Backing self-management

*The **selfBACK** project is a healthcare programme centred round self-management and has the potential to save both time and monetary resources in the field of low back pain. Professor Paul Jarle Mork and Associate Professor Kerstin Bach from the Norwegian University of Science and Technology expand on the advantages of their work*

Professor Paul Jarle Mork   *Associate Professor Kerstin Bach*

What are the key objectives of the selfBACK project?

The overall aim of the project is to improve the self-management of non-specific low back pain in order to prevent chronicity, recurrence and pain-related disability. To achieve this we are currently developing a decision support system – selfBACK – that will be used by the patients in the self-management of low back pain. The patient receives this information through a smartphone app, providing advice to reinforce their personalised self-management plan.

Can you describe how the system works?

Before using the system the patient is required to fill in the web questionnaire that provides information about a range of patient characteristics used for tailoring the self-management plan. This information is fed to the selfBACK server to initiate the first case-based reasoning cycle and produce the first self-management plan, which is pushed to the smartphone and accessed by the patient. All further interactions happen with the smartphone, which collects subjective follow-up data from the patient, as well as physical activity data from a wearable device.

What research has gone into developing selfBACK? How has the technology been produced that will be part of this work?

As a system, selfBACK incorporates existing knowledge to recommend tailored advice based on the information input by the patient. It uses case-based reasoning, which is a well-established methodology for developing decision support systems in medicine. Patient advice is generated based on successful past cases of similar patients, enhanced by clinical guidelines. The advice given through the smartphone app is customised and followed up according to the patient's personal goal for improving activity and maintaining adherence. Since the advice is grounded in the system's growing experience on the effect of plans for self-management and the accompanying symptom progression, the prediction quality of selfBACK will increase over time. In addition to case-based reasoning for handling situation-specific knowledge, elements of model- and rule-based reasoning will be used to capture and utilise generalised knowledge.

What potential does selfBACK have for reducing pain-related disability?

The selfBACK project targets the most common musculoskeletal disorder and the most significant contributor to disability in Europe. With selfBACK, the patient will be equipped with a tool that will facilitate, improve and reinforce self-management of non-specific low back pain. We estimate the total cost of using selfBACK will range between 120-150 euros per patient, including the app, the activity-detecting wristband and brief education to enable safe use of selfBACK. Furthermore, selfBACK does not require direct medical supervision and it can easily be made available for a large number of people, thereby resulting in a highly cost-effective use of resources.

Relieving the burden of back pain

*The **selfBACK** project aims to address the burden of low back pain on individuals and healthcare systems. By focusing on self-management and relatively low-cost technology, there is the potential to make an overwhelming difference in the future care for this condition*

With a grant of 4.92 million euros provided by the European Union Horizon 2020 research and innovation programme, the work of selfBACK began in January 2016 and will run until December 2020. It is managed by a consortium of seven partners, bringing expertise from different backgrounds including medicine and technical innovation development. The project is coordinated by Professor Paul Jarle Mork and managed by Associate Professor Kerstin Bach, both from the Norwegian University of Science and Technology.

A TAILORED SYSTEM

The ultimate objective of selfBACK is to improve self-management of non-specific low back pain, to prevent chronicity, recurrence and pain-related disability. This will be achieved through the development of a decision support system that a patient will use themselves to facilitate, improve and reinforce self-management of low back pain. It does this by assisting the patient in deciding and reinforcing the appropriate actions to manage their pain, following a consultation with a primary care healthcare professional.

The decision support is conveyed to the patient via a smartphone app, in the form of advice for self-management. This advice is always tailored to the patient, and is based on their symptom state, symptom progression, goal setting and other patient characteristics, such as information from a physical activity-detecting wristband worn by the patient. Each week the patient will receive an update of their self-management plan, reflecting their recent symptoms, any progression and the goal setting that was determined by the patient.

REFINING THE THEORY

Once the selfBACK system has been implemented, it will be tested and then evaluated in an international multi-centre randomised controlled trial. This will form the second part of the project, and will involve patients from Scotland, Denmark and Norway. These patients will be seeking support from primary care, with non-specific low back pain as their main health problem.

This phase aims to provide any further insights into barriers or facilitators for using the technology within the self-management of low back pain. The evaluation will document the implementation of selfBACK, and map the satisfaction of those using it. This will help to refine the overall system to ensure it is delivering in its objectives to support patients with the self-management of their pain. As Mork and Bach highlight: 'Process evaluation will be carried out as an integrated part of the trial to document the implementation and map the patients' experience with selfBACK.'

EASING THE PAIN

The subject and focus of low back pain in this project is crucial given the scale of the condition. It is common in all age groups, but incidence peaks in adults aged 35-55 years. According to Mork and Bach: 'Nearly everyone will experience an episode of acute low back pain at least once in their lifetime.'

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For the majority of people, an acute episode of low back pain will be resolved in five to six weeks, but in five to 15 per cent of cases, the symptoms will progress into temporary or persistent disabling back pain.

The Global Burden of Disease Study has shown that low back pain is the most significant contributor to disability worldwide, and in Europe it is one of the most common reasons to visit a general practitioner or seek help from other healthcare professionals. Every year, about one in 15 people in Europe will go to their general practitioner about low back pain. Of this figure, 80-90 per cent will have non-specific low back pain, meaning it cannot be reliably attributed to a specific disease or pathology.

It has been estimated that users of selfBACK will experience a 20 per cent reduction in pain-related disability at nine months follow-up, compared to patients who receive the standard treatment. This figure has been calculated based on results from comparable interventions reported in the literature, but the results from the randomised controlled trial to be carried out in 2019, will provide a more precise answer.

COSTING IT UP
While the impact of low-back pain on an individual is clear, the pressure it places on healthcare systems is often not as visible. Low back pain is one of the most common reasons for sick leave and work disability. A number of cost of illness studies carried out in different European countries, including Sweden, Belgium and the UK, indicate that the total annual cost of low back pain per capita ranges from 116-399 euros. This means it has a total annual cost in Europe of 85-291bn euros. With an ageing population, this figure is expected to increase, which is why low cost self-management programmes such as selfBACK are so urgently needed.

In order to use selfBACK, patients are equipped with an app, an activity-detecting wristband and education to enable the safe use of the system. They do not require direct medical supervision, which is one of the most significant savings compared to other programmes. As a result, the cost of using selfBACK ranges from 120-150 euros per patient. This is considerably cheaper than the standard treatment a patient may receive that is based on interactions with healthcare professionals. As Mork and Bach are keen to stress: 'The potential cost-benefit is without doubt substantial.'

EVIDENCE AND EXPERIENCE
While the technology is relatively low cost, the idea of using mobile apps within pain-management is not new. Recent studies revealed there are nearly 300 pain-related smartphone apps available from the main app stores. However, few of these are evidence-based, many haven't been rigorously tested for effectiveness, and healthcare professionals and patients are rarely involved in their development.

In contrast to the existing apps, selfBACK involves key stakeholders, integrates feedback from users and has been developed by experts in relevant fields. The seven partners in the consortium provide a balanced approach in terms of their expertise in medicine and technical innovation development. Their experience covers musculoskeletal disorders, low back pain, healthcare innovation, data abstraction, knowledge modelling, launching of smartphone app systems and also randomised control trials. 'The experience that has gone into selfBACK means it will be a powerful tool to facilitate, improve and reinforce self-management of non-specific low back pain,' explain the project coordinators.

IDENTIFYING CHALLENGES
While the team behind selfBACK are optimistic of the results they expect to see, they are well aware there are potential challenges along the way. However, they are attempting to pre-empt these in order to avoid any barriers to success. One such issue may be adherence; self-management programmes often fail, and this is often due to a lack of support or motivation failing. In selfBACK there is a decision support system reinforcing the motivation for self-management, through which a personalised plan and real-time feedback are provided. The data collected through a web questionnaire, regular Q&A sessions in the app and an activity-detecting wristband will also be used to provide personalised advice that will optimise and reinforce the self-management plan.

By anticipating any challenges and incorporating solutions for these into the project at its inception, it reinforces the real potential of selfBACK. A business plan with a targeted commercialisation strategy is currently being developed to transfer the selfBACK technology into the market. This could transform the lives of people suffering from the debilitating condition that low back pain can be.

'The potential of selfBACK is significant: it could help to address the huge challenge facing the future sustainability of the European healthcare system'

Project Insights

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