MobiHealth services for medical telemonitoring: rehabilitation@home

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SELF MANAGEMENT

- Monitoring health status at a distance, in own environment of the patient.
- Patients with chronic illnesses.
- Aimed at secondary prevention of health crisis.
- Use PC/Internet of patient or wireless communication with smart phone, tablet PC.
- No manual input of measured data but automatic transfer.
FOCUS
MOBIHEALTH:
CARDIO VASCULAR RISK MANAGEMENT.
MONITOREN OF:

Blood pressure.
Blood clothing (INR).
(Fetal) ECG.
Heart rate (variability).
Respiration frequency.
Oxygen saturation.
Weight.
Exercise.
Temperature.
GSR.
Food intake.
Current solution for heart failure: Philips Motiva

Philips Motiva system is used for heart failure patients. It makes use of the television of the patient. Measures pulse, weight, blood pressure and glucose. Costly: 100 euro’s per month.
Blood pressure, measuring according the guidelines of the European Society of Hypertension

(mostly 7 days per months in succession, 2 measurements in the morning and two in the evening, automatic data transfer after measurement week to a smart phone, ignore the measurements of the first day of the week, relevant representation of data, automatic calculation of the mean systolic and diastolic blood pressure, patients and the care professionals see the same data, automatic e-mail that a new measurement week will start, automatic e-mail when data are not uploaded within two days after the measurement week, message service in portal for messaging between doctor and patient, clinically validated monitor, measuring in specific sitting position).

Weight
Making use of a weight scale that transfer data automatically to a smart phone.

Heartbeat
Measuring the heartbeat by means of a chest strap that communicates the data to the smart phone.

Activity
Activity monitoring, in combination with measuring heartbeat, gives information of the improvement of the condition of the patient.
Blood pressure monitoring according to the guidelines of the ESH.

We use a clinically validated weigh scale.

Makes use of a smart phone instead of a television with all kinds of lock-in solutions.

Because we make use of a heartbeat sensor and a smart phone, activities in and outside the house can be monitored. The Philips system is not able to do that. Activity monitoring is of importance to see if the condition of patients improves. And we know that doing exercise is good for reducing the blood pressure.

Our solution is cheaper than the Philips solution.
All the sensors mentioned below communicate data via blue tooth

Blood pressure monitor
Chest strap to measure heart beat
Weight
Activity

Smart Phone

Communicating data by means of gprs, umts or wifi.

Server MobiHealth

Web portals: one patients who can see their own data and one for the care professionals to see the data of their patients
Blood pressure monitoring with Bluetooth and smart phone
Measured data are send wirelessly to a MobiHealth server.
Data representation blood pressure. Blue dots represent mean of systolic and diastolic blood pressure. Green area is desired blood pressure.
Weight monitoring. Automatic transfer data from scale to smartphone.

Start-up of the 'app'...
Activity monitoring for improving physical condition of patients (COPD, Hypertension, Diabetics, Heart rehabilitation, Heart failure, Oncology). Patient press a button for the kind of activity they are going to do. The system registers date, time, duration of the activity, heartbeat during the activity.

Chest strap measuring heart rate. Communicates data to smartphone.
Cardiac rehabilitation: how much pain for the optimal gain?

J. A. Snoek · M. J. M. Cramer · F. J. G. Backx

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In our opinion the importance and the exact content of an adequate CR exercise protocol is not always sufficiently appreciated. The Cochrane review from Heran shows a...
Measurement loyalty

The combination of motivated patients, “social control” (my doctor can see if I do not measure) and all kind of automatic reminder messages from MobiHealth, contribute to an extremely high measurement loyalty (95%).

That means that patients measure according to the measurement scheme they got from their doctor.
Is this only for young patients?

Research to users of MobiHealth (BP@Home) home blood pressure service.

Gender:
58.2% male and 41.8% female.

Age:
51.7% between 20 and 59 and 48.3% between 60 and 80+
### User friendliness of the service

#### How user friendly is the home blood pressure service?

- Good: 58.6%
- Very good: 38.3%

#### Would you recommend the service to others?

- Yes: 84.7%
## Elements of complete tele service

<table>
<thead>
<tr>
<th>Good to have</th>
<th>Should have</th>
<th>Must have</th>
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<tbody>
<tr>
<td>Good design, intuitive</td>
<td>User friendly for all kind of patient groups</td>
<td>Implement law protection of personal data</td>
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<tr>
<td>Functional, simple and only what is necessary</td>
<td>Clinical relevant representation of data</td>
<td>Two factor authentication</td>
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<tr>
<td>Color scheme taking color-blindness into account</td>
<td>Patient sees own data. Is part of self management</td>
<td>Data safety (acquisition, transfer, storage, retrieve data)</td>
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<tr>
<td>Manual in portal by means of pictures</td>
<td>Helpdesk for patients and professionals</td>
<td>Enlist service to relevant authorities</td>
</tr>
<tr>
<td>Notifying service in portal</td>
<td>CE marking data transport</td>
<td>Informed consent (written) of patient and professional</td>
</tr>
<tr>
<td>Look and feel portal fits to specific patient populations</td>
<td>Scientific publications in relevant magazines of clinical validation sensors</td>
<td>Use of clinically validated sensors.</td>
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CE marking medical software

Due to new regulations of the European Union software for medical purposes must be considered as a medical device.

That’s means that CE marking is an obligation.

MobiHealth is doing this.
The solution we show here makes use of an downloadable application.

Software of MobiHealth (acquire measured data and sent them) must be downloadable from Android Plaza and Apple store.
CE marking software MobiHealth

BP@Home B.V.
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Hengelosestraat 525-527
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Datum: 20 januari 2011
Betreft: uw aanmelding medisch hulpmiddel klasse I

Geachte P. Lems,

Bij dezen bevestig ik de ontvangst van uw aanvraag van 1 februari 2010 om krachtens artikel 5 lid 1 van het Besluit medische hulpmiddelen van 30 maart 1995 onder uw bedrijfsnaam ‘BP@Home B.V.’ onderstaande medische hulpmiddelen klasse I op de Europese markt te brengen.

Allereerst bied ik u mijn excuses aan voor deze vertraagde afhandeling en voor elk eventueel ongemak dat hierdoor is ontstaan.

Uw notificatie betreft het volgende product:

BP@Home

Dit product staat geregistreerd als medisch hulpmiddel klasse I onder nummer:

NL-CA001-2010-3027762

CE marking software of BP@Home.

Made by MobiHealth.

Official registration as a medical aid class I.
CE marking medical apps

“It has been proposed that medical apps should be peer-reviewed by clinical experts and that regulatory measures should be increased in order to safeguard quality of care. Regulation and guidance are urgently needed. Medical professionals must be made aware that some apps contain unreliable, non-peer-reviewed content so that they can choose carefully which apps to use in medical practice”.

The study was published out of the Department of Neurology in the Academic Medical Center of Amsterdam. October 2012.
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