

Regulating Cognitive, Emotional and Behavioral Symptoms Following a Diagnosis of Neurological Disorders

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Abstract

Neurological diseases - both cortical and subcortical in nature - including disorders of memory, movement and different types of brain injuries lead to several changes in different circuits of the brain along with chemical fluctuations and sizes of different brain structures. While some of the functions can be restored or compensated for, others are degenerative in nature. Neuropsychological Rehabilitation and Cognitive Stimulation Therapy have proven to be effective and holistic approaches in working with clients diagnosed with neurological disorders alongside pharmacological interventions. This article explores several ways in which one can slow and/or reverse the progression of cognitive and behavioral deterioration by improving the overall well-being and quality of life.

Keywords: *Neurological Disorders; Quality of Life; Cognitive and Behavioral Deterioration*

Introduction

A disorder of the nervous system, neurological disease are often caused due to chemical and electrical imbalance in the brain. Over the years, there have been numerous researches conducted on the different types of neurological disorders, the manifestation, the progression and the treatment options available. Neuroscientists, neurobiologists, neurologists and neuropsychologists are often intrigued by the complexity of these disorders. While some have a gradual and insidious onset with irreversible changes, some are sudden with a rapid progression, however reversible in nature. With the changing lifestyle, the rate of neurological diseases is increasing at an alarming rate. However, on the brighter side, biomarkers aid in early detection. Because of this, pharmacotherapy along with long term neuroprotective lifestyle changes have lowered the mortality rate. Although, we still are in short of mental health professionals for the same. Despite this, neurological diseases continue to remain the second leading cause of deaths in the world after cardiovascular disease.

Neurological disorders could affect the central and the peripheral nervous system, neuromuscular joints and muscles. It encompasses Alzheimer's disease, fronto-temporal dementia, vascular dementia, epilepsy, Parkinson's disease, acquired brain injury including stroke, neuroinfections, brain tumors, multiple sclerosis, headaches including migraines, disability and bacterial/infection in the brain. Research conducted in 2018 highlights that the highest number of deaths are caused due to stroke, followed by Alzheimer's disease, epilepsy, traumatic brain injury and Parkinson's disease. With the alarming rate, several questions about the prevention of these neurological diseases have been raised. Are these reversible? Can the progression be slowed? Are there medicines available to prevent these disorders? The answer is, that it is possible.

Theoretical framework

There are several reasons for neurological diseases to set in. It can be due to thought process, lifestyle, emotions and genetic disposition. Let's explore each domain to understand the framework of neurological diseases.

When we think of our lifespan we are often focused on our physical body - the heart, bones, kidneys, etc. We view ageing through this physical paradigm has resulted in the disregard of a pertinent factor that influences it, our thoughts. In 2009, Elizabeth Blackburn, Carol Greider and Jack Szostak won The Nobel Prize in Medicine for their discovery of how chromosomes are protected by telomeres and the enzyme telomerase.

Telomeres occur at the ends of chromosomes and keep the genetic material from unravelling. With every cell division, the telomeres length shorten and eventually stop dividing. Their research shed light on how cells become senescent.

Blackburn along with health psychologist Elissa Epel focused on chronic stress and its effects on cell senescence. Their findings shed light on the concept of 'Health span' and 'Disease span'. Our Health span refers to the part of our lifespan that we spend healthy and disease free. The Disease span refers to the part of our lifespan when our cells become senescent resulting in what we often refer to as ageing.

Their research led to an understanding of how thought processes affect telomeres length. Five different types of thought processes were found to be associated with shortened telomeres and hence, cell senescent. Cynical Hostility, a high anger and mistrusting emotional style resulted in a poor response to stress that were associated with shortened telomeres. Pessimism, the thought pattern resulting in constantly thinking and anticipating that something negative is about to happen, was associated with ageing diseases and overall poor health. Negative mind-wandering, the inability to focus on a single task, was linked to shorter telomeres. Thought suppression or an attempt to push away unwanted thought and feelings was found to be associated with chronic stress and depression. Rumination was found to be associated with an increased stress experience. It is also linked to depression and anxiety which in themselves negatively affect telomeres.

However, what was also found was that changing these thought processes could be beneficial, with findings that treatment for anxiety results in telomeres returning to their normal length. This highlights the power every individual has in influencing their ageing process. Changing thought processes through psychotherapy or mindfulness based interventions have been found to decrease stress directly influencing your telomeres. This change can dramatically change people's lifespan - helping keep the Disease span at bay.

Through research and practice we are now aware that the mind and body are linked. However, there still continues to remain a high number of patients that visit professionals for physical health concerns rather than psychological. This can be attributed to existing stigma, but a greater and more important factor is the lack of knowledge associated with mental illness and psychological concerns. Often time's patients come in with their own hypotheses backed up by research done on Google. As professionals it is important for us to know more about the brain-body connection in order to guide our patients and gain a holistic view of their presenting concerns.

Our body responds to the way we think and feel. When we are anxious, stressed or upset our body responds in a way that indicates that we are not well. Psychological factors such as negative thoughts and emotions, as well as mental illnesses such as depression and anxiety have been linked to medical and psychogenic conditions. Oftentimes, patients are misdiagnosed and visit one professional after another because there is a lack of understanding about the part mental health has to play in the problem or condition that has arisen. This leads to increased distress and hospital admittances and/or visits.

We now know that poor emotional health can weaken our body's immune system making us more susceptible to infections, disease, long-standing pain, hypertension, digestive disorders and cardiovascular disease. Various research studies have found that chronic stress leads to changes within the brain. Researchers have discovered that the prefrontal cortex and hippocampus are affected by stress causing

a decline in cognitive performance, specifically difficulties with consolidation of memory, retrieval and working memory [1].

Speaking about the impact of poor emotional health, another study examined how anger and other negative emotions can trigger a stroke. It was found that people who had suffered strokes experienced startle reactions, anger, and negative emotions such as fear, irritability or nervousness just a few hours before the stroke occurred. This gives us insight into how specific emotions can increase the risk of stroke.

Taking the above information into consideration as well as the numerous research studies and evidence that state how our emotional health can affect our brain health, we can remodel our evaluations and treatment procedures to look at the concerns holistically.

Neuroprotective changes can slow down the progression by managing neurocognitive, neurobehavioral and psychosocial changes following a neurological concern.

Neuroprotection refers to those mechanisms that protect the brain and the spinal cord. The neuroprotective factors cannot reverse the condition, however, they have been proven to reduce the progression of these neurological diseases. Neuroprotective lifestyle changes include adequate sleep, nutrition, physical exercise, psychotherapy, cognitive stimulation, socialisation, travel and mindfulness meditation.

A question that we may have thought of or come across at some point is: Is the brain static or is there room for change? For a long time it was believed that when we age, the connections in the brain become static and start to fade. A plethora of research has demonstrated that the brain does have an ability to change throughout a person's life through something known as neuroplasticity. Like the computer receives software updates, our brain can actually receive hardware updates. When we learn something new, we create new connections between our neurons. We rewire our brains to adapt to new circumstances. This happens on a daily basis, but it's also something that we can encourage and stimulate. Different pathways firm and fall dormant based on our experiences. Cognitively stimulating activities such as playing board games, intellectual conversations, learning a new language or an instrument, requires higher cognitive demand, executive functioning as well as speed of processing. Cognitive engagement is said to prevent cognitive decline as well as accumulation of the beta-amyloid, which is a precursor to Alzheimer's Disease. Research shows that engaging in cognitively challenging activities from a young age confers greater protection of the neurons, which ultimately enhances cognition. Brain scans have shown activation in the frontoparietal, lateral temporal and parietal cortex, areas involved in attention, memory and semantic processing, while the person is engaged in a mentally challenging activity. Such activities can be neuroprotective in nature and play an important role in living brain health during/ in late adulthood.

Neuropsychological Rehabilitation (NR) is concerned with amelioration of cognitive, social and emotional deficits caused due to an insult to the brain [2]. When rehabilitation was brain injury is conducted by a trained professional, it enables the client to reach an optimum level of functioning by using theories of neuroplasticity and synaptogenesis to improve the overall independence and quality of life. Different interventions are designed and tailor made based on the client's premorbid functioning and the brain areas and circuits affected. Progress is tracked at regular intervals to monitor the progress and revise the goals if needed. NR is a holistic approach that encompasses different types of therapeutic approaches such as cognitive rehabilitation, physiotherapy, occupational therapy, speech therapy and psychotherapy.

Stress is another major cause of neurological disease. Release of stress related chemicals, cortisol is a precipitating factor for several diseases and disorders. The way one responds to stressful situations could either be, being threatened by it or taking it up as a challenge and being confident about a positive outcome. Our predominant way of reacting to a stressful situation, overtime, paves its way to the cells and grinds down to our telomeres. A challenge response shields the telomeres from the worst effects and a threat response reacts opposite to this. Make an effort to be stress resilient and improve your health.

Interpersonal/social relationships add value and meaning to life. The experience of being valued, cared about and loved by others who are present in one's life acts as a buffer against life stressors and promotes health or wellness in the elderly. An effort to provide social support will aid in building confidence and esteem about adequate support being present when needed. This also provides them with a sense of meaning and purpose. This positive perception of social support may act as a predictor for lesser risk to telomeres and to psychological problems. A quest for maintaining and celebrating relationships should be present from both the sides which is applicable to families, friends, relatives and all the acquaintances you meet in your day to day life.

Something that is so automatic and beneficial, but less valued. What we commonly know about sleep is that any adult requires 7 - 8 hours of sleep. Counting of hours is definitely important but so is measuring the soundness. Common parameters to measure how well you sleep could be that you typically fall asleep in 30 minutes or less, not have more than one awakening at night and drift back to sleep within 20 minutes if you do wake up. It is more about the quality than the quantity that matters. Sleep often helps consolidate information. It is the state in which the brain is at rest. This often enhances productivity and is an important component for holistic health.

Recreational activities such as music, dance, art, learning novel tasks have also proven to be beneficial. An amalgamation of sound, rhythms and words, music has the power to uplift or dampen our mood, transport us back to our childhood, or take us to a place we have never been before. It can evoke strong emotional responses in us that can motivate and inspire us. It is also not without reason that we listen to music to get us motivated to exercise. Recent studies have labeled music as an ergogenic aid, an aid that enhances performance during physical exercise.

Research has shown that listening to music activates the pleasure centres of the brain, resulting in the release of dopamine. Dopamine, the "feel good" neurotransmitter, is important for arousal, movement, motivation, and mood. It makes us feel happy, and we tend to be more motivated when dopamine is released in the brain. The rhythmic and repetitive nature of music is also known to release endorphins, or the natural painkillers in the body, that instantly uplift our mood. It is also known to relax our muscles and release tension. Thus, even when we are not in the best of moods, and we listen to relatively sad music, we tend to become more relaxed and that itself makes us feel better.

Dancing on the other hand is a physical activity and produces endorphins. Endorphins are hormones produced by your central nervous system and pituitary gland which are responsible for a feeling of euphoria. It plays an important role in neuroplasticity and produces a stronger long-term memory.

Lastly, mindfulness meditation has proven to be effective and plays an integral role in neurological diseases. The regular practice of mindfulness can lead to various physical benefits. Not only does a regular dose of mindfulness help increase our body's immunity, but also reduces the likelihood of cell damage. Routine practice of mindfulness has been shown to improve sleep as well as lower one's blood pressure. Furthermore, according to a study published in the *Journal of Neuroscience*, after just 4 days of mindfulness meditation participants who practiced reported pain reduction by nearly half as compared to those who did not practice. In addition to the multitude of physical benefits, mindfulness is shown to better one's mental health as well. A periodic practice of mindfulness in everyday life has been scientifically proven to lessen feelings of depression and anxiety. Additionally, research shows that individuals that have integrated mindfulness into their lives have enhanced memory and find themselves being less absentminded. Mindfulness meditation enables one to direct their focus and not get distracted by irrelevant or repetitive thoughts. Adding to its long list of benefits, mindfulness improves emotional health by boosting confidence and enhancing one's ability to manage emotions. It has been revealed that mindfulness even induces feelings of satisfaction leading to an increase in levels of dopamine and endorphins, elevating one's mood [3-13].

Conclusion

While neurological diseases are preventable, we can start by taking small steps now by incorporating different strategies to help us enhance the quality of life and improve the overall well-being. Adopting these neuroprotective lifestyle changes can slow the progression

of neurodegenerative disorders, improve reversibility of deterioration for some neurological disorders as well as reduce the comorbidities that could arise because of the same.

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