Impact of Fibromyalgia ADL Pain on Cognitive Performance

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Background and Purpose

- Fibromyalgia (FM) – chronic widespread pain in at least 3 of 4 body quadrants and axials
- Estimated 10 million US; 3-6% worldwide affected by FM
  - Ratio of women to men who seek treatment is approximately 7 to 1
- Symptoms: Fatigue, non-restorative sleep, stiffness, pain, concentration problems
- Pain
  - Activities of daily living (ADLs) may be affected by chronic pain
  - Current research shows that FM pain can affect both physical and psychological functioning
- Research suggests that pain impacts cognitive performance

Research Questions

- Does ADL pain in FM predict cognitive performance?
- If so, does ADL pain impact cognitive performance in general or is it specific to certain cognitive domains?

Method

Participants:
- 70 participants with FM
- 65 females, 5 males

Procedures
- Day 1 – Informed consent; demographics, medications, symptoms
- Day 2 – Beck Depression Inventory (BDI), cognitive tasks, physical tasks (not used in these analyses; reported elsewhere)

<p>| Table 1: Means (SDs) and ranges for age, BDI, anxiety, stiffness, ADL pain, and education |</p>
<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean (SD)</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>59.6 (7.6)</td>
<td>50-85</td>
</tr>
<tr>
<td>BDI</td>
<td>17.1 (9.1)</td>
<td>0-42</td>
</tr>
<tr>
<td>Anxiety</td>
<td>4.8 (2.1)</td>
<td>0-10</td>
</tr>
<tr>
<td>Stiffness</td>
<td>6.8 (2.6)</td>
<td>0-10</td>
</tr>
<tr>
<td>ADL pain</td>
<td>3.6 (.76)</td>
<td>2-5</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Some high school</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>High school/GED</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Some college</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>College</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>Graduate work or degree</td>
<td>26</td>
<td></td>
</tr>
</tbody>
</table>

Cognitive Tasks
- Everyday Problems Test (EPT) (18 items)
  - Time (seconds)
  - Score (number correct)
- Mini-Mental State Exam
- Immediate recall T1, T2, T3
  - 10-item Word List (CERAD)
- Stroop Color-Word Test
  - Time (seconds)
- Digit Span Forward
- Digit Span Backward
- Trail Making Test A and B
- Delayed Recall (CERAD)
- Recognition (CERAD)
- Animal Fluency
- Digit Symbol Substitution Test

Symptom Measures

Pain – experience with bodily pain during activities of daily living (ADLs) in the past 4 weeks; ranked on a numeric rating scale from 1-5. (ADLs are functional tasks, such as grooming, feeding oneself, and dressing.)

Anxiety during the past week – ranked on numeric rating scale from 0-10.

Stiffness in the morning during the past week – ranked on numeric rating scale from 0-10.
Results

Initial correlations

- Age, level of education, BDI score, anxiety, and stiffness were significantly related to certain types of cognitive performance.
- These variables were controlled for in later analyses.

<table>
<thead>
<tr>
<th>Predictor Variable</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>8.532</td>
<td>2.464</td>
<td></td>
</tr>
<tr>
<td>Level of bodily pain during ADLs in past 4 weeks</td>
<td>1.615</td>
<td>.661</td>
<td>.298*</td>
</tr>
</tbody>
</table>

Note: Adjusted R²=.074*; Age, education, BDI score, and anxiety level included in initial model, but dropped because not significant. *p<.05

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<th>Predictor Variable</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>8.532</td>
<td>2.464</td>
<td></td>
</tr>
<tr>
<td>Age (years)</td>
<td>1.597</td>
<td>.516</td>
<td>.353**</td>
</tr>
<tr>
<td>Number that best describes anxiety level in past week</td>
<td>-4.516</td>
<td>1.491</td>
<td>-.367**</td>
</tr>
<tr>
<td>Level of bodily pain during ADLs in past 4 weeks</td>
<td>12.376</td>
<td>5.121</td>
<td>.300*</td>
</tr>
</tbody>
</table>

Note: Adjusted R²=.177*; Education, BDI score, and anxiety level included in initial model, but dropped because not significant. *p<.05, **p<.01

- Bodily pain during ADLs alone significantly predicted the time it took to complete the EPT (p < .05).
- Bodily pain during ADLs, along with age and stiffness level, significantly predicted the time it took to complete the Stroop C-W test (p < .05).
- No other cognitive measures were associated with pain.

Conclusions

- Pain in FM seems to impact cognitive performance specifically by inhibiting processing speed, especially on higher-level tasks.
- Greater bodily pain during ADLs in FM was associated with:
  - slower problem-solving within daily living domains
  - worse inhibitory functioning

Future Directions

- Investigate pain and cognitive performance in other clinical populations with chronic pain
- Use additional measures of pain and cognition
- Investigate whether there is also an association between instrumental activities of daily living pain and cognitive performance

Selected References


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