PREVALENCE OF MULTIPLE SCLEROSIS IN THE ABRUZZO REGION (SOUTH ITALY) BASED ON VALIDATED ADMINISTRATIVE DATA

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Introduction: Multiple sclerosis (MS) is a chronic neurodegenerative disease of the central nervous system (CNS) with no cure so far, mostly diagnosed in young people, aged 20-40 years old, that leads to irreversible disability [1].
Actually, according to the latest edition of the WHO/MSIF MS Atlas, in Europe more than 1,2 million people are living with MS, with a prevalence of 133 cases per 100,000 inhabitants [2], and in Italy, which is considered a high-risk country for MS, the prevalence is of 227 cases per 100,000 inhabitants [3].
Due to the huge impact of the disease, not only on the lives of patients and their caregivers but also on society, it is important to have an updated estimation of the number of patients, to help healthcare providers manage resources for MS.
Objectives: Our study aims to update the prevalence rate of MS in Abruzzo (South Italy) as of 2023 using a validated case-finding algorithm based on administrative data.
Methods
We used a validated case-finding algorithm to detect subjects affected by MS [4] based on the following administrative data: hospital discharge records, drug-dispensing records and disease-specific exemptions from co-payment to health care, from 1 January 2018 to 31 December 2023. The anonymized data was obtained through a record linkage between these sources using a unique personal identification code. The cohort was composed of all inhabitants, resident in the Abruzzo Region, alive at the prevalence day who met at least one of the following criteria: (a) at least one hospital discharge record (SDO) with MS diagnosis (ICD-9CM 340*), (b) one active payment exemption (SEA) at December 31, 2023, for MS (046.340 code), (c) at least 2 drug prescriptions (Regional Drug Prescription database (File D + File F)) with different dates for at least one of the drugs that are specific for MS detected by Anatomical Therapeutic Chemical Classification (ATC) codes (in particular: Glatiramer acetate - L03AX13, Interferon beta 1A - L03AB07, Interferon beta 1B - L03AB08, Fingolimod - L04AA27, Natalizumab - L04AA23, Dimetil fumarate - L04AX07, Peginterferon beta 1-a - L03AB13, Teriflunomide - L04AA31, Ofatumumab - L04AA52, Alemtuzumab - L04AG06, Siponimod - L04AA42, Ocrelizumab - L04AA36, Ponesimod - L04AE04, Ozanimod - L04AA38, Cladribina - L04AA40). ***Statistical Analysis*** Descriptive analysis was carried out using mean ± standard deviation for the quantitative variables and percentage values for the qualitative ones. Crude and standardized (the Italian population in 2011 was considered as a reference population) prevalence at the index date stratified by sex and age groups. All analyses were performed using Stata software v18 (StataCorp, College Station, USA).
Results
On December 31, 2023, the algorithm identified 3,208 prevalent cases, with 2,189 females and 1,019 males. Most identified individuals with MS were 15–64 years old. The total crude prevalence obtained was 239.1

per 100,000, 321.2 per 100,000 in females and 154.3 per 100,000 in males, confirming the female to male ratio of more than 2. Then we calculated the age and sex standardized rate, obtaining a prevalence of 336.4 in females (95% CI: 322.1-350.7) and 160.4 in males (95% CI: 150.5-170.3).
Regarding the data-capture pattern, most of the subjects were captured using the SEA source. A total of 2769 cases (86.3%) had an MS-specific payment exemption,1531 cases (47.7%) had at least one MS-related hospitalization, and 1356 (42.3%) had at least 2 prescriptions for an MS-specific drug. In detail, 257 (8%) were captured only with SDO, 929 cases (29%) only with SEA and 133 cases (4%) only with DRUG Prescriptions, whereas 559 cases (17%) were captured with all the three sources, 666 (21%) from SDO+SEA, 615 (19%) from SEA+DRUG Prescriptions and 49 (2%) from SDO+DRUG Prescriptions (Figure 1).

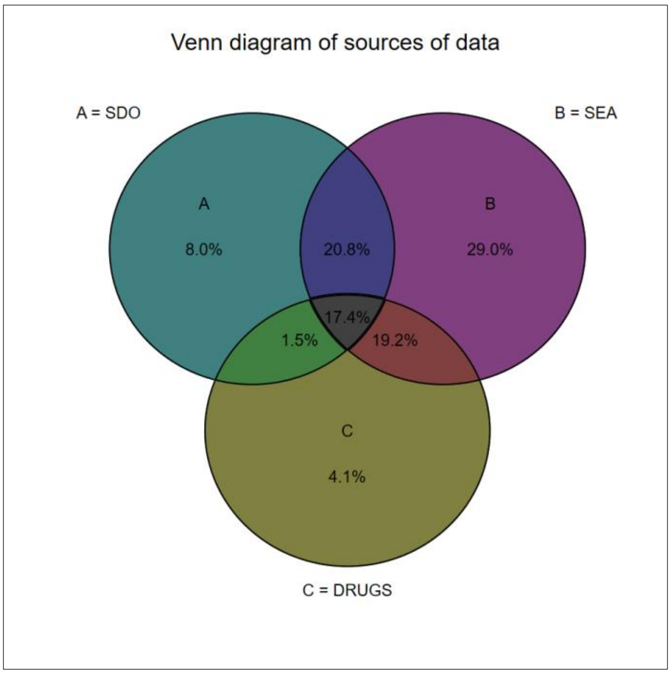

Figure 1. Venn diagram of sources of data (n=3208)

Conclusions

This study contributes to the knowledge on the epidemiology of MS in Abruzzo, South Italy. Our result shows a higher value than the latest available prevalence rate in the l'Aquila district of 53 cases per 100,000 in 1996 reported by Totaro R et al. [5]. Possible reasons for this difference, as observed in other Italian regions are, not only the different methodologies used to capture patients and the different analysed populations, but also the revision of diagnostic criteria and the anticipation of the diagnosis due to the wide use of MRI, the increase of life expectancy in the general population and in MS patients, too, and the normal annual increase of prevalence due to incidence that exceeds mortality [4,6].Our crude prevalence is similar to the Italian estimated prevalence rate (239 vs 227 cases/100,000) [3] and it is similar to the epidemiological situation of Tuscany or Piedmont. In fact, as suggested by Battaglia and Bezzini [6], every year's prevalence rate should increase of 4-5 cases per 100,000, so we can hypothesize an updated prevalence of about 240 cases/100,000 in both regions starting from a prevalence rate of about 209 in 2017 [7,8].
Administrative data confirms to be a cost-effective, continuative, and standardized alternative to classical prevalence studies, with the advantage to be easy to be obtained and processed, and it covers all the resident population enrolled in publicly funded health systems. In conclusion, it represents a valid alternative

to estimate and routinely update the prevalence of MS in a region, giving useful information on the disease burden for healthcare providers.

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