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Remote MONITORing of patients with chronic obstructive pulmonary disease using a tablet system. A randomized crossover study on quality-of-life measurements.

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Background:

Studies on remote monitoring of COPD patients showed varying results. We aimed to evaluate whether a tablet system that monitors COPD related parameters (CAT, mMRC, oxygen saturation, blood pressure, pulse, weight and physical activity) could influence patient-related outcomes related quality of life.

Methods:

70 patients with GOLD D COPD (61% women, age 71±8 years, FEV1 41±13 % pred., CAT 19±7 points) were included and randomized to a tablet-based remote monitoring system (RM) or usual care (UC) for a 26-week period, after which patients had a four week “washout” period before they crossed over to the alternative management for another 26 weeks. SF-12 (primary outcome), CAT, mMRC, EQ5D, HADS were evaluated at four study visits. Exacerbations and hospitalizations were continuously reported. Repeated measurement analyses were performed using generalized estimating equations model including variables for time point and intervention.

Results:

Eleven patients were excluded; 4 died during the study period, 1 patient did not meet the inclusion criteria which was first detected after inclusion, 3 patients suffered from other rapidly progressing serious illnesses and 3 patients withdrew from the study at their own request. Fifty-nine patients completed the study, 28 patients randomized to start with UC and 31 patients with RM. The change in SF-12 physical (PCS) and mental component summary (MCS) as well as in CAT, mMRC, EQ5D, EG5D VAS and HADS was similar in both intervention periods. Neither the follow-up period or the intervention significantly impacted on the measured outcomes (Table1).

Conclusions:

A 24-week tablet-based remote monitoring system that monitors CAT, oxygen saturation, blood pressure, pulse, weight and physical activity, connected to a case manager is feasible and safe but did not influence general health-related quality of life or health care use in patients with COPD GOLD D.

Table 1: Study outcomes before and after usual care or telemonitoring period and the results of the repeated measurement analysis evaluating the effect of the telemonitoring intervention and time

	Usual Care (UC)			Remote monitoring (RM)			Repeated measurement analysis		
	before	after	delta	before	after	delta	Coefficient	p-value	95% CI
n	66	63	63	65	59	59	59		
SF-12 PCS	32.22± 8.40	31.23± 8.11	-1.17± 6.90	31.35± 8.36	30.12± 8.81	-1.06± 8.15	TM effect: 0,028 Time effect: 3,423	0,984 0,012	-2,628-2,684 0,767-6,079
SF-12 MCS	45.75± 9.99	46.30±11.62	0.63±11.14	46.85±11.31	46.66±11.01	-0.63± 8.15	TM effect: -0,999 Time effect: 1,212	0,575 0,496	-4,493-2,495 -2,281-4,706
CAT, points	19.23± 7.00	19.76± 7.51	0.57± 4.87	19.98± 7.12	20.36± 8.30	0.41± 5.14	TM effect: 0,083 Time effect: 0,631	0,929 0,499	-1,747-1,913 -1,198-2,461
mMRC, points	2.67± 1.29	2.67± 1.18	0.02± 0.94	2.51± 1.28	2.78± 1.15	0.27± 1.06	TM effect: 0,297 Time effect: -0,154	0,082 0,366	-0,037-0,632 -0,489-0,180
EQ5D, points	0.66± 0.21	0.66± 0.21	0.00± 0.20	0.64± 0.21	0.65± 0.21	0.00± 0.20	TM effect: -0,012 Time effect: 0,005	0,736 0,880	-0,081-0,057 -0,064-0,074
EQ5D-VAS, points	58.71±20.72	56.63±19.50	-1.16±16.76	60.46±19.31	57.32±20.57	-4.03±18.15	TM effect: -3,240 Time effect: 1,276	0,361 0,719	-10,19-3,708 -5,672-8,224
HADS-A, points	6.53± 4.02	6.27± 4.38	-0.30± 3.08	6.43± 4.38	6.90± 5.16	0.53± 2.83	TM effect: 0,942 Time effect: 0,522	0,072 0,319	-0,085-1,968 -0,504-1,549
HADS-D, points	4.77± 3.75	4.73± 3.49	-0.05± 1.94	4.97± 3.79	4.85± 3.63	-0.22± 2.36	TM effect: -0,069 Time effect: 0,319	0,854 0,394	-0,801-0,664 -0,414-1,051

SF-12 PCS: Short Form-12 physical component summary, MCS: mental component summary, CAT: COPD assessment test, mMRC: modified Medical Research Council dyspnea scale, EQ5D: EuroQol- 5 Dimension, VAS: visual analogue scale, HADS: Hospital anxiety (-A) and depression (-D) scale