

REVIEW ARTICLE (META-ANALYSIS)

# Effectiveness of Energy Conservation Treatment in Reducing Fatigue in Multiple Sclerosis: A Systematic Review and Meta-Analysis

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## Abstract

**Objectives:** To systematically review the effects of energy conservation management (ECM) treatment for fatigue in multiple sclerosis (MS), and to study the effect of ECM treatment on restrictions in participation and quality of life (QoL).

**Data Sources:** PubMed, CINAHL, Embase, and Web of Knowledge were searched to identify relevant randomized controlled trials (RCTs) and controlled clinical trials.

**Study Selection:** To select potential studies, 2 reviewers independently applied the inclusion criteria.

**Data Extraction:** Two reviewers independently extracted data and assessed the methodologic quality of the studies included. If meta-analysis was not possible, qualitative best-evidence synthesis was used to summarize the results.

**Data Synthesis:** The searches identified 532 studies, 6 of which were included. The studies compared the short-term effects of ECM treatment and control treatment on fatigue and QoL; 1 study reported short-term and midterm effects on participation, but found no evidence for effectiveness. Meta-analyses (2 RCTs, N=350) showed that ECM treatment was more effective than no treatment in improving subscale scores of the (1) Fatigue Impact Scale: cognitive (mean difference [MD]=−2.91; 95% confidence interval [CI], −4.32 to −1.50), physical (MD=−2.99; 95% CI, −4.47 to −1.52), and psychosocial (MD=−6.05; 95% CI, −8.72 to −3.37); and (2) QoL: role physical (MD=17.26; 95% CI, 9.69–24.84), social function (MD=6.91; 95% CI, 1.32–12.49), and mental health (MD=5.55; 95% CI, 2.27–8.83). Limited or no evidence was found for the effectiveness of ECM treatment on the other outcomes in the short-term or midterm. None of the studies reported long-term results.

**Conclusions:** The systematic review results provide evidence that in the short-term, ECM treatment can be more effective than no treatment (waiting controls) in reducing the impact of fatigue and in improving 3 QoL scales—role physical, social function, and mental health—in fatigued patients with MS. More RCTs that also study long-term results are needed.

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Fatigue is a frequent, frustrating, overwhelming, and often disabling symptom that affects patients with multiple sclerosis (MS). The Multiple Sclerosis Council for Clinical Practice Guidelines defines fatigue as “a subjective lack of physical and/or mental energy that is perceived by the individual or caregiver to interfere with usual and desired activities.”<sup>1(p2)</sup> Fatigue affects approximately 80% of patients with MS,<sup>2</sup> up to two thirds of whom indicate it as their main

complaint,<sup>3</sup> with fatigue severely limiting their daily activities and restricting participation—that is, their performance of social roles.<sup>4,5</sup> It also has a major impact on quality of life (QoL).<sup>6</sup>

Rehabilitation treatments for relieving this disabling fatigue in patients with MS include an energy conservation course, exercise therapy, cognitive behavioral therapy, and multidisciplinary interventions.<sup>1</sup> In clinical practice, a well-known intervention used in occupational therapy for fatigued patients with MS focuses on teaching energy conservation strategies. Although many interventions for energy conservation strategies have been described,<sup>1,7-9</sup> few programs have been standardized and published. The treatment program used most frequently in occupational therapy and described

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in the literature is “Managing Fatigue,”<sup>10</sup> which is referred to as energy conservation management (ECM). It has been tested in several studies<sup>11–15</sup> and many countries. To fit the unique needs of each individual, ECM promotes a positive attitude focused on decision-making and the optimum use of available energy. It is also intended to reduce the impact and severity of fatigue, to increase patients’ use of energy-conserving strategies, and to improve their confidence in their ability to manage fatigue.<sup>10</sup> Energy conservation strategies have been defined as “the identification and development of activity modifications to reduce fatigue through a systematic analysis of daily work, home and leisure activities in all relevant environments.”<sup>11(p17)</sup> The strategies include balancing work and rest, communicating personal needs to others, analyzing and modifying activities to reduce energy expenditures, delegating activities, examining and modifying standards and priorities, using the body efficiently, organizing work spaces, and using assistive technologies to conserve energy.

Although there have been several systematic reviews of the effectiveness of rehabilitation treatments in MS, including multidisciplinary treatment,<sup>16</sup> exercise therapy,<sup>17</sup> psychosocial intervention,<sup>18</sup> and occupational therapy—related treatments,<sup>19,20</sup> they were focused on outcomes other than fatigue. While 2 reviews<sup>21,22</sup> on nonpharmacologic interventions did evaluate fatigue, they included other diagnoses beside MS. To date, no extensive systematic review is available reporting on the evidence-based effectiveness of ECM treatments and how they affect fatigue in patients with MS. Given the high incidence of fatigue in patients with MS and the frequent use of ECM treatment, the effect of ECM treatment to reduce fatigue may be important in MS rehabilitation treatments. Additionally, the current ECM literature might identify gaps that could indicate new points of focus for studying the effects of ECM strategies as a treatment for fatigue.

We therefore systematically reviewed the effects of ECM treatment for fatigue in MS. We also studied whether ECM treatment affected restrictions in participation and QoL.

## Methods

### Search strategy

The PubMed, CINAHL, Embase, and Web of Knowledge databases were searched systematically to identify relevant randomized controlled trials (RCTs) and controlled clinical trials (CCTs) up to May 8, 2012. Keywords for identifying MS patients, ECM treatment, and fatigue were included in the search string. The complete search strategy is shown in [appendix 1](#). Reference lists from the studies included were screened.

#### List of abbreviations:

CCT	controlled clinical trial
CI	confidence interval
ECM	energy conservation management
FIS	Fatigue Impact Scale
FSS	Fatigue Severity Scale
MD	mean difference
MFIS	Modified Fatigue Impact Scale
MFMP	multidisciplinary fatigue management program
MS	multiple sclerosis
MSFS	MS-Specific Fatigue Scale
QoL	quality of life
RCT	randomized controlled trial
SF-36	Medical Outcomes Study 36-Item Short-Form Health Survey

### Inclusion criteria

References were included if they met the following selection criteria:

- *Type of studies:* RCTs and CCTs
- *Participants:* Patients with diagnosed MS irrespective of age, sex, subtype of MS, or onset of the disease. We also included studies that include another diagnosis as well as MS, but only if results were provided for an MS subgroup.
- *Interventions:* All studies evaluating the effectiveness of an energy management course/training (ECM) or of fatigue management aimed at reducing fatigue, irrespective of the frequency, duration, or mode of delivery. The program had to include energy conservation techniques or strategies. Multidisciplinary fatigue management studies were also included if the program contained clearly defined energy management techniques.
- Comparisons with placebo, controlled, or another intervention group
- Outcome measurements had to be reported on perceived (subjective) fatigue. If perceived restrictions in social participation or on QoL outcomes were measured, these were described as well.

We used no language restrictions.

### Study selection

On the basis of the inclusion criteria, 2 reviewers (L.B., H.K.) independently screened the title and abstract of the studies identified for inclusion. Studies were included if they met the inclusion criteria. Any disagreements were resolved by discussion, and if no agreement was achieved, a third reviewer (B.H.) was consulted.

### Data extraction

Using a customized data extraction table, 2 reviewers (L.B., H.K.) independently extracted the data from each study included. Any disagreements were resolved by discussion; if no agreement was achieved, a third reviewer (B.H.) was consulted. The following data were extracted from each study: descriptions of the participants; characteristics of the intervention and control treatment (contents, duration, frequency, mode of delivery, etc); and outcome measures and *P* values. For the review, we used data only based on the comparison between the intervention and the control group. The follow-up time was categorized as short-term (closest to 3mo), midterm (closest to 6mo), and long-term (closest to 1y). If a compliers’ analysis was also available, we gave preference to data extraction from the intention-to-treat analysis.

### Methodologic quality assessment

Methodologic quality was assessed by 2 reviewers (L.B., H.K.) separately. A consensus method was used to resolve disagreements, and a third reviewer (B.H.) was consulted if disagreements persisted. To assess the potential risk of bias per study, the quality criteria list of Furlan et al<sup>23</sup> was used. Each criterion had to be scored as yes (+), unclear (?), or no (–), where yes indicated that the criterion had been met and thus suggested a low risk of bias. High quality was defined as a score of 50% or more (ie, a “yes” score on  $\geq 50\%$  of the criteria) on the methodologic quality assessment.<sup>23</sup>

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