Personalized Mobile Phone-based Tools for Type 1 Diabetes

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Abstract. The mobile phone-based tools presented are based on a strong degree of user-involvement in the design phase, and the studies presented are based on diabetes patients’ intervention. The easy-to-use system called Few Touch Application is built further into systems such as a peer-support system, insulin recording and collocated data view. Patients express the importance of balancing easiness and usefulness when designing personalized mobile phone-based tools.

Keywords: Diabetes, self-management, mobile phone, decision support.

1. Introduction and Methods

Personalized medicine is getting more focused and more important, partly because the technological development of easy-to-use and ubiquitous personal platforms (our approach is mobile phones, see A in Figure 1). If people with diabetes fail with self-management of important parameters, they face a considerable risk of getting serious health problems. Hard-to-use interfaces prevent many of the available tools from being used over a sufficiently long period to achieve the desired health effects.

The system that has been designed is called the “Few Touch Application” (FTA), and was developed with a high degree of user-involvement [1]. We have combined both methods from medicine and computer science, i.e. methods like focus groups, interviews, questionnaires, paper-prototyping, thinking aloud sessions, prototyping and iterative design of both the software and hardware components. Details on the design process are described elsewhere [2].

2. Results and Discussion

From user involvement of people with Type 2 diabetes [2], 15 suggestions for how to combine data about blood glucose, food intake and physical activity emerged. One of the patients’ own suggestions was found to be the most optimal due to its dynamic way of changing time-span (suggestion B in Figure 1). Despite being based on preferences

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of people with Type 2 diabetes, the data views are relevant also for Type 1 due to similar key parameters – and are currently being tested on a 30-person Type 1 cohort.

Type 1 patients need to inject insulin often, at least each time they eat or drink something that increases their blood glucose level. Since it often is hard to balance the medication, food and physical activity in a way that keeps the glucose level within the recommended range, a system for helping patients to keep track of the injections as well, was designed. Basing the system on the FTA, an easy function was made for recording of insulin together with nutrition; see example screenshot C in Figure 1.

Few current mobile phone-based self-help tools have functionalities for peer support. Our practical approach is to design an intelligent recommender system on top of the FTA. Peer-interactions based on matching user profiles will be one of the main concepts that will be tested. The system will focus on finding relevant and practical recommendations, and on motivation towards healthy behaviors, e.g. D in Figure 1.

According to our patient groups’ feedback during the user-involved design processes, the main success factor for sustainable usage is to balance the ratio between easiness and usefulness. The users express clearly that automatic Bluetooth communication and mobile phones-based systems with good user interfaces, are very helpful tools.

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References
