Applying a User-Centric Design Approach to Develop a Mobile Application for Management and Treatment of Gestational Diabetes in Nepal

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Objectives: Mobile apps can aid with the management of Gestational Diabetes Mellitus (GDM) by providing patient education, and reinforcing daily glucose monitoring and diet/lifestyle modification. Here we describe our process of applying a user-centered design approach in developing a culturally-appropriate app (GDM-DH) to support the management of GDM among patients in Dhulikhel Hospital, Nepal.

Methods: A multidisciplinary team including experts in GDM, mHealth, and behavior and implementation sciences, as well as health providers and patients at Dhulikhel Hospital, contributed to the development of the GDM-DH app. After finalizing the app's content and features, we created the app's wireframe, which illustrated the app's proposed interface, navigation sequences, and features and functions. This was followed by key informant interviews with healthcare providers (n = 5), focus groups, and in-depth interviews with GDM patients (n = 12) in which they were asked to provide feedback on the features and functions of the wireframe. Incorporating their input, we built the minimum viable product, which was user-tested with 6 GDM patients, and further refined for the final version of the GDM-DH app.

Results: Qualitative findings from the user research affirmed the potential utility and usability of our target app and provided insight into app features and design elements that needed to be added or modified. Consistent with the Social Cognitive Theory, the final version of the GDM-DH app supports GDM self-management by providing health education and allowing patients to record and self-monitor blood glucose levels, carbohydrate intake, physical activity, and gestational weight gain. The app uses innovative features to minimize the self-monitoring burden and uses automatic feedback and data visualizations. Healthcare providers can use the web-based admin portal of the GDM-DH app to enter/review glucose readings, track patient progress, and guide treatment and counseling accordingly.

Conclusions: To our knowledge, this is the first mHealth platform for GDM developed for a low-income country, and the first one containing a feature to aid with carbohydrate estimation in meals. A pilot clinical trial is currently underway to explore the clinical utility of the GDM-DH app.

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