Data analysis

Data were analyzed using the Statistical Package for the Social Sciences for Windows 21.0 (IBM Corporation, Armonk, NY, USA). Statistical significance was determined at p-value of <0.05. Participants' demographic and clinical characteristics were described by (mean ± standard deviation or frequency and percentages). To identify if anxiety and depression scores were independent predictors of QoL (PCS and MCS), a series of bivariate correlations were conducted to test for associations between the 2 summary subscales and demographic variables (ie, age, gender, marital status, job status, and anxiety/depression scores) and clinical variables (LVEF, NYHA class, time since HF diagnosis, history of HTN, and DM). Pearson's r was used for interval measures, and Spearman ρ was used for ordinal measures. Next, stepwise regression was used to check the effect on the QoL. Two regression models were carried out, 1 for PCS and 1 for MCS. Each model consisted of 3 blocks. The first block contained age, gender, marital status, and job status, while the second block contained LVEF, NYHA class, time since HF diagnosis, history of HTN, and DM. The last block contained anxiety and depression scores.

Results

The sample of this study consisted of 123 men and 77 women with a mean age of 53.4±14.5 years. Sociodemographic and clinical characteristics of the sample are presented in Table 1. Approximately three-quarters of the sample were married; more than half of the sample was working. More than a third of the sample (35%) were educated to a Baccalaureate level (BS). Based on the HADS criteria, the sample was moderately

Table 1 Demographic and clinical characteristics of patients with HF (N=200)

Characteristics	M ± SD or n (%)
Gender	
Male	123 (61.5)
Female	77 (38.5)
Marital status	
Single	20 (10)
Married	146 (73)
Divorced	10 (5)
Widowed	24 (12)
Education	
Less than high school/high school	91 (45.5)
Diploma	39 (19.5)
Holding BS degree	70 (35)
Job status	
Working	110 (55)
Full time	89 (44.5)
Part time	21 (10.5)
Not working (including unemployed and retired)	90 (45)
NYHA class	
Class I and II	60 (30)
Class III and IV	140 (70)
History of HTN	143 (71.5)
History of DM	85 (42.5)
Age (years)	53.4±14.5
LVEF (%)	38.2±5.7
Time since HF diagnosis (in years)	4.5±3.0
Anxiety scores (mean±SD)	13.7±5.8
Anxiety groups	
Normal	76 (38)
Mild anxiety	16 (8)
Moderate anxiety	95 (47.5)
Severe anxiety	13 (6.5)
Depression scores (mean±SD)	14.0±4.8
Depression groups	
Normal	70 (35)
Mild depression	20 (10)
Moderate depression	100 (50)
Severe depression	10 (5)
PCS	35.8±9.6
MCS	41.5±11.3

Abbreviations: BS, Baccalaureate degree; DM, diabetes mellitus; HF, heart failure; HTN, hypertension; LVEF, left ventricular ejection fraction; MCS, mental component summary; NYHA class, New York Heart Association classification; PCS, physical component summary.

anxious and depressed. The prevalence rates of anxiety and depression were 62% and 65%, respectively.

Table 2 shows the correlations between (PCS, MCS), demographic, and clinical variables. All variables had a negative correlation with PCS and MCS except for LVEF and job status. This meant that patients with higher LVEF and patients who were working had better QoL. Table 3 shows the results of regression analyses for predictors of PCS and MCS. Age, LVEF, NYHA class, and anxiety and depression scores were independent predictors for both PCS and MCS. In addition, job status was an independent predictor for MCS. Job status and LVEF were the only positive predictors in the 2 models. The PCS model explained 49% of the variance and MCS model explained 44% of the variance. Table 4 shows the correlation between anxiety scores, depression scores, NYHA class, LVEF, and age. Anxiety and depression increased with age, NYHA class, and low LVEF. NYHA class increased with age, and lower LVEF.

Discussion

The purpose of this study was to assess the effect of anxiety and depression on QoL for patients with HF in a developing country**.** The results showed that patients with HF have poor QoL in both PCS and MCS. In addition, the results showed that anxiety and depression are prevalent among patients with HF. Anxiety scores, depression scores, age, LVEF, and NYHA class were predictors for PCS. Anxiety scores, depression scores, age, LVEF, NYHA class, and job status were predictors for MCS. The results of this study are consistent with previous studies in regard to poor QoL in patients with HF.[8,9,11] In addition, it is consistent with studies showing that anxiety and depression are associated with poor QoL in patients with HF.[2,6,7,13,17,22–25]

Anxiety and depression affect QoL in patients with HF through different potential mechanisms. Physiologically, anxiety and depression stimulates the sympathetic nervous system, reduces heart rate variability, impairs platelet functioning, motivates inflammatory process, and leads to

Table 2 Correlations between PCS and MCS and demographic and clinical variables (N=200)

Variables	Age	LVEF	Anxiety scores	Depression scores	History of DM	History of HTN	Marital status	Job status	Gender	NYHA class
PCS	–0.46[a]	0.51[a]	–0.45[a]	–0.50[a]	–0.22[b]	–0.16[b]	–0.32[a]	0.37[a]	NS	–0.38[a]
MCS	–0.36[a]	0.30[a]	–0.44[a]	–0.48[a]	NS	NS	–0.24[a]	0.42[a]	NS	–0.39[a]

Note: [a]significant, $P<0.001$, [b]significant at $P<0.05$.
Abbreviations: DM, diabetes mellitus; HTN, hypertension; LVEF, left ventricular ejection fraction; MCS, mental component summary; NS, not significant; NYHA class, New York Heart Association classification; PCS, physical component summary.

Table 3 Stepwise regression analyses for predictors of PCS and MCS (n=200)

Outcomes/predictors	Standardized β	*T*	Model statistics
PCS			R^2=0.49; $F_{(2,188)}$ =11.4, p<0.001
Age	–0.27	–3.1[a]	
LVEF	0.34	5.9[a]	
NYHA classification	–0.33	–2.5[a]	
Depression scores	–0.34	–3.5[a]	
Anxiety scores	–0.33	–2.8[a]	
MCS			R^2=0.44; $F_{(2,188)}$ =12.8, p<0.001
Age	–0.33	–3.9[a]	
LVEF	0.20	3.3[a]	
NYHA classification	–0.38	–2.7[a]	
Job status	0.15	2.1[b]	
Depression scores	–0.32	–3.2[a]	
Anxiety scores	–0.44	–3.5[a]	

Note: [a]significant, P<0.01, [b]significant, P<0.05.
Abbreviations: LVEF, left ventricular ejection fraction; MCS, mental component summary; NYHA class, New York Heart Association classification; PCS, physical component summary.

Table 4 Correlation between anxiety, depression, NYHA class, LVEF, and age

Variable	Anxiety scores	Depression scores	NYHA class	LVEF	Age
Anxiety scores	1	0.78[a]	0.90[a]	–0.22[a]	0.26[a]
Depression scores		1	0.84[a]	–0.28[a]	0.28[a]
NYHA class			1	–0.24[a]	0.25[a]
LVEF				1	–0.30[a]
Age					1

Note: [a]significant, P<0.01.
Abbreviations: LVEF, left ventricular ejection fraction; NYHA class, New York Heart Association classification.

hypercholestermia.[6,41–45] Behaviorally, anxious and depressed patients will neglect their self-care and dietary regimen and fail to follow the prescribed medications.[30,46,47] Moreover, there is a reciprocal relationship between negative emotions (anxiety and depression) and QoL (PCS and MCS). Deterioration of health status in patients with HF; acute exacerbations, made them realize the risk of death which led to anxiety and depression.[17,48]

Previous studies which did not show a significant relation between anxiety and depression and QoL have several limitations including the fact that 1) anxiety and depression measures included confounding somatic symptoms such as fatigue and shortness of breath[23,24,49,50], 2) anxiety and depression symptoms were mixed together while measuring anxiety,[17] 3) PCS in previous studies concentrated on general activities of daily living and did not evaluate items precisely for HF,[17] 4) samples included a large number of patients with no signs and symptoms of HF or a large number of patients with mild HF categories. For example, 85% of the patients included in a study on anxiety and HF were NYHA class I and II.[13]

Age was an independent predictor for poor QoL in both PCS and MCS. Previous studies argue that the prevalence of HF increases with age.[2,3] The results of current study showed that anxiety scores, depression scores, NYHA class increases with age, and LVEF decreases with age. All these factors lead to a decline in physical and mental capabilities in patients with HF, thus contributing to poor QoL.[2,26,51–53] The mean age of the participants of this study was approximately the same as in previous studies on QoL done in Jordan and Saudi Arabia.[9,11] In this study and the 2 previous studies,[9,11] older age was a contributing factor to poor QoL in patients with HF.

Another predictor for poor QoL in this study was the severity of the disease. The severity of HF in this study was measured by high NYHA class and lower levels of LVEF. This result is in line with previous studies about LVEF[9,11] and NYHA class.[2,9,11,54] In this study, patients with high NYHA class and lower levels of LVEF had higher levels of anxiety and depression, which further explain the results of poor QoL. Moreover, patients with severe HF usually have higher rates of admission to the hospitals. Despite the fact that we did not measure this variable in the present study; previous studies demonstrated that patients with severe HF have been hospitalized more than patients with mild and moderate HF. This could have made them more anxious and depressed and thus reduced their QoL.[2]

Job status was one of the predictors for QoL in this study. Previous studies showed that unemployed patients with HF have higher levels of anxiety and depression than employed patients.[2,54] This might explain why we have a positive relation between job status and QoL. The current study has

consistent results with the previous studies in regard to this issue. Approximately half of the patients in this study were unemployed or retired. This group has higher levels of anxiety and depression compared to the employed group, which explains the prediction of poor QoL. Moreover, previous studies showed that HF patients with high annual salary reported lower levels of depression and anxiety and higher levels of security.[2,54] Unemployed/retired patients will have lower levels of income and therefore lower level of security and less socialization, which have an important effect on their QoL.[2,54]

Previous studies showed that social support and socialization have a crucial role in improving QoL in patients with HF.[9,11,17,55] Most of the times, depression and anxiety usually occur due to poor social support and isolation rather than medical causes.[13,19] HF patients with high levels of anxiety and depression may develop somatic pain and other disabilities.[6] Therefore, they might view suicide as a realistic solution for their situation.[6] Based on all these results, it is highly recommended that patients with HF be screened and treated for anxiety and depression.

Conclusion

This study assessed the effect of anxiety and depression on QoL in patients with HF in a developing country. The results of this study give further support to previous conclusions that patients with HF have poor QoL. In addition, it was concluded that anxiety and depression were predictors of poor QoL in patients with HF. Inclusion of routine assessment and management of anxiety and depression in HF protocols is highly recommended.

Study limitations

The major limitations of this study were the use of the cross-sectional design and the convenience sampling technique. Patients were recruited only from 1 major city (Amman). Moreover, anxiety and depression was measured at 1 time point, and this could possibly be a transient episode.

Disclosure

The author reports no conflicts of interest in this work.

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