[KO] - *Do cognitive behavioral therapy skills classes increase a resiliency-related brain connectivity pattern to posttraumatic stress disorder?*

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Priority Research Area: N/A

Relevant PSP Population(s): We are recruiting paramedics and firefighters but the study finding is likely generalizable to other PSPs.

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What is the issue? Cognitive behavioral therapy (CBT) is commonly prescribed to treat PTSD, and recent studies suggest that it may be effective in preventing the condition. We have developed a 5-session class focused on teaching introductory CBT skills and mindfulness training (CBTm) to prevent and manage psychological distress. A clinical trial to test its efficacy in preventing PTSD and related conditions in PSP is now on-going, and the preliminary data suggests very promising results. However the neurophysiological underpinnings of increased resiliency is yet to be understood.

What was the aim of the study? The objective of our study is to develop quantifiable imaging-based biomarkers and to broaden our understanding on the neural underpinnings of CBTm effects. We will identify the brain connectivity patterns that are specifically involved with therapeutic benefits associated with the CBTm class. This may help us to understand why some individuals benefit from CBTm classes while others do not. For example, three different brain connectivity patterns have been identified to be related with PTSD, namely, the central executive network, salience network, and default mode network (related with resting state). We will test which of these network connectivity are strengthened or weakened by CBTm classes, and investigate whether there is a new brain connectivity pattern (other than those three networks) that is responsible for CBTm-related resilience-building. To our knowledge, this will be the first study to demonstrate the neural underpinnings of a proposed, preventive psychological intervention for PTSD.

How was the study conducted? The plan was to recruit 40 PSPs without PTSD from our on-going clinical trial that involves 120 PSPs. In the parent study, three blocks of CBTm classes were to be offered to ~40 PSPs per block, and two blocks of classes were completed before COVID-19 pandemic in March 2020. Before COVID-19, 30 PSPs were enrolled in our brain imaging study. Fourteen of these individuals underwent CBTm classes and 16 were waitlisted. Participants had been assessed by psychiatric diagnostic assessments and MRI at baseline, after 5-week CBTm (or waitlist) and at 3-month follow-up.

What did the study find? The study is still on-going, and it will be resumed when we are allowed to assess our participants. At the moment, all MRI studies that involve healthy volunteers are suspended at University of Manitoba.

What are the implications of this study? In the proposed brain imaging study, we will characterize the brain connectivity profile that is specific to the resilience of PTSD. Understanding the neural underpinnings and developing an objective imaging-based biomarker will aid novel therapeutic approach discovery. The proposed project's potential application includes development of imaging-based biomarkers for clinical trials targeting the prevention of PTSD. While comprehensive psychodiagnostics assessment will remain the gold standard for a treatment biomarker, changes in imaging-based variables will help in the objective assessment of the effect of

experimental interventions (such as online CBTm) as well as providing direct or indirect evidence of the underlying neural mechanisms. We will also be able to examine how well MRI findings converge with scores on self-report measures of PTSD symptoms and psychological resilience.

What are the key messages? The study is still on-going and we have not completed data collection which is interrupted by COVID-19 crisis. This will be updated after the study is completed.

Provide a list of potential target audiences for this research: Researchers and clinicians in the field of PTSD and brain imaging; PSP personnel involved in recruiting and training new members.