Mobile Patient Applications within Diabetes – from Few and Easy to Advanced Functionalities

Eirik Årsand\textsuperscript{a,b}, Stein Olav Skrøvseth\textsuperscript{a}, Ole Hejlesen\textsuperscript{c,b}, Alexander Horsch\textsuperscript{d,b}, Fred Godtliebsen\textsuperscript{e}, Astrid Grøttland\textsuperscript{a}, Gunnar Hartvigsen\textsuperscript{a,a}

\textsuperscript{a} Norwegian Centre for Integrated Care and Telemedicine, University Hospital of North Norway, Norway
\textsuperscript{b} Department of Computer Science, University of Tromsø, Norway
\textsuperscript{c} Department of Health Science and Technology at Aalborg University, Denmark
\textsuperscript{d} Department of Medical Statistics and Epidemiology, Munich University of Technology, Germany
\textsuperscript{e} Department of Mathematics and Statistics, University of Tromsø, Norway

Abstract

Patient diaries as apps on mobile phones are becoming increasingly common, and can be a good support tool for patients who need to organize information relevant for their disease. Self-management is important to achieving diabetes treatment goals and can be a tool for lifestyle changes for patients with Type 2 diabetes. The autoimmune disease Type 1 diabetes requires a more intensive management than Type 2 – thus more advanced functionalities is desirable for users. Both simple and easy-to-use and more advanced diaries have their respective benefits, depending on the target user group and intervention. In this poster we summarize main findings and experience from more than a decade of research and development in the diabetes area. Several versions of the mobile health research platform—the Few Touch Application (FTA) are presented to illustrate the different approaches and results.

Keywords: Diabetes Mellitus, Mobile Health, Blood Glucose, Nutrition Assessment, Physical Activity, Insulin, Software Design

Introduction

More than 371 million people have diabetes worldwide and the numbers are increasing in every country. According to the IDF Diabetes Atlas, 4.8 million people died and 471 billion USD were spent due to diabetes in 2012. This serious health threat is to a certain degree caused by the technological development and a subsequent more sedentary lifestyle among people. Our aim is that the technological development also can help this situation by utilizing the pervasiveness and functionalities today’s mobile phones, sensors and wireless communication technologies offer.

Methods

Design of concepts using paper prototyping, software and hardware prototyping, questionnaires, interviews, thinking aloud and automatically logging have all been important methods in our work. Most important, many user-involved design processes involving real patients with Type 1 and Type 2 diabetes have been facilitated by using focus groups meetings.

Results

We have developed mobile health applications for diabetes throughout the last decade. The main component has been a mobile-phone-based diary that is updated both automatically by Bluetooth data transfer and by manual registration. Simple and easy-to-use applications for Type 2 diabetes (e.g. [1]) and advanced applications for Type 1 diabetes (e.g. [2]) were designed. Some of the main lessons learned and design implications for such applications have been summarized [3] as: Automatic sensor data transfer is very important to increase usability; user interfaces should be designed as motivational and visual as possible; applications should provide considerable health benefits in relation to the effort required; and applications should support dynamic usage (patient/health care personnel, long-/short-term usage).

Conclusion

The findings will be important in the work we now face with documenting the clinical effects and implementing the applications as services offered from health care actors. Motivated users have already confirmed the usefulness. We strongly believe that the simple and easy-to-use as well as the advanced functionalities will benefit many with various diabetes health challenges.

References