Fatigue in neurological disorders

Articles

Different types of fatigue in patients with facioscapulohumeral dystrophy, myotonic dystrophy and HMSN-I. Experienced fatigue and physiological fatigue.

Kalkman JS, Zwarts MJ, Schillings ML, van Engelen BGM, Bleijenberg G.

Although fatigue is a common symptom in neuromuscular disorders, little is known about different types of fatigue. Sixty-five FSHD, 79 adult-onset MD and 73 HMSN type I patients were studied. Experienced fatigue was assessed with the CIS-fatigue subscale. Physiological fatigue was measured during a 2-min sustained maximal voluntary contraction of the biceps brachii muscle using the twitch interpolation technique to assess central activation failure (CAF) and peripheral fatigue. Experienced fatigue, CAF and peripheral fatigue appeared to be predominantly separate types of fatigue.
The development of a model of fatigue in neuromuscular disorders: A longitudinal study.

Kalkman JS, Schillings ML, Zwarts MJ, van Engelen BGM, Bleijenberg G.

Background:
Severe fatigue is reported by the majority of patients with three relatively common types of neuromuscular disorders. OBJECTIVE: This study aimed to identify predictors of fatigue in a longitudinal study and to develop a model of fatigue in patients with three neuromuscular disorders.

Methods:
One hundred ninety-eight patients [60 facioscapulohumeral muscular dystrophy (FSHD), 70 adult-onset myotonic dystrophy (MD), and 68 hereditary motor and sensory neuropathy type I (HMSN-I) patients] were studied twice during an 18-month period. Fatigue severity was assessed by the Checklist Individual Strength. A multidimensional assessment method was used, including self-report questionnaires, a daily Self-Observation List, and physical activity (actometer). Muscle strength was determined using the Medical Research Council scale. Structural equation modeling was used to develop and test a model of factors contributing to the persistence of experienced fatigue.

Results:
Muscle strength, self-reported physical activity, sleep disturbances, and pain at baseline contributed directly or indirectly to fatigue and impairment at follow-up. Lower muscle strength contributed to lower levels of physical activity, which, in turn, contributed to fatigue severity. The model showed excellent fit for the whole group of neuromuscular disorders. In FSHD, pain also contributed to physical activity. A model with the actometer as measurement for actual physical activity instead of self-report showed an excellent model fit in FSHD and HMSN but an insufficient fit in MD.

Conclusion:
The model of perpetuating factors for fatigue in FSHD and HMSN is different from the model in MD. The main difference is in physical (in)activity. These differences have implications for interventions based on these models.
Psychiatric disorders appear equally in patients with myotonic dystrophy, facioscapulohumeral dystrophy, and hereditary motor and sensory neuropathy type I.


Kalkman JS, Schillings ML, Zwarts MJ, van Engelen BG, Bleijenberg G.

Objectives:
To study the presence of psychiatric comorbidity assessed by the use of a structured clinical interview and self-reported questionnaires in a large sample of patients with adult-onset myotonic dystrophy (DM), facioscapulohumeral muscular dystrophy (FSHD), and hereditary motor and sensory neuropathy type I (HMSN-I), and to assess whether psychiatric comorbidity is related to fatigue severity and/or muscle strength.

Methods:
In a cohort of 217 patients with a neuromuscular disorder (79 DM, 65 FSHD and 73 HMSN-I patients) overall psychiatric comorbidity was studied cross-sectionally with the structured clinical interview for DSM-IV axis I disorders. Self-reported psychopathology, fatigue severity and muscle strength were assessed with the Beck Depression Inventory, Symptom Checklist-90, General Health Questionnaire-12, Checklist Individual Strength and muscle strength [Medical Research Council (MRC)-scale].

Results:
In all three neuromuscular disorders (DM, FSHD and HMSN), 10-12% of the patients met DSM IV clinical criteria for current psychiatric disorders. Lifetime psychiatric disorders were found in 32% of patients in all three patient groups. The most common psychiatric disorders were depression and phobias. A comparison of patients with and without current psychiatric disorder showed that fatigue severity and muscle strength (MRC) were not related to psychiatric comorbidity.

Conclusion:
Psychiatric disorders appear equally in patients with DM, FSHD and HMSN-I and are not related to fatigue or muscle strength in these patients.
Effects of training and albuterol on pain and fatigue in facioscapulohumeral muscular dystrophy.

Kooi EL van der, Kalkman JS, Lindeman E, Hendriks JC, van Engelen BG, Bleijenberg G, Padberg GW.

Background:
We recently reported a randomised controlled trial on the efficacy of strength training and the beta2-adrenergic agonist albuterol in patients with facioscapulohumeral muscular dystrophy (FSHD). Strength training and albuterol appeared safe interventions with limited positive effect on muscle strength and volume. We concurrently explored the prevalence and the characteristics of pain and fatigue in the participating FSHD patients, because these are probably underreported but clinically relevant symptoms in this disorder. Next, we studied the effects of albuterol and strength training on pain, experienced fatigue, health-related functional status and psychological distress.

Methods:
Sixty-five patients were randomised to strength training of elbow flexors and ankle dorsiflexors or non-training. After 26 weeks, albuterol (sustained-release, 8 mg bid) was added in a randomised, double-blind, placebo-controlled design. Outcomes comprised self-reported pain, experienced fatigue, functional status and psychological distress obtained with validated questionnaires at 52 weeks.

Results:
Eighty percent of patients reported chronic persistent or periodic, multifocal pains. Thirty-four percent of the participants were severely fatigued. Strength training and albuterol failed to have a significant effect on all outcomes.

Conclusions:
Pain and fatigue are important features in FSHD. Strength training and albuterol do not have a positive or negative effect on pain, experienced fatigue, functional status and psychological distress.
Cognitive complaints after mild traumatic brain injury: Things are not always what they seem.

Stulemeijer M, Vos PE, Bleijenberg G, van der Werf SP.

Objective:
To compare nonreferred, emergency department (ED)-admitted mild traumatic brain injury (MTBI) patients with and without self-reported cognitive complaints on (1) demographic variables and injury characteristics; (2) neuropsychological test performance; (3) 12-day self-monitoring of perceived cognitive problems; and (4) emotional distress, physical functioning, and personality.

Methods:
(Neuro)psychological assessment was carried out 6 months post-injury in 79 patients out of a cohort of 618 consecutive MTBI patients aged 18-60, who attended the ED of our level I trauma centre. Cognitive complaints were assessed with the Rivermead Postconcussional Symptoms Questionnaire (RPSQ). In addition, patients monitored concentration problems and forgetfulness during 12 consecutive days.

Results:
Self-reported cognitive complaints were reported by 39% of the patients. These complaints were strongly related to lower educational levels, emotional distress, personality, and poorer physical functioning (especially fatigue) but not to injury characteristics. Severity of self-reported cognitive complaints was neither associated with the patients' daily observations of cognitive problems nor with outcome on a range of neuropsychological tests.

Conclusion:
Self-reported cognitive complaints were more strongly related to premorbid traits and physical and emotional state factors than to actual cognitive impairments. In line with previous work, this suggests that treatment of emotional distress and fatigue may also reduce cognitive complaints. Cognitive outcome assessment of symptomatic MTBI patients should not be restricted to checklist ratings only, but also include a (neuro)psychological screening. In addition, daily monitoring of complaints is a useful method to gather information about the frequency and pattern of cognitive problems in daily life.
Ambulatory disabilities and the use of walking aids in patients with hereditary motor and sensory neuropathy type I (HMSN I).
BGM. Disability and Rehabilitation 2007; 2(1): 35-41

Van der Linden M, Kalkman J, Hendricks HT, Schillings M, Zwarts M, Bleijenberg G, Van Engelen

Objective:
To study whether HMSN I patients experience ambulatory and mobility related disabilities, and to address which demographic, physical and psychological variables are related to the level of ambulatory disability and the use of walking aids.

Design:
Cross-sectional assessment
Setting: University Medical Center
Patients: Seventy-five ambulatory HMSN I patients, aged 18 to 60 years
Main outcome measures: Demographics, disability of ambulation and mobility (Sickness Impact Profile), muscle strength (Medical Research Council (MRC)), use of walking aids, physical activity (actometer), fatigue (Checklist Individual Strength), and quality of life (EuroQoL).
Results: Patients had increased disabilities, were less active, and more fatigued compared to healthy reference groups. They showed distal paresis (mean MRC = 3.3), a high level of pain-discomfort (76%), but normal levels of employment (62.7%) and anxiety-depression (20%). Walking aids were used by 49% of the patients. These patients were older, less active, had less muscle strength, and experienced more problems with ambulation, mobility and fatigue than non-users, but they did not necessarily perceive walking disabilities.

Conclusion:
Ambulatory disabilities frequently occur in HMSN I patients and are related to age, muscle strength, fatigue, physical activity and general perceived health state. The use of walking aids was not completely in accordance with perceived ambulatory disability. So, with respect to walking aids, counseling and prescription require specific attention. Physicians who attend HMSN I patients should additionally be observant to pain-discomfort and fatigue.
Fatigue is a multidimensional concept covering both physiological and psychological aspects. Chronic fatigue is a typical symptom of diseases such as cancer, multiple sclerosis (MS), Parkinson’s disease (PD) and cerebrovascular disorders but is also presented by people in whom no defined somatic disease has been established. If certain criteria are met, chronic fatigue syndrome can be diagnosed. The 4-item Abbreviated Fatigue Questionnaire allows the extent of the experienced fatigue to be assessed with a high degree of reliability and validity.

Physiological fatigue has been well defined and originates in both the peripheral and central nervous system. The condition can be assessed by combining force and surface-EMG measurements (including frequency analyses and muscle-fibre conduction estimations), twitch-interpolation, magnetic stimulation of the motor cortex and analysis of changes in the readiness potential.

Fatigue is a well-known phenomenon in both central and peripheral neurological disorders. Examples of the former conditions are multiple sclerosis, Parkinson’s disease and stroke. Although it seems to be a universal symptom of many brain disorders, the unique characteristics of the concomitant fatigue also points to a specific relationship with several of these syndromes. As regards neuromuscular disorders, fatigue has been reported in patients with post-polio syndrome, myasthenia gravis, Guillain-Barré syndrome, facioscapulohumeral dystrophy, myotonic dystrophy and hereditary motor and sensory neuropathy type-I. More than 60% of all neuromuscular patients suffer from severe fatigue, a prevalence resembling that of patients with MS. Except for several rare myopathies with specific metabolic derangements leading to exercise-induced muscle fatigue, most studies have not identified a prominent peripheral cause for the fatigue in this population. In contrast, the central activation of the diseased neuromuscular system is generally found to be suboptimal.

The reliability of the psychological and clinical neurophysiological assessment techniques available today allow a multidisciplinary approach to fatigue in neurological patients, which may contribute to the elucidation of the pathophysiological mechanisms of chronic fatigue, with the ultimate goal to develop tailored treatments for fatigue in neurological patients.

The present report discusses the different manifestations of fatigue and the available tools to assess peripheral and central fatigue.
Physiological fatigue, a loss of maximal force producing capacity, may originate both from changes at the peripheral and at the central level. The readiness potential (RP) provides a measure to study adaptations to physiological fatigue at the motor cortex. We have studied the RP in the course of repetitive contractions at a high force level. Fourteen female healthy subjects made repetitive force grip contractions at 70% of their maximal voluntary contraction (MVC) for 30 min. Contractions were self-paced and inter-squeeze interval was about 7 s. During the repetitive contractions, the area under the curve of the RP almost doubled at electrode Cz and increased fourfold at electrodes C3_ and C4_. The onset of negativity moved forward from 1.5 to 1.9 s before force onset at Cz and from 1.0 to 1.6 s and 1.7 s before force onset at C3_ and C4_, respectively. EMG amplitude and median frequency did not change significantly and MVC after the fatiguing exercise was 93% of MVC before, indicating relatively little physiological fatigue. The increase of the RP during the repetitive contractions is clearly in excess of the almost absent signs of peripheral fatigue. Because the increase of the RP does not lead to an increased force production, we propose that it is a central adaptation counteracting the decrease of cortical efficiency during repetitive contractions.

Kalkman JS, Schillings ML, Zwarts MJ, van Engelen BGM, Bleijenberg G.

Objectives:
Fatigue is a common symptom experienced by patients with various neuromuscular disorders. The purpose of this study was to assess the influence of relatives on fatigue experienced by patients with various neuromuscular disorders.

Methods:
In total, 106 close relatives of patients with facioscapulohumeral dystrophy (FSHD), adult-onset myotonic dystrophy (MD), and hereditary motor and sensory neuropathy type I (HMSN), completed the Checklist Individual Strength for themselves, and how they thought their relatives filled in this questionnaire. We compared the agreement between the two. The reaction of the relative to the fatigue and to the neuromuscular disorder of the patient was assessed by the Family Response Questionnaire. Marital dissatisfaction was also measured. The influence of the relative's response to the patients' fatigue and the relatives' fatigue on the fatigue of the patient was tested in linear regression models.

Results:
In all 3 patient groups, the responses of the relatives to fatigue and disease were characterized by sympathetic-empathic responses. Low agreement existed between relatives and MD patients (r = 0.26) over the patients' level of fatigue, but higher agreement was found between relatives and FSHD (r = 0.67) and HMSN (r = 0.73) patients. The spouses of MD patients reported less marital satisfaction. The sympathetic-empathic responses of the relatives of FSHD and HMSN patients, and in FSHD also the fatigue experienced by the relative, contributed significantly to higher levels of fatigue experienced by the patients.

Conclusion:
The sympathetic-empathic responses of close relatives to the fatigue of the patient were related to the higher levels of fatigue experienced by FSHD and HMSN patients, but not MD patients.
Recovery from mild traumatic brain injury: A focus on fatigue.


Background:
Fatigue is one of the most frequently reported symptoms after Mild Traumatic Brain Injury (MTBI). To date, systematic and comparative studies on fatigue after MTBI are scarce, and knowledge on causal mechanisms is lacking. Objectives To determine the severity of fatigue six months after MTBI and its relation to outcome. Furthermore, to test whether injury indices, such as Glasgow Coma Scale scores, are related to higher levels of fatigue.

Methods:
Postal questionnaires were sent to a consecutive group of patients with an MTBI and a minor-injury control group, aged 18–60, six months after injury. Fatigue severity was measured with the Checklist Individual Strength. Postconcussional symptoms and limitations in daily functioning were assessed using the Rivermead Post Concussion Questionnaire and the SF-36.

Results:
A total of 299 out of 618 eligible (response rate 52%) MTBI patients and 287 out of 482 eligible (response rate 60%) minor-injury patients returned the questionnaire. Ninetyfive MTBI patients (32%) and 35 control patients (12%) were severely fatigued. Severe fatigue was highly associated with the experience of other symptoms, limitations in physical and social functioning, and fatigue related problems like reduced activity. Of various trauma severity indices, nausea and headache experienced on the ED were significantly related to higher levels of fatigue at six months.

Conclusions:
In conclusion, one third of a large sample of MTBI patients experiences severe fatigue six months after injury, and this experience is associated with limitations in daily functioning. Our finding that acute symptoms and mechanism of injury rather than injury severity indices appear to be related to higher levels of fatigue warrants further investigation.
Experienced fatigue in Facioscapulohumeral Dystrophy, Myotonic Dystrophy and HMSN-I patients.

Kalkman JS, Schillings ML, van der Werf SP, Padberg GW, Zwarts MJ, van Engelen BGM, Bleijenberg G.

Objective:
To assess the prevalence of severe fatigue and its relation to functional impairment in daily life in patients with relatively common types of neuromuscular disorders.

Methods:
598 patients with a neuromuscular disease were studied (139 with facioscapulohumeral dystrophy, 322 with adult onset myotonic dystrophy, and 137 with hereditary motor and sensory neuropathy type I). Fatigue severity was assessed with Checklist Individual Strength (CIS-fatigue). Functional impairments in daily life were measured with the short form 36 item health questionnaire (SF-36).

Results:
The three different neuromuscular patient groups were of similar age and sex. Severe experienced fatigue was reported by 61–74% of the patients. Severely fatigued patients had more problems with physical functioning, social functioning, mental health, bodily pain, and general health perception. There were some differences between the three disorders in the effects of fatigue.

Conclusions:
Severe fatigue is reported by the majority of patients with relatively common types of neuromuscular disorders. Because experienced fatigue severity is associated with the severity of various functional impairments in daily life, it is a clinically and socially relevant problem in this group of patients.
The relation between daytime sleepiness, fatigue, and reduced motivation in patients with adult onset myotonic dystrophy.


Methods:

Patients

The study was conducted at the outpatient clinic of the Neuromuscular Centre Nijmegen, based at the Institute of Neurology of the University Medical Centre Nijmegen in the Netherlands. Consecutive ambulant patients with a genetically confirmed diagnosis of (adult onset) myotonic dystrophy and an expanded CTG repeat on chromosome 19q13.3 (DM1) were invited to take part. Fatigue was not a criterion for inclusion, and the patients came to the hospital for their regular visits. Those willing to participate were asked to complete the questionnaires at home and then send them back to the hospital.

Data were collected on 32 patients (16 female/16 male), mean age 43.8 years (range 22 to 73), and mean complaint duration 10.1 years (range 1 to 35). Myotonia and muscle weakness were rated using the five point muscular disability rating scale (MDRS).² The scores in this group ranged from 0 (absent myotonia and muscle weakness) to 4 (severe proximal muscle weakness and wheelchair dependence), and the mean (SD) MDRS score for the group was 2.3 (1.1) (range 0 to 4).

Measurements:

Daytime sleepiness

Three items (Nos 2, 5, and 7) of the subscale sleep/rest of the sickness impact profile refer specifically to increased daytime sleepiness.⁸ These three items (“I feel continuously like dozing off”; “I am often hanging around half asleep”; “I sleep more during the day”) were summed, and a score > 0 was taken as an indication of increased sleepiness.

Fatigue severity

The subscale “fatigue severity” of the checklist individual strength (CIS) measures the experience of fatigue associated problems during the previous two weeks. The CIS-fatigue severity scale contains eight items that can be scored on a seven point Likert scale. Scores can range between 8 and 56; higher scores indicate higher levels of fatigue, and scores exceeding 40 points are considered to indicate severe fatigue.

Reduced motivation

The CIS subscale “reduced motivation” contains four items that are also scored on a seven point Likert scale (score range 4 to 28). Higher scores (range 4 to 28) are indicative of taking less initiative and of decreased motivation.
Statistics
Independent $t$ tests were used to compare the groups of patients with and without sleepiness symptoms with respect to their mean CIS-fatigue, CIS-lack of motivation, and MDRS scores. Significance testing was two sided, with $\alpha$ set at 0.05.

Results:
Ten (31%) of the 32 patients answered positively on one or more of the three sleepiness items. The patients were then divided into a group which reported at least one of the three sleepiness symptoms (sleepiness; $n = 10$) and a group which reported no sleepiness symptoms (non-sleepiness; $n = 22$). Independent $t$ test showed no significant differences between the mean CIS-fatigue scores of the two groups (sleepiness, 44.6 (7.5); non-sleepiness, 41.0 (10.2); $t = 0.98$, $p = 0.33$), but there was a significant difference for the CIS-reduced motivation score. The sleepiness group reported a significantly greater reduction in motivation than the non-sleepiness group (sleepiness, 22.5 (3.5); non-sleepiness, 15.1 (4.8); $t = 4.35$, $p < 0.001$). The groups did not differ with respect to their MDRS scores (mean MDRS in the sleepiness group, 2.2 (1.5); in the non-sleepiness group, 2.4 (1.0); $t = -0.4$, $p = 0.69$). The MDRS score was also not significantly correlated with the CIS-fatigue score (Spearman $\rho = 0.19$, $p = 0.32$).
Although the experience of abnormal fatigue is recognised as a major disabling symptom in many chronic neurological diseases, little is known about the persistence of severe fatigue after an abrupt neurological incident like a stroke. Therefore, the objectives of this study were to test whether the experience of severe fatigue persists long after a stroke has occurred, and to assess the relation between experienced fatigue and levels of physical impairment and depression. Ninety stroke outpatients and 50 controls returned mailed questionnaires. Compared to age-matched controls, a significantly larger proportion (16 vs. 51%) of the stroke respondents experienced severe fatigue, while 20% of the patients and 16% of the controls had elevated depression symptom scores. The time which had elapsed since the stroke occurred could not explain levels of fatigue. In the control group, the number of depressive symptoms explained most of the variance in levels of fatigue, while impairment of locomotion explained most of the variance in the stroke group.
Abnormal neuropsychological findings are not necessarily a sign of cerebral impairment: A matched comparison between chronic fatigue syndrome and multiple sclerosis.


Werf SP van der, Bleijenberg G, Prins JP, Jongen PJH, Meer JWM van der.

Objective:

The aim of this study was to assess the potential impact of effort in comparative studies assessing neurocognitive dysfunction in patients with and without a neurologic diagnosis.

Background:

It was hypothesized that a subgroup within a group of patients with prominent neurocognitive complaints but without a neurologic diagnosis would have impaired performance on a task originally designed to detect malingering.

Method:

We compared the neuropsychological performance of a group of 40 patients with a definite diagnosis of multiple sclerosis (MS) with that of 67 patients with chronic fatigue syndrome (CFS). The Amsterdam Short-Term Memory Test, a forced-choice memory task, served as measure to detect submaximal effort. In addition, we administered a regular neuropsychological task generally considered to be sensitive for cognitive deterioration.

Results:

Compared with the MS group (13%), a larger proportion of the matched CFS group (30%) obtained scores indicative of reduced effort. In contrast, the proportions of patients scoring below the cutoff value on a conventional neuropsychological test did not differ significantly (17% of MS patients and 16% of CFS patients).

Conclusions:

The results obtained raise the question of to what extent abnormal test findings in the absence of documented neurologic impairment should be interpreted as a sign of cerebral impairment. The suggestion has been made to screen more often for biased results in comparative research studies so as to enhance valid interpretation of neuropsychological findings.
The persistence of fatigue in chronic fatigue syndrome and multiple sclerosis: development of a model.


Vercoulen JHMM, Hommes OR, Swanink CMA, Jongen PJH, Fennis JFM, Galama JMD, Meer JWM van der, Bleijenberg G.

The cause of chronic fatigue syndrome (CFS) is unknown. With respect to factors perpetuating fatigue, on the other hand, a model has been postulated in the literature in which behavioral, cognitive, and affective factors play a role in perpetuating fatigue. In the present study, this hypothesized model was tested on patients with CFS and on fatigued patients with multiple sclerosis (MS). The model was formulated in terms of cause-and-effect relationships and an integral test of this model was performed by the statistical technique, “structural equation modeling,” in 51 patients with chronic fatigue syndrome and 50 patients with multiple sclerosis matched for age, gender, and education. Attributing complaints to a somatic cause produced low levels of physical activity, which in turn had a causal effect on fatigue severity. Depression had to be deleted from the model. Sense of control over symptoms and focusing on bodily symptoms each had a direct causal effect on fatigue. The model showed an excellent fit for CFS patients, but was rejected for MS patients. Therefore, a new model for MS patients had to be developed in which sense of control had a causal effect on fatigue. In the MS model, no causal relationship was found between the physical state as measured by the Expanded Disability Status Score (EDSS) and fatigue or functional impairment. The present study shows that cognitive and behavioral factors are involved in the persistence of fatigue. Treatment should be directed at these factors. The processes involved in the subjective experience of fatigue in CFS were different from the processes related to fatigue in MS.
Fatigue in multiple sclerosis: interrelations between fatigue complaints, cerebral MRI abnormalities and neurological disability

Werf SP van der, Jongen PJH, Lycklama à Nijeholt GJ, Barkhof F, Hommes OR, Bleijenberg G.

Although fatigue is a frequent complaint of patients with multiple sclerosis (MS), little is known about the origins of multiple-sclerosis-associated fatigue. Our primary focus was to study if the extent of cerebral abnormalities, as shown on magnetic resonance imaging (MRI), had any relation with the frequency and intensity of fatigue complaints of patients with a definite diagnosis of MS. Fatigue severity was rated by the patients with the use of a 2-week diary and a fatigue questionnaire, while conventional T1- and T2-weighted MRI provided several measures for cerebral abnormalities. In total, 72% of 45 patients reported to be seriously fatigued at least several times a week over the last 3-month period. Fatigue severity was not related to the total extent of cerebral abnormalities, or to MRI-based atrophy measures. Regional lesion load did not differ between fatigued and non-fatigued subjects. Although neurological disability, as measured by the Expanded Disability Status Scale (EDSS) and Neurological Rating Scale (NRS), did correlate significantly with most MRI measures, it showed no relation with fatigue severity. Neurological progression rates and number of exacerbations in the 2-year period prior to assessment were not significantly associated with the fatigue measures. Therefore, our findings suggest that differences in levels of self-reported fatigue in patients with multiple sclerosis cannot merely be explained by the degree of clinical disease activity, neurological disability or the extent of MRI abnormalities. These results are compared to other research findings and the possible role of alternative factors influencing fatigue in multiple sclerosis are discussed.
The measurement of fatigue in multiple sclerosis: a comparison with patients with chronic fatigue syndrome and healthy subjects.


Vercoulen JHMM, Hommes OR, Swanink CMA, Jongen PJH, Fennis JFM, Galama JMD, Meer JWM van der, Bleijenberg G.

Objective:
To provide a multidimensional characterization of fatigue in patients with multiple sclerosis (MS).

Design:
Cross-sectional design. Fifty patients with clinically definite MS were compared on the dimensions of fatigue with 51 patients with chronic fatigue syndrome (CFS) and 53 healthy subjects.

Results:
Forty-six percent of the patients with MS reported fatigue to be present at least once a week. Patients with MS and patients with CFS had significantly higher subjective fatigue severity scores than healthy subjects. Patients with MS and patients with CFS had significantly higher scores on measures of psychological well-being than healthy subjects. Patients with MS had scores similar to those of patients with CFS, except that patients with CFS had significantly higher somatization scores. High somatization scores reflect strong focusing on bodily sensations. Both groups of patients were significantly less active than the healthy subjects. The Kurtzke Expanded Disability Status Scale (EDSS) and the Beck Depression Inventory scores were not related to subjective fatigue severity. In patients with MS and in patients with CFS, subjective fatigue severity was related to impairment in daily life, low sense of control over symptoms, and strong focusing on bodily sensations. In CFS, but not in MS, evidence was found for a relationship between low levels of physical activity and attributing symptoms to a physical cause and between subjective fatigue severity and physical activity.

Conclusions:
Patients with MS experienced significant fatigue, which had a significant impact on daily functioning and was not related to depression or Expanded Disability Status Scale score. Psychological factors, such as focusing on bodily sensations and low sense of control, play a role in the experience of fatigue in MS and CFS.