

Sociodemographic factors and depressive symptoms in hospitalized patients with heart failure

Felipe Montes Pena MD^{1,2}, Jamil da Silva Soares MSc³, Beatriz Tose Costa Paiva MD²,
 Maria Clara Teixeira Piraciaba MD⁴, Renata Magliano Marins MD⁴, Amanda Ferreira Barcellos MD⁴,
 Lara Barros Muniz de Souza MD⁴

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OBJECTIVE: To determine the differences in depressive symptoms (DS) among a sample of patients hospitalized with heart failure (HF).

DESIGN: A descriptive, cross-sectional design was used.

METHODS: The Beck Depression Inventory was used to measure DS, and HF severity was assessed using the New York Heart Association (NYHA) classification system. The sociodemographic and clinical variables examined include age, sex, education, marital status, fixed monthly income, habitation, living arrangement and HF severity. The differences between the presence and absence of the variables were evaluated using the Student's *t* test.

RESULTS: The sample included 103 patients with a mean age of 65.4 years: 38 (36.9%) were men and 65 (63.1%) were women. Forty-three patients (41.7%) were in NYHA class III, and approximately one-half of the patient sample (49.5%) were married. Patients with NYHA class IV HF had significantly more DS than patients with NYHA class II or III. Age was correlated with scores of DS ($P=0.002$). There were significant differences in DS among the variables of marital status, habitation and living arrangement.

CONCLUSIONS: Depression is a common and treatable clinical finding in hospitalized patients, requiring an early diagnosis and appropriate treatment for effective management. The implementation and monitoring of treatment are necessary to reduce the costs of treatment of HF.

Key Words: *Depression; Heart failure; Sociodemographic factors*

Heart failure (HF) is a syndrome characterized by high mortality, frequent hospitalization, poor quality of life and a complex therapeutic regimen. Knowledge about HF is accumulating so rapidly that individual clinicians may be unable to translate new information into effective principles of patient care.

Given the complex and changing picture of HF, and the accumulation of evidence-based HF therapy, it is not possible for the clinician to rely solely on personal experience and observation to guide therapeutic decisions. The prognosis of individual patients with HF differs considerably, making it difficult to generalize treatments for this population. Treatments might not dramatically improve symptoms of the disease process, but they may be able to provide important reductions or delays in morbid events and deaths. The assessment of specific therapeutic outcomes is complicated by the potential differential impact of various cotherapies (1,2).

Several studies (3,4), including those with cross-sectional and prospective analyses, have demonstrated an extensive comorbidity of depression and cardiovascular disease. Depression is a chronic disease that is associated with limitations in physical and social functioning equal to or greater than those of other common chronic diseases (5), and is associated with increased mortality (6). Depression is more common in patients with cardiovascular disease, particularly those with HF, than in the general population (7,8). Furthermore,

depressive symptoms (DS) in patients with HF are strongly associated with a decline in health status (9) and an increase in the risk of hospitalization and death (10).

More information is needed regarding the differences in DS across the sociodemographic subgroups in patients with HF (11). An awareness of these characteristics may help researchers to design studies with greater precision in answering specific research questions. With the added knowledge produced from this research, clinicians will be better equipped to provide individualized and specialized treatment with regard to the unique clinical complexion of the sociodemographic subgroups.

Therefore, the purpose of the present study was to determine the differences in DS among subgroups of a sample of HF patients. These patient subgroups included age, sex, education, marital status, fixed monthly income, habitation, living arrangement and HF severity.

METHODS

The present cross-sectional study consisted of patients admitted to the Álvaro Alvim Hospital School (Brazil) with a diagnosis of HF. A diagnosis of HF was defined according to the Boston criteria from September to November of 2009 (12).

Patients were eligible to participate if they were 21 years of age or older, understood Portuguese, had a current medical diagnosis of chronic HF with left ventricular systolic dysfunction validated by transthoracic echocardiography using the

¹Department of Clinical Cardiology; ²Intensive Care Unit; ³Department of Hemodynamics and Invasive Cardiology, Álvaro Alvim School of Medicine; ⁴Campos Medicine University, Rio de Janeiro, Brazil

Correspondence: Dr Felipe Montes Pena, Street Mariz e Barros, number 71, Apartment 601, Niterói City, CEP 24220-120, Rio de Janeiro, Brazil.

E-mail fellipena@yahoo.com.br

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TABLE 1
Baseline characteristics

Sociodemographic factors	
Age, years (mean ± SD)	65.4±13.6
Sex	
Male	38 (36.9)
Female	65 (63.1)
Education	
Illiterate	27 (26.2)
Literate	76 (73.8)
Marital status	
Married	51 (49.5)
Not married	52 (50.5)
Fixed monthly income	
Has income	45 (43.7)
Has no income	58 (56.3)
Habitation	
Owens a home	65 (63.1)
No home ownership	38 (36.9)
Living arrangements	
Living alone	29 (28.1)
Not living alone	74 (71.9)
Cardiovascular risk factors	
Arterial systemic hypertension	95 (92.2)
Diabetes mellitus	35 (34.0)
Dyslipidemia	47 (45.6)
Sedentary	85 (82.5)
Smoking	36 (35.0)
Alcohol consumption	22 (21.4)
Family history	95 (92.2)

Values are presented as n (%) unless indicated otherwise

Simpson method, had an ejection fraction of less than 50% and were hospitalized because of HF. Patients were excluded if they did not require intensive care, had a concomitant diagnosis of serious cancer, used antidepressants in the 30 days before admission, had disorders that prevented clear understanding and communication with the researcher, had a history of alcohol abuse or dependence in the past six months, had psychotic symptoms or a history of psychosis, bipolar disorder or dementia, or were unable to give informed consent.

All of the patients answered a questionnaire that included sociodemographic data, including age, sex, marital status, presence of monthly income, and housing and living arrangements. The hospitalized patients were characterized according to New York Heart Association (NYHA) classification, the drug treatment used for chronic HF, the etiology of HF and the Beck Depression Inventory (BDI) to analyze the presence of DS. The race of the patients was not considered because of the mixed-race population of Brazil, which would not have produced a valid result in the analysis.

The severity of HF was measured by NYHA functional class (13). This scale is used to quantify the degree of functional limitation imposed by HF. Patients were assigned to one of four classes, depending on the degree of effort required to cause symptoms. Patients may have symptoms of HF at rest (class IV), during routine activities (class III), during normal activities (class II) or only during activities that would limit normal individuals (class I) (14). The demographic variables (age, sex, education level, marital status, housing conditions, presence or absence of fixed monthly income, and living arrangements)

were obtained by self-report at the interview. There were no patients in functional class I, and only hospitalized patients were included in the study.

For the diagnosis of DS, BDI (15,16) was applied to all patients in the study within five days of hospital admission. This scale, validated in Brazil and currently used in similar international studies, enables the diagnosis of DS and the degree of DS intensity to be obtained by 21-item indicators. The BDI score ranges from zero to 63: DS is considered to be absent for a score between zero and nine, mild to moderate between 10 and 18, moderate to severe between 19 and 29, and severe for a score 30 or greater (17).

All of the patients were informed about the nature of the research and were required to sign a consent form to participate. To avoid distortions by different subjective criteria, participating patients were interviewed and BDI was applied to patients previously targeted by researchers about the method. The study was approved by the ethics committee of the Álvaro Alvim Hospital School.

Statistical analysis was performed using the data obtained from patients enrolled during the study period. The differences in scores of DS with regard to age, sex, marital status, education level, fixed monthly income, housing and living arrangements were evaluated by comparing the difference between the presence or absence of the variables using the Student's *t* test. The differences in scores of DS among the three NYHA classes (II to IV) were evaluated by ANOVA. $P < 0.05$ was considered to be statistically significant.

RESULTS

The sociodemographic and clinical variables are presented in Table 1. The sample included 103 patients: 65 (63.1%) were women, 76 (73.8%) had some degree of schooling, 51 (49.5%) were married, only 45 (43.7%) had a fixed monthly income, 65 (63.1%) owned a home and 29 (28.1%) lived alone. The mean (\pm SD) age of patients was 65.4±13.6 years, ranging between 24 and 95 years of age. Among the cardiovascular risk factors, hypertension ($n=95$; 92.2%), inactivity ($n=85$; 82.5%) and family history ($n=95$; 92.2%) had the highest rates in the study population.

Table 2 presents the characteristics of the patients with HF and the drug treatment applied. In relation to functional class, 35 patients (34%) were in class II, 43 (41.7%) in class III and 25 (24.3%) in class IV. The most prevalent drug treatments used were angiotensin-converting enzyme inhibitors ($n=69$; 67.0%), beta-blockers ($n=81$; 78.6%), acetylsalicylic acid ($n=66$; 64.1%) and diuretics ($n=59$; 57.3%). A nonischemic etiology predominated in the study group ($n=59$; 57.3%). The mean ejection fraction of the left ventricle was found to be 40.2±7.3%.

The mean BDI score was 14.8±8.4. A total of 69 patients (67%) scored 10 or higher, suggesting the need for clinical evaluation. There was no statistically significant difference according to sex ($t=1.3$; $P=0.28$), education ($t=1.18$; $P=0.32$) or presence of fixed monthly income ($t=1.05$; $P=0.35$). However, significant differences occurred in age group ($t=7.1$; $P=0.002$), marital status ($t=4.05$; $P=0.02$), habitation ($t=11.7$; $P=0.0002$) and living arrangement ($t=13.8$; $P=0.0002$) (Table 3).

Patients with more advanced functional class reported a greater intensity of DS (Table 4). Patients with class IV had

TABLE 2
Characteristics of hospitalized patients with heart failure

	n (%)
New York Heart Association classification	
II	35 (34.0)
III	43 (41.7)
IV	25 (24.3)
Drug treatment	
Angiotensin-converting enzyme inhibitor	69 (67.0)
Inhibitor of angiotensin receptor II	31 (30.1)
Adrenergic beta blockade	81 (78.6)
Thiazide diuretics	21 (20.4)
Aldosterone inhibitors	50 (48.5)
Calcium channel blockers	20 (19.4)
Oral nitrates	33 (32.0)
Acetylsalicylic acid	66 (64.1)
Oral anticoagulation	10 (9.7)
Digitalis	45 (43.7)
Thienopyridines	5 (4.8)
Arterial vasodilators	2 (1.9)
Statins	43 (41.7)
Diuretics	59 (57.3)
Heart failure etiology	
Ischemic	44 (42.7)
Not ischemic	59 (57.3)

significantly higher scores on BDI (18.1 ± 9.8) than classes II and III (13.8 ± 7.4 and 14.1 ± 7.9 , respectively).

DISCUSSION

The purpose of the present study was to examine the socio-demographic factors associated with DS among patients with HF. The most significant findings from the present study demonstrate the following: patients with greater HF severity as assessed by higher NYHA class had more DS; and older age was significantly associated with more DS. The men had higher DS scores on average than women, although they were not significantly different.

The findings from the present study were consistent with previous research, indicating that the patients with higher HF severity have more intense DS (11,18,19). The identification of HF patients who are at risk for the development of depression is important because of the high prevalence of depression and the association between depression and adverse outcomes in patients with HF. Approximately 30% of patients with HF, including both inpatients and outpatients, have significant DS (7,10). Furthermore, depressed patients with HF are at increased risk for mortality, HF hospitalization, and worsening of HF symptoms, functional status and quality of life (8,10). Knowing the risk factors for the development of depression, as delineated in the present study, may facilitate the recognition and treatment of depressed patients with HF.

Among patients admitted to the hospital for HF, studies (20) show an association between the number of DS and the risk of the combined end point of functional decline or death: the association was strong and graded, with higher risks associated with higher DS scores. Our study shows that higher NYHA functional class is associated with a higher level of DS (ie, the BDI score of class IV patients was significantly different from those in classes II and III).

TABLE 3
Comparison of sociodemographic factors

Variables	n	BDI score, mean \pm SD	t test	P
Age group, years				
≥ 65	59	16.3 ± 9.1	7.1	0.002
< 65	44	13.6 ± 7.7		
Sex				
Male	38	15.6 ± 9.03	1.3	0.28
Female	65	14.9 ± 8.4		
Education level				
Illiterate	27	15.1 ± 9.9	1.18	0.32
Literate	76	15.2 ± 8.1		
Marital status				
Married	51	13.3 ± 8.6	4.05	0.02
Not married	52	17 ± 8.3		
Fixed monthly income				
Has income	45	15.6 ± 9.3	1.05	0.35
Has no income	58	14.8 ± 8.06		
Habitation				
Owens a home	65	14.7 ± 8.7	11.7	0.0002
No home ownership	38	15.4 ± 8.6		
Living arrangement				
Living alone	29	18.2 ± 8.9	13.8	0.0002
Not living alone	74	13.9 ± 8.2		

BDI Beck Depression Inventory

TABLE 4
Differences in Beck Depression Inventory (BDI) score between New York Heart Association (NYHA) classes

NYHA class	n	BDI score, mean \pm SD	F	P
II	35	13.8 ± 7.4	0.13	0.87*
III	43	14.1 ± 7.9	7.3	0.002†
IV	25	18.1 ± 9.8	5.35	0.009‡

* $P > 0.05$ when comparing classes II and III; † $P < 0.05$ when comparing classes III and IV; ‡ $P < 0.05$ when comparing classes II and IV

Information regarding the costs for health care use among HF patients with low levels of DS (versus those with high levels of DS) provide data for comparing the rates of hospitalization. Despite the wide range of variables used, data indicate a consistent pattern of increase in costs of health care for patients with depression. This finding leads to a demand for more emergency room visits that is two times greater for depressed versus nondepressed patients (21) – an increase of 29% in the overall costs of health care (aggregate of separate measures of mental health care, hospital and outpatient treatment) for patients with a diagnosis of depression, and increases in both short-term (four weeks) and long-term (six months) medical encounters (22).

In a study (23) evaluating coping styles and DS among 75 adults with HF (aged 27 to 82 years; mean age of 55 years), the problem-focused coping strategies had a direct, negative relationship with DS ($r = 0.27$; $P = 0.02$), and emotion-focused coping strategies (escape-avoidance behaviour) had a direct, positive relationship with DS ($r = 0.45$; $P = 0.001$). Regression analysis revealed that single individuals with more functional impairment who used less problem-focused coping reported more DS. These findings suggest that the ways individuals cope with the stressors of HF may contribute to depression.

Although no statistically significant differences were found in DS scores between men and women in our sample, higher levels of DS were observed in men, which is contrary to other findings in the literature. In previous research, women with HF were found to score significantly higher for DS than men (18,24-26). It is important to note that varying prevalence rates of DS have been reported, in part, because of the instrument used to measure DS. From the reviewed literature, the most common instrument used has been the BDI.

In the present study, the results for marital status, habitation and living arrangement demonstrate significant differences. Thus, these variables demonstrate that the symptoms of HF are affected not only by the pathophysiological component of DS, but also by the environment and psychosocial factors. HF and DS may contribute to the fatigue experienced by patients, making it more severe and requiring the need for more intensive therapeutic interventions.

Study limitations

A limitation of the present study was its cross-sectional nature, which only allows for data to be collected at one point in time

and does not allow for inferences or changes over time. However, significant associations between DS and age, marital status, living arrangements, HF severity and the prevalence among older patients within this time period were demonstrated in the present study. The BDI is not an instrument used to diagnose depression, but it can be used to assess the severity of DS.

CONCLUSION

Findings from the present study demonstrate that higher NYHA class, older age, not married, no home ownership and living alone are associated with more DS. For future research endeavours, longitudinal, biobehavioural studies are needed to investigate the relationships among biological and sociodemographic factors (ie, overstimulation of the adrenergic system), DS and HF. Medical practices need to assess patients for DS, and approaches need to be individually tailored to therapeutically address DS in patients with HF. Depression is a common and treatable clinical finding, requiring early diagnosis and an appropriate treatment. The implementation and monitoring of treatment are necessary to reduce the treatment costs of HF.

REFERENCES

- Adams KF, Lindenfeld J, Arnold JM, et al. HFSA 2006 comprehensive heart failure practice guideline. *J Card Failure* 2006;12:e1-e122.
- Konstam MA, Dracup K, Baker D, et al. Evaluation and care of patients with left ventricular systolic dysfunction. Rockville: Agency for Health Care Policy and Research, U.S. Department of Health and Human Services, 1994.
- Anda R, Williamson D, Jones D, et al. Depressed affect, hopelessness, and the risk of ischemic heart disease in a cohort of U.S. adults. *Epidemiology* 1993;4:285-94.
- Aromaa A, Raitasalo R, Reunanen A, et al. Depression and cardiovascular diseases. *Acta Psychiatr Scand* 1994;377(Suppl 1):77-82.
- Wells K, Stewart A, Hays R, et al. The functioning and well-being of depressed patients: Results from the Medical Outcomes Study. *JAMA* 1998;262:914-9.
- McDaniel J. Depression, medical illness, and healthcare. In: Levenson J, ed. *Depression*. Philadelphia: American College of Physicians, 2000:1-22.
- Havranek EP, Ware M, Lowes BD. Prevalence of depression in patients with congestive heart failure. *Am J Cardiol* 1999;84:348-50.
- Jiang W, Alexander J, Christopher E, et al. Relationship of depression to increased risk of mortality and rehospitalization in patients with congestive heart failure. *Arch Intern Med* 2001;161:1849-56.
- Rumsfeld JS, Havranek EP, Masoudi F, et al. Depressive symptoms are the strongest predictors of short-term declines in health status in patients with heart failure. *J Am Coll Cardiol* 2003;42:1811-7.
- Vaccarino V, Kasl S, Abramson J, Krumholz HM. Depressive symptoms and risk of functional decline and death in patients with heart failure. *J Am Coll Cardiol* 2001;38:199-205.
- Rutledge T, Reis VA, Linke SE, Greenberg BH, Mills PJ. Depression in heart failure. A meta-analytic review of prevalence, intervention effects, and associations with clinical outcomes. *J Am Coll Cardiol* 2006;48:1527-37.
- Remes J, Miettinen H, Reunanen A, Pyörälä K. Validity of clinical diagnosis of heart failure in primary health care. *Eur Heart J* 1991;12:315-21.
- New York Heart Association Criteria Committee. *Disease of the heart and blood vessels: Nomenclature and criteria for diagnosis*, 6th edn. Boston: Little, Brown & Co, 1964.
- Hunt SA, Abraham WT, Chin MH, et al. ACC/AHA 2005 Guideline Update for the Diagnosis and Management of Chronic Heart Failure in the Adult: A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Writing Committee to Update the 2001 Guidelines for the Evaluation and Management of Heart Failure): Developed in collaboration with the American College of Chest Physicians and the International Society for Heart and Lung Transplantation: Endorsed by the Heart Rhythm Society. *Circulation* 2005;112:e154-e235.
- Beck AT, Steerer RA, Brown GK. *Manual for the Beck Depression Inventory-II*. San Antonio: Psychological Corporation, 1996.
- Beck AT, Steerer RA, Garbin MG. Psychometrics properties of the Beck Depression Inventory. *Clin Psychol Rev* 1988;3:77-100.
- Gorenstein C, Andrade L. Questionário de Depressão de Beck – Propriedades Psicométricas da Versão em Português. In: Andrade HSGL, Waldo A. *Escalas de avaliação clínica em psiquiatria e psicofarmacologia*. São Paulo: Lemos Editorial, 2000.
- Gottlieb SS, Khatta M, Friedmann E, et al. The influence of age, gender, and race on the prevalence of depression in heart failure patients. *J Am Coll Cardiol* 2004;43:1542-9.
- Rohyans LM, Pressler SJ. Depressive symptoms and heart failure: Examining the sociodemographic variables. *Clin Nurse Spec* 2009;23:138-44.
- Murberg TA, Bru E, Aarsland T, Svebak S. Functional status and depression among men and women with congestive heart failure. *Int J Psychiatry Med* 1998;28:273-91.
- Himelhoch S, Weller WE, Wu AW, Anderson GF, Cooper LA. Chronic medical illness, depression, and use of acute medical services among Medicare beneficiaries. *Med Care* 2004;42:512-21.
- Fulop G, Strain JJ, Stettin G. Congestive heart failure and depression in older adults: Clinical course and health services use 6 months after hospitalization. *Psychosomatics* 2003;44:367-73.
- Williams SA, Kasl SV, Heiat A, Abramson JL, Krumholz HM, Vaccarino V. Depression and risk of heart failure among the elderly: A prospective community-based study. *Psychosom Med* 2002;64:6-12.
- Naqvi TZ, Naqvi SS, Merz CN. Gender differences in the link between depression and cardiovascular disease. *Psychosom Med* 2005;67(Suppl 1):15-8.
- Adams KF, Sueta CA, Gheorghiane M, et al. Gender differences in survival in advanced heart failure: Insights from the FIRST study. *Circulation* 1999;99:1816-21.
- Vollman MW, LaMontagne LL, Hepworth JT. Coping and depressive symptoms in adults living with heart failure. *J Cardiovasc Nurs* 2007;22:125-30.