



# Role of Smartwatches in Diabetes Patient Care

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## Opinion

At the current time, smartwatches are quite being used by diabetic patients which reflects their increased health consciousness and literacy. Diabetes is a chronic metabolic disorder that can be controlled by changing lifestyle. The well-being of the patients is dependent on diet, and physical activity. These smartwatches contain sensors for continuous recording of heart rate, blood pressure, blood oxygen level, calories burnt, step counts, sleep duration, and sleep quality. These smartwatches are often coupled with non-invasive sensors which have enabled continuous glucose monitoring. This continuous glucose measurement has become a bliss to diabetic patients, specifically in the context of hypoglycemia. It provides a direct correlation between the type of food intake and consequent blood sugar level in a personalized manner. It helps to decide the proper diet for the patient because every patient has their own disease characteristics depending on age, sex, daily activity, and medications. Blood glucose data integrated with steps count, calories burnt, and sleep quality recommends the need for required physical exercises to maintain the daily fitness level.

There are other self-monitoring aspects of smartwatches. Diabetic patients often suffer the problem of frequent urination at nighttime. Zhang et al. demonstrated that diabetic patients walk lesser and show higher variations in their wake-up and bedtimes compared to the reference group [1]. Smartwatch data help us to monitor sleep quality, and wake-up times for diabetic patients. For leveraging self-management, software and applications are also being developed. These applications are often empowered by artificial intelligence. DiaFit app uses smartwatch data as well as patient-provided data and provides statistics and graphics to facilitate informed health decisions with a remote access facility [2]. Accessing patient data from remote locations is another advantage of using smartwatches. It helps caregivers to remotely monitor their patients outside clinical settings. It is beneficial for elderly patients and patients living in the rural area. Diabetes

is often associated with obesity. Smartwatch data also helps its users to control obesity. Smartwatches can also be used to provide information on the required uptake amount of bolus insulin at the time when it is required [3].

The role of smartwatches has extended from self-management to disease diagnostics [4]. The emphasis is on disease risk prediction so that preventive measures can be implemented. Ramesh et al. developed an end-to-end framework for diabetes prediction and management using smartwatch data [5]. The effort is stretched toward diabetes treatment. Recently Mansouri et al. used smartwatch that emitted green light to stimulate implanted engineered cells to treat type-2 diabetes in mice. The cells can produce and release human glucagon-like peptide-1 on demand which further simulates insulin secretion [6].

We observe the use of smartwatches is not limited to mere consumer devices. There are multiple facets to it. It is beneficial in patient care, and disease diagnostics. Smartwatches, a component of digital health are becoming an integral part of health care facilities. However, there are concerns also. The accuracy and precision of the measurement often do not meet the standard of conventional methods. The performance of the devices varies widely. There is the issue of missing data for various reasons like poor internet connectivity, data synchronizing, and charging the device. Also, patients, who are often elderly, may not feel comfortable to wear it. The issue of data security while sharing and storing needs attention. We are optimistic that these issues will be overcome in near future. Development of better sensors can provide more accurate and stable data. The data analytic part also needs to be strengthened. The analytics will perform better when more data will be available from a larger group of people. Better connectivity, automatic synchronizing, and efficient charging components will help to tame other concerns. We are looking forward to a future with better living for diabetic patients.

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