Mobile Health Applications to Assist Patients with Diabetes: Lessons Learned and Design Implications

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Abstract

Self-management is critical to achieving diabetes treatment goals. Mobile phones and Bluetooth® can support self-management and lifestyle changes for chronic diseases such as diabetes. A mobile health (mHealth) research platform—the Few Touch Application (FTA)—is a tool designed to support the self-management of diabetes. The FTA consists of a mobile phone-based diabetes diary, which can be updated both manually from user input and automatically by wireless data transfer, and which provides personalized decision support for the achievement of personal health goals. Studies and applications (apps) based on FTAs have included: (1) automatic transfer of blood glucose (BG) data; (2) short message service (SMS)-based education for type 1 diabetes (T1DM); (3) a diabetes diary for type 2 diabetes (T2DM); (4) integrating a patient diabetes diary with health care (HC) providers; (5) a diabetes diary for T1DM; (6) a food picture diary for T1DM; (7) physical activity monitoring for T2DM; (8) nutrition information for T2DM; (9) context sensitivity in mobile self-help tools; and (10) modeling of BG using mobile phones.

We have analyzed the performance of these 10 FTA-based apps to identify lessons for designing the most effective mHealth apps. From each of the 10 apps of FTA, respectively, we conclude: (1) automatic BG data transfer is easy to use and provides reassurance; (2) SMS-based education facilitates parent-child communication in T1DM; (3) the T2DM mobile phone diary encourages reflection; (4) the mobile phone diary enhances discussion between patients and HC professionals; (5) the T1DM mobile phone diary is useful and motivational; (6) the T1DM mobile phone picture diary is useful in identifying treatment obstacles; (7) the step counter with automatic data transfer promotes motivation and increases physical activity in T2DM; (8) food information on a phone for T2DM should not be at a detailed level; (9) context sensitivity has good prospects and is possible to implement on today's phones; and (10) BG modeling on mobile phones is promising for motivated T1DM users.

Abstract cont.

We expect that the following elements will be important in future FTA designs: (A) automatic data transfer when possible; (B) motivational and visual user interfaces; (C) apps with considerable health benefits in relation to the effort required; (D) dynamic usage, e.g., both personal and together with HC personnel, long-/short-term perspective; and (E) inclusion of context sensitivity in apps. We conclude that mHealth apps will empower patients to take a more active role in managing their own health.

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