The Effect of Mindfulness on Cognition & Self-Monitoring After Acquired Brain Injury

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Background

- Mindfulness programs have been explored as a possible intervention to address the comorbid cognitive, metacognitive, and emotional impacts of ABI.
- Bishop and colleagues (2004) suggest that two components of mindfulness - namely, self-regulation of attention and orientation of experience - impact cognition and mood by promoting acknowledgement of present experiences.
- The activation of various areas of the brain during sustained and switching attention suggests that mindfulness plays a role in developing more effective mental processing (Bishop et al., 2004; Kabat-Zinn, 2013).
- A systematic review conducted by Link and colleagues (2016) found that areas of the brainstem, left temporal lobe, hippocampus, right orbital frontal cortex, and right thalamus had increased gray matter density following mindfulness-based intervention for post-TBI individuals. In effect, this is vital for executive functioning, memory, self-awareness, and mood may improve in functionality following direct training in mindfulness.
- Given that many of the deficits seen in post-ABI individuals mirror the deficits that mindfulness-based interventions target, research should focus on how mindfulness programs can fit into a clinical model or rehabilitation, in which time and resources may be limiting factors.

Objectives

Specific aims of this study are as follows:
1. To determine the feasibility of a mindfulness-based intervention program at an inpatient clinic for individuals with acquired brain injury.
2. To determine if mindfulness can be taught in the population of acquired brain injury in a three-week program combining in-person group training and individual practice.
3. To measure the impact of mindfulness-based intervention on:
   a. Areas of cognition (memory and attention) for individuals with acquired brain injury
   b. Self-monitoring for individuals with acquired brain injury
   c. Mood for individuals with acquired brain injury

The primary purpose of this poster is to report the findings of Aim 3.

Methods

Setting

A three-week mindfulness program was conducted at Shepherd Pathways, an inpatient rehabilitation hospital serving individuals with brain and spinal cord injuries in Decatur, Georgia.

Participants were quasi-randomized based on time of admission into either the mindfulness group or the control group.

- The control group receives treatment as usual.

Mindfulness Program

The three-week mindfulness program was adapted from Dr. Kabat-Zinn’s Mindfulness-Based Stress Reduction (MBSR) and was comprised of:
- An in-person group mindfulness program that met twice a week for an hour;
- Lab sessions, in which participants listened to audio and wrote journal entries on an IPad, were conducted three times for a week.

Analysis

- Because of variability and non-normal distribution, nonparametric statistics were applied to pre- and post-differences through a Wilcoxon rank sign test.
- Current analyses consider differences within group only.

- Group comparisons below are for illustration only, although as groups become balanced with additional data, between group analyses will be conducted.

Results

<table>
<thead>
<tr>
<th>Experimental</th>
<th>Control</th>
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<tbody>
<tr>
<td>Demographics</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td>Age</td>
<td>29 (15.34)</td>
</tr>
<tr>
<td>Gender</td>
<td>6 males; 3 females</td>
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<tr>
<td>Education Diagnosis</td>
<td>11.89 years (2.96)</td>
</tr>
<tr>
<td>TPO*</td>
<td>1 CVA</td>
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<tr>
<td>TBI</td>
<td>83.88 days (29.28)</td>
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<table>
<thead>
<tr>
<th>PRMQ Retrospective</th>
<th>DASS Depression</th>
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<tbody>
<tr>
<td>Exp Alert</td>
<td>0</td>
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<tr>
<td>Exp Alert</td>
<td>0</td>
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<tr>
<td>Exp Orient</td>
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- **p = .012**
- **p = .057**
- **p = .058**

Discussion

Experimental Group

- Significant improvement within the mindfulness group was observed in measures of sustained attention on four paradigms indicating a normal level memory on post-test (RBMT).
- A positive trend was observed in awareness of self-reported levels of emotional problems (PRMQ). Participants endorsed more problems, suggestive of increased awareness.
- A positive trend was observed in self-reported feelings of depression, but not anxiety and stress (DASS). However, only two participants had clinically elevated depression scores at baseline, although both benefited from home training.
- A positive trend was observed in functionality of attentional networks related to orienting and conflict, but not alerting (CRSD-ANT). The data indicate improvement in efficiency and attention with spatially-loaded cues following mindfulness.

Control Group

A significant improvement was observed in awareness on the FFMQ – Questions measuring awareness related to controlling daydreaming, distractibility, and accessibility of tasks.
- No significant changes were observed in other scales.
- The poor alerting average in the control’s CRSD-ANT pretest may due to poor effort or the presence of an outlier.

Take-Away

- Mindfulness intervention shows promise for improving cognition, self-monitoring, and mood after ABI.
- Patients reported high acceptability and interest in the program.
- Treatment effectiveness may have been influenced by scheduling and patient attendance.

Future Research

- In order to address Aims 1 and 2, we will analyze journal entries to learn more about participant’s experiences in reflecting on mindfulness. We will investigate dose effect to see if better attendance leads to better outcomes.
- We are continuing to collect data and recruit participants to balance groups by age and diagnosis. We are running another experimental cycle to determine the direction of current trends.
- Future work will further develop the maniulization program and will be tested with individuals with chronic ABI.

Acknowledgments

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Key References