



Dra. Marta Camacho Cardeñosa.
Instituto Maimónides de Investigación Biomédica de Córdoba.
Department of Endocrinology and Nutrition.
Hospital Universitario Reina Sofía de Córdoba. Córdoba, Spain



What is digital health for people with diabetes?

People with diabetes (PWD) need to acquire knowledge and practical skills to monitor their glucose levels, adapt their diet and, in many cases, administer insulin several times a day. This constant management of the disease sometimes begins at

an early age, which can represent a major challenge for children and adolescents, especially during key stages of development. All of this can generate emotional stress and affect both social relationships and the family environment, fostering feelings of frustration, guilt, fear, or hopelessness (1).

In this context, digital health tools can become a useful support for improving self-care and the overall management of the disease (2).

In PWD, digital health refers to the use of technological tools that facilitate disease control and follow-up, with the aim of reducing the risk of complications and improving quality of life.¹ This concept includes information and communication technologies (ICT), mobile health (mHealth), and electronic health (eHealth). The rapid technological progress of the past decade has helped these tools become part of everyday life, thereby increasing their potential usefulness in diabetes management (1).

HOW CAN DIGITAL HEALTH HELP ME IN MY DAILY LIFE?

Digital health-based interventions have shown positive effects both on the clinical management of diabetes and on patients' own experience. Various studies show improvements in quality of life, communication with health care professionals, and adherence to therapeutic and self-care recommendations. In addition, these tools help increase knowledge and awareness of the disease.

Many of these technologies allow more direct communication with patients and provide immediate feedback on different aspects of treatment. As a result, they facilitate decision-making and help modify behaviors related to diet, physical activity, or therapeutic adherence (1).

Furthermore, this type of intervention can promote healthier lifestyle habits, especially in relation to diet and physical exercise (3). Similarly, continuous glucose monitoring (CGM) systems and telemedicine platforms have been associated with a better perception of quality of life and a positive impact on patients' psychological and emotional well-being (3).

Overall, these digital solutions can play a relevant role in promoting self-care, diabetes education, and treatment adherence, contributing to improved glycemic control (3). Better glucose control may reduce the risk of severe episodes of both hypo- and hyperglycemia and promote safer disease management in both the short and long term. In

addition, some studies also describe benefits in other clinical parameters, such as glycated hemoglobin (HbA1c), blood pressure, or body weight (1).

Furthermore, many of these interventions could represent cost-effective strategies within the comprehensive management of diabetes (1).

WHAT DO PATIENTS SAY?

PWD who use digital tools to manage their disease usually show a positive attitude toward their use, especially because these tools help them with self-monitoring tasks and daily disease follow-up. Among the most valued functions are those that relate glucose levels to aspects such as diet or physical activity (4).

According to different studies, users believe that these tools can help them achieve health goals, improve self-care, and promote glycemic control.² In addition, many patients perceive that these applications facilitate decision-making related to their health care and improve communication with health care professionals (1).

However, PWD also highlight several fundamental aspects for maintaining the use of these technologies: they should be easy to use, should not require too much time to record information, and should not replace human contact with health care staff (2).

ARE THERE ONLY BENEFITS TO USING DIGITAL HEALTH?

The answer is no. Despite technological advances, there is still a significant number of PWD who do not achieve their therapeutic goals or improve their health outcomes, especially when these tools are used in isolation and without professional support.¹ In this scenario, the role of nursing is particularly relevant. Nursing professionals already perform key roles in diabetes education, follow-up, and continuous patient support; therefore, they can also facilitate the effective incorporation of these technologies into daily practice.

To this end, it is important to initially assess the patient's level of digital knowledge and offer practical training and technical »

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RECOMMENDATIONS

NURSING PROFESSIONALS ALREADY PERFORM KEY ROLES IN DIABETES EDUCATION, FOLLOW-UP, AND CONTINUOUS PATIENT SUPPORT; THEREFORE, THEY CAN ALSO FACILITATE THE EFFECTIVE INCORPORATION OF THESE TECHNOLOGIES INTO THE ROUTINE CLINICAL PRACTICE

 APPS FOR THE GENERAL MANAGEMENT OF DIABETES Digital tools to take care of your health every day			
APP	MAIN USE	KEY FUNCTIONS	APPLICATION IN DIA BETES MANAGEMENT
 SocialDiabetes	COMPREHENSIVE SELF-MANAGEMENT Allows users to keep a complete record of the key aspects of diabetes.	• Glucose recording. • Insulin recording and calculation. • Diet recording. • Physical activity recording.	Example of a comprehensive application for daily diabetes management.
 OneTouch	VISUALIZATION AND ANALYSIS Helps interpret data to identify patterns and trends.	• Identificación de patrones glucémicos • Relationship between diet, exercise, and medication. • Reports and charts.	Allows users to interpret data and relate them to habits and treatments to improve control.
 mySugr	SIMPLE DAILY RECORDING Facilitates quick and intuitive daily diabetes recording.	• Blood glucose recording. • Food intake recording. • Drug recording. • Reports and statistics.	Simple tool for daily diabetes follow-up.
 InsulClock	SUPPORT FOR INSULIN TREATMENT Helps organize insulin doses.	• Insulin reminders. • Dose recording. • Glucose recording. • History and follow-up.	Facilitates adherence to insulin treatment through reminders and records.
 myDiabetic Alert	COMPLETE FOLLOW-UP Comprehensive platform for diabetes control and data sharing.	• Glucose recording. • Food intake recording. • Communication with health care staff. • Alerts and reminders.	Useful for patients with complex diabetes or for follow-up by professionals/caregivers.
 suggin	PREDICTION AND RECOMMENDATIONS Anticipates glucose levels and offers recommendations.	• Glucose prediction. • Personalized recommendations. • Goals and follow-up. • Integration with devices.	Advanced tool for anticipating and preventing glycemic imbalances and optimizing treatment.
These applications should not replace the advice and recommendations of a health care professional. 			

support from the first visits. This support » should be maintained continuously to resolve doubts, reinforce motivation, and promote adherence. For this reason, hybrid models—which combine digital tools with regular human follow-up—appear to be the most appropriate.

In addition, not all digital tools offer the same user experience. Some applications may be complex, generate an excessive amount of information that is difficult to interpret, or present technical problems that hinder their continued use (4).

Information overload is one of the aspects that generates the greatest frustration among users. Technical difficulties, lack of time, and the need to enter data manually on a constant basis are also frequent. Therefore, many patients prefer automated data-recording systems, as they require less effort and time. However, these systems are not free from problems either, such as technical failures or loss of information related to the application used (4).

WHAT ASPECTS COULD ENSURE SUCCESS WHEN WE TALK ABOUT DIGITAL HEALTH?

Continuity in the use of these tools is one of the factors that most influences the achievement of health benefits in PWD. In this regard, ease of use is one of the most important elements for ensuring long-term maintenance. Other relevant factors include personalization, continuous feedback, and data integration with health care systems (2). »

» Moreover, Individualization seems to be a fundamental feature for improving the user experience (3). Patients' needs may vary according to age, social context, or type of diabetes.

For example, adolescents tend to respond better to strategies based on text messages, gamification, or more interactive dynamics, as occurs with tools such as Sweet Talk. Conversely, adults may benefit more from systems integrated with CGM or telemedicine platforms.

Furthermore, the user experience may be influenced by social, cultural, and economic factors. Therefore, these tools

should be adapted to each person's cultural and linguistic context.

In addition, some socioeconomic barriers could be reduced through initiatives such as device loan programs, access to connectivity in health care centers, or simplified versions for patients with older devices or limited internet access (2).

Finally, individualization should take into consideration the type of diabetes and each patient's specific needs (4).

- People with type 2 diabetes mellitus, for example, do not always need daily

glucose monitoring and, in many cases, receive oral treatment.

- By contrast, people with type 1 diabetes mellitus require frequent monitoring and insulin treatment, and therefore may benefit from more advanced tools, such as bolus calculators or graphs that relate carbohydrate intake, insulin dose, and glucose levels. **D**

Marta Camacho Cardeñosa carries out her research activity at Instituto Maimónides de Investigación Biomédica de Córdoba (IMIBIC, Córdoba, Spain), in the field of metabolic diseases and aging. Her lines of work include the study of nonpharmacological interventions and the development of digital applications based on artificial intelligence for integrating physical exercise into the clinical management of obesity and diabetes.

CONCLUSIONS

- Digital health can improve self-care and glycemic control in PWD, especially when it facilitates continuous monitoring and real-time decision-making.
- Digital tools should not replace in-person health care follow-up, but instead be integrated into hybrid models that combine technology with professional support.
- Ease of use, personalization, and cultural and generational adaptation are essential factors for maintaining adherence and the continued use of these applications.
- Excess information and technical problems can generate frustration and abandonment; therefore, simplicity and automatic data integration are priority aspects.
- The role of nursing and health care professionals is key to training, supporting, and helping patients incorporate these technologies safely and effectively.

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