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LETTER TO THE EDITOR

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E-NEUROREHABILITATION: USE OF MOBILE PHONE BASED HEALTH APPLICATIONS DURING THE COVID-19 PANDEMIC

The World Health Organization (WHO) report that the safest method to prevent coronavirus 2019 (COVID-19) infection is through social distancing and social isolation (1). However, this poses various challenges for healthcare workers and patients, regarding the provision of rehabilitation services during COVID-19 lockdowns. Neurorehabilitation professionals are at high risk of exposure to COVID-19 due to close proximity with patients. Many neurological patients require regular rehabilitation services in order to improve their outcomes and quality of life, and these may be affected by social distancing (2).

Digital provision via the internet and other tools can provide new possibilities in care provision and follow-up for patients with neurological and related disorders. The application of information and communication technologies (ICT) in healthcare settings is termed "e-health", and can help patients achieve goals in activities of daily living, improve their lifestyle, and to provide care, follow-up and intervention opportunities that are accessible to all individuals at the community level. Mobile-based rehabilitation (MBR) uses technology for communication between therapists, patients and caregivers (2). Everyday technologies have become an integral component of rehabilitation. Mobile devices, such as smart-phones and tablets, can be used as assistive equipment to improve individuals' functional performance. MBR equipment comprises web-based devices and internet connectivity for the therapist and in the patient's home.

Mobile-based health apps are promising tools for use in healthcare. Advanced technologies are being developed to increase patient participation and reduce disability. The use of mobile device based apps has been the focus of several recent clinical practices in neurological rehabilitation (3).

MBR provides an alternative means of delivering rehabilitation services to remote areas or to patients who are unable to visit hospital/clinics on a regular basis. It can be used to support rehabilitation services and help to prevent decline, to diagnose, and to provide therapeutic care. MBR may be an accessible method of providing rehabilitation care during social distancing. Consultation via video-conferencing can help to keep patients safe and prevent infection, although if patients need urgent hospital care full preventive measures should taken (4). Rehabilitation team members must be educated in the correct use of personal protective equipment (PPE) and infection control procedures.

MBR can help patients to continue their exercise protocols through the use of exercise videos. In order to minimize connectivity problems videos of exercises can be provided to the patient in advance and professionals can guide the patient using real-time instructions via video conferencing (5). The provision of 20 min of stretching, strengthening and balancing exercises in each session, guided by rehabilitation professionals using video-conferencing, may be beneficial in minimizing overall decline in functional status during lockdown due to COVID-19 (6).

The authors recommend providing WhatsApp video-based rehabilitation and consultation to groups of patients, together with monitoring and guidance. Online video-based group therapy enables patients to communicate via audio, text or video messaging. A WhatsApp group video-conferencing call can currently include up to 8 people; hence it can be an effective and feasible means of providing group therapy to a number of patients on a single platform. Other web-based platforms can be used to provide group therapy to large numbers of people via video-based rehabilitation or consultation, e.g. Google Duo, Google Meet, Microsoft Teams, WebEx and Zoom.

Various mobile-based apps that may be used in the rehabilitation of neurological patients during the COVID-19 pandemic are listed in Table I. Various

Table I. Mobile phone based applications for use in e-neurorehabilitation

Mobile-based rehabilitation apps	Description/use
Clock Yourself Physiotherapy available from: https://play.google.com/store/apps/details?id=com.nextstepalliedhealth.clockyourself&hl=en_IN	To improve co-ordination and balance
CanPlan available from: https://apps.apple.com/us/app/canplan/id598687543	To improve cognitive skills, reading comprehension and activity performance
Constant Therapy available from: https://play.google.com/store/apps/details?id=com.constanttherapy.android.main&hl=en_IN	For speech therapy, cognitive function and memory
Elevate – Brain Training Games available from: https://play.google.com/store/apps/details?id=com.wonder&hl=en_IN	To improve problem-solving skills, memory function, attention and speaking skills
Google Fit available from: https://play.google.com/store/apps/details?id=com.google.android.apps.fitness&hl=en_IN	To improve overall mental and physical health
NeuroScores App available from: https://play.google.com/store/apps/details?id=com.mobiblocks.neuroscores&hl=en	To evaluate critically ill patients, contains scales used in neurological assessment
Physiotherapy Exercises available from: https://play.google.com/store/apps/details?id=com.advancim.physiotherapyexerciseshelp&hl=en_IN	Set of physical exercises to improve mobility and muscle strength
Paralisia Facial available from: https://play.google.com/store/apps/details?id=com.luisramalho.paralisiafacial&hl=en	Measures the degree of impairment of facial paralysis and loss of sensitivity
Recognize Rehabilitation App available from: https://play.google.com/store/apps/developer?id=Noigroup	Motor imagery training (mirror therapy) to improve performance and enhance neuroplasticity
Rancho Gait2 available from: https://play.google.com/store/apps/details?id=ranchorep.android.mops&hl=en_IN	Observational analysis of gait impairments aimed at prescription of lower extremity orthoses
Visual Attention Therapy available from: https://play.google.com/store/apps/details?id=com.tactustherapy.vat&hl=en	To improve reading, concentration, attention and memory skills
WordBrain available from: https://play.google.com/store/apps/details?id=se.maginteractive.wordbrain&hl=en_IN	To improve language skills by brain training
7 Minute Chi available from: https://play.google.com/store/apps/details?id=com.zhenwu.sevenchi&hl=en_IN	To improve motor coordination, balance, provide posture correction and breathing exercises

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Table II. Advantages and disadvantages of mobile-based rehabilitation (MBR)

Serial Number	Advantages	Disadvantages
1	Social distancing can be maintained by the indirect interaction/digital interaction of patient and therapist	Use of MBR may be difficult for patients who have learning disabilities, cognitive impairment or psychological problems
2	MBR is an easy and cost-effective method of rehabilitation. It reduces the travel costs and time consumption	It may be difficult to gain access to the rural population due to poor availability of resources
3	MBR is flexible and convenient to access at any time, as videos can be downloaded and saved to mobile devices	There may be problems with network connectivity
4	Entertaining method of rehabilitation, using games and virtual environments	Manual contact with the physiotherapist is impossible

aspects of rehabilitation can be provided via MBR, e.g. healthcare monitoring, providing therapy, education and functional assessments. The advantages and disadvantages of MBR are listed in Table II.

During social distancing inadequate access to rehabilitation may occur in both rural and urban community areas. Rehabilitation professionals may be able to assess the home environment via videoconferencing and advise on the modifications needed for rehabilitation. Mobile-based apps can benefit healthcare professionals and increase patient access to point-of-care. MBR assists professionals to monitor and manage the patients' condition, make clinical decisions and access health-related training. In the current pandemic, the use of MBR should be explored to provide neurorehabilitation to all levels of the community and to improve the impact on functional and patient-centred outcomes. Use of MBR could increase accessibility to neurorehabilitation in remote areas, where provision of rehabilitation services is challenging, relieve the burden on current traditional healthcare systems and provide more effective use of digital resources to improve patient outcomes.

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