Original Research

Factors Associated with Depression and Anxiety of Hospitalized Patients with Heart Failure

Maria Polikandrioti[1], John Goudevenos [2], Lampros K. Michalis[2], John Koutelekos[1], Helen Kyristi[1], Dimitrios Tzialas[3], Moses Elisaf[4]

[1]Nursing Department A, Technological Institute, Athens, [2]Cardiology Department, Ioannina University Hospital, [3]Nursing School, University of Ioannina, [4]Department of Internal Medicine, University of Ioannina, Greece

Introduction: Heart failure (HF) is a chronic disease associated with significant prevalence, mortality, and health care expenditure. The aim of the present study was to explore the factors associated with anxiety and depression experienced by patients hospitalized with HF.

Methods: We evaluated 190 hospitalized HF patients in four public hospitals. The data were collected using a specific questionnaire, which, apart from demographic and clinical variables, included the Hospital Anxiety and Depression Scale (HADS).

Results: In the total sample, 24.7% and 32.6% of patients were found to have moderate or high levels of anxiety, respectively. Simple multinomial logistic regression showed that no characteristic was significantly associated with anxiety. It also appeared that 17.4% of patients had minor and 24.2% major depression. Among the factors examined, longer disease duration was associated with a higher probability of being depressed (p=0.041). Moreover, single/divorced and widowed patients were more likely to have major depression compared to married patients (35.6% vs. 19.2%, p=0.046). Simple multinomial logistic regression revealed that married patients were 59% less likely to have major depression compared to their unmarried counterparts (OR: 0.41). Moreover, patients with short (<1 year) and moderate (2-5 years) disease duration were 69% (OR: 0.31) and 61% (OR: 0.39) less likely to have major depression compared to those with a long disease duration. Multiple multinomial logistic regression showed that only the disease duration remained statistically significantly associated with depression after controlling for the rest of factors found to be significant at a univariate level.

Conclusions: Nurses and physicians must take measures for the identification, assessment and management of anxiety and depression in this clinical population.

Heart failure (HF) is a chronic disease with significant prevalence and mortality, entailing high health care expenditure.[1,2] The prevalence of heart failure is expected to increase, not only because of the growing aging population, but also because of the increasing life expectancy of patients with coronary artery disease as a result of substantial medical advances in diagnosis and treatment, including interventional therapies.[1-3]

HF patients experience frequent hospitalizations due to exacerbation of symptoms. More specifically, one-half of hospitalized HF patients experience readmission within 6 months. Preventing HF hospitalization is important to improve patient outcomes and minimize health care costs.[2] Moreover, hospitalized HF patients are at particularly high risk for mortality. Median survival is only 1.7 years for men and 3.2 years for women, with only 25% of men and 38% of women surviving for 5 years. This is a mortality rate 4-8 times more than that of the general population of the same age.[3]

Heart failure is a progressive disease, in which the heart is not able to eject the required amount of blood because of a structural or functional cardiac disorder. Heart failure is characterized by the clinical symptoms of shortness of breath, fluid retention, edema, fatigue, and poor exercise tolerance. Patients endure a burden of severe and various symptoms, resulting in poor physical, psychological and social functioning, and an impaired quality of life.[4] The outcome of HF patients depends not only on the physical characteristics of the disease, but also on psychological stress in the form of anxiety and depression.[4-8]

However, psychological stress in HF patients is frequently under-diagnosed by health professionals or inadequately treated. Indeed, a considerable number of patients remain undiagnosed for various reasons. First and foremost, patients are sometimes unwilling to reveal their emotional state, for fear of being stigmatized under the label of mental illness; secondly, health professionals pay more attention to the treatment of the HF disease, or they may accept many of the depressive symptoms as a normal response to HF. Last but not least, depression is frequently expressed either by physical symptoms, thus leading patients to other specialties and not to the psychiatrist, or by hostility towards medical and nursing staff, withdrawal and poor compliance with instructions.[4-8]

Failure to understand the importance of diagnosing anxiety and depression may be one of the reasons why their morbidity and mortality remain high. On the other hand, early detection and treatment of depression may improve the prognosis of heart failure and the patient's quality of life in general.

Methods

This study evaluated 190 HF hospitalized patients in the Intensive Care Unit or cardiology department of 4 general public hospitals in the area of Attica. The sample studied was a convenience sample. Inclusion criteria in the present study were: 1) diagnosis of HF; 2) left ventricular ejection fraction (LVEF) ≤40%; 3) at least 3 days' hospitalization because of HF; and 4) sufficient understanding of the Greek language. Patients were excluded if they had a concurrent diagnosis of other life-threatening diseases (e.g. cancer) or a chronic severe psychiatric condition (e.g. psychosis), had a history of alcohol abuse or dependence in the past six months, had received antidepressant medicine within 30 days before admission, or were unable to clearly communicate with the researcher or to give their consent.

Patients who met the entry criteria were informed about the purposes of the research. Only those who gave their consent were included in the study. Participation was voluntary; however, patients were able to withdraw from the study at any moment. The study was approved by the Ethics Committee for Medical Research in each participating hospital and was conducted in accordance with the Declaration of Helsinki (1989) of the World Medical Association.

The Hospital Anxiety And Depression Scale (HADs), proposed in 1983 by Zigmond and Snaith,[9] was used for the evaluation of depression and anxiety. The term "hospital" in the title of the scale suggests that it is only valid in medical practice, although it is widely used in community settings and primary care. It is worth mentioning that HADs is a self-assessment scale that is only valid for screening purposes, while the definitive diagnosis is based on clinical examination.

The HADs scale has been translated into Greek and its validity and reliability were evaluated by Mistakidou al[10] in end-stage cancer patients and by Michopoulos al[11] in hospitalized patients in pathological and surgical departments. Both the internal consistency and the validity of the two sub-scales and the total of all items were found to be satisfactory. The HADs scale consists of 14 questions that assess how respondents felt during the previous week. It takes only 2 to 5 minutes to complete. Respondents are able to answer each question on a four-point Likert-type scale (0-3). Seven of the 14 questions (2, 4, 6, 8, 10, 12 and 14) assess the level of depression, while the remaining seven (1, 3, 5, 7, 9, 11 and 13) assess the respondents' level of anxiety. The scores assigned to questions were accumulated for the questions that assess depression and those that assess anxiety, thus leading to two scores, each with a range between 0 and 21. Higher values of scores indicate higher levels of anxiety and depression. The following classification for 2 scores has been proposed and used widely in the literature: score 0-7, indicating no anxiety or depression; score 8-10, indicating moderate levels of anxiety or depression; and scores >11, indicating high levels of anxiety or depression.

The associated factors recorded were the patients' sociodemographic and clinical characteristics. More specifically, the sociodemographic factors were sex and age, marital status, educational level, place of residence, and the number and ages of children. The clinical characteristics recorded were years passed since the onset of the disease, prior experi-

ence of hospitalization due to HF disease, degree of patient information relating to their heart problems, and days of hospitalization.

Statistical analysis

Categorical variables are summarized as absolute and relative (%) frequencies. Continuous variables are given as mean ± standard deviation or as median (interquartile range), depending on whether they were normally distributed or skewed, respectively. Associations between categorical variables were tested using the chi-square test. Comparisons between the non-normally distributed length of in-hospital stay and the categories of anxiety and depression were performed using the Kruskal–Wallis test.

Finally, simple and multiple multinomial logistic regression was performed in order to evaluate the association between patients' demographic and clinical characteristics (independent variable) and the level of anxiety and depression (dependent variable). In the multiple multinomial logistic regression, all factors found to be significantly associated with anxiety and depression in the simple logistic models were entered as independent variables. The results are presented as odds ratios (OR) and 95% confidence intervals (95% CI).

All reported p-values were based on two-sided hypotheses and compared to a significance level of 5%. All statistical analyses were carried out using SPSS software, version 17 (SPSS Inc, Chicago, Il, USA).

Results

Baseline demographics and clinical characteristics

The baseline demographic and clinical characteristics of the hospitalized HF patients are presented in Table 1. The majority of patients were men, married, and older than 60 years, with a disease duration longer than 1 year. Almost half of the participants lived in Attica, had low educational status (primary education), and two children, were quite well informed regarding their disease, and had prior experience of hospitalization for their current disease.

In the total sample, 24.7% and 32.6% of patients were found to have moderate and high levels of anxiety, respectively. The association between patients' baseline demographic and clinical characteristics and anxiety, based on univariate analyses, is presented

Table 1. Baseline demographic and clinical characteristics of patients with heart failure in Greece (n=190).

Socio-demographic and clinical characteristics	n (%)
Male sex	124 (65.3%)
Age (years):	
≤50	13 (6.8%)
51-60	22 (11.6%)
61-70	66 (34.7%)
>70	89 (46.8%)
Marital status:	
Married/living together	131 (68.9%)
Single/divorced/separated/widowed	59 (31.1%)
Professional status:	
Civil servant	14 (7.4%)
Private employee	27 (14.2%)
Freelancer	16 (8.4%)
Household	21 (11.1%)
Retired	112 (58.9%)
Educational status:	
Primary education	112 (58.9%)
Secondary education	55 (28.9%)
University/master/doctorate	23 (12.1%)
Place of residence:	
Attica	107 (56.3%)
Capital city	32 (16.8%)
Small town	32 (16.8%)
Rural	19 (10.0%)
Number of children:	
None	24 (12.6%)
One	43 (22.6%)
Two	81 (42.6%)
Three or more	42 (22.1%)
Years with heart failure:	
<1	43 (22.6%)
2-5	74 (38.9%)
>5	73 (38.4%)
Prior experience of hospitalization due to heart failure	
Yes	145 (76.3%)
Degree of information:	
Much	84 (44.2%)
Enough	90 (47.4%)
Little/not at all	16 (8.4%)
Length of stay in hospital, mean (interquartile range)	5 (4-6)

in Table 2. Simple multinomial logistic regression showed that no single characteristic was significantly associated with anxiety (Table 3).

Regarding the patients' depression levels, it was found that 17.4% and 24.2% appeared to have minor or major depression, respectively. Among the factors examined, the disease duration seemed to be statistically significantly associated with depression (Table 4), with a longer disease duration being associated with a higher probability of being depressed (p=0.041). Moreover, single/divorced and widowed patients were more likely to have major depression compared to married patients (35.6% vs. 19.2%,

Table 2. Association between sociodemographic and clinical characteristics of patients with heart failure and anxiety in Greece (n=190).

Anxiety level	Healthy n=80		Moderate n=47		High n=62		p-value
Sex:							0.532
Male	56	(45.2%)	30	(24.2%)	38	(30.6%)	
Female	24	(36.9%)	17	(26.2%)	24	(36.9%)	
Age (years):							0.613
≤50	5	(38.5%)	2	(15.4%)	6	(46.2%)	
51-60	10	(45.5%)	5	(22.7%)	7	(31.8%)	
61-70	33	(50.0%)	14	(21.2%)	19	(28.8%)	
>70	32	(36.4%)	26	(29.5%)	30	(34.1%)	
Marital status:							0.286
Married/living together	60	(46.2%)	30	(23.1%)	40	(30.8%)	
Single/divorced/separated/widowed	20	(33.9%)	17	(28.8%)	22	(37.3%)	
Professional status:							0.232
Civil servant	8	(57.1%)	3	(21.4%)	3	(21.4%)	
Private employee	10	(37.0%)	4	(14.8%)	13	(48.1%)	
Freelancer	9	(56.3%)	6	(37.5%)	1	(6.3%)	
Household	7	(33.3%)	6	(28.6%)	8	(38.1%)	
Retired	46	(41.4%)	28	(25.2%)	37	(33.3%)	
Educational status:			0.227				
Primary education	49	(43.8%)	33	(29.5%)	30	(26.8%)	
Secondary education	21	(38.9%)	10	(18.5%)	23	(42.6%)	
University/master/doctorate	10	(43.5%)	4	(17.4%)	9	(39.1%)	
Place of residence:							0.423
Attica	45	(42.1%)	25	(23.4%)	37	(34.6%)	
Capital city	9	(28.1%)	9	(28.1%)	14	(43.8%)	
Small town	17	(53.1%)	8	(25.0%)	7	(21.9%)	
Rural	9	(50.0%)	5	(27.8%)	4	(22.2%)	
Number of children:							0.233
None	12	(50.0%)	2	(8.3%)	10	(41.7%)	
One	21	(48.8%)	8	(18.6%)	14	(32.6%)	
Two	31	(38.3%)	27	(33.3%)	23	(28.4%)	
Three or more	16	(39.0%)	10	(24.4%)	15	(36.6%)	
Years with heart failure:							0.258
<1	15	(35.7%)	14	(33.3%)	13	(31.0%)	
2-5	38	(51.4%)	14	(18.9%)	22	(29.7%)	
>5	27	(37.0%)	19	(26.0%)	27	(37.0%)	
Prior experience of hospitalization due to heart failure:							0.175
Yes	66	(45.5%)	32	(22.1%)	47	(32.4%)	
No	14	(31.8%)	15	(34.1%)	15	(34.1%)	
Degree of information:							0.205
Much	38	(45.2%)	22	(26.2%)	24	(28.6%)	
Enough	36	(40.4%)	24	(27.0%)	29	(32.6%)	
Little/not at all	6	(37.5%)	1	(6.3%)	9	(56.3%)	
Length of stay in hospital, mean (interquartile range)	5	(4-6)	5	(4-6)	5	(4-7)	0.095

p=0.046). Simple multinomial logistic regression revealed that married patients were 59% less likely to have major depression compared to their counterparts (OR: 0.41). Moreover, patients with a short (<1 year) or moderate (2-5 years) disease duration were 69% (OR: 0.31) and 61% (OR:0.39) less likely to have major depression compared to those with a long disease duration.

Multiple multinomial logistic regression showed that only the disease duration remained statistically significantly associated with depression after controlling for the rest of the factors found to be significant at a univariate level (Table 5).

Discussion

The results of the present study showed that 24.7% and 32.6% of patients had a moderate or high level of anxiety, respectively. According to Scherer et al,[5] anxiety is commonly observed in HF patients, with re-

Table 3. Association between sociodemographic and clinical characteristics of patients with heart failure and anxiety in Greece. Results from multinomial logistic regression (n=190).

	Moderate OR (95% CI)	High OR (95% CI)
Sex:		
Male	0.76 (0.35–1.62)	0.68 (0.34–1.37)
Female	Ref	Ref
Age (years):		
≤50	0.49 (0.09–2.75)	1.28 (0.35–4.64)
51-60	0.62 (0.19–2.03)	0.75 (0.25–2.22)
61-70	0.52 (0.23–1.18)	0.62 (0.29–1.30)
>70	Ref	Ref
Marital status:		
Married/living together	0.59 (0.27–1.29)	0.61 (0.29–1.25)
Single/divorced/separated/widowed	Ref	Ref
Professional status:		
Civil servant	0.62 (0.15–2.52)	0.47 (0.12–1.88)
Private employee	0.66 (0.19–2.29)	1.62 (0.64–4.10)
Freelancer	1.10 (0.35–3.41)	0.14 (0.02–1.14)
Household	1.41 (0.43–4.62)	1.42 (0.47–4.28)
Retired	Ref	Ref
Educational status:		
Primary education	1.68 (0.49–5.82)	0.68 (0.25–1.87)
Secondary education	1.19 (0.30–4.74)	1.22 (0.41–3.57)
University/master/doctorate	Ref	Ref
Place of residence:		
Attica	1.00 (0.30–3.31)	1.85 (0.53–6.49)
Capital city	1.80 (0.43–7.53)	3.50 (0.83–14.85)
Small town	0.85 (0.21–4.03)	0.93 (0.21–4.03)
Rural	Ref	Ref
Number of children:		
None	1.13 (0.38–3.37)	0.30 (0.05–1.67)
One	1.40 (0.53–3.73)	0.86 (0.26–2.79)
Two	1.26 (0.52–3.07)	1.76 (0.67–4.67)
Three or more	Ref	Ref
Years with heart failure:		
<1	1.33 (0.52–3.38)	0.87 (0.35–2.16)
2-5	0.52 (0.22–1.22)	0.58 (0.27–1.22)
>5	Ref	Ref
Prior experience of hospitalization due to heart failure:		
Yes	0.45 (0.20–1.05)	0.67 (0.29–1.51)
No	Ref	Ref
Degree of information:		
Much	3.47 (0.39–30.7)	0.42 (0.13–1.33)
Enough	4.00 (0.45–35.4)	0.54 (0.17–1.68)
Little/not at all	Ref	Ref
Length of stay in hospital	0.90 (0.80–1.01)	0.96 (0.86–1.07)

OR – odds ratio; CI – confidence interval.

ported rates of prevalence around 29% to 45%, while Olafiranye et al[12] reported rates of 38% to 70% in patients with congestive HF. MacMahon et al[13] claimed that HF patients generally experience moderate levels of depression, but not greatly heightened anxiety.

To some extent, anxiety is considered to be a normal response to the disease with a beneficial effect, because it prompts the individual to quickly seek medical help or alter risk factors. In contrast, high levels of anxiety are adversely associated with a poor prognosis in HF patients. More specifically, anxiety is related with longer hospitalization, a higher risk of recurrence of coronary events, and difficulty in promoting self-care behaviors and adopting necessary changes in lifestyle and risk factor modification, resulting in non-adherence to treatment.[14-16] De Jong et al,[17]

Table 4. Association between sociodemographic and clinical characteristics of patients with heart failure and depression in Greece (n=190).

Depression	Healthy n=110		Minor n=33		Major n=46		p-value
Sex:							0.170
Male	77	(62.1%)	22	(17.7%)	25	(20.2%)	
Female	33	(50.8%)	11	(16.9%)	21	(32.2%)	
Age (years):							0.128
≤50	8	(61.5%)	1	(7.7%)	4	(30.8%)	
51-60	17	(77.3%)	3	(13.6%)	2	(9.1%)	
61-70	43	(65.2%)	10	(15.2%)	13	(19.7%)	
>70	42	(47.7%)	19	(21.6%)	27	(30.7%)	
Marital status:							0.046
Married/living together	82	(63.1%)	23	(17.7%)	25	(19.2%)	
Single/divorced/separated/widowed	28	(47.5%)	10	(16.9%)	21	(35.6%)	
Professional status:			0.892				
Civil servant	8	(57.1%)	4	(28.6%)	2	(14.3%)	
Private employee	15	(55.6%)	4	(14.8%)	8	(29.6%)	
Freelancer	11	(68.8%)	3	(18.8%)	2	(12.5%)	
Household	12	(57.1%)	3	(14.3%)	6	(28.6%)	
Retired	64	(57.7%)	19	(17.1%)	28	(25.2%)	
Educational status:							0.420
Primary education	63	(56.3%)	22	(19.6%)	27	(24.1%)	
Secondary education	32	(59.3%)	6	(11.1%)	16	(29.6%)	
University/master/doctorate	15	(65.2%)	5	(21.7%)	3	(13.0%)	
Place of residence:							0.071
Attica	62	(57.9%)	16	(15.0%)	29	(27.1%)	
Capital city	13	(40.6%)	8	(25.0%)	11	(34.4%)	
Small town	25	(78.1%)	5	(15.6%)	2	(6.3%)	
Rural	10	(55.6%)	4	(22.2%)	4	(22.2%)	
Number of children:							0.658
None	12	(50.0%)	4	(16.7%)	8	(33.3%)	
One	25	(58.1%)	9	(20.9%)	9	(20.9%)	
Two	52	(64.2%)	13	(16.0%)	16	(19.8%)	
Three or more	21	(51.2%)	7	(17.1%)	13	(31.7%)	
Years with heart failure:							0.041
<1	26	(61.9%)	10	(23.8%)	6	(14.3%)	
2-5	49	(66.2%)	11	(14.9%)	14	(18.9%)	
>5	35	(47.9%)	12	(16.4%)	26	(35.6%)	
Prior experience of hospitalization due to heart failure:							0.167
Yes	81	(55.9%)	24	(16.6%)	40	(27.6%)	
No	29	(65.9%)	9	(20.5%)	6	(13.6%)	
Degree of information:							0.319
Much	54	(64.3%)	14	(16.7%)	16	(19.0%)	
Enough	50	(56.2%)	15	(16.9%)	24	(27.0%)	
Little/not at all	6	(37.5%)	4	(25.0%)	6	(37.5%)	
Length of stay in hospital, mean (interquartile range)	5	(4–6)	5	(4–6)	5	(4–7)	0.107

who explored the relation between anxiety and event-free survival (i.e. emergency department visits or hospitalizations) in HF patients, showed that those with high anxiety had a shorter period of event-free survival than patients with lower anxiety. Furthermore, anxiety is often present concurrently with depression, while according to Jiang et al,[18] the poor outcomes of HF disease are associated with depression, but not with anxiety.

As concerns depression levels, we found that 17.4% and 24.2% of patients appeared to have minor or major depression, respectively. The prevalence of depression in HF patients has been reported to range from 15% to 36%, which is clearly above the lifetime prevalence of 13% for major depression in the general population.[5] Gottlieb et al[19] reported depression rates among hospitalized patients of 13% to 77.5% and rates for outpatients from 13% to 42%.

Table 5. Association between sociodemographic and clinical characteristics of patients with heart failure and depression in Greece. Results from multinomial logistic regression (n=190).

| | Crude | | Adjusted[†] | |
	Minor OR (95% CI)	Major OR (95% CI)	Minor OR (95% CI)	Major OR (95% CI)
Sex:				
Male	0.86 (0.37-1.95)	0.51 (0.25-1.04)		
Female	Ref	Ref		
Age (years):				
≤50	0.28 (0.03-2.37)	0.78 (0.21-2.84)		
51-60	0.39 (0.10-1.49)	0.18 (0.04-0.86)		
61-70	0.51 (0.21-1.23)	0.47 (0.21-1.03)		
>70	Ref	Ref		
Marital status:				
Married/living together	0.79 (0.33-1.85)	0.41 (0.20-0.84)*	0.80 (0.34-1.90)	0.46 (0.22-0.98)*
Single/divorced/separated/widowed	Ref	Ref	Ref	Ref
Professional status:				
Civil servant	1.68 (0.46-6.21)	0.57 (0.11-2.86)		
Private employee	0.90 (0.27-3.03)	1.22 (0.46-3.21)		
Freelancer	0.92 (0.23-3.64)	0.42 (0.09-1.99)		
Household	0.84 (0.22-3.30)	1.14 (0.39-3.35)		
Retired	Ref	Ref		
Educational status:				
Primary education	1.04 (0.34-3.22)	2.14 (0.57-8.01)		
Secondary education	0.56 (0.15-2.14)	2.50 (0.63-9.91)		
University/master/doctorate	Ref	Ref		
Place of residence:				
Attica	0.65 (0.18-2.33)	1.17 (0.34-4.04)		
Capital city	1.54 (0.36-6.60)	2.11 (0.52-8.67)		
Small town	0.50 (0.11-2.25)	0.20 (0.03-1.27)		
Rural	Ref	Ref		
Number of children:				
None	0.93 (0.30-2.88)	0.93 (0.20-4.21)		
One	1.72 (0.61-4.81)	1.86 (0.51-6.84)		
Two	2.01 (0.83-4.90)	1.51 (0.47-4.89)		
Three or more	Ref	Ref		
Years with heart failure:				
<1	1.12 (0.42-2.99)	0.31 (0.11-0.86)*	1.07 (0.39-2.94)	0.40 (0.14-1.17)
2-5	0.66 (0.26-1.65)	0.39 (0.18-0.84)*	0.63 (0.25-1.64)	0.49 (0.22-1.12)
>5	Ref	Ref	Ref	Ref
Prior experience of hospitalization due to heart failure:				
Yes	0.96 (0.39-2.29)	2.39 (0.92-6.22)		
No	Ref	Ref		
Degree of information:				
Much	0.39 (0.10-1.57)	0.30 (0.08-1.05)		
Enough	0.45 (0.11-1.81)	0.48 (0.14-1.64)		
Little/not at all	Ref	Ref		
Length of stay in hospital	0.89 (0.80-0.99)	0.94 (0.83-1.07)		

*$p<0.05$. [†]After controlling for the rest of the factors significantly associated with depression at a univariate level. OR – odds ratio; CI – confidence interval.

Polikandrioti et al,[4] who studied both hospitalized patients and outpatients with heart failure, showed that 20.9% and 17.2% of the sample experienced moderate and severe depression, respectively. Vaccarino et al[20] showed that 78% of HF hospitalized patients experienced depressive symptoms.

These differences in the prevalence of depression in HF patients are possibly attributable to differences in sampling, diagnostic instruments, the definition and classification of depression, and the severity of HF; this highlights the importance of using a universally accepted measuring instrument that will allow comparisons between populations.

Amin et al[21] maintained that the period during

hospitalization is the best for depression diagnosis, because all patients have the same probability of early diagnosis and treatment and are under effective management. Lane et al[22] recommended that psychological distress should be re-evaluated at discharge from hospital. Patients identified as anxious and depressed, and those with a history of depression should receive appropriate psychological intervention.

There is growing evidence that depression increases the risk of mortality and other adverse outcomes, including rehospitalization and functional decline.[13,23,24] An explanation for the link between depression and an adverse outcome of HF is that depression has been identified as one of the most important barriers to effective HF self-care.[24,25] Moreover, Jiang et al[23] showed that major depression in HF hospitalized patients is associated with the risk of hospital readmissions at 3 months and at 1 year, and with increased mortality at 3 months and at 1 year, regardless of age, New York Heart Association (NYHA) classification, baseline ejection fraction, or ischemic origin of HF. According to the results of the present study, the longer the disease duration, the higher the probability of a patient being depressed.

HF duration is associated with physical impairment, resulting in significant limitations in these patients' daily life and activities. Furthermore, patients who are unwilling to accept all these restrictions and are aware of their failure to maintain previous roles (family, professional, social) often experience depression. Along with the disease progression, especially when medical treatment provided by health professionals is not essential, patients experience feelings of abandonment at a time when their emotional needs are high. In these cases, the maintenance of communication and frequent contact with health professionals is a mater of vital importance.

Relevant research has shown a high prevalence of depression in patients with severe heart failure or a poor level of physical function.[26,27] Pena et al[28] showed that HF patients in NYHA grade IV were more depressed than those in NYHA grades II or III. Gottlieb et al[19] demonstrated that patients classified as NYHA class III and IV were more likely to be depressed than class II patients. In their meta-analysis, Rutledge et al[29] demonstrated that higher prevalence rates were associated with worse NYHA class. Polikandrioti et al[4] found that higher levels of depression were observed for HF patients in NYHA II and NYHA III compared to those in grade I. In Greece, given the difficulties in organ donation and the pro-

longed waiting time, it is likely that candidates experience depression through fear of suffering an unpleasant event before finding a donor. They may also feel abandoned by the country's health system.

The results of the present study also showed that single/divorced and widowed patients were more likely to have major depression compared to married patients. Apart from their loss of health, it is possible that these patients experience depression for various reasons, such as the unavailability of a person to whom they can express their feelings, or the lack of emotional support and encouragement from their partners. Another common reason is a lack of tangible assistance in getting to physician appointments and maintaining independent living (e.g. obtaining groceries, cooking).

Havranek et al,[30] who evaluated HF outpatients with an LVEF <0.40 at baseline and one year, showed that living alone was one of the independent predictors of developing depressive symptoms. On the other hand, Scherer et al[5] demonstrated that living in a relationship may positively influence the psychological health of HF patients, while according to another study conducted by the same researcher[31] living alone was one of the psychosocial factors that influence primary care patients' consultation frequency in the case of HF. Luttik et al[32] found that HF patients living alone reported a lower quality of life regarding future expectations. A previous study conducted by Chin et al[33] showed that single marital status was associated with increased morbidity. Dunbar et al[34] suggested that the possible mechanism by which marital status affects HF outcomes is through support for enhanced self-care. Wang et al[35] claimed that family support has a positive influence on the adoption and maintenance of health behaviors.

The needs of patients living alone have received a great deal of attention in the literature. However, it still remains doubtful to what extent this help is essential to the patient, given the variety in the structure and nature of family relations. Sometimes, though a willing supportive network may exist, it fails to provide meaningful help because of inadequate channels of communication or an overprotective environment. According to Joekes et al,[36] an overprotective partner may be a marker for the patient's having poor function. The opposing view holds that people living alone probably do not wish to be overprotected under the label of "mental disease", and thus try hard to look after themselves.

The recent literature increasingly highlights the

importance of support in both the outcome of heart failure and depression. A commonly held view is that the prevention of social isolation promotes health because it maintains a rhythm. Penninx et al[37] concluded that the presence of social support is associated with a lower risk of developing depression, while Murberg al[38] reported that social isolation is an important predictor of mortality, irrespective of age, functional level, and treatment of depressive symptoms. Similarly, Krumholz et al[39] declared that the absence of emotional support is a strong predictor of cardiovascular events in elderly patients admitted to the hospital with heart failure. Richardson[40] reported that depressed HF patients who lack social support have increased morbidity and hospital readmission rates, are less adherent to their medical regimen, and have an overall greater cost of care. Finally, Friedmann et al[41] showed that depression and social isolation predicted mortality in HF outpatients, independently of demographic and clinical status.

The importance of support should not be underestimated by health professionals but rather incorporated into the treatment of hospitalized HF patients who experience depression, since empowerment of support, including family, social and spiritual support, positively affects the outcome of the disease.

Another important factor that should not be underestimated when assessing depression in HF patients, according to Kelpis et al,[42] is the important role of Type-D personality. Kelpis et al[42] found that the prevalence of Type-D personality among Greek patients with coronary artery disease was 18.24%. Furthermore, type-D patients showed a higher rate of anxiety and depression compared to non type-D patients; moreover, type-D patients were at an increased risk of developing postoperative atrial fibrillation.

Study limitations

The present study was cross-sectional and collected data at one point in time; thus, it did not allow for inferences or changes over time. This limits the generalizability of the findings. A cross-sectional study does not allow the determination of a causal relationship between mental health (anxiety or depression) and the sociodemographic and clinical variables.

The study sample was not representative of HF patients in Greece, but was a convenience sample. This also limits the generalizability of the results.

The strengths of the study include the use of a validated and reliable questionnaire (HADs) that is frequently used in medical practice.

Conclusions

The recognition of psychological stress in hospitalized HF patients is an essential step towards effective treatment. By enhancing their awareness of the association between sociodemographic and clinical characteristics and psychological stress in HF patients, clinicians will be better equipped to provide individualized and specialized treatment. Moreover, acknowledgment of these characteristics is essential for researchers to design studies with greater precision in answering research questions.

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