

## RESEARCH ARTICLE

# EVALUATION OF FATIGUE IN HOSPITALIZED PATIENTS WITH HEART FAILURE

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## Abstract

**Background:** Fatigue is a common symptom that experience patients with heart failure. Objective: of the study was to assess factors associated with fatigue in hospitalized patients with heart failure. **Methods:** In the present study, 60 hospitalized patients were enrolled. Data collection was performed by the method of the interview using the questionnaire of Fatigue (MFIS-Greek) and a questionnaire developed by the researchers of the study for the collection of demographic, clinical and other characteristics. **Results:** At least 50% of the patient's scored below 69 (median) in the total fatigue score and below 41 and 28 for the physical and mental fatigue, respectively. These values indicate moderate to high effects of heart failure in the fatigue patient's felt. Finally, it was found that patients who were a little or not at all informed about their state of health had 13.9 points higher score in total fatigue than patients who were very informed ( $p=0.018$ , 95%CI: 2.47, 25.34). Similarly, patients with insomnia had 11.11 points higher score in total fatigue than those without insomnia ( $p=0.034$ , 95%CI: 0.87, 21.34). As far as mental fatigue was concerned, patients who were enough informed about their state of health had 8.46 points higher score in mental fatigue than patients who were very informed ( $p=0.004$ , 95%CI: 2.78, 14.14). **Conclusion:** Assessment of fatigue is essential in order to provide holistic treatment to patients with heart failure.

**Keywords:** heart failure, fatigue, hospitalization

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## 1. INTRODUCTION

Heart failure consists a major global health issue not only for patients, and their family but also for society as it involves a heavy economic burden mainly due to frequent re-hospitalizations. Almost, 6.5 million people in Europe, five million people in USA, and 2.4 million people in Japan suffer from the disease.(1) Approximately, up to 50% of hospitalized patients due to heart failure are readmitted within 6 months. (2)

Fatigue is the most common symptom that experience patients with heart failure and is frequently described as difficulty in performing daily activities because of persistent tiredness. Prevalence and severity of this symptom seems to vary globally due to various associated factors such as illness progression, physical activity, social and demographic variables, comorbidity, treatment and others. (3-8)

Additionally more, level of fatigue differs by sex with women to describe their fatigue as severe, whereas men as mild. (8) Fatigue is related more to physical symptoms than to psychological factors in older women with HF,4 or is strongly associated with depression. (5) Furthermore, the symptom of fatigue is associated with dyspnea, negative personality traits, sleep disturbances,(9) restricted physical activity,(7) worsening prognosis and diminished level of self-care. (9)

Interestingly, this symptom is usually underestimated since is perceived by health professionals as a vague complain mainly attributed to the biological dimension of the disease. Approximately, one-third of patients view fatigue as an unimportant symptom and up to 50% report having difficulty in recognizing it as a symptom of worsening heart failure. (7)

Knowledge of factors associated with fatigue experienced by heart failure patients may provide elaborate information about the

type of interventions needed to cope with this distressing symptom.

The **purpose** of the current research was to explore prevalence of fatigue and identify associated factors in hospitalized patients with heart failure.

## 2. MATERIALS AND METHODS

The sample of the study consisted of 60 patients (40 men and 20 women) suffering from heart failure. It was a convenience sample. The study included patients admitted to the a public hospital in Athens during the period January 2017 -March 2017. Criteria for including a patient in the study were: a) good comprehension of Greek language and b) being diagnosed with heart failure. The exclusion criteria were: a) patients with history of mental illness and b) patients with heart failure but being hospitalized for other serious illness.

**Ethical considerations** : Patients who met inclusion entry criteria were informed by the investigator for the purposes of this study and gave written consent to participate. The study was approved by the Medical Research Ethics Committee of dialysis center and conducted in accordance with the Declaration of Helsinki (1989) of the World Medical Association.

Data collection was performed by the method of the interview using using anonymous questionnaires that included the Greek version of the Modified Fatigue Impact Scale in (MFIS-Greek) and a questionnaire for each patient that included: demographic, clinical characteristics and other patients' reports. The interview lasted approximately 10-15 minutes.

To evaluate the fatigue of heart failure patients, the Modified Fatigue Impact Scale in (MFIS-Greek) was used. This scale was translated into Greek by Bakalidou Dafni, 2104.<sup>10</sup> The scale consists of 21 questions that assess the fatigue of heart failure

patients in the last month (4 weeks). Respondents are able to answer every question in a Likert type scale (scores from 1-5). Two separate groups of questions are distinguished. The physical fatigue of patients and their mental fatigue. The score assigned to the questions is summed separately to questions that assess physical fatigue, for those that assess mental fatigue and all questions together to an aggregate score, the total fatigue. Higher values of scores indicate higher fatigue.

**Statistical analysis** : Categorical data are presented in absolute and relative (%) frequencies, whereas continuous data are presented with median (interquartile range). The Kruskal-Wallis test was used to test the existence of association between the fatigue and a factor with more than two categories, while the Man-Whitney test for the existence of association between the fatigue and a factor with two categories. Moreover, multiple linear regression was performed to estimate the effect of patient characteristics on the fatigue. Results are presented as regression coefficients  $b$  ( $b$ -coefficients) and 95% confidence interval (95% CI). The level of statistical significance was set to  $\alpha = 5\%$ . All statistical analyzes were performed using the SPSS version 20 package (SPSS Inc, Chicago, IL, USA).

### 3.RESULTS

In total 60 patients met the inclusion criteria, of whom men constituted 66.7%, while 76.7% was over 70 years old. Demographic and other characteristics are shown in Table A1, and A2 Appendix.

Table 1, presents the results related to the fatigue patients felt. We observe that at least 50% of the patient's scored below 69 (median) in the total score and below 41 and 28 for the physical and mental fatigue,

respectively. Regarding the total score it was found that 25% of the participants had a score higher than 80. Accordingly, with regard to the physical condition and mental fatigue, 25% of enrolled patients had a score higher than 47.5 and 33.5, respectively. These values indicate moderate to high effects of heart failure in the fatigue patient's felt.

Tables 2 present the associations between fatigue and patients characteristics. Fatigue's total score, was statistically significantly associated with NYHA ( $p=0.007$ ), the degree of information about the state of health ( $p=0.011$ ), insomnia ( $p=0.007$ ), dyspnea during night ( $p=0.009$ ), swelling ( $p=0.017$ ), whether patients faced difficulties in every-day activities ( $p=0.005$ ), whether they had limited their social contacts ( $p=0.013$ ), report of body change ( $p=0.006$ ) and whether patients were satisfied from their life ( $p=0.025$ ). Specifically, patients with NYHA IV felt more fatigue related to those with lower NYHA (median: 76 vs 65). Similarly, patients who were a little or not at all informed about the state of their health felt more fatigue than those were very or enough informed (median: 77 vs 64.5 and 63.5 respectively). Likewise, patients who had insomnia or dyspnea or had swelling (median 71.5, 71 and 70 respectively) felt more fatigue than those who did not (median 65.5, 65 and 62 respectively). Moreover, patients who faced difficulties in every-day activities, those who had limited very much their social contacts, those who believed that their body had changed and those who were a little or not at all satisfied from their life felt more fatigue.

The physical score of fatigue was statistically significantly associated with NYHA ( $p=0.001$ ), insomnia ( $p=0.006$ ), dyspnea ( $p=0.010$ ), the increase of number of pillows patients used ( $p=0.047$ ), swelling ( $p=0.002$ ), whether patients had difficulties in everyday activities or had limited their social contacts

( $p=0.001$  and  $p=0.004$  respectively), report of body change ( $p=0.001$ ) and how much satisfied the patients were from their life ( $p=0.003$  respectively). As before, patients with NYHA IV, those with insomnia and dyspnea, those who increased the number of pillows they were using, those who had a swelling, who had limited their social contacts, who believed that their body had changed and those who were not satisfied from their life felt more physical fatigue.

The mental score of fatigue was statistically significantly associated with the degree of information patient's had about their state of health ( $p=0.007$ ), insomnia ( $p=0.010$ ), dyspnea ( $p=0.009$ ), whether patients had difficulties and how much they had limited their social contacts ( $p=0.028$  and  $p=0.028$  respectively). Similarly, patients who were not informed for the state of their health, those with insomnia and dyspnea, those who faced difficulties in everyday activities or had limited their social contacts felt more mental fatigue.

Multiple linear regression was performed in order to assess the effect of independent factors associated with fatigue. Table 3 presents the results. It was found that patients who were a little or not at all informed about their state of health had 13.9 points higher score in total fatigue than patients who were very informed ( $p=0.018$ , 95%CI: 2.47, 25.34). Similarly, patients with insomnia had 11.11 points higher score in total fatigue than those without insomnia ( $p=0.034$ , 95%CI: 0.87, 21.34). As far as mental fatigue was concerned, patients who were enough informed about their state of health had 8.46 points higher score in mental fatigue than patients who were very informed ( $p=0.004$ , 95%CI: 2.78, 14.14).

#### 4. DISCUSSION

The present study showed moderate to high effects of heart failure in fatigue of hospitalized patient's felt. Prevalence of fatigue ranges from 69% to 88% among patients with heart failure. (3)

Participants with NYHA IV felt more fatigue. Interestingly, though New York Heart Association Functional Classification was originated in 1902, it still remains the most common and simple way to evaluate level of failure. In regard to relation between fatigue and NYHA classification, literature results are controversial. (10- 13) Possibly, fatigue is difficult to measure with precision due to its subjective nature. However, it is reasonable to suggest that a lower classification of disease is associated with reduced patient's perception of fatigue while effective treatment seems to alleviate the symptom. (12)

Likewise, patients who had insomnia, dyspnea or swelling felt more fatigue. Smith et al., (11) who explored 136 heart failure outpatients age  $\leq 80$  years showed that general fatigue at 12-month follow-up was predicted by dyspnea, depressive symptoms, type-D personality and sleep problems. Insomnia is the most common cause for sleep disturbances and occurs in one-third (insomnia) of patients. (13,14) Also, frequent awakenings have adverse effects on the cardiovascular system leading to increased morbidity and mortality. (15)

Similarly, patients who were a little or not at all informed about the state of their health felt more fatigue. Several explanations are responsible for this finding. Heart failure patients are mainly above 70 years of age and are suffering from other co-morbidities which may cause functional and cognitive limitations. Moreover, they may experience depression or they may live alone, having poor social support or not a spouse to help

them in enhancing knowledge about the disease. All the above barriers lead to inadequate information and contribute to high levels of fatigue. However, information on medication and symptoms are ranked as most important, followed by general heart failure education, risk factors modification, prognosis, physical activity, psychological factors and diet. (16) Sneed et al., (17) showed that among heart failure patients that were educated about disease management, only the 39% reported to know "a lot" and 55% to know "something". Failure patients [20,21,55,56], but from a psychometric point of view, these instruments need further validation. Multiple choice questionnaires are mostly used, but these only measure a very superficial level of knowledge. These tests evaluate fragmented knowledge without being able to detect the comprehension, application or analysis level. A more qualitative evaluation using for example Bloom's taxonomy can provide a deeper and more complete understanding of knowledge [57].

Strikingly, patients may experience unawareness about their health problem and even worse they may not know that they are diagnosed with heart failure.(16)

Moreover, patients who faced difficulties in every-day activities, those who had limited very much their social contacts, those who believed that their body had changed and those who were a little or not at all satisfied from their life felt more fatigue. Possibly, all these factors consist a cluster of problems that may exacerbate symptoms of fatigue or on the other end of the spectrum, fatigue may imply all these limitations. Though, the traditional aim in the treatment of heart failure is to relieve symptoms and improve prognosis, however, it is equal important to maximize function in everyday life. Implementation of all above goals demands a multidisciplinary approach.

### Limitations of the study

Some limitations must be considered when interpreting the results from the present study. First, causation cannot be inferred. Our findings merely support the association between fatigue and several demographic, clinical and other self reported variables. Secondly, patients were all being hospitalized at a single public hospital. Next, the use of a convenience sample limits the ability to generalize to all patients with heart failure. Finally, the small sample size (60 patients) is a limitation, though it is difficult to meet with hospitalized patients.

### 5. CONCLUSIONS

Fatigue's total score, was statistically significantly associated with NYHA, the degree of information about the state of health, insomnia, dyspnea during night, swelling, whether the patients faced difficulties in every-day activities, whether they had limited their social contacts, whether patients were satisfied from their life, and whether they reported body change. The physical score of fatigue was statistically significantly associated with NYHA, insomnia, dyspnea, the increase of number of pillows patients used, swelling, whether patients had difficulties in everyday activities or had limited their social contacts, change in body change and how much satisfied the patients were from their life. The mental score of fatigue was statistically significantly associated with the degree of information patient's had about their state of health, insomnia, dyspnea, whether patients had difficulties and how much they had limited their social contacts.

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## Appendix

**Table 1. Measuring fatigue in HF patients**

	Fatigue Median (IQR)
Total Score of Fatigue (Range 21-105)	69 (60-80)
Physical Fatigue (Range 11-55)	41 (37-47.5)
Mental Fatigue (Range 10-50)	28 (19-33.5)

**Table 2. Factors associated with fatigue**

	Fatigue					
	Total Fatigue		Physical Fatigue		Mental Fatigue	
	Median (IQR)	p-value	Median (IQR)	p-value	Median (IQR)	p-value
<b>Sex</b>						
Male	68.5 (80-96.5)	0.480	41 (47.5-54)	0.400	26.5 (33.5-45)	0.354
Female	69.5 (80-95)		43 (47.5-53.5)		29 (33.5-43)	
<b>Age</b>						
≤70	66 (79-92)	0.468	44.5 (50-54)	0.362	23 (30-38)	0.072
>70	69.5 (81-98)		41 (47-53)		29 (36-46)	
<b>Marital status</b>						
Married/ Living together	66 (82-98)	0.845	41 (48-54)	0.792	26 (36-46)	0.691
Single/ Divorced/ Widowed	70 (77-86)		42 (47-51)		29 (32-38)	
<b>Education</b>						
Primary	71 (81-98)	0.250	41 (47-53)	0.709	30 (34-46)	0.157
Secondary	66 (79-95)		41.5 (47-54)		24.5 (30-46)	
University	58 (82-98)		36.5 (51-54)		19.5 (33.5-44)	
<b>NYHA</b>						
I-III	65 (77-87)	<b>0.007</b>	38 (41-53)	<b>0.001</b>	28 (32-41)	0.160
IV	76 (88-98)		47 (50.5-54)		30.5 (38-46)	
<b>Previous hospitalization</b>						
No	70 (81-95)	0.982	41 (45-54)	0.249	30 (36-46)	0.510
Yes	68.5 (81-98)		42 (49-54)		25.5 (34-44)	
<b>Informed about the state of health</b>						
Very	64.5 (75-81)	<b>0.011</b>	41 (45-51)	0.094	21 (30-36)	<b>0.007</b>
Enough	63.5 (82-91)		41 (47-52.5)		26.5 (35.5-40.5)	
A little/ Not at all	77 (92-99)		46.5 (50-54)		32 (39-48)	
No	65.5 (69.5-83)	<b>0.007</b>	36.5 (45-51.5)	<b>0.006</b>	21 (29-34.5)	<b>0.010</b>
Yes	71.5 (84.5-98)		43.5 (48.5-54)		30 (37-46)	
<b>Do you wake up during the night because of dyspnea?</b>						
No	65 (70-81)	<b>0.009</b>	37 (45-54)	<b>0.010</b>	21 (29-36)	<b>0.009</b>
Yes	71 (85-98)		44 (48-54)		30 (36-46)	
<b>Do you use more pillows than before?</b>						
No	66 (79-95)	0.117	41 (47-54)	<b>0.047</b>	25 (32-44)	0.233
Yes	75 (83-99)		46 (50-54)		31 (35-46)	
<b>When do you feel more fatigue?</b>						
Morning/ Noon	63 (74.5-87.5)	0.126	41 (45.5-52.5)	0.457	21 (29.5-39.5)	0.061
Afternoon	70.5 (82.5-99)		45 (48.5-54)		31 (35.5-46)	
Night	70 (85-95)		41 (49-54)		29 (34-46)	
<b>Do you have swelling?</b>						
No	62 (72-98)	<b>0.017</b>	36.5 (44-54)	<b>0.002</b>	25 (31-44)	0.068
Yes	70 (82-95)		45 (49-54)		29 (36-46)	
<b>Do you have difficulties in every-day activities?</b>						

No	47 (72.5-81)	<b>0.005</b>	28 (41-46)	<b>0.001</b>	19 (31.5-36)	<b>0.028</b>
Yes	70 (82.5-98)		43 (49-54)		29 (35.5-46)	
<b>Have you limited social contacts?</b>						
Very	70 (84-98)	<b>0.013</b>	43.5 (49.5-54)	<b>0.004</b>	29 (35-46)	<b>0.028</b>
Enough	68 (82-92)		45 (48-54)		29 (36-43)	
A little/ Not at all	51 (77-81)		37 (44-46)		18 (31-36)	
<b>Relations with nursing staff</b>						
Very good	68 (78.5-98)	0.985	42 (49-54)	0.303	24.5 (32.5-44)	0.386
Good	69 (79-90)		41 (45-48)		29 (32-43)	
<b>Do you believe your body has changed?</b>						
No	48 (68-78)	<b>0.006</b>	28 (37-46)	<b>0.001</b>	20 (31-32)	0.062
Yes	70 (82-98)		44 (49-54)		29 (36-46)	
<b>How much satisfied are you from your life?</b>						
Very	62.5 (71-82)	<b>0.025</b>	39 (41-47)	<b>0.003</b>	21.5 (30-41)	0.090
Enough	68.5 (78-92)		41 (46.5-54)		28.5 (33.5-39)	
A little/ Not at all	75.5 (90-99)		47 (49-54)		30.5 (38-46)	

**Table 3. Factors associated with fatigue** (Multiple linear regression)

	<b>Total Fatigue β coef (95% CI)</b>	<b>Physical Fatigue β coef (95% CI)</b>	<b>Mental Fatigue β coef (95% CI)</b>
<b>NYHA (IV vs I-III)</b>	1.96 (-8.12, 12.03)	1.85 (-3.68, 7.39)	0.46 (-5.04, 5.96)
<b>Informed about the state of health</b>			
Very	Ref.Cat.	-	Ref.Cat.
Enough	-0.07 (-10.2, 10.05)	-	8.46 (2.78, 14.14)*
A little/ Not at all	13.9 (2.47, 25.34)*	-	5.14 (-0.28, 10.56)
<b>Insomnia (Yes vs No)</b>	11.11 (0.87, 21.34)*	5.13 (-0.49, 10.75)	5.14 (-0.28, 10.56)
<b>Dyspnea (Yes vs No)</b>	4.34 (-5.66, 14.35)	2.77 (-2.75, 8.29)	2.81 (-2.54, 8.16)
<b>More pillows than before (Yes vs No)</b>	-	0.78 (-4.35, 5.91)	-
<b>Swelling (Yes vs No)</b>	8.97 (-2.01, 19.95)	3.67 (-2.09, 9.43)	-
<b>Difficulties in every-day activities (Yes vs No)</b>	1.7 (-15.24, 18.63)	2.54 (-6.68, 11.76)	-1.12 (-8.89, 6.64)
<b>Have you limited social contacts?</b>			
Very	Ref.Cat.	Ref.Cat.	Ref.Cat.
Enough	2.88 (-6.51, 12.28)	-1.08 (-6.15, 4)	2.26 (-3.09, 7.61)
A little/ Not at all	-6.3 (-19.64, 7.04)	-4.07 (-11.27, 3.14)	-5.46 (-12.46, 1.54)
<b>Body change (Yes vs No)</b>	-0.68 (-15.91, 14.55)	1.07 (-7.41, 9.55)	-
<b>How much satisfied are you from your life?</b>			
Very	Ref.Cat.	Ref.Cat.	-
Enough	5.86 (-5.41, 17.13)	2.54 (-3.58, 8.67)	-
A little/ Not at all	5.98 (-7.87, 19.83)	5.24 (-1.77, 12.25)	-

\* Statistically significant coefficient

**Table A1. Patients characteristics (N=60)**

	N (%)
<b>Sex</b>	
Male	40 (66.7%)
Female	20 (33.3%)
<b>Age</b>	
30-40	3 (5.0%)
41-50	2 (3.3%)
51-60	3 (5.0%)
61-70	6 (10.0%)
>70	46 (76.7%)
<b>Marital status</b>	
Married	34 (56.7%)
Single	4 (6.7%)
Divorced	4 (6.7%)
Widowed	17 (28.3%)
Living together	1 (1.7%)
<b>Education</b>	
Primary	33 (55.9%)
Secondary	14 (23.7%)
University	11 (18.6%)
Msc - Phd	1 (1.7%)

**Table A2. Clinical characteristics of patients**

Patients' characteristics	N (%)
<b>NYHA</b>	
I	2 (3.4%)
II	12 (20.3%)
III	21 (35.6%)
IV	24 (40.7%)
<b>Have you ever been hospitalized for the same reason? (Yes)</b>	42 (79.2%)
<b>Informed about the state of health</b>	
Very	22 (36.7%)
Enough	20 (33.3%)
A little	13 (21.7%)
Not at all	5 (8.3%)
<b>Do you have insomnia? (Yes)</b>	40 (66.7%)
<b>Do you wake up during the night because of dyspnea? (Yes)</b>	39 (65.0%)
<b>Do you use more pillows than before? (Yes)</b>	19 (31.7%)
<b>When do you feel more fatigue?</b>	
Morning	7 (11.9%)
Noon	13 (22.0%)
Afternoon	16 (27.1%)
Night	23 (39.0%)
<b>Do you have swelling? (Yes)</b>	42 (70.0%)
<b>Do you have difficulties in every-day activities? (Yes)</b>	48 (80.0%)
<b>Have you limited social contacts?</b>	
Very	24 (40.0%)
Enough	21 (35.0%)
A little	7 (11.7%)
Not at all	8 (13.3%)
<b>Relations with nursing staff</b>	
Very good	44 (73.3%)
Good	13 (21.7%)
Moderate	1 (1.7%)
Bad	2 (3.3%)
Very bad	0 (0.0%)
<b>Do you believe your body has changed? (Yes)</b>	49 (81.7%)
<b>How much satisfied are you from your life?</b>	
Very	14 (23.3%)
Enough	28 (46.7%)
A little	12 (20.0%)
Not at all	6 (10.0%)

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