

Developing a system for prevention of metabolic syndrome

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Abstract. The aim of this presentation is to explain how a behaviour change support system has been developed, what were its core features, how users perceived those features and whether it succeeded to produce desired health outcomes.

Keywords: Behavior change support systems, PSD, outcome, user experience

1 Introduction

Despite promising results of digital health interventions, there is insufficient understanding of why some interventions succeed and some do not work.

2 Background

This study is part of a large ongoing research project called PrevMetSyn addressing working-age overweight or obese people (BMI 27–40) who are at risk of developing or have already developed metabolic syndrome. A randomized controlled trial for 52-week lifestyle intervention with different types of counselling with and without information system support has been carried out.

Persuasive Systems Design (PSD) model [1] and Behaviour Change Support Systems (BCSS) framework [2] provided systematic methods to develop a web information system for this purpose. The information content was based on cognitive-behavioural theories seeking to educate users to identify and cope with dysfunctional thoughts interfering with their behavioural goals and self-efficacy beliefs. Healthcare professionals with extensive experience in guiding people in lifestyle changes provided the content used in the system.

This presentation addresses the design science effort for developing the system and mixed methods research for evaluating the design. The latter is based on interpretive interview analysis of user experiences based on 43 users [3, 4] and quantitative analysis of the health outcomes of 259 users [5].

3 Results

When designing the target system, a careful analysis of the Persuasion context, including the Intent (who actually is the Persuader, what is the Intended Outcome/Change, and what is the Designer bias), the Event (User, User and Technology context) and the Strategy (Message and Route) for persuasion was carried out. The key persuasive features finally implemented into the system consisted of self-monitoring, reduction, tunnelling and tailoring for Primary Task support; reminders, praise, suggestion and liking for Computer-Human Dialogue support; verifiability for Credibility support; and social learning and social facilitation for Social support.

In the user experience study, self-monitoring, reminders, and tunnelling were perceived as especially beneficial persuasive features. The need for social support appeared to grow along the duration of the intervention. Unobtrusiveness was found to be very important in all stages of the intervention. In the RCT with one-year and two-year follow-ups, it was found that the designed system had a major impact on weight loss and on waist circumference, the main criterions of the metabolic syndrome. The other components of metabolic syndrome, such as blood pressure, plasma triglycerides, HDL cholesterol and fasting glucose, were also slightly improved by the designed system.

4 Conclusion

The design effort and randomized controlled trial shows that health behaviour change support systems can affect individuals' health behaviours. In general, explanation of what has been implemented in the designed system and how, is critically important for advancing the science into digital health behaviour change. The PSD model and the BCSS framework provide systematic and effective support for the design and development of such interventions.

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