Systematic Review on Multiple Sclerosis

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Systematic Review Question

What is the effectiveness of interventions within the scope of occupational therapy practice for persons with Multiple Sclerosis?

Additions to MS Search Strategy

• Articles included:
  — January 2003 to May 2011

Search results

• Initial screening yielded a total of 3484 titles and abstracts
• 70 Articles relevant to the research question were included:
  — Level I — 43
  — Level II — 13
  — Level III — 14
  — Level IV — 0
  — Level V — 0

Themes of evidence

• Integrated Rehabilitation Programs
• Fatigue Management Programs
• Health Promotion Programs
• Client Factors and Performance Skill:
  — Cognition
  — Emotional Regulations
  — Motor and Praxis Skills
    • Exercise
    • Motor training

Integrated Rehabilitation Program

• Sixteen studies were categorized into this theme:
  — Inpatient rehabilitation program
    • 2 Level I and 3 Level III
  — Outpatient rehabilitation program
    • 1 Level I and 1 Level II
  — Home-based program
    • 1 Level I, 1 Level II, and 1 Level III
  — Rehabilitation program in a variety of settings
    • 2 Level I
  — Vocational rehabilitation
    • 1 Level I
  — Functional mobility
    • 2 Level I and 1 Level II
<table>
<thead>
<tr>
<th>Integrated Program: Inpatient Rehabilitation</th>
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<tbody>
<tr>
<td>• Maitra et al (2010): efficacy of OT intervention</td>
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<td>– Level III, N = 193</td>
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<td>– The greatest improvement were in ADLs</td>
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<td>– Participants may benefit from self-care skill training directly compared to therapeutic exercise</td>
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<td>– Increasing OT intensity was positively associated with the improvement of ADL performance.</td>
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<th>Integrated Program: Inpatient Rehabilitation</th>
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<td>• Strong evidence that MS patients may benefit from the individualized and goal-oriented multidisciplinary rehabilitation program (MDR) in improvement of functional status, motor function, self-perceived quality of life, MS related disability.</td>
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<td>– Total sample size across studies: N=538</td>
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<th>Integrated Program: Inpatient Rehabilitation</th>
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<tr>
<td>• OT’s role in MDR:</td>
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<tr>
<td>– Maintaining use of upper extremities for ADL</td>
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<td>– Enhancing communication skills and attention span</td>
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<td>– Providing adapted equipment</td>
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<td>– Fatigue and stress management</td>
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<th>Integrated Program: Inpatient or Outpatient Rehabilitation</th>
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<td>• Khan et al, 2008 (Level I):</td>
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<td>– MDR had short term effect on the levels of activity but not participation.</td>
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<td>– Significant improvements in FIM scores: transfers, locomotion, and self-care.</td>
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<td>– Low intensity outpatient and home based MDR provided strong evidence for longer term improvement in quality of life</td>
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<th>Integrated Program: Home-based rehabilitation</th>
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<td>• Inconsistent evidence supports the use of telerehabilitation program in home based setting.</td>
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<td>– 12-week telerehabilitation program (HAT) was effective in improving balance and walking ability (Finkelstein et al, 2008, Level III)</td>
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<tr>
<td>– No significant differences between usual care and a one-month home based telerehabilitation system (HCAD) in grasping, gross movement, and finger dexterity (Huijen et al, 2008, Level I)</td>
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<th>Rehabilitation Program: Vocational Rehabilitation</th>
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<tr>
<td>• Systematic Literature Review (Khan et al, 2011, Level I)</td>
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<td>• No conclusive statements could be drawn for vocational rehabilitation</td>
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<td>– the diversity of target population, aim of intervention, and the small number of studies included</td>
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Rehabilitation Program: Functional Mobility

- Insufficient evidence supports the use of assistive technology
  - Both static and dynamic AFOs helped improve static balance (Cattaneo et al., 2002, N = 14, Level II)
  - A combination of an AFO and external FES had significant improvement in performance and satisfaction of COPM (Esnouf et al., 2010, N = 64, Level I)
  - Exercise training on core stability had significant improvement in satisfaction of COPM (Esnouf et al., 2010, N = 64, Level I)

Fatigue Management: Face-to-Face

- 3 Level I and 1 Level II included
  - Fatigue: Take Control (Hugos et al., 2010, N = 30, Level I)
    - Included multiple strategies for managing fatigue
    - Immediate effect only
      - Significant improvement in fatigue impact and self-efficacy
      - No significant improvement in fatigue severity was observed

Fatigue Management: Face-to-Face

- Managing Fatigue Course (Mathiowetz et al., 2005, N = 169, Level I; Mathiowetz et al., 2007, N = 169, Level I; Sauter et al., 2008, N = 32, Level II)
  - First proposed by Packer et al. (1995)
  - Short term efficacy (immediately post-course)
    - Reduction of fatigue impact
    - Improved some aspects of quality of life
    - Improved self-efficacy
  - Long term efficacy (1 year post-course)
    - Beneficial effects of the course were maintained for both outcomes

Fatigue Management: Long distance

- 1 Level I and 2 Level III studies were included
  - Online fatigue self-management program (Ghahari et al., 2010, N = 95 (74 MS), Level I)
    - Adapted from Managing Fatigue program
    - After intervention,
      - Significant improvement in fatigue impact
      - Fatigue self-management group had no better improvement than the information-only group

Fatigue Management: Long distance

- Teleconference delivered energy conservation program (Finlayson, 2005, N = 29, Level III; Finlayson et al., 2007, N = 29, Level III)
  - Adapted from Managing Fatigue program
  - Immediate effect
    - Significant reduction in fatigue severity, fatigue impact, and increase quality of life (bodily pain and general health)
  - Strength
    - Social support and normalization, quality and usefulness of the resources, comfort and confidence with the format (participants)
    - Power of peers and value of repetition (therapists)
  - Limitation
    - Logistics and time (both participants and therapists)
    - Diverse needs of participants (participants)

Health Promotion Program

- 3 Level I studies were included
  - Individualized physical rehabilitation (IPR) vs. group wellness intervention (GWI) (Plow et al., 2009, N = 42, Level I)
    - Significant improvement in health and physical activity in both groups
    - IPR: more in reducing fatigue impact and impeding the decline of physical health
    - GWI: better in improvement of mental health

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Health Promotion Program

- 12-week motivational interviewing based telephone counseling (Bombardier et al, 2008, N = 130, Level I)
  - Significant improvement in physical activity, spiritual growth, and stress management
  - Significant improvement in self-reported minutes of exercise per week
  - No significant finding in fatigue.

Health Promotion Program

- Health promotion education program (OPTIMISE) (Ennis et al, 2006, N = 62, Level I)
  - Significant improvements found in the intervention group were health responsibility, physical activity, spiritual growth, and stress management
  - Beneficial effects were maintained 3 month post-intervention

Performance Skills

Emotional Regulations

- 5 Level I and 1 Level II studies were included

- Strong evidence supports Cognitive Behavioral Therapy on reduction of mild to moderate depression (Forman et al, 2010, N = 40, Level I; Thomas et al, 2009; Level I; Hughes et al, 2006, N = 105, Level I; Malcomson et al, 2007)

- MS patients may benefit from the combination of education, multidisciplinary program, goal setting, homework assignments, and discussion forums (Malcomson et al, 2007)

Performance Skills

Motor and Praxis: Exercise

- 14 Level I, 2 Level II, and 7 Level III studies were included

- Exercise types:
  - Physical activity
  - Aerobic exercise
  - Resistance training
  - Yoga

- Targeted population:
  - Persons with mild to moderate MS

- Aerobic exercise was the most common type.
- No exacerbation of MS related symptom was reported secondary to exercise programs

- Effect sizes for body function, activity, and quality of life varied greatly (Asano et al, 2009, Level I systematic review)
Performance Skills: Cognition
• Limited evidence for attention training
• Beneficial effect on computer-based training program
  – On information processing/attention and decision making (Flavia et al, 2009, N = 20, Level II)
  – Phonemic retrieval (Solari et al, 2004, N = 77, Level I)
• Long-term efficacy on cognitive function remained unclear

Performance Skills: Motor and Praxis: Exercise
• Immediate or short term effect of exercise
  – Improved Walking performance
  – Improved Physical fitness and mood
  – Improved Quality of life
    • Roehrs et al, 2004, N = 31, Level III; Schulz et al, 2004

Performance Skills: Motor and Praxis: Exercise
• Some evidence for aerobic exercise and/or strength training decreased fatigue impact but not disability (Veilkonja et al, 2010, N=20, Level I; Freeman et al., 2004, N=10, Level III; McCullagh et al., 2008, N=30, Level I; White et al, 2004, N=8, Level III)
• Limited evidence for long-term effects of exercise (McCullagh et al., 2008, N=30, Level I)

Performance Skills: Motor and Praxis: Exercise
• Yoga was beneficial for selective attention ability but not for mood, spasticity, or executive functions (Velikonja et al., 2010, N=20, Level I)
• Pilates-based group exercise program showed improvements in balance, walking performance, physical component and motor component of fatigue impact (Freeman & Allison, 2004)
• Men and women with MS benefitted equally from aerobic and strengthening exercises (Surakka et al, 2004, N = 35, Level I)
• Some evidence for unloaded leg cycling exercise to reduce MS related spasticity and pain (Szarnoff et al, 2009, N = 22, Level II)

Performance Skills: Motor and Praxis: Motor Training
• Improvement on Balance performance:
  – Balance-based torso weighing improved balance (Wildener et al, 2009, N = 38, Level I)
  – Balance retraining aiming at motor and sensory strategies improved static balance (Cattaneo et al, 2007, N=10, Level I)
• Improvement on Upper extremity motor function:
  – Constraint-induced movement therapy improved amount of use (Mark et al, 2008, N = 5, Level III)
  – Robot-based rehabilitation protocol reduced duration of tracking movement and improve smoothness of the trajectory. (Carpinella et al, 2009, N = 10, Level I)
• MS patient with ataxia may benefit from PT, but the benefits were not sustained (Wills et al, 2007, Level I systematic review)
Performance Skills: Cognition

- No positive effects in maintenance and long term (5 weeks) efficacy of the Story Memory Technique for MS participants (Chiaravalloti et al, 2005)

- Higher repetition had poorer recall ability across learning trials in healthy and MS participants (Chiaravalloti et al, 2003, N = 84, Level II)

- Pure treatment effect of 6-week non-specific homework-based cognitive training program could not be determined (Brenk et al, 2008, N = 41, Level II)

Limitations

- Overall
  - Insufficient studies with strong methodology
  - Inconsistent outcome measures across studies
  - Potential publication bias if non-significant findings are not published

- Individual studies
  - Small sample size
  - High attrition rates
  - Lack of a control group
  - Lack of short- and long-term follow-up assessments
  - Presence of co-intervention
  - Mixed types of MS or other neurological conditions
  - Unreported reliability and validity of outcome measures
  - Difficult to determine OTs unique contribution in MDR

Implications

Clinical and community-based

- MS patients benefit more from intervention addressing functional performance, participation, and symptom management

- Interventions executed in settings with the presence of professionals, such as inpatient and outpatient programs, had better results compared to those settings without, such as home-based exercise program

Implications

Clinical and community-based

- Positive evidence for impairment level focused studies
  - Immediate but not long-term effects were observed
  - OT interventions should foster clients' active learning and engagement in those chosen occupations

Implications

Clinical and community-based

- Positive evidence for impairment level focused studies
  - Aerobic exercise (cycling and aquatic therapy), resistance and stretching exercises, and yoga studies revealed improvements in endurance and muscle strength
  - Although beneficial effect of cognitive retraining, it is unknown whether the results of these studies on memory and attention can be generalized to problem solving in the real world

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Implications
Clinical and community-based
• Positive evidence for impairment level focused studies
  – CBT based psychological interventions are beneficial for reduction of depression
  – There is a need to evaluate activity-based intervention effects on psychological variables

Implications
Program Development
• Community-based settings
  – Developing programs that help persons with MS engage in wellness program, physical activity, and fatigue management
• Clinic
  – Contribute to improving MDR
  – Incorporate activity-based intervention strategies
• Both clinic and community-based OT practitioners
  – Developing programs addressing balance among person, occupation, and environment systems

Implications
Education and Training of OT students
• Evidence-based findings regarding factors influencing health and well-being of persons with MS
• Fatigue management and development of physical activity and wellness programs in curricula
• Fieldwork serving persons with MS in community-based programs will benefit future OT practitioners entering the workforce

Implications
Research
– Need more OT researchers evaluating OT interventions for persons with MS
– Need to evaluate both short-term and long-term efficacy of OT interventions
– Need to evaluate effects of OT interventions on the activity and participation level
– OT needs to be involved in design of MDR programs
– Comparison of group vs. individual formats for fatigue management.
– Comparison of distance vs. in-person formats for fatigue management