m-health PROGRAM
Integrated Care for COPD patients

Pilot study: HU La Princesa, XII Octubre, Clinic, Madrid
HappyAir
A COMPLEMENTARY SERVICE
AREAS OF ENGAGEMENT

- Prevention
- Orientation in Diagnosis
- Tele-care
- Self-management
- ICTs m-health

- Educator
- Patient & Care-giver
- Feedback
- Doctors + Pharmacists
- Tele-Health Self-monitoring Bio-monitoring
Direct communication via educator network + platform + telecare support allows more effective and efficient patient self-management.


Direct access to patient activity. Interconnected HC professionals & educators for better patient evaluation, feedback and adjustment on specific programs. Doctor’s recommendations to improve response to patient events.

HC professionals can design & deliver specific prevention programs via the platform + educator network.

Educators + care-givers guide patient in personal program with disease specifics: presentional + virtual, workshop Sessions, home-visits, tele-care services + CRM tools.

Generate value in chronic care: respiratory disease EIP Active & Healthy Ageing FP7/Horizons2020
WHAT WE HAVE LEARNED ABOUT PATIENTS WITH CHRONIC LUNG DISEASE
Activity levels

In Healthy elderly (n 25)
- Walking: 11%
- Standing: 42%
- Sitting: 42%
- Lying Down: 4%

In COPD (n 50)
- Walking: 6%
- Standing: 27%
- Sitting: 52%
- Lying Down: 12%

Pitta et al. Am J Respir Crit Care Med 2005
Exacerbation & Activity

Donaldson, G et al. Am J Respir Crit Care Med 2005
Activity & Readmissions

Pitta, F et al. Chest 2006

p<0.05 (18 min/d)
Puente-Maestu, L. et al. ERJ, 2000
Activity & Supervision Long Term

Waterhouse, JC. et al. Health Tech Asses 2010
Activity & Follow-up Long Term

Barberan, A. et al. Respir Med 2014
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<tr>
<th>Topic</th>
<th>Response</th>
<th>Motivation %</th>
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<td></td>
<td>enjoyment</td>
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<td>function</td>
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<td>sports after age 30 yr</td>
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<td>Reasons to be sedentary(^b)</td>
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Pilot Study

m-health Program with Integrated Care for COPD Patients
Study Goals

Evaluate Adherence improvement & Quality of Life in an integral care program, post- pulmonary rehabilitation, when the patient is managed and monitored using tele-care and TICs.
Hypothesis

Incorporating **ICTs** in an integrated care program for patients with **COPD** to improve adherence and thus **Quality of Life**
<table>
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<tr>
<th>Intervention Group</th>
<th>Lovexair team: patient tele-care support+ monitoring</th>
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<tr>
<td>Intervention Group</td>
<td>M-health program</td>
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<td>Conventional rehab</td>
<td>Self-care+ exercise</td>
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<td>Hospital Pulmonary Dept</td>
<td>ICT supervision</td>
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<td>+Rehab team</td>
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</table>

1st evaln+randomized

Control Group

Conventional rehab Hospital

Hospital Pulmonary Dept +Rehab team

2nd evaln

Conventional follow-up

M-health program

Self-care+ exercise

ICT supervision

3rd evaln post rehab

M-health program

Self-care+ exercise

ICT supervision

4th evaln post rehab

2 months

10 months home-setting

NB: the study exempted prior education on self-care in COPD.
Only allowed 2 x 1hour sessions on digital literacy
Pilot study. Evaluation criteria

1\textsuperscript{st} Evaln
- Spirometry
- CAT
- SGRQ
- EUROQOL-5D
- 6MWT

2\textsuperscript{nd} Evaln
- CAT
- SGRQ
- EUROQOL-5D
- 6MWT

3\textsuperscript{rd} Evaln
- CAT
- SGRQ
- EUROQOL-5D
- 6MWT
- Test Adherence
- CAP Fisio Questionaire
- Adherence Phys ex.
- Morisky-Green
- 6MWT

4\textsuperscript{th} Evaln
- CAT
- SGRQ
- EUROQOL-5D
- 6MWT
- Test Adherence
- CAP Physio Questionaire
- Adherence Phys ex.
- Morisky-Green
- 6MWT
Patient Group Inc O2

44 patients

21 oxygen users

11 intervention group
10 complete study

10 control group
10 complete study

22 non-oxygen users

8 intervention group
7 complete study

14 control group
14 complete study

1 not confirmed as user O2 Doesn’t complete study

17 use O2 During exercise

10 complete study

10 complete study

7 complete study

14 complete study
Recruitment process

- **3 Hospitales in** Madrid: XII de Octubre, La Princesa, Clínico San Carlos
- **Period:** 24 February - 17 July 2016
- **Patients from each hospital:**
  - XII October: 20 patients (9 intervention & 11 control)
  - La Princesa: 12 patients (5 intervention & 7 control)
  - Clínico San Carlos: 12 patients (6 intervention & 6 control)

NB: Nº patients assigned to each group is different due to low resources & Nºs recruited for Pulmonary rehabilitation in general. Start dates different in each hospital.
Study Group Profiles

- 44 patients
- Men 26
- Women 17
- Average age 69.55 years
- GOLD stages II, III, IV
**Adverse events Intervention Group**

Respiratory problems with hospital admission
- Respiratory failure due to exacerbation: 8 admissions for 7 different patients

Respiratory problems without hospital admission:
- Broncoespasms 1
- Neumonia 3
- Catarrh symptoms 2

Muscular-skeletal injuries:
- Herpes zoster with pain lateral side right
- Sacrum Fractura
- Shoulder Fracture

Others
- Post-hospital admission for respiratory failure walks with a stick due to severe dyspnoea

Tele-care with educator enables patients evolution to be more Closely monitored via patient feedback
M-health program ICTs

APP

Web-based Clinical tool in data platform
Clinical tool

EHR patient

• Evaluations

• Medication

• Adverse events with alert

• PRO Data collected via data forms in app by patients
HappyAir app

Daily self-care monitoring

- Lung health:
  - Alerts
  - Lung hygiene
  - Rescue Inhaler

- O2 saturation
- Exercise plan
- Wellbeing: How am I feeling today
- Physical activity: Google Fit connected to platform

My educator:

- Direct contact with my Coach: messaging+calls
Educator tasks

• Ensure evaluations are met in hospital settings
• Review patients' daily PRO in their selfcare plan
• Contact patients ≥ 3 days no activity recorded
• Resolve issues or problems in self-care plan, illness or adverse events
• Act on alerts and filter genuine vs perceived
• Offer guidance on resolving difficulties inc. technical problems (app/mobile)
• Overview and reporting to Lovexair &/or Hospital rehab teams + physicians when necessary
Total Nº Contacts during 365 days

- Coach a paciente: 537
- Paciente a Coach: 303

64% Coach a paciente
36% Paciente a Coach
Channel for contacts

- **Llamadas (Calls):** 467
- **SMS/Canal message:** 373

Total: 840
Motive for contacts made

NB: the study exempted prior education on self-care in COPD. Only allowed 2 x 1hour sessions on digital literacy.
Time invested in patient support 12 months

Total time Spent in contact with patient

Total time Spent monitoring Via platform All users

Average 1 minute day per patient

Average: 5 mins/Day Exc adverse events
Motives for Contacts made-annual

Motivos de contacto durante el Año

- App: 61%
- Salud: 35%
- Apoyo social: 1%
- Móvil: 4%
Results

Daily PROs
Other Daily PROMs to be evaluated by end of study (June 4\textsuperscript{th} evaluation)

- Alerts and follow-up by educator
- % bronquial hygiene
- Rescue Inhaler use/frequency
- O2 for individuals
- Average daily exercise compared to recommended levels
- Nº days no exercise
- Well-being of patients related to their illness
Partial results from 3rd evaluation
IMPACT of COPD in Patients quality of life:
Interval of results: 0-40
<10: Low impact
10-20: Medium Impact
20-30: High Impact
>30: Very High Impact
Results: SGRQ-symptoms
Results: SGRQ-activity
Results: SGRQ-impacts
Results: SGRQ-total score

Results closer to 0% indicate better Quality of Life than those closer to 100%
Results: Visual Analogue Scale
EUROQOL-5D (quantitative measure of health)

Visual Analogue Scale
Self-rated health:
100 is the best imaginable health state
0 worst imaginable health state

http://www.euroqol.org/about-eq-5d/how-to-use-eq-5d.html
## Results: CAP- Respiratory Physiotherapy Adherence

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Intervention</th>
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<tbody>
<tr>
<td>CAP Physio Tot</td>
<td>55,1 (17,4)</td>
<td>64,8 (5,0)</td>
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<td>PERCEPTION patient</td>
<td>31,4 (11,0)</td>
<td>38,2 (4,1)</td>
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<td>ADHERENCE physiotherapy technique</td>
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<td>26,6 (2,9)</td>
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</tr>
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</table>
Conclusions

Carrying out an m-health integrated care program in patients with COPD produces significant improvements in Adherence, their Quality of Life and their own perception of improvement.
¡GRACIAS! www.happyair.org