

Smart Healthcare in Neurology

Sir,

In 2016, the World Economic Forum declared digital technology as the Fourth Industrial Revolution.^[1] Although digital technology has brought about a revolution in other industries, it has not impacted healthcare to the same degree. However, this is now beginning to change.

Digital Technology in Neurological Diseases

Data capture and analysis

The human neurological system is a complex biological system. Diagnosing human neurological ailments is a monumental task. They have to gather information from various sources. Amalgamating all the information, in a time-pressured, chaotic, clinical scenario, can be very difficult for a clinician. However, data capture and analysis from all sources can be improved by utilizing artificial intelligence. This will lead to diagnostic accuracy and save a huge amount of work.

Diagnosis

New smartphone apps have been developed to diagnose genetic neurological diseases. The Neural Impairment Test Suite app created by researchers at the Kaunas University of Technology in Lithuania provides its users, with a series of tests to check the presence of symptoms, which if detected prompts the user for further investigations and professional advice. Hereditary neurological disorders can be detected early by this technology.

Virtual reality can identify early symptoms of Alzheimer's disease more accurately than clinical cognitive tests. Results published in the journal *Brain*^[2] has supported the above findings.

Treatment analysis

With long-term neurological disorders such as Parkinson's disease and epilepsy, the opportunities to use technologies are numerous. Parkinson's KinetiGraph app can track the gait and movement of people with Parkinson's through a wrist device. Recording their movement, the data can be examined by the clinician to see the progress of their condition and monitor response to treatment.

The EpSMon app helps people with epilepsy to monitor their health and keep track of their level of risk from seizures.

Assistive technologies can help patients with dementia. Devices such as motion sensors can prompt them to lock a door. Smartphone apps can help them to locate items and medications easily.

Communication aids help children and adults with communication difficulties.

Digital biomarkers

Digital cognitive biomarkers offer the opportunity to introduce precision medicine in the field of neurology and psychiatry.

Digital biomarkers have several advantages over conventional markers. First, they are unobtrusive, requiring the normal use of a smartphone. Second, they are ecological as the smartphone data are recorded in a natural environment. Third, they are continuous in the assessment as they provide daily data of the variations of cognitive function.^[3]

Digital therapeutics

Recent years has shown a large investment toward implementing technologies in drug development process. Otsuka's Abilify MyCite digital pill (aripiprazole tablets with sensor) represents the first US Food and Drug Administration-approved software-based therapy for schizophrenia. It involves the use of a Bluetooth sensor, which when the pill is ingested releases a signal, picked up by a patch on the patient's ribcage, which transmits a signal to a smartphone app. This way, the dosing and adherence to medication can be monitored.

Conclusion

It is just a beginning for smart healthcare. Issues of high cost, adopting unknown technology, monitoring, ethical issues, and patient privacy concerns will bring about many challenges. Smart healthcare has a long way to go, requiring substantial amount of work, to cause a real and lasting change.

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Conflicts of interest

There are no conflicts of interest.

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