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Process evaluation of physical activity counselling with and without the use of mobile technology: A mixed methods study

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ABSTRACT

Background: A monitoring-and-feedback tool was developed to stimulate physical activity by giving feedback on physical activity performance to patients and practice nurses. The tool consists of an activity monitor (accelerometer), wirelessly connected to a Smartphone and a web application. Use of this tool is combined with a behaviour change counselling protocol (the Self-management Support Programme) based on the Five A's model (Assess–Advise–Agree–Assist–Arrange).
Objectives: To examine the reach, implementation and satisfaction with the counselling protocol and the tool.
Design: A process evaluation was conducted in two intervention groups of a three-armed cluster randomised controlled trial, in which the counselling protocol was evaluated with (group 1, $n = 65$) and without (group 2, $n = 66$) the use of the tool using a mixed methods design.
Settings: Sixteen family practices in the South of the Netherlands.
Participants: Practice nurses ($n = 20$) and their associated physically inactive patients ($n = 131$), diagnosed with Chronic Obstructive Pulmonary Disease or Type 2 Diabetes, aged between 40 and 70 years old, and having access to a computer with an Internet connection.
Methods: Semi structured interviews about the receipt of the intervention were conducted with the nurses and log files were kept regarding the consultations. After the intervention, questionnaires were presented to patients and nurses regarding compliance to and satisfaction with the interventions. Functioning and use of the tool were also evaluated by system and helpdesk logging.
Results: Eighty-six percent of patients (group 1: $n = 57$ and group 2: $n = 56$) and 90% of nurses (group 1: $n = 10$ and group 2: $n = 9$) responded to the questionnaires. The execution of the Self-management Support Programme was adequate; in 83% (group 1: $n = 52$, group 2: $n = 57$) of the patients, the number and planning of the consultations were carried out as intended. Eighty-eight percent ($n = 50$) of the patients in group 1 used the tool until the end of the intervention period. Technical problems occurred in 58% ($n = 33$). Participants from group 1 were significantly more positive: patients: $\chi^2(2, N = 113) = 11.17$, $p = 0.004$, and

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nurses: $\chi^2(2, N = 19) = 6.37$, $p = 0.040$. Use of the tool led to greater awareness of the importance of physical activity, more discipline in carrying it out and more enjoyment. *Conclusions:* The interventions were adequately executed and received as planned. Patients from both groups appreciated the focus on physical activity and personal attention given by the nurse. The most appreciated aspect of the combined intervention was the tool, although technical problems frequently occurred. Patients with the tool estimated more improvement of physical activity than patients without the tool.

What is already known about the topic?

- Practice nurses are increasingly responsible for coaching patients with chronic conditions in maintaining a healthy lifestyle.
- Integrating self-management support tools for people with chronic conditions in primary care nursing is a complex process with many influencing factors.
- Information and communication technologies may facilitate this integration process, but adoption and implementation problems impede their dissemination and use.

What this paper adds

- Explicit attention to physical activity promotion in primary care nursing using the Five A's model is valued by patients as well as nurses.
- Supporting self-management regarding physical activity, by using a monitoring and feedback tool, leads to more awareness and discipline by patients.
- Practice nurses find objective measurements retrieved from the monitoring-and-feedback tool a useful addition to their counselling.
- The adoption of mobile health for physical activity promotion is promising, especially given the growing number of people who are using a Smartphone.

1. Background

People who are insufficiently active have a 20–30% increased risk of death compared to people who engage in at least 30 minutes of moderately intense physical activity on most days of the week (World Health Organisation, 2009, 2010). Since physical inactivity is the fourth leading risk factor for global mortality, the World Health Organisation agreed on targets that include a 10% reduced prevalence of insufficient physical activity by 2025 (World Health Organisation, 2013). To achieve this goal, it is recommended that routine patients' contacts in primary care should include assessment of physical activity, advice on the benefits of increased levels of physical activity, and practical support to help patients initiate and maintain healthy behaviours (Khan et al., 2011; Meriwether et al., 2008; Peterson, 2007; Strath et al., 2013). Practice nurses have regular contacts with chronically ill patients who can benefit from an active lifestyle; therefore these contacts are an excellent opportunity for promoting physical activity. Effective interventions to stimulate physical activity include consultations with brief negotiation or discussion to decide on reasonable and attainable goals, targeted information, and follow-up (Foster et al., 2009). New modes to support self-management through computer or mobile phones are promising (Broekhuizen et al., 2012; Foster et al., 2013; Marcus et al., 2009). Interventions including these technological innovations show potential to change health behaviours and to improve clinical outcomes in patients with a chronic illness.

In the project *It's LiFe!* (an acronym for **I**nteractive **T**ool for **S**elf-management through **Li**festyle **Fe**edback!) a personalised monitoring and feedback tool (Fig. 1) was developed (van der Weegen et al., 2013) and tested (van der Weegen et al., 2014; Verwey et al., 2012) according to User Centred Design, a design philosophy in which the end-user's needs, wants and limitations are a focus at all stages within the design process (Poulson et al., 1996). This tool aims to support patients with Type 2 Diabetes or Chronic Obstructive Pulmonary Disease in achieving a more active lifestyle. The tool consists of three elements:

1. a three-dimensional activity monitor (accelometer) worn on the hip;
2. a Smartphone application (app);
3. a web application (for both patients and nurses).

Patients receive personalised feedback on the Smartphone concerning their amount of activity in relation to an activity goal, which is set in dialogue with their practice nurse after a two week pre-measurement period. Nurses can monitor patients' physical activity via the web application. Patients receive different types of personalised feedback: the amount of physical activity (absolute as well as relative to their activity goals), automatically generated feedback messages on the app and the response of the practice nurse on their performance. The tool is employed within a behaviour change counselling protocol which is executed by practice nurses, named the Self-management Support Programme (Verwey et al., 2014a).

After a successful feasibility study of the complete intervention (Verwey et al., 2014b), a three armed cluster randomised controlled trial was conducted to evaluate the effect of the intervention on physical activity (exercise) self-efficacy, quality of life and patient health. A detailed study protocol of the *It's LiFe!* RCT was published in

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