



# Database of Knowledge Translation Tools

## Intervention Summary

### 1. Energy-conservation management (ECM) for patients with Multiple Sclerosis

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**Date Published:** Pending

### 2. Intervention Description

*Quick summary: ECM has poor evidence to support it for management of fatigue in MS. Please see the Cognitive Behavioral Therapy and Aerobic Exercise summaries to learn about interventions with evidence to support their use.*

**Purpose of the intervention:** (van den Akker, Beckerman, Collette, Eijssen, Dekker, de Groot, 2016; Blikman, Huisstede, Kooijmans, Stam, Bussmann, van Meeteren 2013)

Energy conservation management (ECM) aims to:

- Reduce fatigue through systematic analysis of daily work and home and leisure activities in all relevant environments.
- Reduce energy expenditure through:
  - Managing work and rest
  - Setting priorities
  - Budgeting energy
  - Using the body efficiently
  - Optimizing workspace
- Strategies include:
  - Balancing work and rest
  - Communicating personal needs
  - Modifying or delegating activities
  - Using the body efficiently
  - Organizing workspace
  - Using assistive devices

### 3. Considerations for Clinical Use

**Knowledge Expert group summary on ECM:**

There is poor evidence to support effectiveness of energy conservation management for patients with MS. It is better than no treatment, but no better than a placebo.

As stated by Moss-Morris and Norton(2017): “ECM appears to have a small effect size at best (further limited by dropout), so is not worth further research on its own, particularly as there are now several EC studies showing small or null effects. Future trials could use ECM as a better and more matched control condition for either exercise or CBT. We also need to focus on how to maintain treatment effects in an illness where increasing disability, fluctuating symptoms and relapse are likely. This may mean longer term treatments or booster treatment sessions. Perhaps combining CBT and exercise would provide greater benefits.”

The KE group suggests reviewing other KT summaries on Cognitive-Behavioral Therapy and Aerobic Exercise to learn about more effective treatment approaches for fatigue management in MS.

**Considerations:**

- The content in the control groups varied; waiting list, attention, information, peer-support. The between group differences with ECM in several studies demonstrate significant differences, but not clinically meaningful changes (Blikman et al 2017)
- Effect sizes are lower in studies providing ECM online (Asano et al 2015)

**4. Overview of the Literature**

**Why are patients with MS fatigued?**

Primary and secondary mechanisms of fatigue

- The cause and consequences are considered multidimensional, includes psychological and biological factors (van Kessel, Moss-Morris 2006).
- **Primary mechanism** may be disease process of the central nervous system caused by inflammation and neurodegeneration.
- Indirect evidence for elevated levels of cytokines( IL-35 and IL-2) based of the immune-mediated inflammation. This suggest these cytokines may have a role in MS related fatigue.(Patejdl, Penner, Noack, Zettl 2016).
- Lesions and atrophy at subcortical structures or bifrontal areas correlates with fatigue(Patejdl et al 2016).
- This results in loss of connectivity, delayed processing of information and neuroendocrine dysfunction(Patejdl et al 2016).
- **Secondary mechanism** may be weakness, stiffness, cognitive alterations, tremor, disturbed sleep or negative emotions.
- Unknown cause, diverse consequences and lack of precise measurement of the impact of fatigue, lead to a challenge to develop and prescribe effective intervention (Asano & Finlayson 2014)

**Brief overview of theoretical basis for intervention:**

- Fatigue is one of the most disabling symptoms in MS.
- Assessment requires the investigation of potential primary causes of fatigue using a multidisciplinary assessment (Tur 2016).
- Treatment of MS-related fatigue should include:
  - Explanation that MS-related fatigue might be precipitated by heat, overexertion and stress, or may be related to the time of day.
  - Mindfulness-based training, cognitive behavioural therapy (NICE guideline 2014)
  - Additional recommendations for assessment and treatment includes: anxiety, depression, difficulty in sleeping, and any potential medical problems such as anemia or thyroid disease
- ECM treatments are routinely used in clinical practice even though the approach lacks evidence for effectiveness (Blikman, van Meeteren, Twisk, de laet, de Groot, Beckerman, Stam & Bussmann 2017).
  - ECM has shown short-term effectiveness compared to a waiting list in several studies. (Blikman et al. 2017)
  - Systematic reviews of controlled studies show little long-term data that demonstrate effectiveness of the intervention (Blikman et al. 2017)

- ECM has been described, but few programs have been standardized or published. The treatment most commonly used program is called “*Managing Fatigue*” (Packer, Brink and Sauriol 1995). It is not available for purchase or libraries in Norway.
- An overview of the intervention sessions from Packers et al. 1995 is below (Finlayson et al 2011). Weeks 2 – 6 include a teaching session on a specific topic, homework review and instructions for homework on the topic for the next week.
  - Week 1: Introductions, overview and orientation to course; discussion of fatigue: Fatigue impact of fatigue on life and the fatigue cycle; overview of major fatigue management principles; instructions for homework (planning and using rests).
  - Week 2: When, where and how to communicate with others about fatigue
  - Week 3: Body mechanics, using tools and technology
  - Week 4: Teaching session and discussion: Activity analysis, evaluating priorities, and making active decisions
  - Week 5: Living a balanced life, taking control of your day, analyzing & modifying a day
  - Week 6: Goal Setting and discussion: long-term vs. short-term goals
- *Fatigue: Take Control*, is the first formal program modeled on the MS-related fatigue guideline. It was produced in partnership with the National MS Society (Hugos et al 2010).

**Guideline: NICE guideline 2014:** Low to very low quality evidence from 5 RCTs (Finlayson 2011, Kos 2007, Garcia 2013, Hugos 2010, Mathiowetz 2010) comprising 549 participants showed that there was no difference in clinical effectiveness between ECM and controls.

### **Systematic reviews or meta-analysis on ECM:**

#### **ECM compared to NO treatment in the control group**

- **Blikman et al 2013:**
  - ECM can in the short-term, be more effective than no treatment for fatigue impact.
  - Limited evidence for short term effects exist (measured 7 or 8 weeks from baseline) on fatigue impact compared to a support group. (Finlayson 2011, Mathiowetz 2005; Cognitive subscale: -2.91(-4.32, -1.50); Physical subscale: -2.99(-4.47, -1.52); Psychosocial: -6.05(-8.72,-3.37))
- **Asano et al 2015:** Small short term(8 weeks) effect size in 8 studies for energy conservation
  - Mathiowetz et al 2001: *Moderate effect size* (0.37)
  - Vanage et al. 2003: *Moderate to large effect size* (0.74) compared to waiting list
  - Mathiowetz et al 2005: *Moderate effect size* (0.53)
  - Sauter et al 2008: *Large effect size* (0.84) compared to waiting list.
- **Wendebourg et al. 2017:**
  - ECM for fatigue severity Shows inconclusive effect sizes:
    - Finlayson 2011: *Small effect size* (0.32, 95%CI -0.61,-0.02)
    - Hugos 2010: *Small effect size* (0.15, 95% CI -0.57, 0.87)
  - ECM for fatigue impact: Shows inconclusive effect sizes:
    - Finlayson 2011: *Moderate effect size* -0.59(95% CI -0.88, -0.29)
    - Hugos 2010: *Moderate effect size* -0.34(95%CI -1.07, 0.38)
    - Ghahari 2010: *Moderate effect size* -0.09(95%CI -0.57, 0.39)
- **Asano & Finlayson 2014:** 2/4 studies with ECM showed significant effect.
  - Hugos et al 2010: *Small to negative effect size* (0.43, 95%CI -0.29, 1.57 )
  - Finlayson et al 2011: *Medium effect size* (0.53, 95% CI19-0.86).
  - Mathiowetz et al 2005: *Small to medium effect size* (0.42, 95% CI:0.08-0.76)

### **ECM compared to placebo/other treatment:**

- **Blikman et al 2013:** ECM compared to “Fatigue take Control” (Hugos et al 2010) or multidisciplinary fatigue management (Kos et al 2007). *No evidence that ECM is more effective than placebo interventions.*
- **Khan et al 2014:** (Blikman et al 2013; Asano&Finlayson 2014) 6 trials involving 494 participants ECM is more effective than no treatment (waiting controls). *No evidence that ECM programs are more effective than placebo.*

### **Single studies:**

- **Blikman et al. 2017** Energy Conservation Management *is not more effective* for reducing fatigue compared to the information-only control group. *Small effect size* (0.10, 95%CI - 0.36-0.57)
- **Hugos et al 2017:** “Fatigue: Take control” *did not clinically significant improve* fatigue compared to “MS: Take control.” FTC difference at MFIS: 5.0, MSTC difference at MFIS: 4.8. p value 0.82

### **Online or teleconference:**

- Finlayson 2005: Telephone conference, *Moderate effect size* (0.51)
- Ghahari et al 2009: Online self-management program, *Small to Moderate effect size* (0.27)
- Ghahari et al.2010: Online fatigue self-management program, *Small to moderate effect size* (0.23) compared to providing fatigue information which had *Moderate effect size* (0.53)
- Finlayson et al 2011: Teleconference-delivered program, *Moderate effect size* (0.54)

### **Measurements used in Studies on Energy Conservation:**

- **Fatigue Severity Scale:** (Sauter et al 2008),(Vanage et al 2003), (Blikman et al 2017), (Finlayson et al 2011), (Kos et al 2007), (Hugos et al 2010), (Garcia 2013), (Ghahari et al 2010)
- **Modified Fatigue Impact Scale:** (Sauter et al 2008), (Hugos et al 2010), (Vanage 2003), (Blikman et al 2017),( Kos et al 2007)
- **Fatigue Impact Scale:** (Vanage, et al. 2008), (Finlayson, et al. 2011), (Mathiowetz et al 2005), (Garcia 2013), (Ghahari et al 2010)

## **5. Links to other relevant resources:**

**Websites:** Applying Evidence with Confidence Website, <https://www.appeco.net/>

**Other KT resources:** See Cognitive Behavioural Therapy and exercise in MS summaries

## **6. References:**

### ***Overview of the studies:***

**Asano et al 2015:** *Systematic review. For ECM included: Sauter et al 2008, Vanage et al 2003, Ghahari et al 2009, Ghahari et al 2010, Finlayson et al 2011, Finlayson et al 2005, Mathiowetz et al 2005, Mathiowetz et al 2001*

**Asano and Finlayson 2014:** *Meta-analysis of three different types of fatigue management; Exercise, Education and Medication. Studies included for ECM: Finlayson et al 2011, Mathiowetz et al 2005, Hugos 2010. N=380. Exercise and education based on CBT showed greatest effect sizes.*

**Blikman et al 2013:** Review article (Meta-analysis) 4 RCT, 2 CCT studies published between 2003 and 2011, 494 patients with MS. (Mathiowetz 2005, Kos 2007, Finlayson 2011, Hugos 2010, Vanage 2003, Sauter 2008). Concludes that ECM can be more effective than no treatment, compared to waiting controls. ECM did not increase participation

**Blikman et al 2017:** RCT. Based on the group program developed by Packer et al. 1995. N=42. Participants mean age were 47,7. Mostly women. MS type mostly RR, secondly SP. EDSS score 2,5(2-4)

**Finlayson et al 2011:** RCT study design. N=181. ECM program based on Packer et al. manual. ECM versus waiting controls. Short term follow up at 7 week, 13 week. Long term follow up at 3 and 6 months. Participants predominantly women, PDDS 4. FSS 5, mean age 56. Type of MS 95% RR, 39% SP, 16% PP. Risk of bias: Questionable blinding of patients and assessors, co-interventions. Score 8/12 high quality (Blikman et al 2013).

**Garcia 2013:** RCT. N= 23. Predominantly women. EDSS < 6; FSS > 4; Type of MS mostly SP. 2 hours sessions during five weeks. ECM compared to peer support group.

**Ghahari et al 2010:** RCT. Evaluate online fatigue self-management programme. N=95 with MS, Parkinson og Psot-polio. FSS < 4. 77% women. 77.9% diagnosed with MS, of these 66% had RR type of MS. Mean age: 56,25.. Both the fatigue self-managemnt and the information only group improved on the Fatigue Impact Scale. The control group showed no improvements.

**Hugos et al 2010:** RCT study design. N= 30. ECM based on Fatigue: Take control. 6 weekly 2 hours group sessions. Short term follow up at 7 weeks and 3 months. Participants 80% women, EDSS 5.20, 63% unemployed. Compared to waiting control group. Risk of bias: Questionable blinding of patients and assessors, addressing of incomplete outcomes or dropouts. Score 8/12. (Blikman et al 2013).

**Hugos et al 2017:** RCT "Fatigue: Take control" program compared to "MS: Take control". N=204. Six weekly 2 hours sessions. Follow up at 3 months and six months. Participants mean age: 53.9 years, EDSS mean 5.1(3.5-6.5), 80% women. 67% RR, 26% PP, 15 % SP.

**Kos et al 2007:** RCT. Multidisciplinary intervention. N=46. Type of MS: 72% RR, 7% PP, 7% Chronic progressive. Mean age 42,9. Predominantly women. MFIS score: 46. The multidisciplinary fatigue management programme showed no efficacy in reducing the impact of fatigue compared to a placebo intervention programme.

**Mathiowetz et al 2005:** RCT study design. N=169. ECM versus waiting controls. Follow up to 1 year, no comparison with the control group Risk of bias: questionable blinding of authors. Score 9/12, high quality (Blikman et al 2013). ECM based on Packer manual. Characteristics of participants: Predominantly women. 61%, mean age 48.34. FSS score: 5.93. MSFC score -0.99. RR, 18.9% SP, 5.9% PP. 48% full time employed.

**NICE guideline 2014:** 5 RCT (Finlayson 2011, Kos 2007, Garcia 2013, Hugos 2010, Mathiowetz 2010) comprising 549 participants. Concludes:

Consider mindfulness-based training, cognitive behavioural therapy or fatigue management for treating MS-related fatigue. Advise people that aerobic, balance and stretching exercises including yoga may be helpful in treating MS-related fatigue.

**Sauter et al 2008:** CCT study design. N= 32. Short term follow up at 6 weeks and long term at 7-9 months. ECM program based on the Packer manual, 2 hours course once a week. Participants EDDS score mean 4, FSS mean score 5.5. Type of MS 53% Relapsing Remitting(RR), 33% Secondary Progressive(SP), 13% Primarily Progressive(PP). Low quality study due to risk of bias concerned to randomization, blinding patients and assessors and timing of outcome assessment. Score: 5/12(Blikman et al 2013)

**Vanage et al 2003:** CCT study design. The Packer manual was adjusted to 1 hour weekly session for 8 weeks. Measures from baseline to 8( weeks when the course ended) and after 8 weeks follow up. N=37. Compared ECM to a support group. Participants were 81% women. 38% used a powered wheelchair, 38 %used a three-wheeled wheelchair. FSS score mean 5.3. Mean age 56. Risk of bias: Questionable randomization, allocation concealment, blinding of patients and assessors and if co-interventions were avoided or similar. Score 6/12(Blikman et al 2013).

**Wendebourg et al 2017:** Systematic review. For ECM included Finlayson et al 2011, Mathiowetz et al 2005, Hugos et al 2010 and Ghahari 2010.

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