

Cognitive Rehabilitation Services – an Emerging Public Health Need!

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Abstract

Objective: The objective of this article is to draw the attention of the health sector in general and national and state governments in India towards the magnitude of the problem, need and urgency of cognitive rehabilitation services as a part of comprehensive health care to achieve universal health coverage by 2030 goal as assured in national health policy 2017.

Enhanced quality of health care has resulted in a population living longer than ever before, which comes with issues about the quality of life. The changing demographics, ageing population, Stroke or Cerebrovascular accidents even among much younger population, Traumatic brain injuries, the disability trends, depression, and anxieties and of late, post long Covid 19 brain fogging have become common companions for people who were seriously ill, or suffered for long or disabled. Often people struggle to manage deficits, focusing hard on what they were doing the past easily and mourning that loss of efficiency. There is a large psychological component that needs to be managed and poses a big challenge in existing physical medicine and rehabilitation human resource constraints. Most of the current population need rehabilitation at some point in their lives, following an injury, surgery, disease, or illness, or age resulting declined brain functioning. Globally, about 2.4 billion people are currently living with a health condition that benefits from rehabilitation but in many parts of the world, this increasing need for rehabilitation is largely unmet. Rehabilitation services are amongst the health services severely disrupted by the COVID-19 pandemic.

Locations of cases reported: Four case reports of people needing cognitive rehabilitation, three successfully managed and one failed due to want of care provider, from Karnataka.

Participants: The successful cases of cognitive therapy included a septuagenarian male suffering post-covid 19 brains fogging from Hangal, district Haveri, five autism children in Gadag district and my autobiography of cognitive therapy after Traumatic brain injury from Gadag//Bengaluru and lone unsuccessful case of an elderly lady with stroke not getting due cognitive therapy, unable to coordinate speech and mobility from Hospete, Vijayapura a recently upgraded district headquarters.

Measurements: While three successful cases were assessed by qualified professionals and therapy given, the failed case did not access the cognitive therapy for want of the facility locally and financial constraints to approach a specialist.

Results: Three case that sought cognitive therapy services have returned to their normal cognitive efficiency, but the lady with stroke is unable to coordinate speech and mobility even after 3months.

Conclusion: This article reviews three cases one each of Stroke, Long Covid 19, three Autism cases and one TBI case followed in 2022 to emphasize the urgency of establishing Cognitive Rehabilitation services to address the unmet needs both at present and anticipated to increase in near future.

Materials & Methods: Four case reports of personal experience and their management challenges of people needing cognitive rehabilitation, literature review and worldwide experience of cognitive rehabilitation experimentation in various conditions.

Keywords: cognitive challenges; rehabilitation; cognitive rehabilitation; post-covid 19 brain fogging; stroke; traumatic brain injuries; autism; & multiple sclerosis; disability-adjusted life years (dalys); years of life lost (yll)

Introduction

In developed countries and most developing countries including India, enhanced quality of health care has resulted in a population living longer than ever before, which comes with issues about the quality of life. The changing demographics, ageing population, better literacy, health awareness, Stroke or Cerebrovascular accidents in much younger cohort's Traumatic brain injuries mainly due to road traffic accidents, the disability trends, mental health issues like depression, and anxieties and of late, post long Covid 19 brain fogging have become common companions for people who were either seriously ill, had chronic illness or are disabled. Often people struggle to manage deficits, focusing hard on what they were doing the past easily and mourning that loss of efficiency. There are both physical, occupational and a large psychological component that needs to be managed, which poses a big challenge in existing physical medicine and rehabilitation facilities and human resource constraints [1] in most developing countries.

Rehabilitation is defined as "a set of interventions designed to optimize functioning and reduce disability in individuals with health conditions in interaction with their environment" Physical Medicine and Rehabilitation (PMR), is a great specialty but it is slower-paced and requires a great deal of patience as rehab takes time. Rehabilitation helps a child, adult, or older person to be as independent as possible in everyday activities and enables participation in education, work, recreation, and meaningful life roles such as taking care of family. It does so by addressing underlying conditions and improving the way an individual functions in everyday life, supporting them to overcome difficulties with thinking, seeing, hearing, communicating, eating, or moving around [2].

Almost everybody needs rehabilitation at some point in their lives, following an injury, surgery, disease, or illness, or because their functioning has declined with age, or mental health issues like depression and anxiety. Regardless of the specifics of the injury, or post-acute or chronic (long Covid 19) diseases, there are main themes like peers, advice, physical exercise, assistive technology, home adaptations, and personal responsibility. Fundamental components that need to be included in all successful rehabilitation programs which include Pain Management, Flexibility and Joint ROM, Strength and Endurance, Proprioception and Coordination, Functional Rehabilitation, use of Orthotics, and Psychology of Injury and cognitive rehabilitation [3]. The importance of peers and peer support in rehabilitation planning can't be underestimated. Rehabilitation is not a set of mechanistic interventions but requires good cognitive support, social relationships, and support for a comprehensive and individual view in rehabilitation. Professionally guided peer support should be offered as a part of rehabilitation. Interventions related to assistive technology and home adaptations are an obvious part of rehabilitation. It is important to support people to preserve identity as an active person and to take personal responsibility in their own rehabilitation [4]. The key task of rehabilitation includes a) Exercises to improve a person's mobility, speech, language, and communication. b) Modifying an older person's home environment to improve their safety and independence at home and to reduce their risk of falls. c) Exercise training and education on healthy living for a person with a heart disease. d) Making, fitting, and educating an individual to use a prosthesis after a leg amputation. e) Positioning and splinting techniques to assist with skin healing, reduce swelling, and to regain movement after burn surgery. f) Prescribing medicine to reduce muscle stiffness for a child with cerebral palsy, g) Psychological support for a person with depression and h) training in the use of a white cane, for a person with vision loss.

Rehabilitation is highly person-centred, meaning that the interventions and approach selected for everyone depends on their goals and preferences. Rehabilitation can be provided in many different settings, from inpatient or outpatient hospital settings, to private clinics, or community settings such as an individual's home.

Cognitive Rehabilitation

Cognitive challenges arise because of small blood clots, chronic inflammation, abnormal immune responses, brain injuries such as strokes and haemorrhages, viral persistence, and neurodegeneration triggered by covid. Cognitive rehabilitation is therapy for people whose brains have been injured by concussions, traumatic accidents, strokes, or neurodegenerative conditions such as Multiple sclerosis and Parkinson's disease. Cognitive rehabilitation therapy (CRT) focuses on restoring, strengthening, and sharpening cognitive functions that have been impaired due to an insult to brain due to injury, stroke, Covid 19 fogging or any another medical incident [5]. In cognitive rehabilitation therapy, a clinical provider will work with a patient by promoting cognitive exercises to perform, hands-on, bridging activities, and discussion questions to help the patient learn and translate cognitive strategies to their everyday life. Cognitive rehabilitation involves four stages of i) Education ii) Process training iii) Strategy training and iv) Functional activities training [5,6]. CRT has documented its positive impact for patients with brain injury, stroke, multiple sclerosis and most importantly in the last 2 years in long Covid 19 brain fogging. Cognitive rehabilitation therapy encompasses many therapeutic techniques, such as computerized cognitive training, neurofeedback, and assistive technology. There are two different approaches to CRT: restorative and compensatory.

Restorative CRT

Restorative CRT's goal is to improve cognitive function by reinstating or strengthening the functions a person has either lost due to an injury or continues to find challenging after an illness. As an example, if a person finds it difficult to remember what he needs to do in a day or pay attention to tasks given to him by another person, a medical professional may assign different memory tasks to improve their memory, using worksheets or digital exercises that challenge memory functions. It repeatedly challenges a person to practice skills to improve their cognitive deficiencies by using the concept of neuroplasticity.

Compensatory CRT

Compensatory CRT (CCRT) helps an individual work around their injury. This is an assistive device like assistive speech devices, calendars, memory tools, smart devices, alarms to regain a person's attention in specific contexts. Though CCRT will be temporary until an individual builds up a new skill, sometimes it may be a long-term strategy if it is not possible to restore a person's functioning fully [5,6].

This article reviews four cases one each of Stroke, mild or moderate Traumatic Brain Injury (TBI), Post-Long Covid 19 brain fogging, and cognitive rehabilitation of Autism children followed in 2022 to emphasize the need for establishing Cognitive Rehabilitation services to address the unmet needs both at present and anticipated to increase of the same in future.

Case Reports:

1) Cognitive rehabilitation in a Case of Stroke

Sheila a 65-year lady had 2nd stroke on 8 August 2022, resulting in left sided hemiparesis and speech in a newly created Vijayanagar district headquarter of Hospete. She did have a mild stroke in December 2019 and recovered fully. She was put on anti-hypertensives and blood thinner, that

was poorly adhered to. This time around her ECG and Echo showed normal screening and LV systolic function (EF 65%). She was hospitalized for 3 days, BP stabilized, all investigations done and discharged with suggestions for physiotherapy and speech therapy. The physiotherapy has helped her to manage her daily chores with support, but her mental status has been shattered. Her faculties affected include i) language skill to translate sounds into words and generate verbal output ii) the ability to focus on tasks and details to complete and use them, iii) the ability to hear, process, blend, segment, and use sounds to shape behaviour and iv) ability of processing to perform simple tasks quickly and accurately compared to what she was able to do until 8th August. For want of occupational and speech therapist not much of improvement is observed in last 3 months.

2) **Cognitive rehabilitation for a case of Brain Fogging following long Covid 19** Eight months after falling ill with covid-19 and hospitalized for 2 weeks (4 days in ICU won ventilator), in early 2022, a 73-year-old man in Bengaluru city couldn't remember what his wife had told him a few hours before. He would forget to remove laundry from the washing machine at the end of the cycle. He would turn on the tap at a sink and walk away. Before covid, the man had been doing bookkeeping for a local business house, now, he couldn't add single-digit numbers in his head. When a therapist assessed the man's cognition, his scores were normal. It was not the earliest stage of dementia! Like many people who've contracted covid, this man was having difficulty sustaining attention, organizing activities, and multitasking. He complained of brain fog and didn't feel like himself. Providing cognitive rehabilitation to the patient, by an occupational therapist helped him getting better and almost normal by end of October 2022.

3) **Cognitive Rehabilitation for Autism Children Mental Status:** In an Anganwadi centre in Gadag district, Karnataka one of our MPH scholars (an Occupational Therapy graduate) observed the behaviour of the autism children for day-to-day activities with the simple query related to children's language understanding. Observing the 5 autism children (3boys and 2 girls) in the age between 3 to 6 yrs.) The support of therapist gave promising improvement over the behaviour in the virtual interactive environment and enhanced their cognitive rehabilitation. Each level the therapist repeated the level, wherever children not responding. Observation results gave the children interact with virtual world with happy and positive emotions. In all the levels we incorporated children native colloquial language (Kannada) for the instruction, queries and appreciated when they interacted well. Later tracked their face, eyeball movement and predicted the mental status of the children in detail, that improved overall mental status of those autism children over a period of 9 months [10]

4) **Cognitive retraining in moderate and severe traumatic brain injury**

This is an autobiographic case report of myself, I am an elderly male of 76 years, with an average built and known diabetic for 30 years and having undergone CABG in August 2005. On the fateful night of 17 August 2021, after the day's lunch I had food poisoning symptoms of diarrhoea from around 1900hrs of the evening. Around midnight (0230 of 18 /08/21) after the fourth episode of purging and getting up from the commode, got rigors and collapsed, my head hitting the commode. Following the fall, I was unable to stand up but managed to crawl and reach the bed and went into syncope without even recognizing the bleeding injury and had lost consciousness till 0700 hrs. It is only in the morning I noticed that entire pillow, bedsheets, and my shirt was drenched with blood. Touching the head, I noticed a cut, and clotted blood with little active oozing. I managed to clean the wound with warmwater and

put-up a tight bandage with a handkerchief on my head approximating the cut ends of the lacerated wound. Reached a private surgery around 0900hrs. On Physical examination, i. a lacerated half-moon shaped wound on the left occipital region. ii. GCS score was 15.iii. BP- 110/60 mm Hg and iv. SPO2- 92%. V. CT/BT & Hemogram- Normal, vi. Hb-10G%. CT scan had revealed a) small vessel ischaemic changes in bilateral periventricular regions, b) No evidence of intra/extra-cerebral Haematoma and c) No evidence of Fracture. The wound in about 2 weeks. There were minor no neurological /psychological manifestations like decreased concentration, easy distractions, short term memory loss. No executive functional disturbance was observed as I could address my PG scholar before I left for Bengaluru for further treatment. I Started taking my routine morning walk on 5th day after injury increasing from 1 km to 4 km by end of second week. Also started Gym exercises including weight up to 10 Kg by end of third week. In terms of cognitive rehabilitation, after an assessment by a rehabilitation professional who pinpointed cognitive tasks that need attention practiced different memory tasks to improve my memory and did a few multitasking exercises, that resolved the issues in about 4 weeks' time, and I was back to my normal self in 6 weeks' time.

Causes, Types and Magnitude of the Rehabilitation Challenges

The median DALYs per 100,000 persons per year were higher in urban as compared to rural and in men as compared to women (1270 vs 758) in India [7]. The direct impact of COVID-19 in 2020 in India was responsible for 14,100,422 DALYs, consisting of 99.2% YLLs and 0.80% YLDs. DALYs were higher in urban than rural areas (1854 vs 646) and in men (64%) than women (36%). In absolute terms, the highest DALYs occurred in the 51–60-year-old age group (28%) but the highest DALYs per 100,000 persons were estimated for the 71–80 years old age group (5481). There were 4,815,908 DALYs after considering reported COVID-19 deaths only [7]. The changing demographics, Cerebrovascular accidents, Traumatic brain injuries, cerebral palsy, Autism, mental health, down syndrome and other the disability trends, and since early 2020 Long Covid 19 brain fogging cases have experienced the problems in accessing physical medicine and rehabilitation services and human resource, exposing the unmet needs both at present and anticipated in future.

Ageing

Aging is associated with cataracts, hearing loss, osteoarthritis, osteoporosis, sarcopenia, issues with bodily balance, frailty, and psychological problems, amongst many other impairments. With the rise in the elderly population, the demand for holistic care is growing. Most of these impairments can result in physical and cognitive disability. As people age, there are increased chances of developing multisystem morbidities, and once disabled, there are high chances of deterioration and decreased likelihood of recovering from illnesses. Long covid 19 cognitive limitations have added fuel to the fire. Declining regenerative and repair capability in old age makes focused preventive strategies vital [1,2].

Cardiovascular disability (CVD)

In India the early age of CVDs disease onset in the population, and the high case fatality rate cardiovascular disease, particularly strokes epidemic along with epidemiological transition from predominantly infectious disease to noncommunicable diseases has occurred over a relatively brief period in India. Cardiac rehabilitation will prevent cardiac incidents to a considerable degree in the first place, decrease recurrence, and enable the survivors to lead a relatively safe, independent, and productive life. Cardiac rehabilitation includes preventive strategies before any major catastrophe in addition to techniques and coping strategies after any cardiovascular event, such as myocardial infarction and cerebrovascular incidents [1,2].

Pulmonary disability and COVID-19

Disability-adjusted life year loss due to respiratory diseases has increased in India from 1990 to 2020. Chronic obstructive pulmonary disease is one of the most everyday illnesses that can benefit from pulmonary rehabilitation. The current COVID-19 pandemic has put pressure on existing health-care systems around the world. Many people are predicted to become critically ill with acute respiratory distress syndrome and require intensive care unit management. High levels of physical, cognitive, and psychosocial impairments are reported. Innovative approaches to care, like tele-rehabilitation, started by NIMHANS Bengaluru, the telemedicine, cloud clinics with its legal validity & implications are needed in this environment [1,2].

Chronic pain syndromes

Global chronic pain prevalence survey found that 19.3% of the Indian adult population suffers from chronic pain. Chronic pain is a growing problem. It becomes complex due to underreporting, inadequate treatment, and under recognition in developing countries. Half of the surveyed people belonged to the rural areas. Data in the Indian population are lacking, and, therefore, reliance on global data. The World Health Organization estimates that 80% of patients with severe pain never receive adequate treatment. 71.2% of chronic pain sufferers visit a general practitioner, while only 5% of patients consult a specialist. This shows a lack of awareness about “pain medicine” as a separate specialty among the general population. Ultrasound examination of the musculoskeletal system is a logical extension of clinical examination, which is rarely taught in undergraduate courses and even among post-graduate courses, (except for Radio-diagnosis /Radiotherapy courses) provide limited exposure to training in ultrasonography [2].

Locomotor disability

Approximately 0.6% of the Indian population has locomotor disabilities. Approximately 15–20% of the total disabled children have cerebral palsy. These children are likely to live longer into adulthood. Similarly, with improvements in health care, spinal cord injury (SCI) patients will live longer. They face multiple problems affecting almost all aspects of their life. Acute care, bladder care, bowel care and sexuality, and fertility management all add to the challenges of SCI and the apparent issues in locomotion. Lower limb amputations post road traffic accidents, railway accidents, other trauma, and diabetes form a considerable number, with about 5.5 million Indians having a locomotor disability. Most members of this group are young, active, earning members. Diabetes and vascular insufficiency are likely to lead to an increased risk of amputations with increased longevity [1,23].

Cognitive (Mental disabilities)

Psychiatric rehabilitation is to help individuals with persistent and serious mental illness to develop the emotional, social, and intellectual skills needed to live, learn, and work in the community with the least amount of professional support [5].

Physical therapy (PT), Occupational therapy (OT), Vocational rehabilitation, Speech-language pathology, and Cognitive rehabilitation are the different types of rehab programs aim to improve fitness, energy management, speech, mobility and memory and cognitive functions. Mental health rehabilitation services are vital to people living with severe and enduring illness, and who struggle to manage everyday activities without support. They help people to live more independently and improve quality of life.

Traumatic brain injury (TBI)

TBI is among the significant causes of morbidity and mortality in the present world. Around 1.6 million persons sustain TBI, whereas 200,000 die annually in India, thus highlighting the rising need for appropriate cognitive rehabilitation strategies. Attention process training and tasks for attention deficits, compensatory strategies and errorless learning training for memory deficits, pragmatic language skills and social behaviour

guidance for cognitive-communication disorder, meta-cognitive strategy, and problem-solving training for executive disorder are the mainstay of therapy for cognitive deficits in persons with TBI [5,6,11].

Posttraumatic and post covid 19 deficiencies reported include attention deficits, memory deficits, and disturbances in executive functioning are the mostly seen neurocognitive deficits. Attention and memory deficits may exacerbate or cause additional disturbances in executive function, interpersonal communication skill, and other complex cognitive functions [6,8,9,11].

Covid 19 Pandemics Contribution to urgency of Rehabilitation

COVID-19 is primarily a respiratory disease but up to two thirds of hospitalised patients show evidence of central nervous system (CNS) damage, predominantly ischaemic, in some cases haemorrhagic and occasionally encephalitic. Limited data suggest that the causative SARS-CoV-2 virus may enter the CNS via the nasal mucosa and olfactory fibres, or by haematogenous spread, and is capable of infecting endothelial cells, pericytes and probably neurons. Several aspects of COVID-19 are likely to impact on cognition. Cerebral white matter is particularly vulnerable to ischaemic damage in COVID-19 and is also critically important for cognitive function. There is accumulating evidence that cerebral hypoperfusion accelerates amyloid- β (A β) accumulation and is linked to tau and TDP-43 pathology, and by inducing phosphorylation of α -synuclein at serine-129, ischaemia may also increase the risk of development of Lewy body disease. Current therapies for COVID-19 are understandably focused on supporting respiratory function, preventing thrombosis, and reducing immune activation. Since angiotensin-converting enzyme (ACE)-2 is a receptor for SARS-CoV-2, and ACE inhibitors and angiotensin receptor blockers are predicted to increase ACE-2 expression. Recent meta-analyses have suggested that these medications are protective. COVID-19 is likely to leave an unexpected legacy of long-term neurological complications in a significant number of survivors [6].

A retrospective review of 3,403 patients of confirmed positive for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection, in Birmingham, UK between 1 March 2020 and 31 May 2020, and who underwent neuroimaging indicated that, 167 (4.9%) had neurological signs or symptoms warranting neuroimaging. The most common indications were delirium (44/167, 26%), focal neurology (37/167, 22%), and altered consciousness (34/167, 20%). Neuroimaging showed abnormalities in 23% of patients, with MRI being abnormal in 20 patients and computed tomography (CT) in 18 patients. The most consistent neuroradiological finding was microhaemorrhage with a predilection for the splenium of the corpus callosum (12/20, 60%) followed by acute or subacute infarct (5/20, 25%), watershed white matter hyperintensities (4/20, 20%), and susceptibility changes on susceptibility-weighted imaging (SWI) in the superficial veins (3/20, 15%), acute haemorrhagic necrotising encephalopathy (2/20, 10%), large parenchymal haemorrhage (2/20, 10%), subarachnoid haemorrhage (1/20, 5%), hypoxic-ischaemic changes (1/20, 5%), and acute disseminated encephalomyelitis (ADEM)-like changes (1/20, 5%) [8].

Conclusion: Various imaging patterns on MRI were observed including acute haemorrhagic necrotising encephalopathy, white matter hyperintensities, hypoxic-ischaemic changes, ADEM-like changes, and stroke. Microhaemorrhages were the most common findings. Prolonged hypoxaemia, consumption coagulopathy, and endothelial disruption are the likely pathological drivers and reflect disease severity in this patient cohort. [5,6]

Disability certification:

“Disability certificate” is necessary to access benefits accorded under India’s Rights of Persons with Disabilities Act. A proper assessment of the persons is of utmost importance. Disability certification is intricately

linked to the reservation in educational institutes, jobs, concessions in tickets and taxes, opportunities to avail of loans at reduced interest rates, and monthly pensions. The curriculum of PM and R doctors should include adequate training as they invariably form a part of the disability certification boards. The hallmark of a just society is that it treats its citizens fairly.

Scarcity of rehabilitation services:

A 2018 literature review found that more than 50% of people who require rehabilitation worldwide services do not receive them. Data in India are not available. Several studies from Africa, for example, show that between 62.5% and 82.5% of those needing rehabilitation services don't receive them (Mozambique 62.3%, Malawi 76.2%, Zambia 62.5%, and Lesotho 82.5%).

Discussions:

Stroke: Stroke, or a cerebrovascular accident (CVA), occurs when blood flow is disrupted to the brain. A stroke may occur when one of the arteries providing blood flow to the brain is blocked, or when one of these arteries is ruptured causing a bleed to occur. A stroke impacts one or both sides of the brain, resulting in survivors experiencing different complications. Common ones include cognitive, psychological, and physical problems. Cognitive rehabilitation therapy helps patients with stroke to relearn and compensate with new cognitive strategies to help them live more independently.

Cognitively, stroke survivors often have processing speed, memory, language, attention, executive functioning, visual-spatial skill, and motor skill deficits. If a stroke occurs on the left side of the brain, a stroke survivor may have aphasia or the loss of language. Stroke survivors typically work with speech therapists, occupational therapists, psychologists, and physical therapists to recover and rehabilitate from their stroke. As stroke survivors have complex needs, their cognitive rehabilitation therapy must be adaptable and individualized. With Happy Neuron Pro, clinical providers can provide targeted and customized cognitive rehabilitation therapy for their patients with stroke. From targeting communication complications from the stroke to remembering where they were going in a store, Happy Neuron Pro can help with the rehabilitation of individuals.

Cognitive Rehabilitation for Stroke Patients Targets- i) Executive Function: The ability to enable goal-oriented behaviour, cognitive flexibility, and emotional regulation, ii) Language: Skill to be able to translate sounds into words and generate verbal output, iii) Attention: The ability to focus on tasks and details to complete and use them, iv) Audition: The ability to hear, process, blend, segment, and use sounds to shape behaviour v) Processing Speed: Enables you to perform tasks quickly and accurately, vi) Visual-Spatial Skills: Ability to process incoming visual stimuli, understand spatial relationships between objects, and visualize images and scenarios, vii) Visual Memory: Work on the ability to process, encode, store, and retrieve visual information, viii) Verbal Memory: The ability to remember something written or spoken that was previously learned and ix) Spatial Memory: Enables you to store and retrieve of information needed to plan a route to a desire location [1, 2].

Multiple Sclerosis

Quality of life and social functioning improvements have been demonstrated using CRT for people with MS in whom demyelination of the nervous system causes the damage.

Depression and anxiety

common companions for people who are seriously ill or disabled — also need attention. "A lot of times when people are struggling to manage deficits, they're focusing on what they were able to do in the past and

really mourning that loss of efficiency. There is a large psychological component as well that needs to be managed. [1,2 3]

Post Covid 19 Brain Fogging

In a recent development, some medical centres are offering cognitive rehabilitation to patients with long covid (symptoms that persist several months or longer after an infection that can't be explained by other medical conditions). According to the Centres for Disease Control and Prevention, about 1 in 4 older adults who survive covid have at least one persistent symptom. Experts are enthusiastic about cognitive rehabilitation's potential as anecdotally, a good number of people [with long covid] make significant gains with the right kinds of interventions. Among the post-covid cognitive complaints being addressed are problems with attention, language, information processing, memory, and visual-spatial orientation. A recent review in JAMA Psychiatry found that up to 47% of patients hospitalized in intensive care with covid developed problems of this sort. Meanwhile, a new review in Nature Medicine found that brain fog was 37% more likely in nonhospitalized covid survivors than in comparable peers who had no known covid infections [4,5].

There's emerging evidence that seniors are more likely to experience cognitive challenges post-covid than younger people, a vulnerability attributed to older adults' having other medical conditions.

Caution: Before this kind of therapy can be tried, other problems may need to be addressed, including sleeping enough, maintaining their nutrition and hydration, and getting physical exercise that maintains blood flow and oxygenation to the brain, that impact our cognitive function and communication. Cognitive rehabilitation can help people with mild cognitive impairment, it's not appropriate for people who have advanced dementia [5,6].

Initiating Cognitive Therapy:

Getting help starts with an assessment by a rehabilitation professional to pinpoint cognitive tasks that need attention and determine the severity of a person's difficulties. One person may need help finding words while speaking, for instance, while another may need help with planning and yet another may not be processing information efficiently. Several deficits may be present at the same time. Next comes an effort to understand how patients' cognitive issues that affect their daily lives. Among the questions that therapists will ask, a) "Is this [deficit] showing up at work? At home? Somewhere else? B) Which activities are being affected? C) What's most important to you and what do you want to work on? [4,5].

Therapies in vogue:

1. **Restorative cognitive rehabilitation for attention:** To try to restore brain circuits that have been damaged, patients may be prescribed a series of repetitive exercises. If attention is the issue, a therapist might tap a finger on the table once or twice and ask a patient to do the same, repeating it multiple times. This intervention is known as restorative cognitive rehabilitation. "It isn't easy because it's so monotonous and someone can easily lose attentional focus, But it's a kind of muscle building for the brain."
2. **Multi-tasking:** A therapist might then ask the patient to do two things at once: repeat the tapping task while answering questions about their personal background, for instance. Now the brain has to split attention, a much more demanding task, building connections in right place.
3. **Impairments that interfere with people's daily lives:** A therapist will work on practical strategies with patients, like making lists, setting alarms or reminders, breaking down tasks into steps, balancing activity with rest, figuring out how to conserve energy, and learning how to slow down and assess what needs to be done before acting.
4. **Memory Aids:** Current evidence shows that "older adults can learn to use these strategies and they enhance their everyday life. Along

the way, patients and therapists discuss what worked well and what didn't, and practice useful skills, such as using calendars or notebooks as memory aids.

5. **Self-Steering:** As patients become more aware of where difficulties occur and why, they can prepare for them, and they start seeing improvement.

NIMHANS Bengaluru has been conducting neuropsychiatric exams on patients who come to its post-covid clinic. About 67% have mild to moderate cognitive dysfunction at least three months after being infected. When cognitive rehabilitation is recommended, patients usually meet with therapists once or twice a week for two to three months [4,7,5].

Other Challenges:

Health Insurance: Existing Health Insurance policies in India (Medicare) usually do not cover cognitive rehabilitation (patients may need to contribute a co-payment), but Medicare Advantage plans may differ in the type and length of therapy they'll approve and how much they'll reimburse providers — an issue that can affect access to care [2,3].

Information Gap:

Many people, even medical professionals know about cognitive rehabilitation or understand what it does, and it remains underutilized." Primary care practitioner-led cognitive rehabilitation is preferred as that ensures individualized assessment, feedback, and coaching. Experts don't recommend digital brain-training programs marketed to consumers as a substitute [2].

Primary care physicians' responsibility to decide when and to whom to Refer:

On noticing cognitive changes of concern, a primary care physician must refer to an occupational or speech therapist, who have experience in addressing memory and thinking issues in daily life [1,2].

Misconceptions about rehabilitation:

Rehabilitation is not only for people with long-term or physical impairments. Rehabilitation is a core health service for anyone with an acute or chronic health condition, impairment or injury that limits functioning, and as such should be available for anyone who needs it.

Rehabilitation is not a luxury health service that is available only for those who can afford it., Nor is it an optional service to try only when other interventions to prevent or cure a health condition fail.

Full extent of the social, economic and health benefits of rehabilitation: Timely, high quality and affordable rehabilitation interventions should be available to all as soon as a health condition is noted and continuing to deliver rehabilitation alongside other health interventions [2].

Unmet global need for rehabilitation:

Globally, about 2.4 billion people are currently living with a health condition that benefits from rehabilitation. With changes taking place in the health and characteristics of the population worldwide, this estimated need for rehabilitation is only going to increase in the coming years. People are living longer, with the number of people over 60 years of age predicted to double by 2050, and more people are living with chronic diseases such as diabetes, stroke, and cancer. At the same time, the ongoing incidence of injury (such as a burn) and child developmental conditions (such as cerebral palsy) persist. These health conditions impact an individual's functioning and are linked to increased levels of disability, for which rehabilitation is essential.

In many parts of the world, this increasing need for rehabilitation is going largely unmet. More than half of people living in some low- and middle-income countries who require rehabilitation services do not receive them. Rehabilitation services are consistently amongst the health services most severely disrupted by the COVID-19 pandemic.

Enhanced quality of health care has resulted in a population living longer than ever before; however, the increased life expectancy comes with issues about the quality of life. Health care in India faces newer challenges, predominantly concerning conditions afflicting the geriatric

age group and the increased prevalence of noncommunicable diseases. In the wake of Covid 19 pandemic since early 2020, the challenge is especially relevant to physical medicine and rehabilitation (PM and R), a specialty focused on enhancing the quality of life by improving functional outcomes. Psychiatrists (PM and R specialists) will find themselves in higher demand in times to come.

Summary:

- Enhanced quality of health care has resulted in a population living longer than ever before, which comes with issues about the quality of life. The changing demographics, ageing population, non-communicable conditions like Stroke or Cerebrovascular accidents Traumatic brain injuries, the disability trends, depression, and anxieties and of late, post long Covid 19 brain fogging have become common companions for people who were seriously ill or disabled.
- Often people struggle to manage deficits, focusing hard on what they were doing the past easily and mourning that loss of efficiency. There is a large psychological component that needs to be managed and poses a big challenge in existing physical medicine and rehabilitation human resource constraints.
- Most of the current population need rehabilitation at some point in their lives, following an injury, surgery, disease, or illness, or age resulting declined brain functioning
- Globally, about 2.4 billion people are currently living with a health condition that benefits from rehabilitation. More than 50% of people who require rehabilitation worldwide services do not receive them. Data in India are not available, but projected to be over 60%
- Health care in India faces newer challenges, predominantly concerning conditions afflicting the geriatric age group and the increased prevalence of noncommunicable diseases.
- Since early 2020, the challenge is especially relevant to physical medicine and rehabilitation (PM and R), a specialty focused on enhancing the quality of life by improving functional outcomes.

Way Forwards:

- ✚ Rehabilitation in general and cognitive rehabilitation is a core health service for anyone with an acute or chronic health condition, impairment or injury that limits functioning, and as such should be available as everyone needs it sometimes in lifetime.
- ✚ The national and State governments must promote the professional discipline that helps the most with cognitive rehabilitation medicine."

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