Clinical and Economic Impact and Treatment Patterns in People with Secondary Progressive Multiple Sclerosis: A Retrospective Cohort Study in the United States

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BACKGROUND

- Secondary progressive multiple sclerosis (SPMS) is characterized by irreversible disability accumulation, and it develops in approximately 50% of people initially diagnosed with relapsing-remitting MS (RRMS) within 20 years of disease onset[1]
- SPMS is often diagnosed retrospectively due to the lack of defined criteria and variability in symptoms indicating the transition from RRMS to SPMS[2,3,4]
- Currently, evidence on clinical outcomes, economic burden, and treatment patterns in people with SPMS remains limited

OBJECTIVE

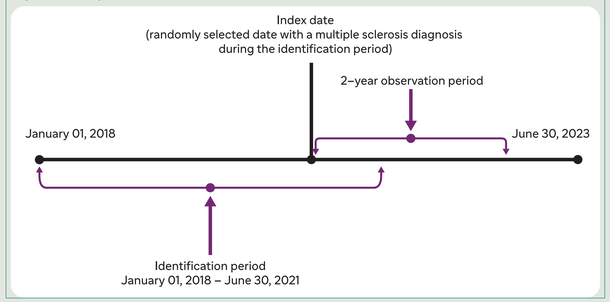
To evaluate the real-world clinical and economic burden and treatment patterns in people with SPMS in the United States (US)

METHODS

Study design and population

- A retrospective cohort study was conducted using a large, integrated US-based administrative claims database from January 01, 2018 to June 30, 2023 (**Figure 1**)
- The study included people with MS who were identified for SPMS based on the inclusion/exclusion criteria (**Figure 2**)
- People with SPMS were followed up for 2 years after the index date and were required to be continuously enrolled in a health plan throughout the observation period
- The index date was defined as a randomly selected date on which an MS diagnosis was recorded during the identification period, i.e., from January 01, 2018 to June 30, 2021

Figure 1: Study time frame



Study measures

- Baseline demographics, Charlson Comorbidity Index (CCI) score, Kurtzke Functional Systems (KFSS)-adapted disability score, specific comorbidities of interest, and treatment patterns were assessed over the 2-year observation period
- Economic impact was also analyzed in terms of healthcare resource utilization (HCRU) and healthcare costs (HCCs)
  - HCRU included inpatient admissions, emergency department (ED) visits, non-ED outpatient service visits, and use of specific healthcare services
  - HCCs included medical and pharmacy costs, as well as infection-related costs

Statistical analysis

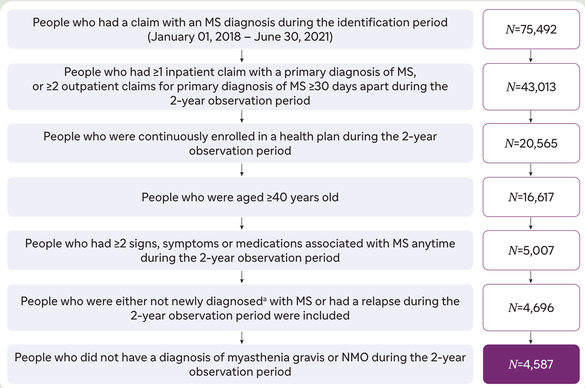
- Descriptive statistics were used to summarize all study outcomes
- All costs were reported in US dollars and adjusted to 2023 values

RESULTS

Baseline demographics

- The study included 4,587 people with SPMS, with a mean (standard deviation [SD]) age of 57.8 (10.1) years
- The cohort was predominantly female (76.9%, *n*=3,529) and primarily covered by commercial insurance (73.5%, *n*=3,372)

Figure 2: Attrition chart for the identification of SPMS cohort in the claims database

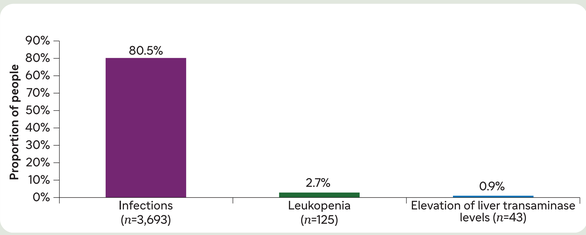


N is the total study population.
[a]Newly diagnosed was defined as having no MS diagnosis and no disease-modifying therapy use prior to the index date.
MS, multiple sclerosis; NMO, neuromyelitis optica; SPMS, secondary progressive multiple sclerosis.

Clinical characteristics

- The mean (SD) KFSS-adapted disability score was 4.7 (1.9)
  - Majority of people with SPMS had moderate (KFSS 3–5.5: 47.2%, *n*=2,165) to severe disability (KFSS ≥6: 35.8%, *n*=1,643), whereas only 17.0% (*n*=779) reported as having mild disability (KFSS 0–2.5)
- Infections were frequently reported, affecting 80.5% (*n*=3,693) of people with SPMS (**Figure 3**)

Figure 3: Proportion of people with infections, leukopenia, and elevated transaminase levels in the SPMS cohort

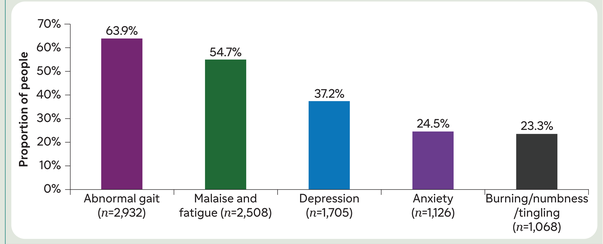


Data presented as the percentage of people. *n* is the subset of people with SPMS with the listed complications.
SPMS, secondary progressive multiple sclerosis.

Specific comorbidities of interest

- The mean (SD) CCI score of people with SPMS was 2.0 (2.4)
- MS-related comorbidities were reported in 98.8% (*n*=4,534) of people with SPMS. The top five most common MS-related comorbidities were abnormal gait, malaise and fatigue, depression, anxiety, and burning/numbness/tingling (**Figure 4**)
- Other comorbidities were reported in 84.1% (*n*=3,859) of people with SPMS, whereas urinary tract infections and autoimmune comorbidities were observed in 36.1% (*n*=1,657) and 31.1% (*n*=1,425) of the SPMS cohort, respectively

Figure 4: Most frequent MS-related comorbidities in the SPMS cohort

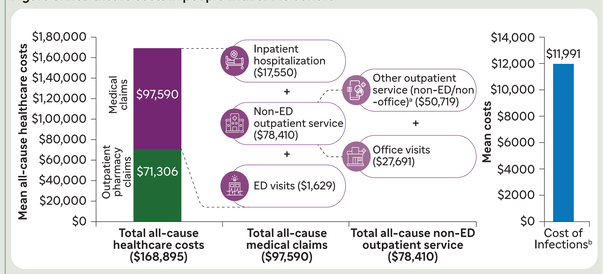


Data presented as the percentage of people. *n* is the subset of people with SPMS who experienced the listed comorbidities.
MS, multiple sclerosis; SPMS, secondary progressive multiple sclerosis.

All-cause healthcare resource utilization and healthcare costs

- By the end of the 2-year observation period, ED visits were reported in 44.8% (*n*=2,057) of the SPMS cohort, while 30.9% (*n*=1,416) experienced inpatient hospitalizations
  - The mean (SD) length of stay for hospitalized individuals was 12.0 (23.7) days
- Occupational and physical therapies were commonly utilized among people with SPMS at 71.2% (*n*=3,264) and 62.8% (*n*=2,879), respectively. Similarly, ambulatory devices were required by 68.3% (*n*=3,134) of the SPMS cohort
- The mean total all-cause HCCs was $168,895 with costs of medical claims ($97,590) and outpatient pharmacy ($71,306) being the major contributors. The mean all-cause cost related to infections was $11,991 (**Figure 5**)

Figure 5: Healthcare costs in people with SPMS cohort

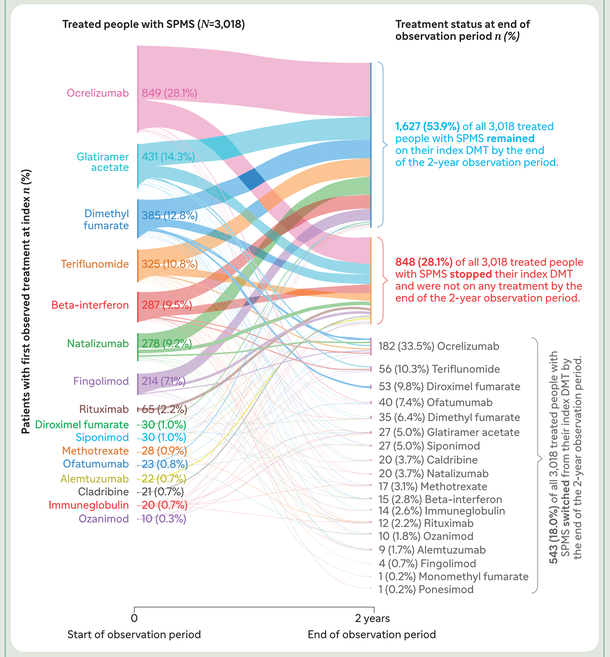


Data presented as the mean cost.
[a]Includes outpatient hospital, lab, home care, and telehealth, which together account for about 95% of other outpatient services.
[b]Defined as the costs of medical claims with a diagnosis of infections in any field plus the costs of antibiotics or antivirals pharmacy claims with days of supply being <21 days filled within 7 days of an infection medical claim.
ED, emergency department; SPMS, secondary progressive multiple sclerosis.

Treatment patterns

- At index, 2,938 (65.2%) people with SPMS were on disease-modifying therapies (DMTs) and 1,569 (34.8 %) were not on any DMT
- The top three most commonly reported DMTs by the end of the observation period were ocrelizumab (22.8%), glatiramer acetate (10.0%), and dimethyl fumarate (9.2%)
- Among the treated SPMS population (*n*=3,018), 53.9% continued their index DMT through the end of the 2-year observation period, 28.1% discontinued the treatment, and 18.0% switched to another DMT by the end of the 2-year observation period (**Figure 6**)

Figure 6: Treatment patterns in people with SPMS



Data presented as *n* (%). *N* is the total number of treated people with SPMS, *n* is the subset of people with SPMS.
DMT, disease-modifying therapy; SPMS, secondary progressive multiple sclerosis.

LIMITATIONS

- Like all claims database analyses, this study is inherently subject to potential miscoding that may affect patient identification
- The results may not be generalizable to uninsured populations or patients aged >65 years, who are under-represented in commercial claims data

CONCLUSIONS

People with SPMS experience high clinical and economic burden, underscoring the need for more effective treatments in this population, which has limited therapeutic options

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Disclosures
Nupur Greene: Employee of Sanofi and may hold stocks or stock options in the company.
Ashis K. Das, Eunice Chang, Marian H. Tarbox, and Michael S. Broder: Employees of PHAR (now a part of ADVI Health), which was paid by Sanofi to conduct the research described in this abstract. PHAR also discloses financial relationships with the following commercial entities outside of the submitted work: Akcea, Amgen, Celgene, Delfi Diagnostics, Dompe, Exact Sciences Corporation, Genentech, Gilead, GRAIL, Greenwich Biosciences, Ionis, Nobelpharma, Novartis, Pardes, Prothena, Pfizer, Recordati, Regeneron, Sanofi US Services, and Sunovion.

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