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EPIDEMIOLOGICAL PROFILE OF PATIENTS WITH MULTIPLE SCLEROSIS TREATED IN THE MUNICIPALITY OF GUARAPUAVA, PARANÁ

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Abstract: Introduction: Multiple sclerosis is a chronic, autoimmune, demyelinating, and neurodegenerative inflammatory disease of the central nervous system, characterized by high clinical heterogeneity. Although widely described in large centers, its characterization in rural municipalities remains limited, especially within the context of regional services of the Unified Health System. **Objective:** To analyze the clinical and epidemiological profile of patients diagnosed with multiple sclerosis treated at the Specialty Medical Clinic in Guarapuava, Paraná, between 2023 and 2025. **Methods:** An observational, descriptive, cross-sectional, and retrospective study conducted through the analysis of electronic medical records of adult patients diagnosed with multiple sclerosis. Sociodemographic and clinical variables were collected, including sex, current age, age at diagnosis, duration of illness, neurological manifestations, functionality, clinical form, initial symptoms, and current treatment. The data were analyzed using descriptive statistics. **Results:** Initially, 17 patients with a recorded diagnosis of multiple sclerosis were identified; four were excluded due to diagnostic inconsistencies or insufficient information, resulting in a final sample of 13 patients. There was a predominance of females (76.9%), with a mean current age of 51.5 years, a mean age at diagnosis of 39.9 years, and a mean duration of illness of 8.0 years. Motor impairment was the predominant neurological manifestation, with sensory and visual changes also occurring, in addition to cerebellar, bulbar, and autonomic manifestations to a lesser extent. Some degree of functional impairment was reported in 61.5% of patients, including one case of severe disability. Current use of disease-modifying therapy was recorded in 46.2% of medical records. Analysis of clinical forms, initial symptoms, and functionality was limited by the incompleteness and lack of standardization of the records. **Conclusion:** Patients with multiple sclerosis followed at the evaluated service presented a profile consistent with that described in the literature, with a female predominance, diagnosis in adulthood, and varied neurological manifestations, especially motor symptoms. The study contributes to regional knowledge of the disease and reinforces the need for more structured clinical records, standardized functional assessment, and specialized neurological follow-up.

Keywords: Multiple sclerosis; Epidemiology; Outpatient care; Medical records; Retrospective studies.

INTRODUCTION

Multiple sclerosis (MS) is a chronic, autoimmune, demyelinating inflammatory disease with neurodegenerative components of the central nervous system (CNS), and is considered one of the leading causes of non-traumatic neurological disability in young adults (Filippi et al., 2018). It is a multifactorial condition resulting from the interaction between genetic predisposition and environmental factors, capable of triggering an aberrant immune response directed against components of the CNS (Shi et al., 2024; Lorenzut et al., 2025).

The disease exhibits high clinical and biological heterogeneity, with manifestations that vary widely among individuals. The diagnosis of MS is based on the demonstration of neurological lesions disseminated in space and time, reflecting the persistent, dynamic, and progressive nature of the disease (Filippi et al., 2018). Among the most common clinical manifestations are motor deficits, sensory changes, visual

symptoms, cerebellar and brainstem manifestations, autonomic dysfunction, fatigue, and cognitive impairment (Shi et al., 2024; Haki et al., 2024).

In the global epidemiological landscape, multiple sclerosis exhibits a heterogeneous distribution, with significant variations in prevalence and incidence across different regions. It is estimated that approximately 2.8 million people live with the disease worldwide, with an upward trend in recent decades (Walton et al., 2020). This increase may be related both to improvements in diagnostic criteria and expanded access to healthcare services, as well as to a possible actual rise in incidence (Kapica-Topczewska et al., 2025).

The geographic distribution of MS shows a latitudinal gradient, with higher rates in high-latitude regions, especially in Europe and North America, while regions such as Latin America and Africa have lower prevalences. This pattern suggests the influence of genetic, environmental, and diagnostic access-related factors, including sun exposure, vitamin D levels, and the organization of health systems (Kapica-Topczewska et al., 2025; Haki et al., 2024).

In Latin America, the prevalence of multiple sclerosis is lower than that observed in other regions of the world, but with wide variation among countries (Becker et al., 2026). In Brazil, this pattern of heterogeneity is also evident, with significant regional differences and a higher concentration of cases in the South and Southeast regions (Cassiano et al., 2020; ABEM, 2023). National data indicate a predominance among females, symptom onset in young adults, diagnosis generally in the fourth decade of life, and a higher frequency of the relapsing-remitting form (Cassiano et al., 2020; Gabardo et al., 2020).

The clinical course of multiple sclerosis is classically categorized into different forms of progression. The relapsing-remitting form is the most common at the onset of the disease, characterized by neurological relapses followed by partial or complete remission. Some patients may progress to the secondary-progressive form, marked by gradual and irreversible neurological deterioration. The primary-progressive form, in turn, presents a continuous progression from the onset, without well-defined episodes (Filippi et al., 2018; Lorenzut et al., 2025).

Despite advances in knowledge about MS, gaps remain in the epidemiological characterization of patients followed in rural municipalities. In Brazil, most studies focus on state capitals and major urban centers, which limits understanding of local and regional particularities. In this context, the Specialty Medical Clinic (AME) of Guarapuava, located within the coverage area of the 5th Regional Health Department of Paraná, constitutes an important neurological care service within the Unified Health System. Regional studies, such as the one conducted in Cascavel, demonstrate a female predominance, onset in young adults, and initial motor and sensory manifestations, in addition to visual changes and associated comorbidities (Gabardo et al., 2020).

Given this scenario, this study aimed to analyze the clinical and epidemiological profile of patients diagnosed with multiple sclerosis treated at the AME in Guarapuava, Paraná, between 2023 and 2025, contributing to the understanding of the regional characteristics of the disease and to the improvement of specialized outpatient care.

METHODS

This is an observational, descriptive, cross-sectional study involving retrospective collection of secondary data, based on the analysis of electronic medical records of patients diagnosed with multiple sclerosis, classified under ICD-10 G35, treated between 2023 and 2025 at the AME - Specialized Medical Clinic of Guarapuava, Paraná.

The AME is part of the Unified Health System network and serves as a referral center within the 5th Regional Health District of Paraná. The period analyzed corresponded to records available since the service began operations.

The study population consisted of patients diagnosed with multiple sclerosis who were followed at the clinic during the analyzed period. Individuals aged 18 years or older with a confirmed diagnosis of the disease and sufficient records to obtain the variables of interest were included. Medical records with insufficient information for analysis, records outside the defined period, or those pertaining to minors were excluded.

Data collection was performed through the analysis of electronic medical records available at the service, following institutional authorization. Sociodemographic and clinical variables were collected, including sex, current age, age at diagnosis, duration of illness, clinical manifestations, predominant neurological deficit, functionality or disability, clinical form of the disease, initial symptoms, and current treatment, with an emphasis on disease-modifying therapies.

The data were organized into spreadsheets and analyzed using descriptive statistics with Microsoft Excel® software. Categorical variables were presented as absolute and relative frequencies. Numerical variables, such as current age, age at diagnosis, and duration of illness, were described by mean, standard deviation, minimum, median, and maximum, depending on the availability of information in the records.

The study was approved by the Research Ethics Committee, in accordance with the guidelines of Resolution No. 466/2012 of the National Health Council (Brazil, 2012). Since this was a retrospective study based on secondary data, with no direct contact with participants and with guaranteed anonymization of information, the application of the Informed Consent Form was waived.

RESULTS

Data collection initially identified 17 patients with a recorded diagnosis of multiple sclerosis treated at the Specialty Medical Clinic in Guarapuava, Paraná, during the analyzed period. After a detailed analysis of the medical records, four cases were excluded due to clinical inconsistencies related to the diagnosis, including conditions incompatible with demyelinating disease, or due to insufficient information for adequate analysis. Thus, the final sample consisted of 13 patients.

With regard to demographic characteristics, females predominated, with 10 patients, accounting for 76.9% of the sample. Males accounted for three patients, or 23.1%. The current mean age was 51.5 years, with a standard deviation of 15.4 years, ranging from 24.4 to 76.0 years, indicating a heterogeneous age distribution.

Regarding age at diagnosis, the mean was 39.9 years, with a standard deviation of 11.7 years, ranging from 21.9 to 60.3 years, considering cases with available data. Disease duration had a mean of 8.0 years, with a standard deviation of 7.4 years, ranging from 0.4 to 19.0 years, also considering the available records.

Regarding the predominant neurological manifestations, motor impairment was observed with the highest frequency, present in approximately 70% of patients with available data. Sensory and visual manifestations were also identified, although they did not always constitute the predominant deficit. Bulbar involvement and autonomic dysfunctions were observed less frequently, reinforcing the clinical variability of the disease.

The main clinical manifestations described in the medical records involved different neurological domains. Motor abnormalities were identified, including spasticity, hemiparesis, reduced muscle strength, and gait disturbances. Signs of cerebellar involvement, such as dysmetria and dysarthria, were also observed, in addition to sensory abnormalities, significant fatigue, and bulbar symptoms, including dysphagia. Less frequently, autonomic manifestations and nonspecific symptoms related to chronic neurological impairment were identified.

Regarding functionality, some degree of functional impairment was observed in eight patients, corresponding to 61.5% of the sample. Among the cases described, the records suggested functional limitations of varying intensity, including the need for assistance with ambulation and more significant motor deficits. One patient, corresponding to 7.7% of the sample, presented with severe functional disability, characterized by bed confinement, dependence for basic activities, and the need for enteral feeding support.

On the other hand, four patients, corresponding to 30.8%, did not present significant functional disability described in the medical records. In one case, equivalent to 7.7%, it was not possible to perform a functional assessment due to insufficient available information. A lack of standardization in the documentation of functionality was also observed, with no systematic use of specific scales, such as the Expanded Disability Status Scale.

Regarding the clinical forms of the disease, there was a significant limitation in the standardization of the information available in the medical records. Only one patient had an explicit record of secondary progressive multiple sclerosis. In the other cases, the clinical form was not described in a clear or standardized manner, making it impossible to draw adequate inferences about the phenotypic distribution of the sample.

Similarly, records regarding initial manifestations were heterogeneous and often incomplete, hindering systematic analysis. Among the described symptoms, visual manifestations stood out, including optic neuritis, as well as motor and sensory deficits, progressive fatigue, dysphagia, severe constipation, and progressive hearing loss. Analysis of these variables was limited by the lack of standardization in medical records.

Regarding treatment, current use of disease-modifying therapy was recorded in six patients, corresponding to 46.2% of the sample. The medications described included teriflunomide, dimethyl fumarate, fingolimod, azathioprine, ocrelizumab, and

Table 1 – Descriptive characteristics of the sample

Variable	n	Mean	Standard deviation	Minimum	Median	Maximum
Current age (years)	13	51.5	15.4	24.4	56.4	61.5
Age at diagnosis (years)	11	39.9	11.7	21.9	38.6	30.8
Duration of illness (years)	11	8.0	7.4	0.4	6.0	7.7

Source: Survey data, 2026.

Table 2 – Distribution of functionality described in medical records

Functionality described	n	%
Some degree of functional impairment	8	61.5
No significant functional impairment reported	4	30.8
Insufficient information for functional assessment	1	7.7
Total	13	100.0

Source: Survey data, 2026.

Table 3 – Distribution by use of disease-modifying therapy

Therapeutic record	n	%
DMT currently in use	6	46.2
Previous DMT use suspended at the time of registration	1	7.7
No DMT described or insufficient information	6	46.2
Total	13	100.0

Source: Survey data, 2026

natalizumab, in addition to prior use of interferon beta in one case. One patient, representing 7.7%, was also identified with a history of natalizumab use, which was subsequently discontinued at the patient's own discretion, and was not receiving disease-modifying therapy at the time of the record. In the remaining medical records, accounting for 46.2% of the sample, no disease-modifying therapy was described, or the available information did not allow for confirmation.

In addition to disease-modifying therapies, medications aimed at symptomatic control were described, such as gabapentin, pregabalin, baclofen, and antidepressants, used primarily for the management of neuropathic pain, spasticity, sleep disturbances, and associated psychiatric symptoms. In one case, the use of cannabis was included in the treatment plan for symptomatic control.

DISCUSSION

The analysis of patients followed at the Guarapuava Specialty Medical Clinic revealed a profile consistent with that described in the literature for multiple sclerosis, but also highlighted relevant aspects of the local context. A female predominance was observed, along with diagnosis around the fourth decade of life, a higher current age, frequent motor manifestations, and functional impairment in a significant portion of the sample. At the same time, the exclusion of four medical records initially identified by ICD-10 G35, due to diagnostic inconsistencies or insufficient data, highlights a relevant methodological and clinical care issue, as multiple sclerosis requires careful clinical-radiological correlation and the exclusion of conditions that may mimic it, especially in retrospective studies based on electronic medical records (Filippi et al., 2018; Becker et al., 2026).

The mere presence of a diagnostic code in an electronic system is not sufficient to ensure a case's inclusion in clinical-epidemiological studies. This observation is particularly important in neurological diseases with high clinical heterogeneity, in which motor, sensory, visual, cerebellar, bulbar, and autonomic manifestations may overlap with other inflammatory, vascular, infectious, metabolic, or degenerative conditions (Filippi et al., 2018; Haki et al., 2024; Lorenzut et al., 2025).

The female predominance observed in Guarapuava, accounting for 76.9% of the sample, is consistent with the classic epidemiological pattern of multiple sclerosis. The international literature describes a higher prevalence of the disease in women, with a female-to-male ratio that can approach 3:1, in addition to an increase in this difference over the past few decades (Filippi et al., 2018; Shi et al., 2024). The Multiple Sclerosis Atlas also highlights the high proportion of women among people living with the disease in different regions of the world (Walton et al., 2020). In the Brazilian context, this pattern is evident in healthcare analyses, such as the national study of hospitalizations for MS, which showed a female predominance among hospital records (Cassiano et al., 2020). In Paraná, Gabardo et al. (2020), when evaluating patients from Cascavel, found an even higher female proportion, at 85.7%. Although the proportion found in the present study was slightly lower than that observed in that cohort, the general pattern of female predominance was maintained.

Regarding age, the mean age at diagnosis was 39.9 years, a value consistent with the age group described for the disease, although slightly higher than that observed in the Cascavel study, where the mean was 34.8 years (Gabardo et al., 2020). The literature describes that multiple sclerosis usually manifests primarily in young adults, especially between the second and fourth decades of life (Filippi et al., 2018; Shi et al., 2024). The presence of diagnoses at older ages reinforces, however, that the disease should also be considered outside the classic age range, especially in the presence of compatible neurological manifestations.

The current mean age of 51.5 years, combined with a mean disease duration of 8.0 years, suggests a population under long-term follow-up. This finding aligns with the contemporary scenario of an aging population with multiple sclerosis, driven by improved disease recognition, increased survival, and advances in diagnostic and thera-

peutic care (Filippi et al., 2018; Montague et al., 2025). This reality underscores the need for longitudinal follow-up, periodic functional assessment, and integrated management of comorbidities and chronic symptoms.

Clinically, motor impairment was the predominant deficit, present in approximately 70% of patients with available data. This finding is consistent with the multifocal nature of multiple sclerosis, in which the location of lesions in the central nervous system can result in different combinations of motor, sensory, visual, cerebellar, bulbar, and autonomic manifestations (Filippi et al., 2018; Shi et al., 2024). The literature describes optic neuritis, myelitis, and syndromes related to brainstem and cerebellar involvement as frequent presentations of the disease, in addition to symptoms such as muscle weakness, fatigue, sensory changes, and autonomic dysfunctions (Montague et al., 2025; Lorenzut et al., 2025).

In the Guarapuava sample, the presence of spasticity, hemiparesis, gait disturbances, dysmetria, dysarthria, dysphagia, and autonomic manifestations reinforces this diversity of presentations. In a study conducted in Cascavel, although the focus was on describing initial symptoms, there was also a predominance of motor and/or sensory manifestations, in addition to visual changes, suggesting a similarity between the clinical profiles observed in the two centers in Paraná (Gabardo et al., 2020).

Visual and sensory manifestations were also recorded, including reports of optic neuritis and sensory deficits. These findings are consistent with presentations frequently described in multiple sclerosis, especially at the onset of the disease (Filippi et al., 2018; Montague et al., 2025). However, the heterogeneity and incompleteness of the records prevented a precise systematization of initial symptoms, limiting direct comparisons with other cohorts.

Functionality analysis showed that 61.5% of patients had some degree of impairment documented in their medical records, including one case of severe disability, with bed confinement, dependence on others for basic activities, and the need for enteral support. This finding highlights the clinical impact of multiple sclerosis beyond acute relapses, particularly due to its effects on gait, autonomy, and activities of daily living. This finding is consistent with the literature, which recognizes MS as one of the leading causes of non-traumatic neurological disability in young adults, even in the face of therapeutic advances that have reduced inflammatory activity and slowed part of the disease's progression (Filippi et al., 2018; Cree; Oksenberg; Hauser, 2022; Montague et al., 2025).

The lack of systematic application of specific scales, such as the Expanded Disability Status Scale, has limited the objective measurement of disability and hindered comparisons with other samples. Standardized functional assessment is particularly relevant in chronic and progressive diseases, as it allows for tracking the progression of disability, guiding therapeutic decisions, indicating rehabilitation, and monitoring treatment response. Recent Brazilian data suggest that earlier diagnosis and the timely introduction of disease-modifying therapies may be associated with a lower accumulation of disability over time (Callegaro; Silva, 2025). Nevertheless, due to the retrospective and descriptive design adopted, it is not possible to establish a relationship between treatment, disease duration, and functional outcome in the evaluated sample.

The lack of standardization in records regarding clinical forms also constituted a significant limitation. Only one patient had an explicit description of secondary-progressive multiple sclerosis, while the other medical records did not clearly indicate this classification. This limitation prevents an adequate comparison of the distribution of clinical forms in Guarapuava with the literature, which describes the relapsing-remitting form as the most common presentation of the disease, both globally and in Latin America (Shi et al., 2024; Becker et al., 2026). Thus, rather than indicating a specific phenotypic profile, this finding highlights the need for more systematic clinical documentation.

Regarding treatment, the current use of disease-modifying therapy was reported in 46.2% of patients. The medications described included teriflunomide, dimethyl fumarate, fingolimod, azathioprine, ocrelizumab, and natalizumab, in addition to prior use of interferon beta. These drugs are among the therapeutic options described for the management of multiple sclerosis in Brazil, including immunomodulatory and immunosuppressive agents used according to clinical form, disease activity, therapeutic availability, and care criteria (Nascimento et al., 2023). In Cascavel, similar drugs were also reported, such as glatiramer, interferon beta-1a, natalizumab, dimethyl fumarate, ocrelizumab, teriflunomide, azathioprine, and fingolimod, with the highest frequency observed for glatiramer, interferon beta, and natalizumab (Gabardo et al., 2020).

However, nearly half of the medical records did not document disease-modifying therapy or did not allow for confirmation of its use. This finding limits interpretations regarding access, adherence, treatment continuity, or potential referral to other services. In retrospective studies, the absence of documentation does not necessarily correspond to the absence of treatment, which is why the data should be interpreted with caution.

In addition to disease-modifying therapies, symptomatic medications such as gabapentin, pregabalin, baclofen, and antidepressants were recorded. This pattern is consistent with the need to manage neuropathic pain, spasticity, sleep disturbances, and associated psychiatric symptoms—relevant aspects of comprehensive care for individuals with multiple sclerosis (Lorenzut et al., 2025). Symptomatic management is essential for preserving the patient's functionality, and quality of life, especially in patients with long-term disease or established functional impairment.

In the regional context, this study contributes to the characterization of patients with multiple sclerosis followed in a specialized service in the interior of Paraná, a population still poorly described in the literature. Although the sample is small, the findings from Guarapuava are similar to data observed in other regional clinics, especially regarding the female predominance, diagnosis in adults, and the presence of different disease-modifying therapies (Gabardo et al., 2020). This comparison should be interpreted with caution, but it reinforces the importance of local studies to expand knowledge about multiple sclerosis outside major urban centers.

Qualified epidemiological data are relevant for service planning, organization of the care pathway, standardization of registries, assessment of specialized care needs, and reduction of inequalities in access to diagnosis and treatment (Walton et al.,

2020). Similarly, studies on Latin America highlight the importance of regional registries and real-world data for a better understanding of the disease's distribution and care needs in different contexts (Becker et al., 2026). In this sense, describing the profile of patients treated at the Guarapuava AME can contribute to a better understanding of MS-related demands within the 5th Regional Health Department of Paraná and the Unified Health System.

The results of this study should be interpreted with its limitations in mind. This is a small sample, drawn from a single service and analyzed retrospectively, which makes the findings dependent on the quality of the information recorded in the medical records. Furthermore, the period analyzed was limited by the availability of the service's records, restricted to the years 2023 to 2025. The lack of standardization in variables such as clinical presentation, initial symptoms, functional status, use of specific scales, and treatment limited more detailed analyses and more precise comparisons with other cohorts.

Nevertheless, the data obtained contribute to the characterization of patients with multiple sclerosis followed at a regional clinic of the Unified Health System, underscoring the importance of structured clinical records and local studies on the disease. Taken together, the findings from Guarapuava are consistent with the epidemiological profile described in the literature and reinforce the importance of specialized neurological care in rural Paraná.

CONCLUSION

The present study described the clinical and epidemiological profile of patients with multiple sclerosis treated at the Specialty Medical Clinic in Guarapuava, Paraná, between 2023 and 2025. The sample showed a predominance of females, diagnosis around the fourth decade of life, and a higher current age, indicating a group under long-term follow-up at the clinic. These findings are consistent with the epidemiological profile described for the disease and reinforce the importance of characterizing patients followed in regional clinics.

From a clinical perspective, motor manifestations predominated, frequently accompanied by sensory and visual symptoms, in addition to reports of cerebellar, bulbar, and autonomic involvement. Functionality proved to be a relevant aspect, with impairment in part of the sample and one case of severe disability. These findings highlight the impact of multiple sclerosis on different neurological domains and on patients' autonomy, reinforcing the importance of continuous neurological follow-up and functional assessment in outpatient care.

The analysis of clinical forms, initial symptoms, and treatment was limited by the lack of standardization in the records. Nevertheless, it was possible to identify diverse clinical presentations and the use of disease-modifying therapies in some patients, in addition to medications aimed at symptomatic control. The presence of only one explicit record of a secondary progressive form does not allow for inferring the phenotypic distribution of the sample, but highlights the need for more systematic clinical documentation.

In the regional context, the findings contribute to expanding knowledge about patients with multiple sclerosis followed in a specialized service in the interior of Paraná. The characterization of this population may aid in understanding the care demands of the Guarapuava AME, the 5th Regional Health Department, and the Unified Health System, especially regarding neurological follow-up, functional management, and the organization of clinical records.

The conclusions should be interpreted considering the study's observational, descriptive, cross-sectional, and retrospective design, as well as the small sample size and reliance on secondary data from medical records. The incompleteness and heterogeneity of the records limited more detailed analyses. Nevertheless, the study outlines a relevant local landscape and reinforces the need for new regional research, with larger samples, qualified clinical records, and the systematic use of standardized functional assessment instruments.

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