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Neural Retraining Project Highlights

Because of your generous support, researchers at the University of Calgary and University of Alberta are collaborating to discover effective treatments for millions of individuals suffering from debilitating chronic conditions.

With a focus on determining the effectiveness of mind-body interventions (MBIs) on three conditions — myalgic encephalomyelitis/chronic Fatigue Syndrome (ME/CFS), multiple chemical sensitivities (MCS), and fibromyalgia syndrome (FMS) — the project may help guide future intervention strategies for these populations.

Myalgic encephalomyelitis/chronic fatigue syndrome (ME/CFS) is distinguished by disabling fatigue associated with other neurological and cognitive changes, including insufficient motor function, pain and sleep problems. Multiple chemical sensitivities (MCS) is a poorly understood condition in which individuals develop physical, cognitive and psychological symptoms after being exposed to low concentrations of one or more chemicals. Fibromyalgia syndrome (FMS) is a chronic disease that manifests itself in musculoskeletal pain, fatigue, sleep disturbances, cognitive dysfunction, stiffness, headaches and mood disorders like depression, anxiety and stress.

Mind-body interventions harness the complex interaction between mind and body to improve health and well-being. Some mind-body therapies include progressive muscle relaxation, guided imagery, hypnosis, meditation, Tai Chi, Qigong, yoga and biofeedback. Newer approaches are targeting the brain's ability to change through repeated purposeful thoughts, feelings or behaviours.

Completion of first phase informs creation of clinical trials protocol

The first stage of this three-phase study included a systematic review of previously published research to understand what is already known about MBIs as they relate to the conditions being investigated. (*see attached timeline*). Informed by first phase, the second is underway with the development of a mixed methods clinical trial protocol to assess the effectiveness of MBIs for the three populations. Completion of the second phase should be complete by the end of 2019, with a pilot clinical trial kicking off phase three in 2020.

Through literature searches (more than 300 documents) screening and data extraction in phase one, the teams at the Integrative Health Institute at the University of Alberta and Cumming School of Medicine at UCalgary found the most frequently used interventions for ME/CFS were mindful-based cognitive therapy and Qigong, with the most commonly measured outcomes being fatigue severity, anxiety and depression, and quality of life.

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They concluded that MBIs significantly improved total fatigue, physical and mental fatigue severity, depression and anxiety scores, and quality of life.

In the case of MCS, the studies compared mindful-based cognitive therapy (MBCT) to usual treatment with measured outcomes of symptom severity, chemical exposures, life impact, patients' cognitive and emotional representation of their illness, and anxiety and depression. No significant differences were observed in the areas of interest in past studies.

For FMS, the most commonly studied interventions include mindfulness training, biofeedback — the electronic monitoring of a normally automatic bodily function such as heart rate — and guided imagery, with measured outcomes of pain, depression, perceived stress, sleep quality and health-related quality of life. The teams found that mindfulness interventions appear to be the most helpful for improving social engagement and relieving the widest range of symptoms, including depression, tension, stress, anger, anxiety, distress and sleep quality.

With MBIs having varying results depending on the condition — some significantly improving symptoms in patients affected by them — these findings are being submitted for publication ahead of the next phase of the project.

Having a deeper understanding of previous conclusions, the collaboration's researchers are now developing protocols and building the outline for the study's clinical trials combining quantitative, qualitative and neuroimaging methods to evaluate the impact of Dynamic Neural Retraining Systems. This step includes outlines of the populations to be used (ages, diagnoses, exclusion criteria such as medication risks or pregnancy) as well as the trial's hypothesis and expected outcomes, and how they will be measured.

A plan on how to synthesize and translate all the data is also being developed. A randomized controlled trial is among the most rigorous methods for evaluating an intervention, including causality (linking the intervention to the outcome).

Your support through salaries and materials has helped build the foundation of the project, create a collaborative environment and foster mentorship with junior researchers. These relationships spark interest in the work for future generations and secure the sustainability and progression of research.

This momentum will help in leveraging additional support from public funding agencies as well as others with aligned interests to fuel phase three, ultimately providing new avenues of intervention and resources in the area of neuroplasticity.

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