IMPROVING QUALITY OF CARE IN EUROPE

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Real-World Evidence of User Engagement With Mobile Health for Diabetes Management

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Key Findings

- Engagement with mHealth was higher for app modules with automated data collection, but initial uptake remained lower and occurred later compared to modules requiring manual data entry.
- Male users, older users and users who were recently diagnosed for the first time tended to use the app more actively.
- Although the app targets various aspects of diabetes management, most users took advantage of one specific app module.

What Problem Was This Research Addressing?

Mobile health (mHealth) apps provide novel possibilities for the management of diabetes [1]. They offer patients to play an active role in monitoring their condition, increase their treatment responsibility and often allow sharing the data with the health care practitioner (HCP). Hence, mHealth may be a way to increase quality of care while at the same time offering the potential to reduce healthcare costs. However, low digital competence or limited availability of technology could reduce the use. In addition, data privacy can be a concern and may lead users to omit use or enter incorrect information [2]. Lastly, it is difficult for the patient and the HCP to select the most appropriate app among those available on the market. Although mHealth requires active user engagement to be effective, there is little evidence exploring engagement with mHealth for diabetes.

What This Research Adds

The aim of this research was to study the use of mHealth among diabetes patients, here represented by the users of the Cornerstones4Care Powered by Glooko (C4C) app. In particular, the study aims to analyze how actively users engage with the app and to identify patient characteristics that are associated with user engagement. Addressing these issues will help to understand how mHealth apps can be used effectively and what areas could be optimized. Given the lack of consensus on how to assess user engagement, it was a subgoal of this paper to propose a set of theoretically founded user engagement metrics that were used to investigate user engagement in this study.
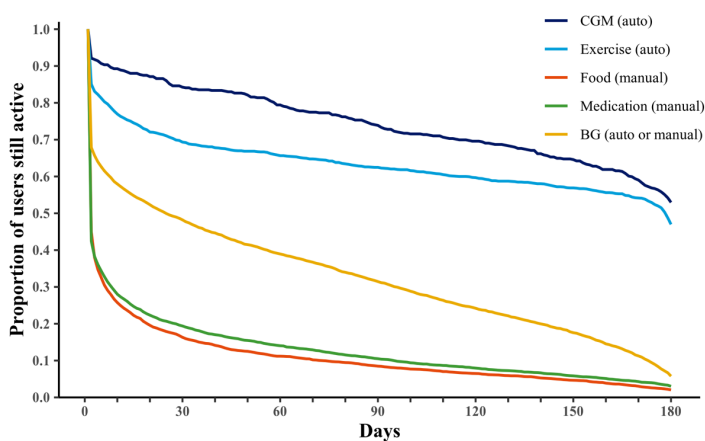
Methods

The C4C data set includes all records (manual and automated) collected during the period from app launch (June 28, 2017) to October 21, 2019. The data set is structured corresponding to the five main modules of the app: food intake, exercise, intake of medication, blood glucose (BG) values obtained by BG meters, and continuous glucose monitoring (CGM) device data. In addition, it contains basic user information. For each module, user engagement was estimated as the number of active days and using measures expressing the persistence (time until discontinuation of use), longevity (time from the first to the last entry), and regularity of interaction (average time between active days) within the first 180 days of use. Beta regressions were estimated to assess the associations between user characteristics and engagement outcomes for each module of the app.

Project Partner:

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Research Findings

After giving consent, 43% of the users initiated use. Most users took advantage of only one of five modules of the app, indicating that the needs of patients with diabetes are heterogeneous. User engagement and the amount of collected data were higher for the (partly) automated modules (exercise, CGM) although initial uptake remained lower for these modules and first activity started later. One explanation for this may be the burden to connect the app to external devices or other apps and data protection or privacy concerns of the users.

Figure 1: Survival curves visualizing the relative dropout of users per module.

Policy Relevance of Research

- Only a subgroup of individuals who gave consent after download, initiated use (43%).

- To increase the sustainable use of mHealth, providers should consider the mode of data gathering and content design, but take into account privacy concerns of the users at the same time.

- Particular patient groups should be specifically targeted when integrating mHealth into the self-management of their disease. E.g., if older patients overcome potential barriers to initiate use, their engagement was higher compared to younger users.

They may have considered their mobile phone as a helpful tool when establishing their initial individual self-management strategy.
This policy brief was adapted form a full article [3].

Figure 2: Event diagrams expressing the user activity patterns per module over time. A dotted horizontal line represents a user's interaction with the app, and each dot represents an active day. The density of points shows a pattern of intensity of use.
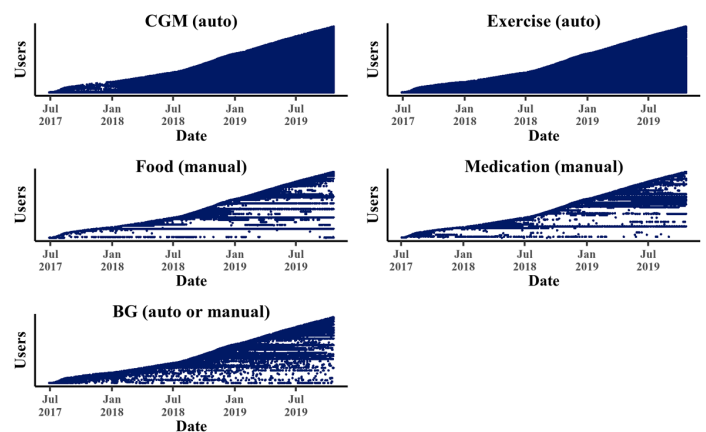

Users' engagement was determined by various patient characteristics: Although most users reported to be female, male users engaged significantly more with the app, except from the exercise module. Older patients tended to use the app more actively. One explanation for this novel finding could be that if older users overcome the burden to use the app, they may be motivated to apply their newly obtained skills. Recently diagnosed patients tended to use the app more intensively, too.

References
[1] B Bellei, Ericles Andrei, et al. „Diabetes mellitus m-Health applications: a systematic review of features and fundamentals." Telemedicine and e-Health 24.11 (2018): 839-852.
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