EFFECTS OF AN 8-WEEK SELF-EFFICACY PLUS EXERCISE INTERVENTION ON PHYSICAL ACTIVITY, QUALITY OF LIFE, AND FATIGUE IN AN INDIVIDUAL WITH PROGRESSIVE MS

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Background

Multiple Sclerosis (MS) is characterized by an unpredictable disease course

Persons with MS are...
• Faced with many physical + psychological challenges
• Susceptible to non-adherence to health promoting behaviors secondary to many barriers to adherence
Background - Role of Exercise in MS

Background - Physical Activity

- Persons with MS are less physically active than diseased & non-diseased populations
- <20% are meeting minimal physical activity guidelines
- General Population is relatively inactive
- Starting at a low baseline

Identify factors that correlate with physical activity & are modifiable by an intervention
Decides to start exercising

Helps with symptom management

Increased motivation and perception of ability to exercise

Improved Quality of life

\[\uparrow \text{Symptoms} \]

\[\text{MS Exacerbation} \]

\[\text{Injury} \]

Exercise becomes harder to do

A Viscous Cycle…

Decreased Quality of life

Decreased motivation and perception of ability to exercise

Symptoms get worse

Stops Exercising

Self-Efficacy

- Extent or strength of **one’s belief in one’s own ability** to complete tasks & reach goals *(Bandura, 2004)*
- Persons with MS with **high self-efficacy** report higher levels of physical activity *(Motl, McAuley, Doerksen, Hu, & Morris, 2009)*
- Emerging research on self-efficacy promoting interventions to increase physical activity in MS *(Jongen & Ruimschotel, 2014; McAuley et al., 2007; Motl, Dlugonski, Wójcicki, McAuley, & Mohr, 2011; Motl et al., 2006; Motl & Snoek, 2008; Suh, Joshi, Olsen, & Motl, 2014)*
- **Little research** has examined a self-efficacy promoting intervention on persons with more advanced MS and/or high disability severity
**Sources of Self-Efficacy Information**

- Modeling by Others
- Performance Accomplishments (Past Experience)
- Social Persuasion (coaching & evaluative feedback)
- Psychological & Emotional States

**Behavior/Performance**

(Bandura, 2004)

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**Objective**

Analyze the effects of a **self-efficacy + exercise intervention** in a middle-aged individual with **advanced MS & low self-reported self-efficacy** on:

- Self-Efficacy
- Physical activity
- Quality of life
- Fatigue
**Functional Baseline/Characteristics**

- 60 year old Caucasian female with SPMS
- 21 years since diagnosis of MS
- EDSS score: >7
- **Most disabling symptoms:**
  - Cerebellar ataxia
  - Increased muscle tone in upper & lower extremities
  - Bilateral hip flexor & dorsiflexor contractures
- **Usual Exercise Routine:**
  - **Daily:** Stretches in the morning
  - **3-4 times per week:**
    - Walking down hallway (usually cannot make it entire way)
    - Upper extremity exercises w/o weight
    - “Dancing” by pulling up on grab bars (unable to “dance” through entire 3-4 min song)
    - 10-15 mins on personal NuStep

**Study Design**

- 8 week self-efficacy + exercise Intervention
- 2 Month Follow-up

- **Self-efficacy Component**
  - 1x per week education sessions
  - 4 one-on-one mentor sessions
- **Exercise Component**
  - Review of current exercise routine
  - Modifications to maximize adherence
### Self-Efficacy Component

- Modelling by Others
- Performance Accomplishments (Past Experience)
- Social Persuasion (coaching & evaluative feedback)
- Psychological & Emotional States

**MS Mentor Session**

**Daily Journal + Discussion Sessions**

**Educational Presentations + Discussion Sessions**

**Reflections in Daily Journal**

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**Self-Efficacy**

- Modelling by Others
- MS Mentor Session
- Daily Journal + Discussion Sessions
- Educational Presentations + Discussion Sessions
- Reflections in Daily Journal

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**How did you sleep last night?**

<table>
<thead>
<tr>
<th>Rate your sleep quality from the night before</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fantastic</td>
</tr>
<tr>
<td>0</td>
</tr>
</tbody>
</table>

**Why:**

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**Fatigue Level**

- **Morning** — rate when you first get up in the morning
- **Evening** — rate just before you go to bed

<table>
<thead>
<tr>
<th>Rate</th>
<th>No Fatigue</th>
<th>Mild Fatigue</th>
<th>Moderate Fatigue</th>
<th>Severe Fatigue</th>
<th>Worst Possible Fatigue</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

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**Was today a “Good” or “Bad” day?**

- **It was a GOOD day**
- **It was a BAD day**

**Why:**

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**Activity Log**

- List what you did for physical activity today (should include exercises, community outings, etc.)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Duration, Frequency, Date, Notes, etc.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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**Notes**

- Please use this space to reflect on progress, jot down questions, and any other thoughts. You may use the back of the page if needed.
### Outcome Measures

<table>
<thead>
<tr>
<th>Primary</th>
<th>Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exercise Self-Efficacy</td>
<td>Exercise Self-Efficacy Scale (ESES)</td>
</tr>
<tr>
<td>Self-Efficacy to overcome MS-related Barriers</td>
<td>MS Self-Efficacy Scale (MS-SES)</td>
</tr>
</tbody>
</table>

#### Quality of Life
- MS Impact Scale 29 (MSIS-29)
- Patient Health Questionnaire 9 (PHQ-9)

#### Fatigue
- Modified Fatigue Impact Scale (MFIS)
- Daily Journal Fatigue ratings

#### Exercise Tolerance
- 5 Meter Walk Test (5MWT)

#### Physical Activity
- Daily activity log
- Accelerometer

### Methods - Overview

- MSIS-29
- ESES
- MFIS
- MS-SES
- PHQ-9

#### 8 week Intervention
- Weekly discussions
- MS-related educational presentations via PowerPoint
- 4 one-on-one sessions with a MS “mentor”
- Current exercise routine modifications & recommendations

#### Ongoing Data
- Accelerometer
- Daily journal

#### 5MWT
- Wk 0 Baseline
- Wk 4 Mid-point
- Wk 8 Post-Intervention

#### 5MWT
- Wk 16 Follow-up
Results – Daily Journal

Intervention

Follow-Up

Weekly Average Rating

Week

Results – Daily Journal

Intervention

Follow-Up

Weekly Average Rating

Week
## Results - Questionnaires

Improved self-efficacy to exercise, perceived fatigue + decreased depression

<table>
<thead>
<tr>
<th>Questionnaire</th>
<th>Week 0</th>
<th>Week 8</th>
<th>Week 16</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESES – Exercise Self-Efficacy</td>
<td>50</td>
<td>90</td>
<td>90</td>
</tr>
<tr>
<td>MSIS-29 - QOL</td>
<td>4.17</td>
<td>3.62</td>
<td>3.62</td>
</tr>
<tr>
<td>MFIS - Fatigue</td>
<td>48</td>
<td>33</td>
<td>39</td>
</tr>
<tr>
<td><strong>MS-SES – Disease Self-Efficacy</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Function</td>
<td>17.78%</td>
<td>21.11%</td>
<td>18.89%</td>
</tr>
<tr>
<td>Control</td>
<td>37.78%</td>
<td>34.44%</td>
<td>37.78%</td>
</tr>
<tr>
<td>Total</td>
<td>27.78%</td>
<td>27.78%</td>
<td>28.33%</td>
</tr>
<tr>
<td>PHQ-9 – Depression (QOL)</td>
<td>15</td>
<td>8</td>
<td>10</td>
</tr>
</tbody>
</table>

## Results – 5MWT

<table>
<thead>
<tr>
<th></th>
<th>Week 0</th>
<th>Week 4</th>
<th>Week 8</th>
<th>Week 16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-walk BP (SBP/DBP)</td>
<td>144/70</td>
<td>137/81</td>
<td>137/81</td>
<td>145/83</td>
</tr>
<tr>
<td>Post-walk BP (SBP/DBP)</td>
<td>142.5/83</td>
<td>116/72</td>
<td>155/95</td>
<td>140/84</td>
</tr>
<tr>
<td>Pre-walk HR (bpm)</td>
<td>73</td>
<td>80</td>
<td>75</td>
<td>70</td>
</tr>
<tr>
<td>Post-walk HR (bpm)</td>
<td>73</td>
<td>71</td>
<td>72</td>
<td>72</td>
</tr>
<tr>
<td>Gait Speed (inches/sec)</td>
<td>0.098</td>
<td>0.123</td>
<td>0.173</td>
<td>0.180</td>
</tr>
<tr>
<td>Total Time (mm:ss.00)</td>
<td>17:10.50</td>
<td>22:22.09</td>
<td>18:58.00</td>
<td>18:16.20</td>
</tr>
<tr>
<td>Distance (meters)</td>
<td>2.65</td>
<td>4.19</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Number of seated rest breaks</td>
<td>6</td>
<td>6</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>Assistive Device</td>
<td>Rollator</td>
<td>Rollator</td>
<td>Rollator</td>
<td>Rollator</td>
</tr>
</tbody>
</table>
Physical Activity Data

Steps Per Week
Interview Findings

• **Most Useful**: Educational & Discussion sessions + MS “mentor” sessions
• **Least Useful**: Daily journal
• **Overall**: enjoyed intervention
• Reports walking better with increased tolerance to exercise
• *Was able to “dance” for an entire 3-4 minute song (has not been able to do that in a long time)*

Some Limitations

• Single-subject study design
• Missing data from daily journal / burden of daily reporting
• Lack of follow up data regarding daily physical activity
• Possible floor effect on some outcome measures
• Proxy reporting
Conclusion

- Results suggest that an 8-week self-efficacy intervention may:
  - Improve self-efficacy to exercise
  - Improve quality of life
  - Reduce perceived fatigue
- Future research should examine a self-efficacy intervention in a larger sample size of persons with progressive MS and severe disability
- Peer mentoring appears to be a very effective method for helping improve self-efficacy

Acknowledgements
References
