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*Research Article*

# Heart Failure Patients: How Effective Can a Rehabilitation Program be in Relation to Physical and Mental Fatigue, General Health and Anxiety?

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**Abstract:** Exercise is an important factor of rehabilitation in heart failure patients, improving several indicators of disease prognosis and functional capacity. The aim of the present study was to examine the effect of a cardiorespiratory rehabilitation program on the physical and mental fatigue, general health and anxiety in patients suffering from heart failure. Thirty-one patients with heart failure [(M±SD) age: 67.59±7.60 years] participated in a cardiorespiratory rehabilitation program. The program included aerobic exercise on cycle ergometers and muscle strengthening for 3 months (12 weeks), 3 times/week. Before and after the program, patients' fatigue, general and mental health were assessed using the following self-reported questionnaires: a) Fatigue Assessment Scale (FAS), b) Goldberg's General Health Questionnaire (GHQ-28) and c) Spielberger's Anxiety Questionnaire. Data analysis showed a statistically significant tendency of reduction in social dysfunction (from 1.99±0.42 to 1.75±0.45, p=0.05), while anxiety (from 27.10±7.61 to 26.40±4.35) showed no change (p>0.05).Also, evaluating the changes in the health level after attending the program, there was a trend of improvement in physical activity and functioning with the appearance of fewer physical symptoms (from 1.38±0.43 to 1.24±0.31, p=0,13). These results show that exercise can contribute to increasing the general well-being of these patients and reducing feelings of helplessness, making them able to cope with their daily activities and tasks.

**Keywords:** Heart Failure, Fatigue, General Health, Anxiety, Rehabilitation

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## 1. Introduction

In recent years, there has been an increase in the number of people suffering from heart failure due to the aging of the population, the treatment provided and the "rescue" of patients after acute myocardial infarction, as coronary heart disease is the main cause of heart failure. Patients with heart failure show a progressive course of deterioration of heart function, partially or completely responding to the treatment given, especially if it has been diagnosed in the initial stages. But what happens to patients who are in the final stage of heart failure, which indicates a great degree of impairment of functional capacity, poor quality of life with a significant limitation even in the daily self-careactivities of the person himself?

The relevant literature search identified scientific articles and references. The findings of the studies indicate the decisive role that physical exercise has in the quality of life of people with chronic heart failure, contributing to an increase in general well-being and a reduction in feelings of inadequacy, especially when these are associated with an increase in exercise performance [1]. More specifically, the analysis of data from the implementation of a cardiac rehabilitation program in elderly women with heart failure showed an improvement in key parameters of quality of life (reduction of anxiety,

depression, better social integration) after treatment follow-up [2, 3]. Also, in a study involving 126 patients (M.O. = 60.6 ± 11 years) the changes in the level of health were evaluated after three and six months of following a rehabilitation program and a significant improvement was found in indicators of quality of life, such as physical activity and functioning as well as psychological health [4]. In addition, a larger study evaluated the effect of a cardiac rehabilitation program in a population of 700 patients (M.E. = 67 ± 11 years) with cardiac and functional problems. In particular, this research examined whether participants in the program had better functional outcomes six months after the intervention compared to patients who did not participate. Results showed that participants in the rehabilitation program scored high on all scales of the Short-Form 36 Health Status Survey (SF-36), except mental health [5].Also, participation in the program tended to be associated with a healthier lifestyle, as well as more reports of regular exercise and adherence to a healthy diet.

Another study found that exercising for 12 weeks improved self-efficacy by 30%-100% in people who followed a strength program, while also having effects on walking ability. At the same time, it improved physical function, physical pain, vitality and the role of emotional mood in health. Also, in the same study, changes in SF-36 were found to correlate with changes in upper and lower body muscle strength while changes in psychological well-being were associated with changes in muscle endurance [6]. It is noteworthy that the effect of participation in a cardiac rehabilitation program is the same for both sexes, both on the level of metabolism and physical activity and on quality of life. However, women report a smaller increase in their level of general vitality [7]. It seems that just incorporating physical activity into a cardiac rehabilitation program is not enough. It is necessary to simultaneously provide psychological support to the patients, so that the intervention is complete and its goal is achieved faster and easier.

Although there is considerable data on the physiological effects of exercise among heart failure patients, the same is not in the case of mental health parameters. The aim of the present study was to examine the effect of a cardiorespiratory rehabilitation program on the physical and mental fatigue, general health and anxiety in patients suffering from heart failure.

## 2. Method

Thirty-one patients with heart failure [(M±SD) age: 67.59±7.60 years] participated in a cardiorespiratory rehabilitation program. The program included aerobic exercise on cycle ergometers and muscle strengthening for 3 months (12 weeks), 3 times/week.

Taking into account the inclusion criteria, all patients were adults, diagnosed with heart failure and were following the above program three times per week consistently in a hospital. Exclusion criteria were related to age (under 18) and those patients who could suffer from a double diagnosis one of which would alienate the results (heart failure and psychotic syndrome or other physical disabilities for instance). These patients should be excluded from the research since their emotional, behavioral, physical and cognitive condition could impact the results. Another exclusion factor included language. Since the questionnaires were translated in Greek, participants should also be native speakers or know the Greek language. Before the distribution of the questionnaires, each participant had to fill a consent form and a demographic form. In the consent form participants were informed that the anonymity of their participation would be preserved, it was explicitly explained that their participation was voluntary and that they could withdraw from participation anytime they wished, without having to give any explanations whatsoever. In addition, if they desired, they could also get the results after the completion of the research project.

Before and after the program, participants completed the “The Fatigue Assessment Scale (FAS)”, which is a tool for assessing perceived fatigue and consists of 10 questions on a five-point Likert scale (1 = never to 5 =always). Five questions are about physical, and

five questions are about mental fatigue. This scale is considered a reliable tool for measuring fatigue for both healthy people and people with diseases [8-10].

The General Health Questionnaire (GHQ-28) is a widely used self-report measure of general health, developed by Goldberg in 1978 [11], and validated for Greek populations [12]. It may identify short-term changes in mental health and is often used as a screening instrument for psychiatric cases in medical setting and general practice. The 28-item version used in this study consists of four sub-scales: (a) somatic symptoms, (b) anxiety/ insomnia, (c) social dysfunction, and (d) severe depression. Higher scores indicate a worse general health status. The State-Trait Anxiety Inventory (STAI 1/STAI 2) consists of 20 items referring to self-reported state anxiety and 20 items referring to trait anxiety [13, 14]. State anxiety reflects a ''transitory emotional state or condition of the human organism that is characterized by subjective, consciously perceived feelings of tension and apprehension, and heightened autonomic nervous system activity''; it may fluctuate over time and can vary in intensity. In contrast, trait anxiety denotes ''relatively stable individual differences in anxiety proneness'' and refers to a general tendency to respond with anxiety to perceived threats in the environment [13]. Higher scores mean that patients are more anxious.

The analysis performed aimed to examine the levels of physical and mental fatigue, general health and anxiety in patients suffering from heart failure before and after the participation in the rehabilitation program. All analyses were performed with the Statistical Package for the Social Sciences (SPSS for Windows).

## 3. Results

The age range of participants that took part in the research was between 48 and 82 years old (*m*=67.59, *SD*=7.60). Most of them were males (*n*= 21, 67.7%) and the rest of them were females (*n*=10, 32.3%).

In order to examine the main hypothesis of the current study, a paired sample t-test was calculated in order to measure fatigue before and after the program. Table 1 shows the descriptive statistics for all the variables that were explored. More specifically, there was a significant difference in the scores for physical fatigue before (M= 14.12, SD= 2.89) and physical fatigue after (M= 12.77, SD= 3.50) the PRP; t(30)= 2.271, p= 0.031.There was also a significant difference in the scores of mental fatigue before (M= 9.80, SD= 2.61) and mental fatigue after (M= 8.12, SD= 2.78) the PRP; t(30)= 2.979, p= 0.006.Moreover, there was a significant difference in the scores of fatigue total before (M= 23.93, SD= 4.87) and fatigue total after (M= 20.90, SD= 5.50) the PRP; t(30)= 3.276, p= 0.003.

**Table 1.** Descriptive Statistics and t-test results for physical fatigue, mental fatigue and fatigue total.

| | Before | | After | | | 95% CI for Mean Difference | | |
|---|---|---|---|---|---|---|---|---|
| **Outcome** | **M** | **SD** | **M** | **SD** | **n** | | **t** | **df** |
| **Physical fatigue** | 14.12 | 2.89 | 12.77 | 3.50 | 31 | 0.13, 2.57 | 2.27 | 30 |
| **Mental fatigue** | 9.80 | 2.61 | 8.12 | 2.78 | 31 | 0.52, 2.82 | 2.97 | 30 |
| **Fatigue total** | 23.93 | 4.87 | 20.90 | 5.50 | 31 | 1.14, 4.92 | 3.27 | 30 |

The data analysis showed a statistically significant tendency of reduction in social dysfunction (from 1.99±0.42 to 1.75±0.45, p=0.05), while anxiety (from 27.10±7.61 to 26.40±4.35) showed no change (p>0.05).Also, evaluating the changes in the health level after attending the program, there was a trend of improvement in physical activity and functioning with the appearance of fewer physical symptoms (from 1.38±0.43 to 1.24±0.31, p=0,13).

## 4. Discussion

The aim of the present study was to examine the effect of a cardiorespiratory rehabilitation program on the physical and mental fatigue, general health and anxiety in patients suffering from heart failure. The findings show that the participation in the program is very effective indicating lower values of physical, mental and total fatigue after the completion of it. Moreover, general health is presented to be more favourable and particularly in the dimension of social relations. It seems that these programs contribute positively to the patients' social life.

These results are in line with other similar research findings. Another study found that exercising for 12 weeks improved self-efficacy by 30%-100% in people who followed a strength program, while also having effects on walking ability. At the same time, it improved physical function, physical pain, vitality and the role of emotional mood in health. Also, in the same study, changes in SF-36 were found to correlate with changes in upper and lower body muscle strength while changes in psychological well-being were associated with changes in muscle endurance [6].

In a study of Theofilou [15] concerning the evaluation of quality of life (QoL) in Greek patients with heart failure (CHF) and the role of health cognitions before and after participation in an exercised based rehabilitation program, the results indicated that before the participation of CHF patients in the rehabilitation program, internal cognitions affected negatively their QoL and specifically their evaluation of overall QoL/health. On the other hand, after the end of the program, CHF patients' personal control regarding their condition of health affected positively their status of mental health as well as QoL. Another study of Kallivoka et al. [16] regarding fatigue and quality of life after Pulmonary Rehabilitation Program, the results showed decreased levels of fatigue after the completion of the programcomparedtopre-intervention.Moreover,althoughQoLdidnotseemtochangeaftertheintervention,howevert hedimension"Transcendent"seemedtobeincreasedforthemajorityoftheparticipants.

In general, we can assume that exercise can help increase the well-being of patients with heart failure and reduce feelings of helplessness, enabling them to cope with their daily activities and tasks. The short-term and long-term effects of rehabilitation programs and exercise on the psychosocial profile of heart failure patients require further investigation.

Last but not least, there are some limitations in the context of the present study. The total sample of 31 participants which does not seem to be large enough may decrease the power of the research and raise at the same time the margin of error by leading to a possible meaning less study. Finally, future research should be performed regarding fatigue and general as well as mental health in Cardiac Rehabilitation for these patients in order to investigate whether there are differences before and after the program.

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