



**Polikandrioti, Maria and Christou, Apostolos and Morou, Zoi and Kotronoulas, Gregory and Evagelou, Helen and Kyritsi, Helen (2010) Evaluation of depression in patients with heart failure. Health Science Journal, 4 (1). pp. 37-47. ISSN 1108-7366 ,**

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## Evaluation of depression in patients with heart failure

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### Abstract

**Background:** Despite advances in medical therapy heart failure consists a prevalent debilitating disease of poor prognosis, strongly associated with high mortality and morbidity rates. On the same time, depression rates are higher in patients with heart failure than in the general population. Depression may be underdiagnosed and consequently undertreated in the patients, as symptoms can often be similar in the two disease states.

**Purpose:** The purpose of the present study was to explore the frequency of occurrence of depression in patients with heart failure and to evaluate possible precipitating factors.

**Method and material :** Study sample consisted of 139 patients with heart failure, who were hospitalized or visited outpatients' clinics in two major hospitals in Athens. Collection of data was performed using the Zung Self-Rating Depression Scale. Statistical analyses (Student's t-test, One-way ANOVA) were conducted using the Statistical Package for Social Sciences 13.0 (SPSS, Chicago, Il, USA).

**Results:** 110 patients (79.1%) were male and only 29 patients were female, over the age of 40. 71.9% were outpatients, 20.2% were hospitalized in the departments of cardiology, while 7.9% were I.C.U. patients. Analysis of data showed that 34.6% of patients scored lower than 40 in Zung Self-Rating Scale, indicating absence of depression, 27.3% scored 40 to 47, indicating mild depression, 20.9% scored 48 to 55, indicating moderate depression, and 17.2% scored over 56, indicating severe depression. More specifically, it was found that, regarding patients' gender and age, women ( $p=0.001$ ) and patients over the age of 60 ( $p=0.001$ ) experienced higher levels of depression, while regarding educational background patients who received only basic education may have been more prone to depression ( $p=0.05$ , non-significant). In addition, higher levels of depression were observed for those retired ( $p=0.028$ ), those living in metropolitan areas ( $p=0.021$ ), patients at 2<sup>nd</sup> or 3<sup>rd</sup> stage of heart failure ( $p<0.001$ ), patients who had been diagnosed for over 1 year ( $p=0.032$ ), as well as those who reported that were less informed about the extent of their condition ( $p=0.001$ ).

**Conclusions:** The majority of patients with heart failure experience various levels of depression. The main precipitating factors are age, gender, educational and economic status, place of residence, amount of receiving information as well as the stage and the onset of the disease. Nurses and physicians must act towards identification, assessment and management of depression in this clinical population.

**Keywords:** Depression, heart failure, risk factors

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## Introduction

The association between depression and cardiovascular disease has been well established in several studies, for almost two decades now. However, many recent research studies have turned their interest to the association between depression and heart failure.<sup>1,2</sup>

Over 4.9 million Americans are patients with heart failure and 550,000 new cases are diagnosed annually, a number that is expected to reach 1.5 million until 2040, given that population ages and a great percentage of patients survive after a heart attack. In 2000, treatment of heart failure in America cost over \$24 billion, while it constitutes the only great category of expenses for the health system. Heart failure's morbidity rates reached 25% one year later, reaching 59% for male and 45% for female patients 5 years later. Re-admission rates reach 25% to 50% within 6 months after a patient is discharged from hospital. In Greece, it is estimated that there are 200,000 patients diagnosed with heart failure, while the new cases diagnosed every year reach 30,000.<sup>1-6</sup>

Heart failure consists a prevalent debilitating disease of poor prognosis at which heart cannot fill with or eject the sufficient amount of blood that is required due to structural or functional cardiac disorder. Patients suffering from congestive heart failure experience a variety of symptoms as a result of the disease. The most frequent symptoms are fatigue, decreased exercise tolerance, swelling in the legs and ankles (edema), weight gain and difficulty in breathing (dyspnea) because of fluid accumulation. As a result, heart function is decreasing, the needs of oxygen in the tissues are unmet and also cognitive impairment (memory loss, poor concentration) may occur. Consequently, the disease is significantly related to poor physical, psychological and social functioning.<sup>4</sup>

Although the feelings of anxiety that experience patients about the management of the disease are considered to be rather

normal, depression can not be counted as a normal response-reaction to the process of disease. On the contrary, depression is a chronic disease which needs medical treatment and poses several limitations to patients' life given the disabilities that provokes. Depressive patients are presented with great impairment of daily activity than that associated with other chronic diseases.<sup>2-7</sup>

According to the existing literature, there is a relation between morbidity, hospital re-admissions and patients suffering from heart failure who are depressive. Psychological interventions and pharmaceutical or non-pharmaceutical treatment of depression may lead to a substantial decrease in morbidity and perhaps in mortality among these patients.<sup>9-11</sup>

Cost of hospitalization for depressive patients with heart failure is by 25% to 40% higher than the respective cost for those suffering from heart failure but who are not depressive. Nonetheless, it still remains unclear whether cost is correlated to depression's impact on these patients' poor prognosis or it rather reflects their greater tendency to resort to health care services.<sup>8-11</sup>

## Purpose

The purpose of the present study was to explore the frequency of occurrence of depression in patients with heart failure and to evaluate possible precipitating factors.

## Material and Method

Study sample consisted of 139 patients with heart failure, who were hospitalized or who visited outpatients' clinics in two major hospitals in Athens. Collection of data was performed using the Zung Self-Rating Depression Scale. Statistic analyses (Student's t-test, One-way ANOVA) were conducted using the Statistical Package for Social Sciences 13.0 (SPSS, Chicago, IL, USA).

Zung Self-Rating Depression Scale (ZSDS) is a 20-item self-report instrument, which is widely used as a diagnostic tool for psychological and physical symptoms associated with depression. It needs approximately 10 minutes to complete and its questions are posed as positive or negative statements. Each question is rated on a 4-point Likert-scale (1 to 4), with 4 representing the most unfavorable answer. Total score comes up by adding each question's rating and ranges from 20 to 80. Total score is classified in two levels of psychological status: level I with a total score of <50, regarded as psychopathically non-significant and level II with a total score of  $\geq 50$ , indicating the existence of depression. Total score offers indicative variabilities in depression's severity, which may be useful for clinical and diagnostic purposes.

More specifically, total score may be classified in four categories to give an overall clinical estimation of depression. A total score of <40 is interpreted as normal or absence of depression, 40 to 47 indicates mild depression, 48 to 55 indicates moderate depression and a total score of 56 to 80 indicates severe depression.<sup>12-14</sup>

In addition, Zung Self-Rating Depression Scale constitutes a simple tool for the recording of alterations in depression's severity over time. Total score also indicates the levels of depression in symptomology, which is of paramount clinical importance. Overall, ZSDS has shown high reliability as Cronbach's alpha of 0.84 reveals, and efficient internal validity.<sup>12-14</sup>

## Results

### 1. Descriptives

110 patients (79.1%) were male and only 29 patients were female.

In regard to age, 20.9% of patients were below the age of 50, 23.0% were between 50 and 59 years of age and 56.1% were over the age of 60.

Regarding family status, 72.2% were married or engaged and 27.3% were not married or divorced, while regarding

educational background, 47.5% of participants had received only basic education, 25.2% had received high school education, 27.3% had attended some college or university.

In terms of patients' residency, 41.7% were living in the region of Attica, 34.5% were living in big cities in the skirts, and 23.7% were living in the countryside.

In regard to diagnosis, 48.2% of patients were diagnosed with ischemic heart failure, while 51.8% were diagnosed with myocarditis. Regarding level of heart failure, 17.3% of patients had NYHA I heart failure, 52.5% had NYHA II heart failure, and 30.2% had NYHA III heart failure. 36.7% of total study sample reported a family history of heart failure, while 52.5% suffered from some other disease.

24.5% of participants felt they were very well informed about the extent of disease, 54.7% felt they had received a sufficient amount of information, and 20.9% had not received any or hardly any information on their condition. Similarly, 28.8% felt they were very well informed about their medical treatment, 48.2% were moderately informed, and 23.0% had received limited information on treatment.

62.6% of patients visited hospital once a month, 23.7% visited hospital twice a month, while 13.7% visited hospital more than twice a month. Regarding type of hospital treatment received, 71.9% were considered as outpatients, 20.2% were hospitalized in the cardiology department, while 7.9% were I.C.U. patients.

49.2% of patients reported that their quality of life status was "somewhat" to "very much" negatively influenced by their condition. In a similar way, through analyzing the variables referring to physical symptoms, it was found that in 58.3% of patients quality of life was "somewhat" to "very much" negatively affected by those symptoms, while in 38.2% of patients emotional vulnerability also "somewhat" to "very much" negatively affected their quality of life.

### 2. Statistics

Analysis of data showed that 34.6% of patients scored lower than 40 in Zung Self-Rating Scale, indicating absence of depression, 27.3% scored 40 to 47, indicating mild depression, 20.9% scored 48 to 55, indicating moderate depression and 17.2% scored over 56, indicating severe depression. In other words, 65.4% of patients could be considered as depressive.

More specifically, it was found that, regarding patients' gender and age, women ( $p=0.001$ ) and patients over the age of 60 ( $p=0.001$ ) experienced higher levels of depression, while regarding educational background patients who received only basic education may have been more prone to depression ( $p=0.05$ , non-significant). In addition, higher levels of depression were observed for those retired ( $p=0.028$ ) and for those living in metropolitan areas ( $p=0.021$ ) as compared with patients living in the countryside (Table 3).

Neither parenthood nor the number of children was significantly correlated to severity of depression. Furthermore, etiology of heart failure was not associated with severity of depression ( $p=0.481$ ).

Higher levels of depression were observed for patients at 2<sup>nd</sup> or 3<sup>rd</sup> stage of heart failure ( $p<0.001$ ) compared to those with grade 1 heart failure, as well as for patients who were diagnosed for over 1 year ( $p=0.032$ ) (Table 4).

Higher levels of depression were also observed for those reporting that they were less informed about the extent of their condition ( $p=0.001$ ). More in detail, less informed patients experienced more severe depression than those moderately or very well informed ( $p=0.015$  and  $p=0.001$ , respectively). In addition, patients who were less informed about treatment experienced higher levels of depression ( $p=0.019$ ). Number of hospital admissions did not influence depression's severity ( $p=0.116$ ).

Severity of depression was not connected to patients' family background that is whether they lived alone or not, or with whom they used to live.

In the present study it was found that ambulatory patients with heart failure

experienced less intense depressive symptoms ( $p<0.001$ ) in comparison with inpatients ( $p<0.001$ ) and ICU patients ( $p=0.012$ ) (Table 5).

## Discussion

Statistic analysis of data showed that 34.6% of patients scored lower than 40 in Zung Self-Rating Scale, indicating absence of depression, 27.3% scored 40 to 47, indicating mild depression, 20.9% scored 48 to 55, indicating moderate depression and 17.2% scored over 56, indicating severe depression. In other words, 65.4% of patients could be considered as depressive, a finding that is consistent with other studies suggesting that a significant percentage of patients with heart failure are presented with depression as well. Vaccarino et al.,<sup>15</sup> found that 35%, 33.5% and 9% of a sample of heart failure patients aged over 50 years had mild, moderate, or deep depression, respectively, while Jiang et al.,<sup>16</sup> found that 13.9% of patients with heart failure satisfied the criteria for significant depressive syndrome during an 18-year follow up.<sup>2,17,18</sup>

This difference in percentages of depression's incidence may be explained by the use of different diagnostic tools, as well as by the association of each subgroup with the total of patients as regards their age, gender and severity of disease. Moreover, patients are sometimes unwilling to reveal their emotional stress or anxiety to healthcare professionals of fear for being stigmatized under the label of mental illness. At the same time, healthcare professionals fail to recognize the presence of depression because they lack education on the typical and atypical symptoms and they show more concern about the treatment of heart failure.<sup>19-21</sup>

Depression is difficult to be diagnosed within a cycle of illness with symptoms mimicking those of depression. Depression is described by decreased mood, loss of interest in everyday activities, loss or gain of weight, sleep disturbances, decreased ability to focus, and weakness, whereas heart failure is described by fatigue, exhaustion,

insomnia and other symptoms simulating the ones of depression. It is widely accepted that physical symptoms of depression can be confused with the symptomatology of heart failure. To reduce this danger, evaluation of depression must begin from diagnosis of heart failure and be continued throughout the progress of disease because the level of depression is frequently altered, due to the involvement of other factors. Though considerable advances were made in last decade in understanding and recognizing depression in patients with heart failure, so far no specific etiological factor has been isolated, but rather many factors have found to contribute to the development of depression, such as genetic, pathophysiological, psychological and environmental factors.<sup>2,19-22</sup>

The result of the present study that women experienced depression more intensively is in line with that of the study by Gottlieb et al.<sup>24</sup> Although women in the general population are likely to experience depression, there are not enough data regarding the effect of gender on depression among women with heart failure. However, relevant research studies have shown that gender differences do exist not only in depression but also in the health-related quality of life and coping ability in patients with heart failure.<sup>25-28</sup>

In regard to age, patients over 60 years experienced higher level of depression, which was possibly attributed to the fact that after having lost their previous healthy status, often come along with unpleasant situations able to change their lives, such as functional impairment and loss of interest for activities. Furthermore, the elderly usually suffer from cognitive disorders (poor memory or concentration difficulties) and they find it hard to fully realize that they actually experience depression. Finally, another possible explanation is that even if depression is diagnosed and the elderly are given antidepressant therapy, they still have difficulties to understand, to remember and follow the complex medical advice or receive the drug therapy.<sup>29-31</sup>

This finding of the present study contradicts that of the study by Gottlieb et al.,<sup>24</sup> where depression was more frequent in younger than over 65 years old age-groups, indicating that these patients being unable to reach their expectations and fulfill their dreams experience depression.

In terms of educational status, it has been found that primary school graduates may have been more prone to depression. Interestingly, the educational status of the chronic-disease patients may determine the psychological attitude of the patient towards the disease and several reasons are to be held responsible for this result. Patients of low educational status do not easily accept the disease, deviate from guidelines and adopt non-compliance to drug therapy. These patients are frequently unwilling to report their depressive symptoms for the reason that treatment of the disease is considered to be more significant. Therefore, they usually seek for advice and care, only when the depression reaches in an advanced level. It is a commonly held view that low educational status and generally culture background affects the emotional expression and in many times, obstructs the detection and the treatment of depression.<sup>30-34</sup>

On the other hand, individuals who work often do not accept the disease, even when they know it exists. These people, being socially active are mobilizing the repulsion and denial mechanisms and ignore the existence of the disease with all the consequences of this phenomenon.<sup>30-34</sup> The higher levels of depression that experience retired patients may possibly reflect their low-self esteem due to retirement and the reduced appreciation of social existence, whereas other research studies showed that patients of low income experienced depression but unfortunately untreatable due to the lack of financial sources.<sup>30-34</sup>

In the present study it was found that regarding residence, patients who lived in Athens or in big cities experienced higher level of depression than those living in the countryside. According to the literature, lack

of social support in large cities compared to the countryside, is associated with many chronic diseases such as stroke and heart disease, but limited information is available about the effect of social support on depression in patients with heart failure. On the other hand, it has been shown that psychosocial factors, such as stressful everyday living, loss of independence and other situations that the patients can not handle without help or support, may lead to depression. Murberg and Bru<sup>26</sup>, who studied patients with heart failure, concluded that social isolation is a significant factor in mortality, regardless of age, physical ability and treatment of depression. On the contrary, social support is associated with lower risk of depression according to Penninx et al.,<sup>35</sup> who studied 2810 patients with chronic disease. Moreover, social support, according to Bosworth et al.,<sup>36</sup> can positively influence the course of depression and reduce or even control the physical inability associated with depression. Finally, the most important conclusion coming from studies is that environmental factors, such as familial and social surroundings are a significant area related to depression. Enhancing awareness among members of family and associates about the disease would benefit patients with heart failure. It would be an essential step if the supportive environment can help patients to improve their coping mechanisms or stop imposing a further emotional burden upon them with feelings of insecurity and rejection.<sup>2,30</sup>

Severity of the disease is another factor that plays a significant role for the level of depression among these patients. Participants at the 2nd and 3rd stage of heart failure were more depressed compared to those at 1st stage. It is well established that as the stage of the disease deteriorates, the physical symptoms are such that impose limitations on the daily activities of the patients or restrict patients from work or activities that they previous enjoyed. Furthermore, due to the exacerbation of the disease patients are unable to maintain relationships and functional roles as before the onset of the

disease. The inability to fulfill their role (social, professional, family) may be one of the contributing factors for the development of depression. Other most common risk factors that need to be taken into account at the assessment of depression are the loss of autonomy and self-esteem, the distorted picture of themselves and the uncertainty about the future. Consequently, patients with severe heart failure or with poor physical health often deny to follow rehabilitation programs.<sup>30,31,34</sup>

According to the results of the present study, the level of depression is also associated with the duration of the disease since patients who had been diagnosed for over 1 year experienced higher level of depression. Given the fact that duration or the severity of the disease exacerbates the physical and emotional symptoms it is understandable why these patient experience depression. An additional factor is that the first year patients are still unable or unwilling to accept all the restrictions that the disease imposes on their life, thus experiencing high level of depression.

Furthermore, the amount of information that the patient receives also affects the level of depression. Patients who were not adequately informed about their health status or their treatment were more depressed compared to those who were sufficiently informed. One possible explanation for this finding is that patients can not fully understand the complicated treatment therapies. As a result, failure to comply with medical advice and guidance, often described in the literature as 'non-adherence', is relatively high. Non-adherence to recommended treatment is a matter of fundamental importance since it affects the prognosis of the disease and is also associated with high mortality rates as well as re-hospitalization in 20-60% of the cases.<sup>31,32,33,37</sup>

Taken for granted that the discipline of the patients in the given instructions is reduced by time, intensive and repeated counseling by health care professionals is highly beneficial. Although the information itself is not a cure, knowledge acquirement

about self-management is the key factor in changing the perception of disease and general behaviour.

Statistic analysis of data revealed that the nursing department was associated with the level of depression. Patients who followed a less intensive treatment were less depressed than those hospitalized in the cardiology department or the intensive care unit.

The high prevalence of depression among hospitalized patients may be due to the severity of the disease, the social constraints and the difficulties to comply with the hospital's rules. According to relevant literature, frequency of occurrence of depression in patients with heart failure ranges from 11%-25% for ambulatory patients and from 35%-70% for hospitalized patients, whereas in other studies in hospitalized patients it ranges from 13% to 77.5%, irrespective of other contributing factors, such as patient's age, gender, or extent of heart failure.<sup>2,3,9,17,18</sup>

The number of visits to the hospital did not affect the level of depression. Another important factor which leads to depression but in the present study did not influence the level of depression is whether the patient lives alone or not, or who the patient lives with.

According to the study of Martensson et al.,<sup>38</sup> patients with heart failure and their partners may both experience depression but for different reasons. Depression in patients with heart failure is associated with their physical ability and their mental health while depression among their partners is associated with the health status of the patient-partner and the partner's job. The level of depression of the partner does not affect the level of depression of the patient.

## Conclusions

The majority of patients with heart failure experience depression as well. It is very common that heart failure's symptoms are also introduced by depression. Both physicians and nurses should evaluate, assess, and differ-diagnose using appropriate

interventions those symptoms in order to treat patients as unique bio-psychosocial entity.

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## Appendix

Table 1: Distribution of study population according to demographic characteristics.

Demographic characteristics	n	%
Gender		
Male	110	79,1
Female	29	20,9
AGE		
< 50 years	29	20,9
50 - 60 years	32	23,0
> 60 years	78	56,1
Marital status		
Married	101	72,7
Divorced - Widowed	38	27,3
Education level		
Primary education	66	47,5
Secondary education	35	25,2
High education	38	27,3
Place of residence		
Attica	58	41,7
Prefecture Capital	48	34,5
Rural	33	23,7

Table 2: Distribution of study population according to clinical characteristics.

Clinical Characteristics	n	%
Diagnosis		
Heart failure caused by ischemic incident	67	48,2
Cardiomyopathy	72	51,8
stage of heart failure		
NYHA I	24	17,3
NYHA II	73	52,5
NYHA III	42	30,2
Method of treatment		
Outpatient clinic	100	71,9
Cardiology Section	28	20,1
Intensive Care Unit	11	7,9
Frequency of hospital visit		
Once / month	87	62,6
Twice / month	33	23,7
More than twice / month	19	13,7

Table 3: Comparison of average prices to assess the overall depression score in relation to sex, age, residence, occupation, and educational attainment.

SEX	TOTAL depression SCORE		
	n	$\bar{X} \pm SD$	
Men	110	42,61±11,09	P= 0,001
Women	29	49,06±11,24	
AGE			
> 50 years	29	37,75±11,61	P= 0,001
50-59 years	32	42,81 ±9,74	
< 60 years	78	46,74±11,05	
PLACE OF RESIDENCE			
Attica	58	44,70±11,75	P= 0,021
Prefecture Capital	48	46,25±11,01	
Rural	33	39,33±10,19	
OCCUPATION			
Private / Public Employee	42	43,02±10,18	P= 0,028
Freelance	28	40,39 ±12,19	
Retired	58	45,72±11,46	
Household	11	47,36±11,99	
Educational Level			
Primary education	66	46,27±11,33	P= 0,050
Secondary education	35	42,02±10,95	
High education	38	41,73±11,38	

Table 4: Comparison of average prices to assess the overall depression score in relation to the stage of heart failure and the duration of the disease.

STAGE OF HEART FAILURE	TOTAL depression SCORE		
	n	$\bar{X} \pm SD$	
NYHA 1	24	31,58±7,11	P= <0,001
NYHA 2	73	43,98±10,03	
NYHA 3	42	51,00±9,53	
DURATION OF THE disease			
> 1 years	30	40,23±11,50	P= 0,032
2-5 years	45	46,22±11,66	
6-10 years	33	44,60±10,98	
< 10 years	31	43,61±10,87	

Table 5: Comparison of average prices to assess the overall depression score compared with the extent of information, the number of visits to the hospital, and the nursing department.

LEVEL OF DISEASE INFORMATION	TOTAL depression SCORE		
	n	$\bar{X} \pm SD$	
High	34	39,73±11,53	P= 0,001
Middle	76	43,69±10,71	
Low	29	49,62±10,93	
LEVEL OF TREATMENT INFORMATION			
High	40	43,10±12,65	P= 0,019
Middle	67	42,46±10,72	
Low	32	48,18±10,33	
nursing department			
Outpatient Clinics	100	41,01±10,68	P= <0,001
Cardiology Section	28	52,35±10,15	
Intensive Care Unit	11	49,45±7,95	
Frequency of visit to hospital			
Once / month	87	42,86±11,75	P= 0,116
Twice / month	33	44,06±11,36	
More than twice / month	19	48,84±8,55	