Decision support for the chronic kidney patient

- A diet management information and communication system to help chronic kidney patients cope with diet restrictions

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Agenda

• Introduction
• Objective
• Methods
• Results
• Discussion on results
• Concluding remarks
Introduction

Kidney patients

Hyperphosphatemia ~ 50%

Hyperkalemia ~ 41 – 67%

Fluid overload ~ 53%

- Vascular calcification
- Renal osteodystrophy

- e.g. heart rate disturbances
- Oedemas
- Heart disturbances

Causes ?


Objective

To develop and test an educational decision support system to help kidney patients cope with diet restrictions and phosphate binder dosage
Methods

- Design process
- Modelling process
- Evaluation process
Design process

- **Focus:** Designing a prototype → diet regimes and binder dosage
- **Goals:** Educational tool and decision support
Modelling process

- **Objective:** To develop an integrated function providing decision support about phosphate binder dosage fitting diet intake and dialysis

- **Process:** Modelling plasma phosphate
Evaluation process

Three steps:

- Usability testing
- Qualitative interviews
- Test of the integrated function (the model)

### Results

**Design of the decision support system**

#### Food analyser database

**Food database** *(choose from the list)*

- Banana
- Beans
- Bread, rye
- Bread, wheat

<table>
<thead>
<tr>
<th>Number</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cup</td>
</tr>
</tbody>
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#### Details

- Phosphate: ____ mg
- Potassium: ____ mg
- Fluid: ____ ml
Results
Modelling plasma - phosphate

![Graph showing simulated and measured plasma phosphate levels over time after dialysis start. The graph includes a line graph with data points for simulated and measured phosphate levels, and a label indicating $R^2 = 0.979$.](image)
Results

Modelling plasma - phosphate

![Graph showing plasma phosphate levels over time after dialysis start (hr).](chart1)

- Simulated plasma phosphate
- Measured plasma phosphate

$R^2 = 0.979$

![Decision support to binder dosage graph.](chart2)

- Phosphate (mmol/l)
- Meal Phosphate (g)
- 1 x Phosphate binder

![Time scale: Thursday, 6th December 2012.](chart3)
Results
Usability testing and qualitative interviews

- Usability testing

- Qualitative interviews
  - Positive opinions and possibilities
  - Critics and limitations
Discussion on results

- **Educational tool:**
  - Increases the accessibility to insight and patient empowerment

- **Food analyser database and diet registration:**
  - Potential to support the patient’s decisions about diet intake
  - Not all food items are accessible in the food database
  - Incorrect information about food content

- **Decision support to binder dosage:**
  - Potential to improve current practice
  - Has to be evolved and studied further
  - Patient specific factors → Individualization?

- Lack of validation relating to diet and phosphate intake
Concluding remarks

- Potential to help chronic kidney patients cope with their disease and to increase patient empowerment.

- A learning and educational tool in clinical practice and increased understanding of the phosphate kinetics?

- At present, the system is in the prototype stage
Thank you for your attention!

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