

How Continuous Monitoring Changes the Interaction of Patients with a Mobile Telemedicine System

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Abstract

Background:

The combination of telemedicine systems integrating mobile technologies with the use of continuous glucose monitors improves patients' glycemic control but demands a higher interaction with information technology tools that must be assessed. In this article, we analyze patients' behavior from the use-of-the-system point of view, identifying how continuous monitoring may change the interaction of patients with the mobile telemedicine system.

Methods:

Patients' behavior were evaluated in a clinical experiment consisting of a 2-month crossover randomized study with 10 type 1 diabetes patients. During the entire experiment, patients used the DIABTel telemedicine system, and during the intervention phase, they wore a continuous glucose monitor. Throughout the experiment, all user actions were automatically registered. This article analyzes the occurrence of events and the behavior patterns in blood glucose (BG) self-monitoring and insulin adjustments. A subjective evaluation was also performed based on the answers of the patients to a questionnaire delivered at the end of the study.

Results:

The number of sessions established with the mobile Smart Assistant was considerably higher during the intervention period than in the control period (29.0 versus 18.8, $p < .05$), and it was also higher than the number of Web sessions (29.0 versus 22.2, $p < .01$). The number of daily boluses was higher during the intervention period than in the control period (5.27 versus 4.40, $p < .01$). The number of daily BG measurements was also higher during the intervention period (4.68 versus 4.05, $p < .05$) and, in percentage, patients increased the BG measurements not associated to meals while decreasing the percentage of preprandial measurements. The subjective evaluation shows that patients would recommend the use of DIABTel in routine care.

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Abbreviations: (BG) blood glucose, (CGM) continuous glucose monitoring, (ICT) information and communication technologies, (PDA) personal digital assistant, (SA) Smart Assistant

Keywords: continuous data management, diabetes, evaluation, mobile telemedicine, multiaccess architecture, Smart Assistant

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Abstract cont.

Conclusions:

The use of a continuous glucose monitor changes the way patients manage their diabetes, as observed in the increased number of daily insulin bolus, the increased number of daily BG measurements, and the differences in the distribution of BG measurements throughout the day. Continuous monitoring also increases the interaction of patients with the information system and modifies their patterns of use. We can conclude that mobile technologies are especially useful in scenarios of tight monitoring in diabetes, and they are well accepted by patients.

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