

Effect of monitoring through mHealth on the adherence to an integrated care program, post pulmonary-rehabilitation, for COPD patients: a randomized control trial.

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1. Background

Pulmonary rehabilitation (PR) is the most efficient non-pharmacological intervention for COPD but the effects, according to many studies, are not maintained beyond a period of 6 months to 1 year. To maintain them, different follow-up methods have been used in patients who complete a PR program. A solution to this problem may be using mobile phones and other wireless technology in medical care (**mHealth**).

Objective: To evaluate the efficacy of an mHealth Integrated Care program (HappyAir) carried out on patients after conventional PR, to continue its benefits and to improve their adherence to the treatment.

2. Methods

- COPD patients at stages GOLD II, III, IV
- 8 weeks of an ambulatory Pulmonary Rehabilitation program
- 12 months follow up
- Control Group: conventional follow up
- Intervention Group: mHealth Integrated care program

Measures	Test	Evaluation			
		1º	2º	3º	4º
		Pre-PR	Post-PR	6 m post-PR	12 m post-PR
Anthropometric and disease characteristics	Clinical History	Yes	No	No	No
Pulmonary function	Forced Spirometry	Yes	No	No	Yes
Quality of life	CAT, SGRQ, EUROQOL-5D	Yes	Yes	Yes	Yes
Exercise capacity	6 Minutes Walking Test	Yes	Yes	Yes	Yes
Adherence	CAP Fisio & Morisky Green	No	No	Yes	Yes

Table 1: The HappyAir mHealth Integrated Care program

Daily self-care monitoring (PROs)	
Lung Care	Warning signs: Check list
	Respiratory Physiotherapy: Signs & Symptoms: phlegm
	Rescue Inhaler: If used, tell us why?
O₂ saturation and Heart Rate	Basal and post physical activity
Physical Activity	How many times did you exercise and how do you feel?
Mood	How are you feeling today?
Educator	Direct contact with respiratory physiotherapist

3. Results

Table 2: Baseline patients characteristics

	CONTROL GROUP	INTERVENTION GROUP
Enrolled Patients	24	20
Dropout: Own decisión	4	2
Withdrawal: Medical contrain	1	1
Gender	13 M + 6 F	9 M + 8 F
Age (years)	68,2 ± 7,1	68,1 ± 6,6
Weight (kg)	68,4 ± 15,3	70,1 ± 10,1
Height (cm)	163,9 ± 9,9	162 ± 6,8
GOLD	2 GOLD II: 1 M / 1 F 14 GOLD III: 10 M / 4 F 3 GOLD IV: 2 M / 1 F	3 GOLD II: 1 M / 2 F 9 GOLD III: 4 M / 5 F 5 GOLD IV: 4 M / 1 F
FEV1 %	43,2 ± 13,7	45,1 ± 15,3
FVC %	72,6 ± 24,5	78,7 ± 22,9
FEV1/FVC %	45 ± (26-63)	44 ± (30-69)
Oxygen Users (%)	10 (52,6)	9 (52,9)
Oxygen Hours/Day	10,8 ± 10,9	10 ± 11,2
Hospital 12 de Octubre n(%)	10 (55,6)	8 (44,4)
Hospital La Princesa n(%)	4 (44,4)	5 (55,6)
Hospital Clínico n(%)	5 (55,6)	4 (44,4)

Table 3: Impact of HappyAir program in Quality of Life and exercise capacity

	Baseline		Post Rehab		6 m Post Rehab		12 m Post Rehab		
	CG	IG	CG	IG	CG	IG	CG	IG	
EuroQoL 5D	Total score	0.57±0.3	0.51±0.3	0.58±0.3	0.51±0.3	0.52±0.3	0.61±0.3	0.55±0.3	0.58±0.3
	VAS	55.4±12.6	63.1±14.6	57.7±17.7	67.8±9.9	57.1±18.3	66.5±15.0	56.7±16.8	62.4 ±16.7
SGRQ	Total	53.2±14.9	53.3±12.1	50.4±14.2	49.5±11.1	50.0±15.8	46.8±13.3	46.8±14.1	45.8 ±19.8
	Symptoms	48.3±20.7	46.8±20.1	47.4±19.4*	43.2±20.3	32.5±17.3*	34.8±17.9	37.6±18.1	39.6 ±24.3
CAT	Impact	45.4±15.3	47.3±12.3	44.2±16.6	45.5±9.5	45.9±16.8	43.0±10.7	35.9±16.2	35.2 ±19.3*
	Activity	69.5±18.1	67.4±21.5	65.7±19.1	60.4±19.5	66.6±21.4	60.0±24.0	71.5 ±16.4	67.7 ±22.4
6MWT	Total score	16.0±7.3	16.4±6.2	14.6±7.0	14.4±5.6	13.8±7.0	12.2±5.8*	17.7±7.4	14.2 ±7.2
	Distance	333.8±69.2	336.2±76.7	362.7±72.2	378.4±90.0*	326.4±83.1	348.3±95.1	340.0±75.9	357.4±112.5

Table 5: Physical activity adherence test results Morisky -Green

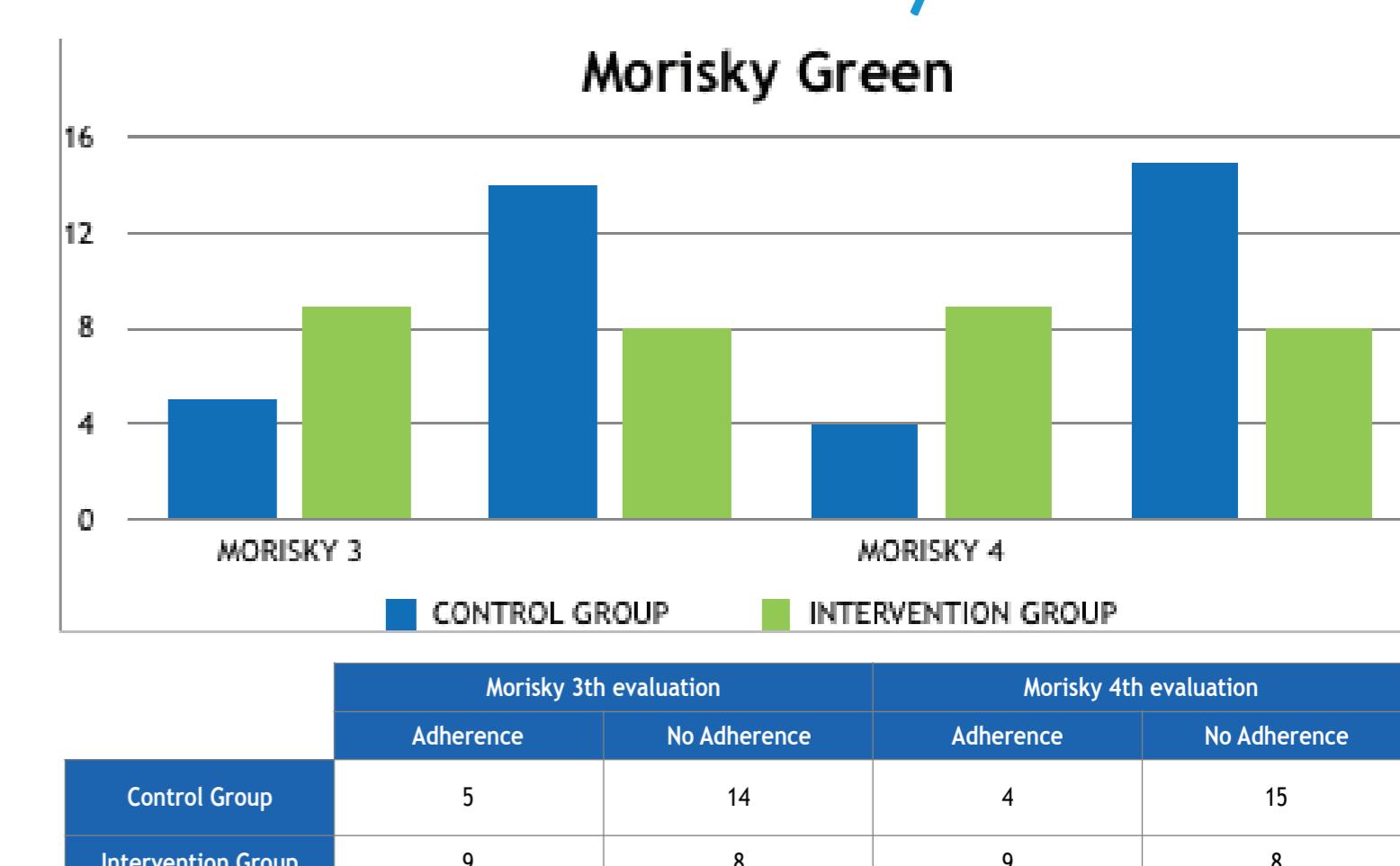
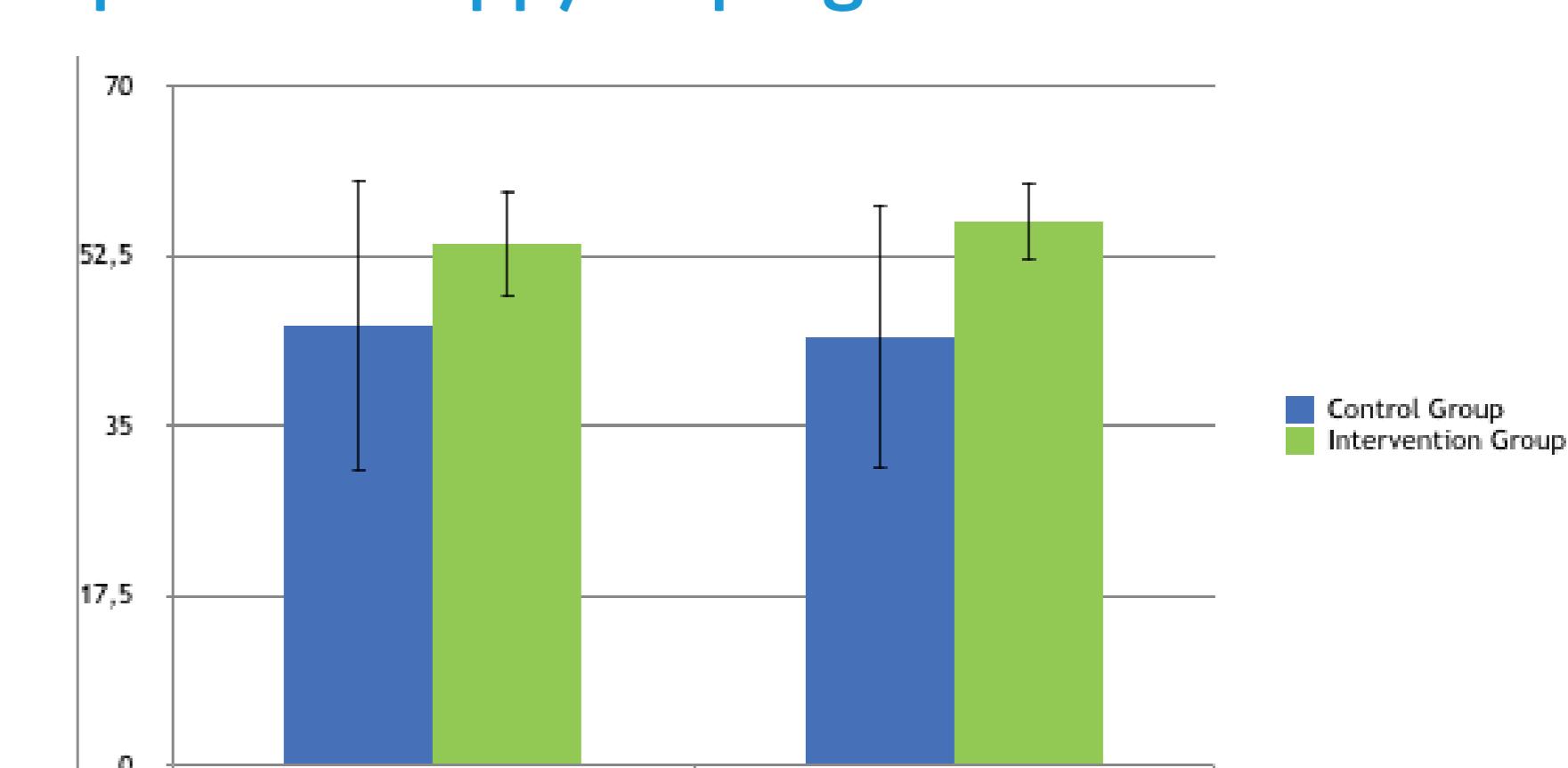


Table 4: Adherence & Patients perception of HappyAir program

	CONTROL GROUP		INTERVENTION GROUP	
	6 m Post Rehab	12 m Post Rehab	6 m Post Rehab	12 m Post Rehab
CAP	45.32±15.03	44.05±13.62	53.65±5.47	56.12±4.07
PERCEPTION	23.58±9.00	22.95±8.18	28.94±4.29	30.41±2.59
ADHERENCE	21.74±6.21	21.11±5.56	24.71±2.91	25.71±1.82



4. Conclusions

A long term mHealth Integrated Care program for COPD patients improves quality of life and increases physical activity carried out, but not exercise capacity 12 months post pulmonary rehabilitation.

Patients perception and adherence to the program is significantly higher in those who follow the HappyAir program showing a positive effect of the mHealth Integrated Care program.