The Potential for Digital Health to Enhance Patient Experiences

The Potential for Digital Health to Enhance Patient Experiences in Neurology

Neuroscience, including neurologic disorders, can be debilitating and life changing. They vary among clinical presentations depending on which area of the brain or which nerves are affected. Moreover, many neurologic conditions are characterized by their disabling (i.e., epilepsy, multiple sclerosis), their neurodegenerative nature (i.e. Parkinson's and Alzheimer's diseases, and dementia), and their fluctuation of symptoms, known as periods of remission and relapses (i.e., multiple sclerosis). These symptoms can be either motor neuron-related or non-motor neuron-related. Motor neuron symptoms include poor muscle tone, lack of reflexes, twitching, tremors, and difficulty swallowing, chewing or eating. Non-motor neuron-related include cognitive impairment, sensitivity disorders, memory loss or confusion.

Patients with neurologic disorders also face anxiety and associated comorbidities that can impact their daily living activities and their social lives. They often experience delays in being diagnosed and seeing specialists, difficulty accessing care in remote areas, and a lack of support in managing their condition at home. Neurologic conditions require frequent monitoring and management, which can be time-consuming, expensive and emotionally taxing for patients and their caregivers.

Data shows that adherence rates to medications for neurologic conditions are often low. A study from E Faught et al. demonstrated that nonadherence of patients with epilepsy can cause serious or fatal consequences such as an increased risk of mortality and higher incidences of emergency room visits, hospital admissions, motor vehicle accident injuries and injuries resulting in fractures.

These diseases all vary enormously in terms of diagnosis, journey, care pathway, symptoms, medication side effects, medication delivery,

Neurologic Disorders Associated Symptoms

Motor Neuron-Related
- Poor Muscle tone
- Lack of reflexes
- Twitching
- Tremors
- Difficulty swallowing, chewing, or eating

Motor Non-Neuron Related
- Cognitive impairment
- Sensitivity disorders
- Memory loss Confusion

Patients also face daily life challenges
- Anxiety and associated comorbidities,
- Delays to diagnosis and to see specialists,
- Difficulty accessing care in remote areas,
- Lack of support for managing conditions at home.

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education, treatments and self-management. Digital health technologies have the potential to enhance neurology care by making it more accessible, cost-effective and patient-centric, and increase length on therapy. They need to be carefully designed and part of an adjunctive therapy approach, which aims to provide the right tools for the right patient at the right time. It is essential to propose and personalize tools into the care pathway.

To provide better care for patients with neurologic diseases, digital health solutions intend to:
- Ease collaboration and communication with the care team
- Optimize disease management through support in medication adherence and modification of behavior
- Enhance treatment cost-effectiveness
- Monitor patient status in real-time
- Educate patients about their diseases and prognosis, display their treatment plans, and raise patient awareness to treatment-associated adverse events
- Assist the patient in monitoring and reporting cognitive skills through personalized exercise

> «Digital Solutions need to embark specific features and functions to meet patient needs.»

Digital solutions need to embark specific features and functions to meet patient needs. Aptar Digital Health has developed a strong understanding of the unmet medical needs of patients and healthcare professionals (HCPs) by performing a thorough evaluation

Focus of digital health solutions for neurology patients

ENHANCE TREATMENT COST-EFFECTIVENESS

MONITOR PATIENT STATUT IN REAL-TIME

EDUCATE PATIENTS

EASE COLLABORATION & COMMUNICATION WITH CARE TEAM

ASSIST PATIENTS WITH THEIR CHALLENGES EVERY DAY

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of the various patient pathways for neurologic conditions such as epilepsy, migraine, multiple sclerosis, Alzheimer's and Parkinson's Diseases by meeting with patients and HCPs in the US and Europe.

This investigation allowed us to design what could be the ideal digital health solution for improving patient experiences in neurology. Key features of interest include:

- Remote monitoring: Connecting patients with their care team remotely by sharing their health data such as blood pressure, heart rate, symptoms experiences and treatment intake can improve communication. Remote monitoring devices can provide real-time data on a patient's condition, allowing physicians to make informed treatment decisions and patients to manage their condition more effectively. It is important to ensure that remote monitoring devices are interoperable with external wearables and devices, for seamless data transmission.
- Self-management and symptom tracking: Through a mobile or web app, self-management and tracking allows patients to monitor symptoms over time, identify patterns and triggers, and better manage their condition thanks to personalized medical recommendations on how to act when a symptom arises. A six-month study conducted by Si Y. et al in China with 380 epileptic patients showed that using a smartphone app improved epilepsy self-management scores. The proportion of patients who were seizure-free at the six-month follow-up was larger for the app user group than for the control group (54 out of 190 (28%) versus 22 out of 190 (12%) respectively). The app users also experienced a reduction in seizure frequency between 75 and 100%. .
- Medication management: Smartphone apps can support patients in tracking their medications and doses, setting reminders and receiving alerts for prescription refills, which can help improve medication adherence.
- Education and resources: Providing information to patients about their condition, treatment options and associated adverse events, and lifestyle modifications can help improve their autonomy and disease understanding to
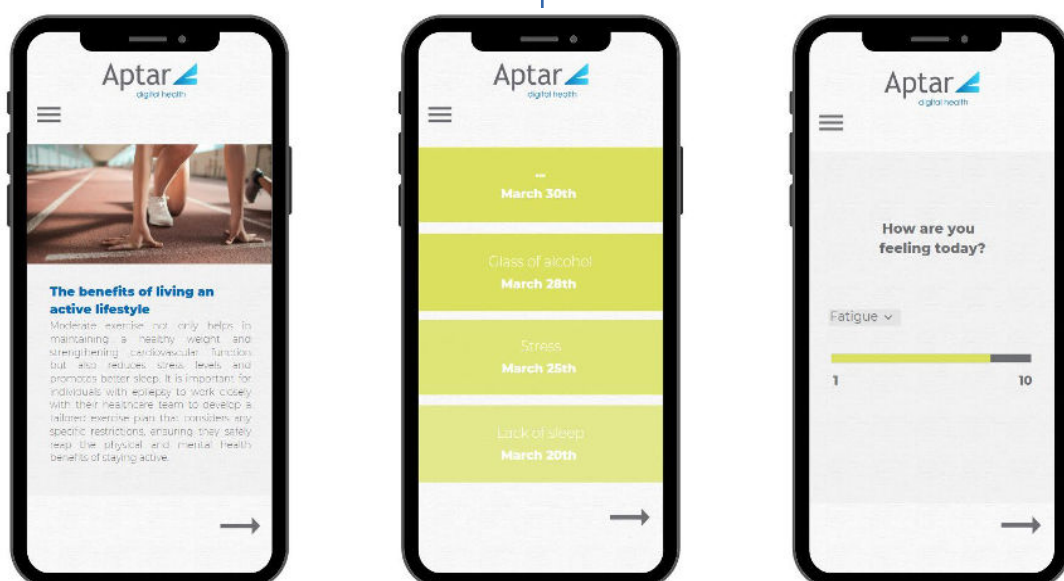
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make smarter decisions about their care.

- Cognitive Exercises: Providing patients with training exercises through digital means can improve executive function, memory, language, attention, and global cognitive abilities. According to a meta-analysis by Di Lorito et al., digital solutions have shown positive impacts on cognitive outcomes . For example, telerehabilitation interventions have been shown to improve significantly MMSE (Mini-Mental State Examination) in a population of 27 patients with early-stage Alzheimer's Disease . While more research is needed in this area, these solutions hold promises to better care for patients with neurodegenerative disorders.

Ultimately, the features included in a mobile
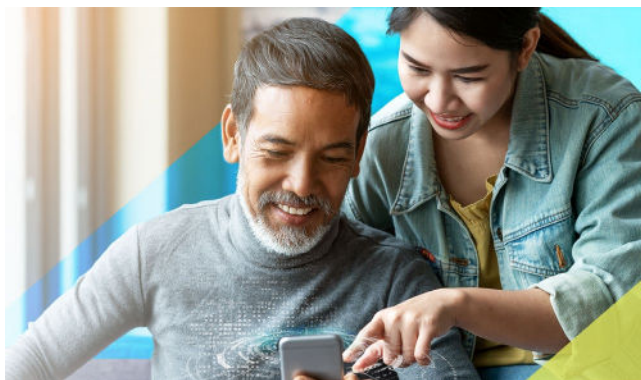
app or a digital therapeutic for neurologic patients will depend on the condition and the needs of the patient population. For example, neurologic diseases are often subject to polypharmacy, which means that patients must take several medications simultaneously and sometimes for other comorbidities such as

hypercholesterolemia or hypertension. Hence, a digital solution can also help patients know which medication to take, remind them to take it at the right time and dosage, and manage their side-effects when they occur.

As a leading provider of integrated health solutions and services, Aptar Digital Health is on a mission to elevate patient experiences at every stage of their treatment journey. Our suite of end-to-end, patient-centric digital solutions provides patients with a comprehensive and personalized approach to care. Our product portfolio includes Digital Patient Support Programs, Digital Therapeutics (DTx) and Disease Management Platforms. With our solutions, patients can track their conditions and symptoms, monitor their medication adherence and connect with their care team. Our platforms also enable healthcare providers to access real-time patient data, support decision-making processes and ultimately improve patient outcomes.

The potential of digital health technologies to improve neurologic care is significant. With the rise of chronic diseases and an aging population, there is a growing need for more effective and efficient healthcare solutions. Aptar Digital Health is committed to providing innovative solutions that address the unique needs and pain points of neurology patients by leveraging user-centric and easy-to-use technologies to improve health outcomes.

About Aptar Digital Health

Aptar Pharma's Digital Health division is part of AptarGroup, Inc., a global leader in the design and manufacturing of a broad range of drug delivery, consumer product dispensing and active material science solutions and services. Aptar Digital Health creates end-to-end solutions to enhance patient experiences every day, leveraging a holistic ecosystem of digital interventions. Amplified by an industry-leading portfolio of products and solutions, Aptar Digital Health's offerings combine mobile and web apps, connected drug delivery systems, onboarding, training and advanced data analytics services to actively empower patients and create a positive treatment journey.

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