

# Effects of Pulmonary Rehabilitation in Patients with Diffuse Interstitial Lung Disease

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### Introduction

Diffuse interstitial lung diseases (DILD) are a heterogeneous group of disorders of the lung parenchyma, which are classified into one group to present similar clinical, radiological, pathophysiology and anathopathological features [1]; idiopathic pulmonary fibrosis is the most common type followed by the extrinsic allergic alveolitis and diseases associated with collagen [2]. In patients with DILD, exercise has benefits to reduce dyspnea, improve functional capacity and quality of life [3]. The aim of the study was to establish the effects of an exercise program in patients with DILD attending an institution providing health services (IPHS) in the city of Cali, Colombia.

### **Materials and Methods**

Quasi-experimental study in a population of patients diagnosed with DILD and those admitted to an exercise program in a secondlevel IPHS, during the period July 2012 to June 2014 in the city of Cali, Colombia. Were linked for convenience and met inclusion criteria: changes in diagnostic CT scan compatible with DILD-spirometry. They were taken as exclusion criteria: -cognitive limitation-patients with cardiovascular and/or metabolic uncontrolled. The variables are set by a previous study [4]: Sociodemographic variables, FVC, FEV1, FEV1/FVC were evaluated as percentage of predicted; Measurements were performed before and after the exercise intervention on BMI, MRC dyspnea, distance and estimated VO<sub>2</sub> in the walk test of six minutes [6MWT] [5] and quality of life related to health in SGRQ [St. George Respiratory Questionnaire] [6].

During eight weeks of exercise was performed: continuous exercise on treadmill for 30 minutes starting at 80% speed increase achieved in 6MWT at 4 weeks at 90% [7,8]; O<sub>2</sub> was administered to patients who present in 6MWT desaturation  $\geq$  4% or during exercise O<sub>2</sub> saturation [SpO<sub>2</sub>] was <90%; upper limb muscle strengthening 4 sets of 12 reps with 1 minute rest at 30% of maximum resistance [RM], increasing to four weeks at 40% of the RM; breathing techniques and mobility of the chest.

The data were entered into a template in Excel 2010 and processed in Statistical Package EPIINFO 2000; statistical tests of differences in means  $\pm$  standard deviation were performed using paired t-test.

## Results

Out of 22 patients admitted to the exercise program, 18 which culminated.

The sociodemographic characteristics of the 18 patients are described in Table 1. Spirometry shown in CVF an average of 61.7  $\pm$  19.5% predicted, FEV 1 with a mean of 67.6  $\pm$  21.3% predicted, FEV1 / FVC ratio presented an average of 105.9  $\pm$  18.3% predicted.

Variable	Frequency			
Age	60.6 ± 13.9 <sup>*</sup>			
Gender				
Male	11 [61.1%]			
Female	7 [38.9%]			
Smoking				
Former Smoker	7 [38.8%]			
Current Smoker	1 [5.6%]			
Never Smoked	10 [55.6%]			
vood smoke exposure				
Yes	3 [16.7%]			
No	15 [83.3%]			
Jomiciliary oxygen				
Yes	10 [55.6%]			
No	8 [44.4%]			
*Mean ± DS				

Table 1: Characteristics of patients.

The MRC dyspnea prior to the exercise program showed a median of 3 at the end of the program was 2, whereas a clinically significant difference is the reduction of 1 point. Changes at the beginning and end of the exercise program statistically significant differences are described in Table 2.

Variables	Initiation	Final	Mean difference	Value-p
BMI [kg/m <sup>2</sup> ]	24.9 ± [4.6]	25.6 ± [4.3]	0.7 ± 1.7	0.13
TC6M distance[m]	344.3 ± [126.6]	405.8 ± [95.2]	61.5 ± [68.6]	0.001
VO <sub>2</sub> e [ml × kg/ min]	8.5 ± [2.3]	10.3 ± [1.6]	1.8 ± [2.2]	0.003

SGRQ					
Symptoms	43.6 ± [16.5]	30 ± [11.5]	13.6 ± [19.3]	0.008	
Activity	61.2 ± [16.2]	46 ± [26.3]	15.2 ± [31.6]	0.06	
Impact	37.7 ± [17.7]	25.9 ± [12.6]	11.8 ± [20.2]	0.02	
Total	47.4 ± [15.7]	33.2 ± [14.2]	14.2 ± [19.9]	0.008	
<sup>*</sup> Values mean ± DS					

Table 2: Changes after intervention.

### Conclusion

Previous studies established that patients with DILD to obtain a minimal difference in the walk test six minutes at the end of pulmonary rehabilitation program in the range of 24-34 meters [9], but was identified that women walked less distance compared with men. Despite the small number of patients involved in the study, there was a significant increase in the distance covered in the walk test of six minutes [10]. The questionnaire St. Georges proved to be an effective tool to assess quality of life related to health for both men and women [11], finding a statistically significant improvement in average total symptom domains, impact and these changes appear as an exercise program generates benefits in quality of life related to health in patients with DILD regardless of gender to which they belong. Symptomatic patients with DILD, with impaired functional capacity and quality of life benefit from an exercise program for 8 weeks, so it is safe and is recommended as an alternative treatment for all symptomatic patients with DILD [12].

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