Mobile apps could hold key to Parkinson's research, care

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Credit: University of Rochester Medical Center

A new study out today in the journal *JAMA Neurology* shows that smartphone software and technology can accurately track the severity of the symptoms of Parkinson's disease. The findings could provide researchers and clinicians with a new tool to both develop new drugs and better treat this challenging disease.

"This study demonstrates that we can create both an objective measure of the progression of Parkinson's and one that provides a richer picture of the daily lived experience of the disease," said University of Rochester Medical Center (URMC) neurologist Ray Dorsey, M.D., a co-author of the study.

One of the difficulties in managing Parkinson's is that symptoms of the disease can fluctuate widely on a daily basis. This makes the process of tracking the progression of the disease and adjusting treatment a challenge for physicians who may only get a snapshot of a patient's condition once every several months when they visit the clinic. This variation also limits the insight that researchers can gather on the effectiveness of experimental treatments.

The new study, which was led by Suchi Saria, Ph.D., an assistant professor of Computer Science at Johns Hopkins University, harnesses the capabilities of technology that already resides in most of our pockets all day, every day.

Researchers recruited 129 individuals who remotely completed a series of tasks on a smartphone application. The Android app called HopkinsPD, which was originally developed by Max Little, Ph.D., an associate professor of Mathematics at Aston University in the U.K., consists of a series of tasks which measure voice fluctuations, the speed of finger tapping, walking speed, and balance.

The Android app is a predecessor to the mPower iPhone app which was developed by Little, Dorsey, and Sage Bionetworks and has been download more than 15,000 times from Apple's App Store since its introduction in 2015.

As a part of the study, the researchers also conducted in-person visits with 50 individuals with Parkinson's disease and controls in the clinic at URMC. Participants were asked to complete the tasks on the app and were also seen by a neurologist and scored using a standard clinical evaluation tool for the disease. This aspect of the study was overseen by URMC's Center for Health + Technology. The researchers found that the measurements collected by the app corresponded with what was observed by the physicians in the clinic.

The smartphone data collected from the larger group of participants was then analyzed using a machine-learning algorithm which the researchers used to generate a mobile Parkinson disease score (mPDS) that uses a scale of 1-100 – with a higher number indicating a greater severity of symptoms.

While the near term uses of this technology will likely be in clinical trials, which would allow researchers to observe in real time the impact of new treatments, ultimately it could provide physicians and patients with a new tool to monitor the disease.

"The ability to remotely monitor patients on a much more frequent basis, more accurately track the symptoms and progression of the disease, and monitor the impact of exercise, sleep, and medications and their side effects holds the potential to transform how we treat Parkinson's disease ," said URMC neurologist Christopher Tarolli, M.D., a co-author of the study.

More information: Andong Zhan et al. Using Smartphones and Machine Learning to Quantify Parkinson Disease Severity, *JAMA Neurology* (2018). DOI: 10.1001/jamaneurol.2018.0809

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