https://doi.org/10.22491/2357-9730.145376

Original article

Prevalence of disabilities in patients with multiple sclerosis at the neuroimmunology outpatient clinic

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ABSTRACT

Introduction: Multiple Sclerosis (MS) presents a variety of signs and symptoms, such as muscle weakness, fatigue, spasticity, interfering with quality of life. These symptoms cause some disabilities as the disease progresses. **Objective**: To identify the prevalence of disabilities in patients with multiple sclerosis of the relapsing-remitting type at the Neuroimmunology Outpatient Clinic of the Hospital de Clínicas de Porto Alegre (HCPA), between the years 2016 and 2022. **Methods**: Retrospective longitudinal epidemiological study, with a follow-up period it was 2 (Group A), 3 (Group B) and 4 to 6 (Group C) years, according to the period between the evaluation and reevaluation of physiotherapy. Data on fatigue, muscle strength, functional mobility, independence and quality of life were analyzed. Descriptive statistics were performed with analysis of frequencies and central tendency and dispersion. **Results**: 35 patients were studied (A, n= 14; B, n=11; C, n= 10). The median EDSS (Expanded Disability Status Scale) at reassessment in the three groups was 2.5. The time to diagnosis ranged from 7.9±5.5 to 13.9±7.9 at reevaluation. There was a change in muscle strength in all patients. Most patients reported a feeling of fatigue in both assessments. Functional mobility remained preserved in most cases, while there was an improvement in quality of life over time in all groups. **Conclusion**: This study made it possible to identify the presence of disabilities in patients with multiple sclerosis, showing that the most common changes were muscle weakness and feelings of fatigue.

Keywords: *Multiple Sclerosis; Muscle Weakness; Fatigue; Mobility Limitation*

Clin Biomed Res. 2025;45:1-6

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INTRODUCTION

Multiple Sclerosis (MS) is currently the most common disease causing neurological disability in young adults[1]. The relapsing-remitting type is the most prevalent in people with MS, accounting for about 87% of cases. It is characterized by the onset of relapses that can last more than a week but fully subside after the episodes[1,2]. These symptoms vary, including muscle weakness, fatigue, spasticity, urinary disorders, ataxia, pain, cognitive impairment, and depression[3,4].

Fatigue is one of the most disabling manifestations of MS, occurring in about 81% of cases[5]. It is strongly associated with muscle weakness and is accompanied by a feeling of tiredness and increased spasticity[6]. Spasticity is commonly observed, affecting approximately 80% of MS patients. It shows a strong correlation with decreased gait speed and balance[7].

Muscle weakness in MS is more pronounced in the muscles of the lower limbs, directly interfering with locomotion and affecting about 70% of these individuals[8]. As disability progresses in people with MS, the number of muscles affected by weakness and the degree of weakness in each muscle tend to increase[8,9]. These symptoms cause disabilities such as the loss of functional mobility, balance, and dependence in activities of daily living[10]. These disabilities lead to a reduction in the quality of life of patients, interfering with work, leisure activities, and the ability to perform usual life functions[11].

Considering this, knowing that people with MS experience numerous disabilities, this study aimed to identify the prevalence of disabilities in patients with relapsing-remitting Multiple Sclerosis, monitored at the Neuroimmunology

Clinic of the Hospital de Clínicas de Porto Alegre, between 2016 and 2022.

METHODS

This is a descriptive, longitudinal, and retrospective epidemiological study, where data on the disabilities of patients with relapsing-remitting multiple sclerosis were collected from medical records. This study was approved by the HCPA Research Ethics Committee, under number CAAE 70422323.60000.5327. All patients were informed about the research and signed the Informed Consent Form.

Participants included individuals over 18 years old, male or female, diagnosed with relapsing-remitting MS, evaluated between 2016 and 2022 at the Neurofunctional Physiotherapy Clinic for Multiple Sclerosis, which takes place alongside the Neuroimmunology Clinic at the Hospital de Clínicas de Porto Alegre (HCPA). Patients who were in a relapse period or those without a complete evaluation and reevaluation of all parameters used in this study were not included.

The sampling was non-probabilistic, and the sample size was defined based on the sample size calculation[12] for infinite proportion, using a prevalence of 0.0272% for multiple sclerosis in the southern region of Brazil[13], assuming a 10% error and an alpha of 0.05, resulting in a minimum of 10 patients in each group. Differents patients were grouped based on the time interval between the first and second evaluation into group A (up to 2 years interval); group B (3 years interval), and group C (4 to 6 years interval).

Data collected from the medical records of MS patients included the evaluation of lower limb strength through the Five Times Sit-to-Stand Test (FTSTS)[14]; fatigue using the Fatigue Severity Scale (FSS)[15]; functional mobility through the Timed Up and Go Test (TUG)[16]; functional independence using the Barthel Index (BI)[17]; and quality of life through the Multiple Sclerosis Impact Scale-29 (MSIS-29)[18].

For assessing the disability status, data on the Expanded Disability Status Scale (EDSS) recorded by the medical team in the patient's medical record were collected. For this study, EDSS was classified as mild disability (0 - 3.5); moderate disability (4 to 6.5); and severe disability (greater than 6.5)[19].

The study's dependent variables were classified according to the nature of each variable: (a) lower limb strength: continuous variable, measured in seconds, with altered strength considered when the test was performed in more than 12 seconds[20]; (b) functional mobility: nominal variable, where a time above 20 seconds indicated altered functional mobility[16]; (c) fatigue severity: nominal variable, where scores equal to or greater than 28 indicated the presence of fatigue[15]; (d) functional independence: ordinal variable, where scores below 60 represented functional dependence[17]; (e) quality of life: ordinal variable, where higher scores indicated a worse level of quality of life[18]; (f) EDSS: ordinal variable, where higher scores indicated greater disease severity[19]. The independent variable was the time interval between the physiotherapy evaluation and reevaluation.

Statistical analysis

For statistical analysis, SPSS version 18.0 software was used. Data were analyzed using descriptive statistics through: (a) analysis of absolute and relative frequencies of nominal and ordinal variables; (b) central tendency analysis (mean and median for continuous and ordinal variables, respectively); and (c) dispersion analysis (standard deviation and range for continuous and ordinal variables, respectively). The percentage changes observed in patients between the initial assessment and the reassessment were compared. When a difference in these percentages was identified, it was considered indicative of a change in the parameter assessed for the patient group.

RESULTS

This study evaluated 35 patients with relapsing-remitting MS at the Neurofunctional Physiotherapy Clinic of the Hospital de Clínicas de Porto Alegre, divided into three groups based on follow-up time: Group A (up to 2 years interval between the 1st and 2nd evaluation) consisted of 14 patients, most of whom were women (57.1%); Group B (3 years interval between the 1st and 2nd evaluation) consisted of 11 patients, 9 of whom were women (81.8%); Group C (4 to 6 years interval between the 1st and 2nd evaluation) consisted of 10 patients, 8 of whom were women (80.0%). Table 1 presents the results regarding sample characterization by age, time since diagnosis, and EDSS.

Regarding the EDSS, it was observed that in Group A, 85.7% of the patients had a classification of mild disability in both the first and second evaluations. In Group B, 72.7% of the patients were classified as having mild disability and 27.3% as having moderate disability in the first evaluation. In the second evaluation, 54.5% were classified as having mild disability, and 45.5% as having moderate disability, indicating an increase in moderate disability in the second evaluation and disease progression in two patients. In Group C, 80.0% of the patients were classified as having mild disability, and 20.0% as having moderate disability in the first evaluation. In the second evaluation, 80.0% were classified as having mild disability, 10.0% as having moderate disability, and 10.0% as having severe disability, indicating disease progression in one patient, from moderate to severe disability, over the six-year interval between evaluations.

The mean values and standard deviations (in seconds) for the FTSTS and TUG tests, along with the median scores of the BI, FSS, and MSIS-29, are presented in Table 2.

Table 1: Sample characterization by age (years), time since diagnosis (years), and EDSS.

	Group A (n=14)		Group B (n=11)		Group C (n=10)	
	1st Evaluation	**2nd Reevaluation**	**1st Evaluation**	**2nd Reevaluation**	**1st Evaluation**	**2nd Reevaluation**
Age (years)[a]	38.9±12	40.1±12	40.2±13	43.2±13	36.2±13.5	41.2±13.5
Time since diagnosis (years)[a]	7.9±5.5	9.1±5.5	10.9±7.9	13.9±7.9	7.4±4.9	12.4±5.1
EDSS[b]	2 (0-7)	2.5 (0-7)	2 (0-6)	2.5 (1-6)	2 (0-6.5)	2.5 (1-7)

EDSS: Expanded Disability Status Scale; a: mean and standard deviation values; b: median, minimum, and maximum values.

Table 2: Results of the tests performed with the patients during the evaluation and reevaluation.

	Group A (n=14)		Group B (n=11)		Group C (n=10)	
	1st Evaluation	**2nd Reevaluation**	**1st Evaluation**	**2nd Reevaluation**	**1st Evaluation**	**2nd Reevaluation**
FTSTS[a] (seconds)	13.5 (±4.1)	12.7 (±3.2)	39.3 (±66.4)	21.5 (±18.7)	14.5 (±5.3)	11.3 (±5.3)
TUG[a] (seconds)	10.4 (±2.8)	10.1 (±2.9)	18.1 (±13.8)	22.3(±19.5)	9.3 (±4.5)	12.8 (±7.1)
BI[b] (0-100 points)	100 (75-00)	100 (80-100)	95 (85-100)	100 (70-100)	100 (80-100)	100 (55-100)
FSS[b] (0-63 points)	40 (15-60)	44 (13-58)	52 (19.2-70)	44 (18.2-59)	34 (16-58)	34.5 (9-47)
MSIS-29[b] (0-116 points)	59 (5-84)	40 (5-71)	57 (2-106)	52 (0.0-98)	40.5 (7-78)	28 (00-72)

FTSTS: Five Times Sit-to-Stand Test; TUG: Timed Up and Go Test; BI: Barthel Index; FSS: Fatigue Severity Scale; MSIS-29: Multiple Sclerosis Impact Scale-29; Eval.: evaluation; Reeval.: reevaluation; a: mean and standard deviation values; b: median, minimum, and maximum values.

The analysis revealed distinct patterns across groups regarding muscle strength, functional mobility, fatigue, and quality of life. Lower limb muscle strength deficits were observed in all groups. Functional mobility remained preserved in most participants, although a slight decline was noted in one group (Group B). Functional independence was maintained across evaluations, except for a minor reduction in one group during follow-up (Group C). Fatigue was prevalent in all groups, with variable progression—some groups showed improvement (Groups A and C), while others exhibited worsening fatigue (Group B).

Table 3: Changes in functional variables and fatigue between evaluations.

	Group A (n=14)		Group B (n=11)		Group C (n=10)	
	1st Evaluation	2nd Reevaluation	1st Evaluation	2nd Reevaluation	1st Evaluation	2nd Reevaluation
Muscle strength	57.1%	57.1%	54.5%	81.8%	50%	50%
Functional mobility	0%	0%	27,3%	36,4%	0%	0%
Functional independence	0%	0%	0%	0%	0%	10%
Fatigue	87.7%	78.6%	72.7%	81.8%	70%	60%

Percentage of patients with changes in the evaluated parameters.

When comparing the median scores of the Multiple Sclerosis Impact Scale-29 (MSIS-29) between the first and second evaluations, patients in all groups showed a reduced disease impact on quality of life over periods of two, three, and six years. These findings indicate a consistent trend toward improved quality of life across all groups between evaluations.

The percentages of patients with alterations in the parameters evaluated in the study are presented in Table 3.

DISCUSSION

This study aimed to identify the prevalence of disabilities in patients with relapsing-remitting multiple sclerosis monitored at the Neuroimmunology outpatient clinic of the Hospital de Clínicas de Porto Alegre. Lower limb weakness, functional mobility, functional independence, fatigue, and quality of life were analyzed and compared between evaluations and reevaluations, which occurred over different periods: up to 2 years, 3 years, and from 4 to 6 years.

In the systematic review study conducted by Smith et al.[21], 17 studies were analyzed, encompassing a total of 15,975 patients aged between 18 and 80 years, with an EDSS score of 2.5 and an average time since diagnosis of 8.5 years. The results highlighted the prevalence of symptoms related to multiple sclerosis, indicating that fatigue affected 60% to 90% of patients and muscle weakness was present in 50% to 70% of cases. In the same research, mobility alterations ranged from 60% to 85%, while changes in quality of life were reported in 80% to 90% of patients. This study aligns with some findings of our research, showing a similar prevalence of alterations in fatigue and muscle weakness.

The longitudinal study conducted by Zurawski et al.[22], involved 2,054 individuals with a median EDSS score of 1.5 at the first consultation and 2 at the last, and an average diagnosis time of 16.3 years. According to these authors, the higher the initial disability status established by EDSS, the greater the likelihood of patients showing a change in their initial score over time. Additionally, for patients monitored for more than 4 to 6 years, an increase in EDSS was observed compared to previous years. This trend of increasing disability over time aligns with the findings of our study.

In this study, all groups exhibited muscle weakness. Previous research has suggested that as the disease progresses, both the number of muscles affected and the severity of weakness in each muscle tend to increase[8,9]. Regarding functional mobility, only the group reassessed three years after the initial evaluation demonstrated changes, whereas the other groups maintained preserved functional mobility at both time points. Over time, it is well recognized that patients with multiple sclerosis (MS) tend to experience declines in functional mobility, as reported by van Asch et al.[23]. In their study involving 436 individuals with MS, approximately 93% showed mobility impairment ten years after diagnosis. This finding may explain the change observed in Group B, as these patients had already been diagnosed for ten years at the time of the first assessment, unlike the other two groups.

When assessing the degree of functional independence using the Barthel Index, patients in all three groups were found to maintain independence in performing activities of daily living across both assessments. In a study by Jansa et al.[24] involving 210 individuals with MS and a mean disease duration of 11.8 years, 52.7% of participants exhibited difficulties in performing daily activities. The authors reported that as disability progresses, the negative impact on everyday functioning becomes more pronounced. In the present study, however, patients preserved their ability to perform routine activities despite a comparable duration of diagnosis. Continuous follow-up in a specialized outpatient clinic for individuals with MS may explain the maintenance of functional independence observed in this cohort.

Fatigue is one of the most disabling symptoms of multiple sclerosis (MS). In a study by Broch et al.[5] involving 1,454 patients, approximately 81% reported experiencing fatigue. In the present study, all groups exhibited fatigue symptoms at both assessment points. However, a reduction in reported fatigue was observed in Groups B and C at reassessment. Heine et al.[25] demonstrated the effectiveness of aerobic exercise in reducing MS-related fatigue following a 16-week aerobic training program. Their findings indicated that participants who engaged in aerobic exercise experienced significant improvements in fatigue, suggesting that physical activity may positively influence this symptom. In our study, data regarding patient participation in physical activity were not collected; however, engaging in regular exercise is one of the recommendations routinely provided to patients.

With respect to quality of life, all groups reported a negative impact of MS on their perceived quality of life at the initial assessment. However, at reassessment, a reduction in this impact was observed across all groups. Physical activity has been shown to provide significant benefits for individuals with MS—not only in terms of functional mobility and fatigue, but also in enhancing overall quality of life—as reported by Axelrad and Any Docu et al.[26]. As previously mentioned, it was not possible to determine whether participants engaged in physical activity during the interval between the two assessments in the present study.

In summary, this study highlights the prevalence of disabilities among patients with multiple sclerosis treated at a neuroimmunology outpatient clinic. Nevertheless, several limitations should be considered, including the small sample size in each group and the absence of statistical analyses to enable comparisons between groups, which could have identified potential differences in disabilities according to the interval between assessments. Additionally, the lack of specific data on patients' engagement in exercise programs or conventional physical therapy during the follow-up period may have influenced the findings. Future studies involving larger cohorts, incorporating statistical analyses, and assessing additional outcomes, such as upper limb function, could provide more comprehensive insights into the progression of disabilities in this population over time.

CONCLUSION

This study identified disabilities in patients with relapsing–remitting multiple sclerosis who were followed at a Neuroimmunology Outpatient Clinic for up to six years. The most prevalent disabilities observed were muscle weakness and fatigue. Additionally, other domains evaluated in these patients followed at the outpatient clinic, including functional mobility, quality of life, and functional independence, also demonstrated changes, although less frequently.

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Received: Jan 22 2025
Accepted: Nov 19 2025