

# **The effects of an energy conservation course to manage fatigue in adults with Multiple Sclerosis.**

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## **Clinical Scenario**

Multiple Sclerosis (MS) is a “disorder of the central nervous system which includes the brain, spinal cord and optic nerves” (Multiple Sclerosis Society of New Zealand (MSNZ), 2010). Currently there are approximately 4000 individuals diagnosed with MS in New Zealand. One of the most common symptoms experienced is fatigue, occurring in 80% of people (MSNZ, 2010). Fatigue can greatly impact on individuals social, physical and cognitive abilities when engaging in the home and community. Occupational Therapists focus on improving fatigue levels and encouraging engagement in everyday activities via energy conservation techniques. As energy conservation is a commonly used intervention for the management of fatigue it is important to have evidence to determine its effectiveness in treatment.

## **Clinical Question**

In adults with Multiple Sclerosis, is an energy conservation course effective in managing fatigue?

## **Summary of Search**

Multiple databases were searched to answer the clinical question. From this nine articles were found, however not all fit within the inclusion/exclusion criteria. Of the nine articles only five focused specifically on energy conservation courses and two meet the additional criteria. One article was a quantitative and the other a qualitative study.

### **Clinical Bottom Line**

There is evidence to suggest that energy conservation courses aid in minimising fatigue, however other factors can impact on each individual's ability to implement the strategies taught.

### **Limitations of this CAT**

This critical appraisal has been peer reviewed by one lecturer as part of an assignment for Otago Polytechnic, School of Occupational Therapy. The breadth of the review has also been limited by the assignment requirements (ie. 2 articles only were reviewed).

### **Search Strategy**

The databases, CINAHL, Pubquest, OT Seeker and Google Scholar, were used to find appropriate articles. The search terms "Multiple Sclerosis", "Fatigue Management", "Energy Conservation" and "Course" were used in varying ways to identify a range of possible articles. The combination of "Multiple Sclerosis" AND "Energy Conservation" produced the best results.

### **Inclusion and Exclusion Criteria**

#### **Inclusion**

- Diagnosis of Multiple Sclerosis
- Article available in full text
- Article available online or through Robertson Library
- Specific to a course on energy conservation

#### **Exclusion**

- Article not available in English
- Published prior to 2000
- Not clearly a Quantitative, Qualitative or Systematic Review
- Literature Review or Opinion Piece

### Results of the search

<b>Study Design/Methodology of Article Retrieved</b>	<b>Level</b>	<b>Author (Year)</b>
Quantitative (RCT)	2	Mathiowetz, Finlayson, Matuska, Chen & Luo (2005)
Qualitative (phenomonology)	4	Holberg & Finlayson (2007)
Quantitative (test-retest)	3	Mathiowetz (2003)
Quantitative (quasi-experimental)	3	Vanage, Gilbertson & Mathiowetz (2003)
Qualitative	4	Matuska, Mathiowetz, & Finlayson (2007)
Qualitative	4	Bowcher & May (1998)

### Best Evidence

The articles that will be critiqued are a quantitative study by Mathiowetz, Finlayson, Matuska, Chen & Luo (2005) and a qualitative study by Holberg & Finlayson (2007). These articles were chosen as they were the most relevant to the clinical question and could be clearly identified as two different types of research. In addition, the articles were chosen to be critiqued as they focused specifically on an energy conservation course.

## Summary of best evidence

**Title of article:** Randomized controlled trial of an energy conservation course for persons with multiple sclerosis.

### **The aim**

The aim of this study is to “assess the short-term efficacy and effectiveness of a six-week energy conservation course on fatigue impact, quality of life and self-efficacy for persons with multiple sclerosis” (p. 592).

### **Study Design**

This study is a Quantitative study that uses a randomised control trial.

### **Setting**

Study was conducted in community settings such as MS chapter office, churches and public libraries.

### **Participants**

In this study participants were recruited through a mailing list of the Minnesota and Illinois Chapters of the National MS Society. Those that were interested contacted the project directors and took part in a two part screening process. From here 169 participants were identified, however only 131 completed the course. To participate in this study, participants were required to have a diagnosis of MS, 18 years or older, literate in English, had a Fatigue Severity score of 4 or greater, lived independently in the community, and agreed to attend at least five out of six energy conservation sessions. Once it was established that participants had met this inclusion criteria they were required to undergo another screening process that focused on cognitive abilities using the Neuropsychological Screening Battery for Multiple Sclerosis. Participants were only excluded from this study if they failed more than one subtest of the cognitive test mentioned. The average age of the participants were 49 years and were predominantly females (104 out of 131). Most participants had been diagnosed with Multiple Sclerosis for ten years and experienced symptoms for fifteen years.

## **Method**

The study involved a structured educational course on energy conservation techniques to help manage fatigue. Sessions ran for two hours per week and were run by an Occupational Therapist. This study went from February 2002 until June 2003 and throughout this time twenty, six week courses were completed. Over this period twelve Occupational Therapists were involved in the education sessions. The sessions were held in community settings such as MS chapter office, churches and public libraries with seven to ten participants in each group. This study had an Immediate Intervention Group and a Delayed Control Group. Due to a previous study it was identified that a control group would not be necessary for this trial. The Immediate Intervention Group received the six week course starting week two, followed by a no intervention period for six weeks. The Delayed Group had a six week no intervention period before they received a six week intervention course in week 8. The course involved a variety of lectures, discussions, short and long-term goals, homework, practice activities, of which both immediate and delayed groups received.

## **Results**

Due to drop outs and missing data three approaches to data analysis were used. These were Intent-to-treat (ITT) likelihood, ITT Last-observation-carried-forward (LOCF) and Compliers for both primary and secondary outcomes. In the primary outcome, which addressed the Fatigue Impact Scale and SF-36 health survey, the results showed a significant difference between the intervention and control group as the p-value was less than 0.05. There was a difference between the three analysis approaches, however, they all showed significant difference to the control group. The secondary outcome, which addressed self-efficacy, showed a significant increase in efficacy post-course, compared to pre-course. This was evident as the p-value was less than 0.05. The overall results of this study were that energy conservation decreased the impact of fatigue on the participants and increased their quality of life. The study also found that there was a significant increase in self-efficacy for performing energy conservation strategies post-course versus pre-course. Both of these results support the studies original hypotheses.

## **Original Authors Conclusions**

The authors' original conclusions suggest that energy conservation strategies are an effective non-pharmacological approach used to decrease the level of fatigue and increase self-efficacy within a person's life.

### **Critical Appraisal:**

According to Taylor (2007) when critically appraising a quantitative article it is important to take into consideration the following:

#### Are the results valid?

The aim of the study was clearly stated within the abstract and outlined in more depth in the introduction. It discussed the main concepts of the study including the population it was aimed at, the length of treatment and the intervention used. 169 participants were randomly assigned into two intervention groups, Immediate Intervention group and Delayed Control group. Those involved in the study were not 'blind' to the treatment as all participants received the intervention. The only difference between the two groups was the time at which they received the intervention. The results clearly showed that only 131 complied with the study. Estimated results were also tallied using a variety of data analysis to include all 169 participants. Ethical approval from the universities' protection of human subjects committee was gained, however specific ethical issues were not mentioned. Prior to the commencement of the study all participants gave informed consent.

#### What are the results?

A screening process occurred prior to the study commencing that gathered information regarding age, sex, fatigue severity and period of time diagnosed with Multiple Sclerosis. A number of standardised and non-standardised assessments were used to gain pre-intervention data.

Two outcome measures were used in the study, the Fatigue Impact Scale (FIS) and the SF-36, to gather pre and post-intervention data. Both assessments have validity and reliability making them appropriate assessments to use for this study. Both assessments had clear descriptions of their purpose and how they related. A self-efficacy assessment was also designed for the study that was used as a secondary outcome.

T-statistics and Pearson chi square statistics were both used to compare baseline measurements between the two intervention groups. From this analysis no significant differences were found. To incorporate the missing data three approaches were used, ITT likelihood, ITT LOCF and Compliers. The article does not provide an adequate explanation of these three approaches, however the authors provide sound justification as to why these approaches have been used.

The key findings were clearly presented in multiple tables. They compared the differences in results of the ITT likelihood, ITT LOCF and Compliers analyses. The tables showed that post-intervention there was decreased fatigue and increased self-efficacy.

For the results of this study to be considered significant the p-value was required to be less than 0.00625 for the SF-36 scale and less than 0.01667 for the FIS scale. Table 3 shows the results of each outcome measure when compared between treatment group and delayed control group. From this table we can be 95% confident that the subscales, vitality, physical and social from the SF-36 ( $p < 0.00625$ ) and FIS ( $p < 0.01667$ ) have significantly improved due to the energy conservation course and was significant over all three analyses. Table 5 shows the comparison of pre-course and post-course scores for self-efficacy. All three analysis approaches showed significant difference in scores as p-value was less than 0.0001. The results of both tables support the initial hypotheses of the study.

#### How will these results help me work with my clients?

When working alongside individuals with Multiple Sclerosis this study provides an Occupational Therapist with evidence that the use of an energy conservation course and the strategies taught, will help to reduce fatigue levels and increase self-efficacy. However this study is only representative of a small population, those that have a Fatigue Severity Scale of 4 or greater and no more than a mild cognitive impairment. This provides difficulty for transference as Occupational Therapists work with clients with a range of cognitive abilities and fatigue levels within Multiple Sclerosis.

#### **Summary/Conclusion**

From the guidelines written by Taylor (2007) this article is valid and reliable. However further explanations regarding the analysis approaches and the interpretation of the tables would have aided in better understanding of the results. The terminology throughout the article

varied making it difficult to interpret the information, this was evident when discussing the delayed intervention group.

**Title of Article:** Factors Influencing the Use of Energy Conservation Strategies by Persons with Multiple Sclerosis

**Aim**

The aim of this study was to “examine the factors influencing the implementation and continued use of energy conservation strategies among persons with multiple sclerosis” (p.96).

**Study Design**

This is a Qualitative study

**Setting**

This study involved multiple settings as the interviews were conducted at a place of the participants' choice, of this, six occurred in their own home and two at a restaurant.

**Participants**

Twelve participants were contacted to be involved in this current study, of this eight agreed to be involved. The eight participants were recruited through a previous pilot study. To be part of the pilot study individuals had to be 18 years or older, could read and understand English, had a Fatigue Severity Score of four or greater and had passed a cognitive screening test. As the eight participants had already met the pilot study eligibility criteria, they were only required to have attended at least two of the six teleconference sessions from the pilot study. They also had to be within driving distance of the university to participate in the current study. The participants were predominately middle age, female, educated and unable to work due to disability. They were all diagnosed with Multiple Sclerosis and had been experiencing symptoms between 4 and 25 years.

## **Method**

Once the eligibility criteria was met, each participant was involved in an interview where consent was gained and each participant completed the Stage of Change Questionnaire. Following this the author conducted a semi-structured interview to determine the influential factors that impacted on the participants' use of energy conservation strategies. The participants were asked about their use of energy conservation strategies prior to and after attending the pilot course. Throughout the interview participants were required to sort cards that identified the strategies taught during the pilot course. This was done using specific criteria, for example easiest to hardest to implement. Further discussion occurred regarding participants choices. The entire session took approximately two hours and was tape recorded with the participants' permission. The recordings were transcribed and a summary was presented to the participants to check accuracy. Two authors then used the transcripts to determine common themes.

## **Results**

The four themes that were identified were, experience with the disease, sense of self, environmental factors and value of education. Energy conservation strategies were chosen depending on the individuals cognitive and physical abilities and own personal experience of Multiple Sclerosis. The strategies used were highly influenced by a person's acceptance of Multiple Sclerosis and where they were in the stage of change. Both social and physical environmental factors influenced what strategies were put in place to enable participants to engage in everyday activities while minimising fatigue. In addition the education delivered during the pilot study increased the participants' awareness of energy conservation strategies and changed their perspectives of fatigue.

## **Original Authors' Conclusions**

The authors' conclusion is that there are multiple factors that influence a person's willingness and ability to implement energy conservation strategies. Through understanding these factors appropriate strategies can be taught and the likelihood of them being implemented is greater.

## **Critical Appraisal:**

According to Taylor (2007) when determining the trustworthiness of a qualitative study it is important to take into consideration the credibility, transferability, dependability and confirmability.

### Credibility

Triangulation occurred as a variety of research methods were used, including questionnaires and interviews. To eliminate personal bias two authors analysed the transcripts to identify the common themes. A written log was also used throughout the interview and coding a process to allow individuals unfamiliar to the study to understand the authors' logic. Throughout the interview process notes were taken by the author and they were tape recorded. The recordings were transcribed verbatim and returned to participants for member checking. The study had a small sample size due to the specificity of the aim and therefore limited individuals met the criteria to be involved.

### Transferability

The results of this study cannot be easily transferred to other settings. This is due to small sample size, specificity of the inclusion criteria and diagnosis. This can only be transferred to individuals who have experience of MS and have been previously involved in an energy conservation course. However there is sufficient detail of participant demographics, settings and methods involved to be able to replicate this study in the future.

### Dependability

To ensure dependability more than one researcher was involved in the analysis of the data. Both researchers independently reviewed the interview recordings to identify common themes. A number of meetings were held between the authors to discuss discrepancies between their analyses. The article has been peer reviewed adding to its trustworthiness.

### Confirmability

The use of more than one researcher, peer review, member checking, triangulation and a reflective log, all aid in eliminating personal bias from the article therefore ensuring confirmability.

### Presentation of Results

Results are categorised into identified themes and sub-themes. Personal quotes from participants have been used in each section to back up authors' conclusions. Experience with the disease, sense of self, environment and value of education were clearly identified as the factors that influenced the use of energy conservation strategies by persons with Multiple Sclerosis.

### **Summary/Conclusion**

The triangulation and member checking of the interviews and results improved the trustworthiness of the article. A larger, more diverse sample size would increase transferability as the results would be more representative to a whole population.

### **Implications For Practice, Education and Future Research**

From reviewing the two articles there is no strong evidence that an energy conservation course will significantly reduce fatigue. The research suggests that improvements can be made in some areas of an individual's life, however there are many other factors influencing the implementation of the strategies.

Mathiowetz et al (2005) conducted an energy conservation course and identified the impact it had on an individual's quality of life and self-efficacy. In contrast Holberg & Finlayson (2007) considered the factors that influence a person using the strategies taught during a previous energy conservation course. After conducting the studies both authors suggests that there are a multitude of areas that require further research. These include setting, cognitive deficits, group learning versus individual learning and the combination of an energy conservation course with another variable (exercise). By addressing these areas the outcomes will be more easily transferred to a wider range of settings within Occupational Therapy practice.

Due to the lack of strong evidence regarding the benefits of an energy conservation course, disagreement between health professionals in practice may occur. As each health professional has their own philosophy regarding treatment of individuals with Multiple Sclerosis, strong evidence is required by each to back up their choice of intervention. This therefore enhances the need for further research to guide Occupational Therapists in practice when delivering energy conservation.

As Holberg & Finlayson (2007) identified, there are many factors that can influence a person implementing energy conservation strategies. Ideally this would mean the course would be more effective if taught with individuals as opposed to groups. This would allow the therapist to identify specific factors that influence the person and therefore create an individualised plan. However this would create further implications for practice as many settings will not

have the staff, time and resources to be able to implement an energy conservation course of this duration and complexity. Therefore further research into group versus individualised sessions would be beneficial to both client and therapist.

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