

Virtual reality-based rehabilitation: A favourable treatment plan for stroke patients in Pakistan

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Madam, Stroke is a neurological disease characterized by impaired cerebral blood flow which results in debilitating symptoms such as severe cognitive and motor function decline, dyskinesia, and loss of balance and gait¹. Annual stroke incidence in Pakistan is 250/100,000 with associated mortality being reported between 11-30%². Despite this existing prevalence, there is only one neurologist per 1 million people to provide stroke rehabilitation². With appropriate innovation by means of adopting the acclaimed computer-assisted rehabilitation methods, Pakistan can fulfill the unmet needs of both acute and chronic stroke patients.

Currently, two main types of rehabilitation exist: conventional (physiotherapy) and computer-assisted (virtual reality (VR): incorporating sensory stimulus through somatosensory systems)³. Both rely on the concept of neuroplasticity (the capacity of the brain to adapt and form new connections following stimulation) to lessen the patient's deficiencies in areas such as concentration, problem-solving, and motor functions⁴. As found in a meta-analysis conducted by Zhang et al in 2016 where 87 randomized control trials were analyzed, VR therapy showed significant improvement when supplemented with conventional rehabilitation in measured outcomes including upper and lower limb function, walking ability, balance, gait velocity, cadence, and daily function. However, VR therapy had an insignificant impact on cognitive function¹. These results were further validated by another meta-analysis conducted by Lee et al in 2019, where a positive relationship was concluded between VR-based rehabilitation and overall motor function including balance and gait in the upper and lower limbs (ES = 0.545, 95% CI = 0.253-0.837, p = 0.001)⁵. A significant amount of clinical data support the notion that VR-based rehabilitation supplemented with conventional physiotherapy-based rehabilitation is the optimal

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treatment plan for improving static and dynamic balance in stroke patients^{1,3,5} With sessions being engaging and immersive, specialists can also expect higher patient retention and enjoyment while motor learning is augmented through immediate virtual feedback⁵.

Taking into account Pakistan's low GDP per capita, citizens would benefit from comparatively more economical VR therapy in conjunction with physiotherapy as opposed to physiotherapy as a stand-alone treatment plan to improve the motor function of stroke patients^{2,3}. Citizens and establishments alike would benefit from the implementation of VR-based rehabilitation in hospitals where patients can virtually perform activities instead of utilizing costly facilities as seen in conventional rehabilitation⁵.

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