Digital therapeutics can improve medication adherence in diabetes

Dear Editor,

I read the review article on Digital Therapeutics (DTx) published recently in the journal titled "Role of digital therapeutics and the changing future of healthcare" by Dang *et al.* with great interest.[1] As pointed out in the article, DTx indeed has tremendous potential in the modern-day world, and the applications of DTx can include a large number of conditions, which predominantly include chronic diseases such as type 2 diabetes.

From a diabetologist's perspective, the most impressive application of DTx, especially in the Indian setting, is through its potential to enhance adherence to medication and non-pharmacotherapy in diabetes. Medication non-adherence is a common, preventable, yet difficult-to-tackle reason for treatment failure, and is seen all over the world.[2] The annual per-capita cost of medication non-adherence was estimated in 2018 to range between USD 949 and USD 44,190.[3] Even in India, medication adherence in diabetes is poor, and contributes immensely to treatment failure.[4] Poor medication adherence in diabetes leads to worsened glycemic status, and the resulting diabetes-related complications lead to poor health outcomes. The net result is an increase in morbidity and mortality, and increased healthcare costs arising from the need to treat complications. From my personal experience as a diabetologist, fewer than half of patients with diabetes who are on long-term pharmacotherapy can claim to have maintained a consistent medication adherence of >80% of their prescribed doses. Essentially, behavioral modification is required in order to improve adherence.

DTx can be a game changer in improving adherence among diabetes patients. Various approaches for behavioral modification that can be achieved using DTx include rewards, reminders, motivation, awareness enhancement, and gamification. Novel approaches for improving medication adherence through DTx in diabetes is even more relevant after the COVID-19 crisis, where concepts such as telehealth and virtual patient monitoring have gained preference over direct patient contact with their physicians. A 2018 systematic review reported over 400 free smartphone applications exclusively catering to improving medication adherence.[5] Some of the important such applications are summarized in the table below:

No	Name of the DTx application	Description	More details
1	Digimeds by Proteus Digital Health	A telemedicine platform with an ingestible sensor, a wearable patch, and an mHealth app to monitor health data	https://www.proteus.com/excellenceatrush/
2	Adherium's SmartTouch for Asthma	Device grafts onto a patient's inhaler and monitors medication adherence as part of a self-management plan through reminders.	https://www.adherium.com/
3	EpSMon by SUDEP	Self-monitoring of epilepsy patients through a simple assessment	https://sudep.org/epilepsy-self-monitor
4	Mango Health	Aims to improve medication adherence by reminders and games	https://www.mangohealth.com/index.html
5	KYT Adhere	Uses reminders, artificial intelligence-enabled direct observed therapy, gamification, information therapy and rewards for enhancing medication adherence	https://kyt.ai/

To conclude, the problem of medication non-adherence in diabetes management is one of the main areas where DTx can be of immense help, especially in India where the burden of diabetes is huge.

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Conflicts of interest

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Tejas Kamat

Director and Consultant, Diabetes Care Clinic, Panaji, Goa, India

Address for correspondence: Dr Tejas Kamat, Director and Consultant, Diabetes Care Clinic, C/o Wisdom Health Care, Gurudatta Appts, 1st Floor, MG Road, Panaji - 403 001, Goa, India.
E-mail: drtejaskamat@gmail.com

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