An Exploration of Stress Reactivity and Mindfulness Meditation in Individuals with Migraine with the use of Heart Rate Variability & Pupillometry

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According to data collected by Statistics Canada in 2010/2011, 2.7 million Canadians reported they had been diagnosed with migraine headaches (Ramage-Morin & Gilmour, 2014). Current research suggests associations between migraine headaches and the autonomic nervous system (ANS) are due to imbalance in the activity of the parasympathetic and sympathetic branches. Mindfulness meditation (MM) has demonstrated effectiveness in alleviating psychological distress related to chronic pain and headache conditions. In addition, mindfulness meditation has been shown to enhance heart rate variability and decrease pupil diameter—vagally-mediated markers of ANS balance. This study examines HRV and pupillometry during cognitive stress and mindfulness meditation in individuals with migraine headaches.

A pilot study was completed illustrating increased HRV after mindfulness meditation in those with migraines and tension-type headaches. This study aims to correct several issues with the previous study including accounting for psychological conditions comorbid with migraine headaches. In addition, this study will only include those with migraine headaches (as categorized by the International Classification of Headache Disorders, 3rd edition). This study aims to examine i) HRV in migraineurs compared to migraine-free, ii) stress-reactivity and stress-recovery using MM for all participants, 3) examine the relationship between psychological comorbidities associated with migraine (e.g. depression) and HRV before and after stress induction. Stress reactivity readings in the aftermath of a stressful task are expected to reveal a prolonged period of sympathetic nervous system activity that can be counteracted through MM practice. Participants are expected to exhibit significantly greater heart rate variability in MM conditions, compared to a mindfulness meditation description. This study will look at the effectiveness of MM as a potential treatment for migraines. This study is novel for several reasons. This is the first study that examines PD and HRV in those with migraines. It is also the first to examine migraines, PD, and HRV during stress. Lastly, there have been no studies on HRV, PD and MM in those with migraines.