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The importance of a multi-disciplinary perspective and patient activation programmes in MS management

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Abstract (max 200 words, now 206)

Background: MS is a progressive disease associated with a large variety of symptoms and changing patients' needs during the disease course. In order to provide appropriate care in every disease stage and let patients live their lives to the full, a multi-disciplinary approach and patient activation is needed.

Objective: To summarise the multi-disciplinary perspective of MS, with focus on the organisation of a multi-disciplinary care team and possibilities to support patient activation in MS.

Methods: This review reflects the content of the presentations, audience polling results and discussions on the multi-disciplinary perspective of MS during the second Pan-European MS Multi-stakeholder Colloquium in Brussels on 15-16 May 2015.

Results: In many countries, the neurologist with or without the support of an MS nurse is responsible for the long-term care of MS patients. When needed, they should refer to other (non-) medical specialists. However, the patient should be empowered as well to manage his disease and to implement a physically active lifestyle in order to improve treatment outcomes and the quality of life.

Conclusion: In order to create equal access to care for MS patients across Europe, evidence-based standards of care, symptom self-monitoring tools and educational programs for patients and healthcare professionals including non-medical treatment strategies should be developed at the European level.

Key words:

Multi-disciplinary perspective, multiple sclerosis, patient participation, rehabilitation

Introduction

MS is a chronic and progressive immune-mediated disorder of the CNS, characterised by inflammation, demyelination and neuronal degeneration[1]. With more than 2.3 million people affected, MS is one of the world's most common neurological disorders. In many countries, it is the leading cause of non-traumatic disability in young adults[2].

At the Blizard Institute (Barts and the London School of Medicine and Dentistry, London, United Kingdom), the journey of MS is depicted on the London underground map (Figure 1)[3]. The majority of patients initially present with a clinically isolated syndrome (CIS). About 2/3rd of these patients develops clinically definite MS (CDMS)[4]. Although the disease course is unpredictable and highly variable, MS usually progresses over time which comes along with an increase in disability. MS patients experience a plethora of symptoms, affecting not only physical, but also visual and cognitive functions, as well as psychological and social aspects of quality of life (QoL) of patients and indirectly also their caregivers[1,5]. As such, it is impossible for one clinician to optimally manage every MS patient on all these aspects. A multi-disciplinary perspective is needed to address all aspects associated with the disease. Furthermore, it is estimated that within a decade[6], or perhaps even as soon as (on average) three years after diagnosis, half of the MS patients become unemployed[7]. In Europe only half of the MS patients with an EDSS 3 (fully ambulatory patients) are employed and this is further decreasing to 20% of patients with an EDSS 6 (patients needing a walking aid)[8]. Again, this has major implications for the QoL of MS patients and their families and friends, as well as for the cost to society[8]. In fact, perceived utility of persons with MS is decreased compared to age matched healthy controls, even in the early disease stages where symptoms may be overall rather mild.[1]

In order to improve the patient's QoL and reduce the burden on society, MS patients should be comprehensively assessed while being empowered to remain active both in their family and social lives as well as in their work environment. This can be achieved by providing optimal care (rehabilitation, multi-disciplinary assessment and services, etc.) and disease-modifying drugs (DMDs) adapted to the needs of every single patient. Unfortunately, a wide variation in access to care and treatment exists nowadays across European countries[9]. New technologies allowing e-communication may be of help to facilitate optimal care and (self) management.

The required multi-disciplinary perspective in MS care and possibilities to improve patient activation were discussed during the second Pan-European MS Multi-stakeholder Colloquium, which was organised on 15-16 May 2015[10] in Brussels. The goal of this and the preceding (23-24 May 2014)[11] Colloquium was to enhance the communication and collaboration between the different stakeholders involved in MS care, including patients and their caregivers, healthcare professionals, researchers, regulators and payers. The programmes developed by the chair and scientific committee aimed at prioritising actions needed to improve the quality of and access to care and treatment. At the first Colloquium, the multi-disciplinary perspective was pointed out as a crucial topic, needing elaboration and extensive discussion at the second Colloquium.

This review summarises the perspectives and propositions of a workgroup on multi-disciplinary approach and patient activation, polling results and related discussions.

How to optimise the multi-disciplinary approach?

Assessing the total clinical burden

As MS patients can suffer from a wide spectrum of symptoms which vary from one patient to the other, it is difficult to assess the total clinical burden with one single instrument. Many different tests and scales, whether or not specific for MS, exist, but none of them is covering the overall clinical burden. Often, less visible, but bothersome symptoms such as fatigue and impaired cognition are not well identified with current standard assessment and therefore underestimated.

The most widely used and best-known instrument is the Expanded Disability Status Scale (EDSS) developed by Kurtzke JF[12]. It is focused on measuring disability on a scale ranging from 1 (no disability) to 10 (death), and heavily depending on ambulation in the higher range. Alternatively, the Multiple Sclerosis Functional Composite (MSFC)[13] consists of three capacity based parts measuring upper limb dexterity with the 9-Hole Peg Test, gait functioning with the Timed 25-Foot Walk (T25-FW) and cognitive functioning with the Paced Auditory Serial Addition Test (PASAT) testing working memory and sustained attention. The MSFC can produce scores for each of the three individual measures as well as a composite score. In contrast to the EDSS, however, the MSFC has not been accepted by regulators as a primary endpoint in clinical trials,[14] but is usually included as secondary endpoint[15]. In the latter framework, as the MSOAC (multiple sclerosis outcome assessment consortium) is investigating the evidence supporting clinical tests to be recognized as primary outcome in medical trials.[2]

However, next to a screening of cognition and (upper/lower) limb movement impairment, MS patients experience other aspects of physical and cognitive impairments such as decreased walking endurance and confidence, falls[3] and aspects as impaired information processing speed or executive functions. As well, many patients are confronted with other symptoms as fatigue and mood disorders (anxiety and depression), bladder and bowel dysfunctions, sexual problems, etc. Although many tests and scales (summarised in Table 1) are available to evaluate the severity or impact of specific symptoms, they appear to be rarely used in daily clinical practice. This can possibly be explained by time constraints in clinical practice to perform comprehensive assessments and unfamiliarity with its specific metrics or knowledge of values of clinically meaningful difference making interpretation of its outcome difficult. Also, although one is seeking for the patient perspective, not all clinicians may value patient-reported measures as they are potentially biased with mood. However, discussions also revealed that some clinical neurologists in Europe may not test some symptoms as fatigue and cognition as they are not aware of effective (non) medical treatments nor to which services or health care professionals the patient can be referred to in their region. This estimated lack of multi-dimensional assessment and referral is to some extent in line with the unmet needs coming from a recent study in 1,205 Italian patients with MS[16]. 79% of the patients declared at least one health or social care need, with psychological support and access to rehabilitation services, and transport as most prevalent health and social care need, respectively[16].

From the above, it is clear that more research is needed on ‘easy-to-use’ tools which capture the total clinical burden of MS. With these, patient-specific needs can be assessed and patient-tailored therapy, with referral to different specialists when needed, can be provided at each phase in the disease course. The patient self can play an important role in (electronic) self-monitoring, which is also related to the patient activation approach which will discussed later.

The multi-disciplinary care team and central coordination of care

A multi-disciplinary care team can be defined as a partnership among healthcare workers of different disciplines inside and outside the health sector, as well as in care centers and the community with the goal of providing continuous, comprehensive and efficient health services[17].

During the past century, there have been some changes in the organisation of healthcare services and the management of chronic diseases. In the 1930's, healthcare specialists were centralised in hospitals. So, to get specialist's advice regarding their MS, patients needed to visit the hospital. In the 1940's, the general practitioner became the central contact in the daily management of MS (at least in some countries including the UK and the Netherlands). When needed, the general practitioner referred the MS patient to the neurologist, nurse or neurorehabilitation specialist. As the management of chronic diseases like MS is very complex and requires specialised care, the neurologist took over the role as central contact person at some point in time. However, since many countries don't have enough neurologists to take care of all MS patients, the MS nurse gained more responsibilities and became the central contact for MS patients in countries such as Denmark and Ireland. Nowadays, the neurologist, together with the MS nurse, are responsible for the long-term care of MS patients. They often work closely together and have the possibility to refer to other medical or rehabilitation specialists in their network when the patient is in need of these services. Some countries have MS centres of excellence, i.e. a campus where all facilities and specialised care including comprehensive medical treatment as well as rehabilitation interventions, are grouped in light of MS patients' needs. Centers of excellence are expected to drive high standards in MS management in the country by education and research, as well as to treat mainly those patients with complex needs.

Other patients are treated in the community, but considerable differences in the composition and management approach of the multi-disciplinary care team exist between countries and regions. As a core team, one could think about the neurologist, the MS nurse, a psychologist and/or rehabilitation physician, while other specialist caregivers contribute upon an “as needed” basis. Optimally, there is a transparent regional network where patients can be easily referred to other health care professionals, whose expertise is well-known.

With the advent of the internet and smartphones and by providing easy access to all kinds of therapists/specialists, it might be possible that, in future, the MS patient himself will be the central person, managing his own disease. This is in line with a book published by the Royal Pharmaceutical Society of Great Britain in 1997 “From Compliance to Concordance: Achieving Shared Goals in Medicine Taking”[18]. Here the authors state that a shift is needed from the ‘authoritarian’ clinician, who decides alone on diagnosis and treatment, to a real partnership between patient and clinician, where both parties negotiate on the most appropriate care.

During the Colloquium, the polling questioned the ideal organisation of a multi-disciplinary care team. Thirty percent of the audience indicated that the multi-disciplinary care team is best based *in a network*, while 26% indicated *regionally in a centre of excellence* and 22% *in the community* (Figure 2a). When the attendants were asked which person should be at the centre of the multi-disciplinary care team, 40% indicated *the neurologist* and 37% *the MS patient* (Figure 2b). With these differences in mind, maybe we should not debate on the optimal structural setting of multi-disciplinary care but rather strive to have an integrated care pathway (ICP) available for every symptom associated with MS. An ICP is a multi-disciplinary outline of anticipated care, placed in an appropriate timeframe, to help a patient with a specific condition or set of symptoms move progressively through a clinical experience to positive outcomes[19]. ICPs should be used in daily practice, revised and adapted in order to improve the ICPs. So in order to improve multi-disciplinary care for every patient, it might be needed to develop ICPs and associated quality metrics and audit tools, rather than focussing on the implantation of specialised MS centres. This was confirmed by the polling results at the

Colloquium where 61% of the respondents indicated that the multi-disciplinary approach should support a set of evidence-based standards of care versus 36% who indicated that specialised care centres should be supported.

Whether it concerns the set-up of an ICP or the approach of multi-disciplinary care, fact is that currently guidelines or recommendations for the management of MS patients at a higher structural level are missing. In the UK, the National Institute for Health and Care Excellence (NICE) developed guidelines on the management of MS in primary and secondary care[20]. They recommend that all patients with mobility problems have access to rehabilitation specialists with expertise in MS to establish and achieve individual goals. However, audits organised by the Royal College of Physicians revealed that the implementation of such guidelines is limited[21]. While 81% of people with MS indicated that specialist neurological services were available locally, only 43% stated that, as far as they knew, they had access to specialist neurological rehabilitation services. Similar to the situation in the UK, many countries have specific guidelines for the management of MS, but they are subsequently not implemented in everyday care. In order to uniform the management of MS across European countries, guidelines should be developed at the European level and implemented in all countries. This need came also out of the polling results at the Colloquium. Having a European level of 'clinical practice guidelines' was ranked as key priority by 35%, followed by 'advocacy for MS network of excellence in each country' by 28%.

Patient activation in self-management: the opportunities of the eHealth (r)evolution for a paradigm shift

With the advent of the internet and the popularity of smartphones, a new shift in the healthcare organisation is coming our way. This process is called creative destruction, which refers to the incessant product and process innovation mechanism by which new production units replace outdated ones[22]. In the future, it might be possible that we can easily access all kinds of healthcare professionals, through mobile applications. Such innovations would give patients the opportunity to take control over their own health and disease (if they are mentally fit for this).

This revolution has started already. In 2004, two brothers of a patient with amyotrophic lateral sclerosis (ALS) started PatientsLikeMe, a health data-sharing platform[23]. With this, they wanted to extend and improve their brother's life. Today, 350,000 patients in 2,500 conditions are sharing their data in order to manage their own disease, accelerate research and create better treatments[23]. In 2008, search engine "Google" launched "Google Health", a personal health information centralisation service, including data on health conditions, medications, allergies and lab results. Since it was not having the expected impact, it was discontinued in 2011. Also technology giant, Microsoft, created "HealthVault", an application that helps you to gather, store, use and share health information of yourself and your family. With the help of electronic devices important health information is easily recorded and stored. The other technology giant, Apple, recently launched "ResearchKit", an application helping you to monitor your health.

Specifically for MS, the symptom tracker application, SymTrac™, is available allowing MS patients to monitor all their symptoms and relapses[24]. Unfortunately, due to privacy issues, it is not possible to directly share these data with the neurologist.

As illustrated above, many eHealth options are already available and it is likely that both their number and their popularity will increase in the future.

In order to make MS patients the central point for managing/coordinating their disease, a behavioural change of both neurologists and patients is needed. As indicated above, neurologists should apply a concordance model in the care of MS patients and take into account the patient's preference regarding their disease. At their turn, patients should be empowered to take control over their disease and to question their neurologist about their disease and treatment possibilities. Patient empowerment can be defined as giving MS patients the opportunity to be independent and to influence their care and treatment[9]. This can be stimulated in multiple ways, e.g. by providing information and education about all aspects associated with MS to patients and their careers, stimulating patient involvement in decision-making about their care and treatment, …[7]. Such initiatives already exist in the UK, where the MS Trust provides education programmes for health professionals, funding for practical research and campaigning for specialist MS services[25]. Their vision is to enable people with MS to live their lives to the full. However, similar to treatment access, also considerable variability in patient empowerment and cultural differences in the wished level of autonomy during shared decision making exists across European countries (Figure 3)[9].

Rehabilitation in a multi-disciplinary perspective

- Impaired functioning and disability are the core experiences of MS patients. According to the World Health Organisation's (WHO) International Classification of Functioning, Disability and Health (ICF), functioning comprises three components: body functions and structures, activities and participation. All these components are affected by interactions between health conditions and contextual factors, including personal and environmental influences[26]. Linking MS to ICF describes the whole health experience of MS patients and provides a uniform language and framework to describe MS-related health[26]. As such, patient activation in MS should include structured exercise to improve patient's activity/capacity as well as a behavioural change to improve patient's participation in daily life.

*Non-medical treatment options: Active Rehabilitation Treatment*Rehabilitation can be defined as assisting individuals who experience disability to achieve and maintain optimal functioning in interaction with their environments. It is considered as a highly individualised education and adaptation process to gain maximum activity and participation.

For many years, MS patients were advised not to participate in physical exercise in order to preserve more energy for the activities of daily living and not worsen disease activity. Over the past decade, evidence on the beneficial effects of exercise therapy has increased and today it is more and more recommended for patients with MS[27-29] The beneficial effect appears to be multi-dimensional. Aerobic capacity, walking mobility[30,31] and muscular strength[32] can be improved, but also QoL[32,33], fatigue[32,34,35], depression[36,37] and cognition[37] can be positively influenced by exercise (Figure 4). Besides, it might currently be the only treatment option leading to symptomatic improvement for patients with progressive MS types[38]. Furthermore exercise therapy is safe: a recent review identified a slightly reduced relapse rate in the exercise training group compared with non-exercising controls and only few adverse events (1.2 and 2.0% in control and training group, respectively)[39]. Nowadays, first translational evidence[6] is being generated with observed clinical improvements after training on a balance board in 27 patients with MS[40] being associated with identified neural changes in the microstructure of superior cerebellar peduncles. Similarly, improvements in upper limb function after intensive exercise was associated with preservation of the corpus callosum.[7] Suggestions have even been made that exercise could be neuroprotective.[8]

The multi-dimensional effect of exercise in MS was supported by the audience polling results at the Colloquium. Sixty-two percent of the attendants believed that exercise in MS not only reduces healthcare costs, but also prevents disease progression and improves the patient’s QoL. The other 38% believed that exercise only improves one aspect of MS (3% reduction in healthcare costs and 35% improvement of the patient’s QoL).

Exercise therapy can be practised in many different settings ranging from specialised rehabilitation centres to general fitness centres and provided in group to individual sessions. Moreover, as the number of people with access to the internet is increasing, tele-rehabilitation can become an alternative model of rehabilitation in the future. Web-based tele-rehabilitation can offer many advantages, especially for patients who are housebound or have transport problems. Some examples exist already. “Web based physio”, developed by the University of Glasgow, offers personalised physiotherapy exercise programmes and advice for people with long-term disease[41]. Similarly, TRHLAB, developed by the Hospital de la Santa Creu i Sant Pau in Barcelona, offers speech therapy at home via videotaped exercises and feedback send by skype [42]. The above-mentioned illustrations and evidence was related to physical rehabilitation approaches. However, it is noted that evidence is also present for other interventions as cognitive retraining and rehabilitation or fatigue management.[9-12]

Access to multi-disciplinary services

Despite the promising study outcomes, the audience beliefs in the multidimensional effects of exercise and the existence of many supportive and rehabilitation therapies, there is a huge variation in current access to therapies and rehabilitation services for MS patients depending on where they live in Europe (Figure 5)[9]. Furthermore, the credibility of rehabilitation strategies is often poor due to shortcomings in the sample size, difficulty of blinding and lack of transparency of the ingredients of the rehabilitation methods used in rehabilitation research. Studies on rehabilitation are often underpowered, not always well-designed and/or lack uniform outcome measures making it difficult to pool data and generate conclusions. Information on health economic parameters are rarely included.

Rehabilitation research is overall poorly known by neurologists and MS nurses. These observations all call for a more thorough and structured research approach to provide more convincing results, followed by education of healthcare providers. The latter was supported by the polling where the need for a European level of education for healthcare professionals and MS patients was ranked key priority by 24.1% of attendants. In this perspective, the initiative of the European MS Platform to develop with partners an electronic education program for nurses (MS PRO) is highly valued. It is advocated to add a module on current knowledge on rehabilitation interventions, as well to open up the education program for other health allies as well.

Patient activation to be (always) physically active in the community: supporting behavioural change

For many years, adults and children of the general population are advised to implement physical activity in their daily lives. This lifestyle physical activity can be accumulated through leisure, occupation, household or transportation activities that are moderate to vigorous in intensity and planned or unplanned, but accumulated as part of everyday life. This can be facilitated through behavioural interventions that prompt sedentary and physically inactive persons to both reduce sedentary pursuits and engage in physical activities as part of daily life[43]. This implies that personal factors such as individuals' attitudes, skills, emotions, beliefs and knowledge are key determinants for someone's physical activity[44]. Such a paradigm shift towards physical activity for health should also be encouraged in patients with MS[43].

Based on this idea, Geidl et al developed a theory-based model of behavioural exercise therapy to increase exercise adherence and promote long-term physical activity behavioural change in individuals with chronic diseases (Figure 6)[44]. To implement this in clinical practice, it is not sufficient to have an appointment with the neurologist and MS nurse every 6 months. Patients rather need a personal coach, someone who supports and encourages them and gives advice when needed, without taking over activity choice and engagement level[45,46]. This was the rationale for the development of the Blue Prescription programme, enhancing physical activity in disabled people, in New Zealand[46]. Unfortunately, such coaching programmes are often not provided or reimbursed for patients with MS.

To enable MS patients to adapt a physically active lifestyle, both the patient and the therapist need to be educated. Professional guidance can help to convince MS patients to engage in and choose the right type of exercise and sport based on their preferences, to keep MS patients motivated and to guide them to success with respect for each patient's own possibilities and capacities. To increase the number of skilled physical therapists and sport instructors, MovetoSport, a non-for-profit organisation in Flanders, was founded in 2010[47]. This organisation regularly provides education courses and workshops for healthcare professionals including sport instructors working in rehabilitation centres but also in the community and sport facilities. These certified professionals are visible on a website. With this, the organisation wants to provide affordable and accessible exercise therapy programmes for all persons with MS[47]. Moreover, different MS organisations organise sportive challenges for people with MS: a climb to Machu Picchu[48,49], to bike the Mont Ventoux[51], “Can Do” weekends[52]. Such sportive challenges positively affect the opinion of patients about the potential of their body and impact of the disease[48,49].

Behavioural interventions could move beyond the internet as a delivery platform and include other delivery sources such as newsletters, smartphone applications or health care providers.

As shown in a pilot randomised controlled trial, such internet-guided interventions can encourage MS patients to implement more physical activity in their lives[53]. Furthermore, mobile health interventions allow for personalised and self-managed physical activity programs. Probably, innovative adaptive systems which are tailored to the patient’s daily preferences will pop up in the future. Such systems exist already for patients suffering from depression[54] and are in development for fatigue.

Conclusions

Given the plethora of symptoms affected in patients with MS, a multi-disciplinary care team is needed in order to improve MS patients’ QoL. Although the ideal organisation and physical localisation of this team is still under debate, it is clear that all people with MS, regardless of where they live, should get access to optimal care. Therefore, evidence-based care practice guidelines for MS should be developed at the European level. These guidelines should include strategies to support patient activation in patients with MS. Firstly, patients should be encouraged to take control over their own disease. The advent of different internet and mobile applications can support patients in doing so. Secondly, rehabilitation treatment should be part of routine clinical practice in the management of MS, although some hurdles still need to be taken. More research (phase III rehabilitation trials) and multi-center data collection (e.g. facilitated by the MS Rehabilitation Repository[55]) on rehabilitation are needed. Thirdly, MS patients should be empowered to implement lifestyle physical activity and to participate in daily life activities.

In addition, education of both healthcare professionals and MS patients on a European level is warranted. In line with the "MSNursePro" programme[56], education programmes for all kinds of healthcare professionals working with MS patients should be developed. In these programmes, also information on active rehabilitation treatment should be implemented. Furthermore, evidence-based educational programmes should be available for every MS patient.[13] They should understand the symptoms and progression of their disease and be aware of medical and non-medical treatment options. Such programmes can improve the patient's awareness of the disease and satisfaction with care[57]. Also, a positive impact on physical and psychological functioning and energy levels have been reported[58,59].

To do so, European MS organisations should work together as partners to retrieve public funding for patient activation programmes. By providing tailored care when needed, patients can be supported to remain physically and mentally active and at work. As such, QoL of patients and caregivers can be improved and costs to society can be reduced.

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Conflict of Interest Statement

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Figure legends

Figure 1. An integrated view on the journey of the MS patient, from preventive and diagnostic approaches to management options in all stages of the disease[3]

CIS: clinically isolated syndrome; DMT: disease-modifying therapy; RIS: radiologically isolated syndrome

Figure 2. Audience polling results from the second Multi-stakeholder MS Colloquium (http://ms-colloquium.org/)

Figure 3. Widespread inequalities in involvement and empowerment of MS patients across Europe as measured through an online questionnaire completed by EMSP member organisations in 2013[9]

Empowerment defined as giving the opportunity to be independent and to influence care and treatment. Scores are allocated according to the responses to the questions; the higher the score (maximum is 35), the better the patients are involved and empowered

Figure 4. The multi-dimensional beneficial effects of exercise therapy in MS

Figure 5. Access of MS patients to rehabilitation services in Europe as measured through an online questionnaire completed by EMSP member organisations in 2013[9]

Figure 6. Behavioural exercise therapy for chronic disease, e.g. MS, with regard to the International Classification of Functioning, Disability and Health (ICF) model of Functioning and Disability (grey boxes and slim black arrows)[44]

The thick (blue) and the double-lined (red) arrows depict supposed mechanisms of action of behavioural exercise therapy. The double-lined (red) arrows represent the biomedical mechanism of action: exercise enhances body functions and structures and consequently reduces activity limitations and participation restrictions. The thick (blue) arrows represent the impact on personal factors that determine physical activity behaviour. Personal factors that promote the "maintenance of an appropriate level of physical activity" are paramount as prerequisites for sustained enhancements in the area of body functions and structures as well as continuous improvements with regard to tasks and actions in different life areas (activities and participation)

Tables

Table 1. Instruments to measure impairment related to different MS symptoms

Symptom	Instrument(s)
Balance ,Walking capacity and endurance	• 2 or 6MWT • T25-FW • MSWS-12 • BBS • FES
Arm functioning	• NHPT • ABILHAND • MAM
Cognition	• BICAMS • PASAT
Visual	• Visual acuity
Fatigue	• FSS • MFIS • FMSC
Anxiety and depression	• HADS • STAI • Beck's depression
Pain	• BPI • VAS
Quality of life	• MSIS-29 • SF-36 • EQ-5D

2 or 6MWT: 2- or 6-Minute Walk Test; ABILHAND: manual ability; BBS: Berg Balance Scale; BICAMS: Brief International Cognitive Assessment for Multiple Sclerosis; BPI: Brief Pain Inventory; EQ-5D: EuroQol-5

dimensions; FES: Falls Efficacy Scale; FMSC: Fatigue Scale for Motor and Cognitive Functions; MAM: Manual Ability Measure; MFIS: Modified Fatigue Impact Scale; MSIS-29: Multiple Sclerosis Impact Scale-29; MSWS-12: 12-item Multiple Sclerosis Walking Scale; SF-36: Short Form-36 Health Survey; STAI: State-Trait Anxiety Inventory; T25-FW: Timed 25-Foot Walk test; VAS: visual analogue scale

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