

## Multiple Sclerosis in Central American and Spanish Caribbean Region: Should it be Recognized as a Public Health Problem?

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Received Date: June 28, 2017, Accepted Date: September 13, 2017, Published Date: September 20, 2017.

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### Abstract

**Background:** A collaborative effort seeking to provide regional information on the status of Multiple Sclerosis (MS) and its recognition as a public health problem.

**Methods:** Certified neurologists from the collaborative group retrospectively provided information on the number of MS cases by country diagnosed until 2016 per the McDonald 2010 criteria to estimate crude prevalence. In addition, some countries provided information related to gender, median time to diagnosis, clinical type, Expanded Disability Status Scale (EDSS) and treatment. Cases (n = 1092) were collected between May 1 to October 24, 2016. Confidentiality of information was guaranteed.

**Results:** The estimated crude prevalence of MS in this region was  $10.1 \times 10^5$  inhabitants. Data from this series indicate a female: male ratio of 3:1; median time from onset to diagnosis < 1 year (0–4 years); 90% of cases had a relapsing remitting multiple sclerosis (RRMS) type. EDSS was between 0–3 in 57% of the cases, and 94% of patients with RRMS were receiving treatment. The proportion of neurologists in the region is less than  $1 \times 10^5$  inhabitants with an adult/child neurologist's ratio of 5:1

**Conclusions:** Although under-reporting of cases may be present in this study, we conclude that MS in the region is a health concern that potentially could result in substantial morbidity and permanent disability (EDSS > 6 = 8.47%). We present evidence to generate new health policies in the region.

**Keywords:** Multiple sclerosis; Prevalence; Central America; Spanish Caribbean Region; Public health

Multiple sclerosis is a multifocal demyelinating disease with progressive neurodegeneration caused by an autoimmune response [1]. The prevalence of MS in North America and Europe is approximately  $100\text{--}250 \times 10^5$  inhabitants [2] in Latin American oscillate between  $1\text{--}22 \times 10^5$  [3]. The epidemiology information of MS in Central American and Spanish Caribbean Region is scarce [4,5]. This collaborative effort aims to provide regional information on the status of multiple sclerosis in this region and recognition

as public health problem. Certified neurologists (n = 33) from the collaborative group retrospectively provided information on the number of MS cases by country, utilizing the McDonald 2010 criteria [6]. In addition, some countries provided information related to gender, median time from onset to diagnosis (years), clinical type, EDSS and treatment. This series of cases (n = 1092) were collected between May 1, 2016 to October 24, 2016. Likewise, quality controls were applied to avoid duplication. The confidentiality of the information was guaranteed. The Epi Info™, version 7.2 [7], was used to statistical analysis to estimated proportions, mean age at disease onset, standard deviation, median time from onset to diagnosis and crude prevalence (Table 1).

The estimated crude prevalence of MS for the region was  $10.1 \times 10^5$  and varied between 0.9 to  $77.7 \times 10^5$  inhabitants. Nicaragua had the lowest prevalence while Puerto Rico had the highest. In this series, the female: male ratio was 3:1. The median time from onset to diagnosis < 1 year (0–4 years), while 90% had a relapsing remitting type (RRMS), 57% of the patients had an EDSS between 0–3, and 94% of RRMS were on treatment. The proportion of neurologists in the region is less than  $1 \times 10^6$  inhabitants with adult/child neurologists ratio of 5:1 (Table 1).

The data from this report show that prevalence in most of these countries fluctuates between very low and low with exception of Puerto Rico who has a moderate prevalence. Reasons adjudicated for Puerto Rico's higher prevalence in the region include the contribution of a national MS registry, unique in the Americas and enforced by local law. In addition, Puerto Rico has a different genetic population make up from the rest of Latin America (higher concentration of white Caucasian groups). Analysis of the origin of its population should eventually be considered. In our series, women are the most affected. Also age of onset and the proportion of clinical type of MS is similar to that described in others studies [3]. Time of diagnosis, were made between two and eleven months -i.e., < 1 year-after the first event (43%), however, in Cuba, Nicaragua and Panama in some patients the diagnosis was made after two or more years later. Earlier diagnosis (less than a

Country	Characteristic Multiple Sclerosis								Service coverage	
	Prevalence (n) <sup>#</sup>	Cases included in the census <sup>##</sup>	Female (%)	Mean age at disease onset (± SD)	Median time from onset to diagnosis (years) (IQR) [n]	Type of MS % (RR/SP/PP) <sup>&amp;</sup>	EDSS % (0-3/3.5-6/6.5+) <sup>§</sup>	RRMS with treatment (%)	Neurologist (10 <sup>6</sup> inhabitants) <sup>**</sup>	Neurologist ratio (adult/child)
Cuba	19.8 (2250)	226	74.3	35.30 (10.78)	3 (0-7) [226]	85 / 7 / 8	44 / 50 / 5	93	0.8	7
Guatemala	1.2 (193)	193	69.4	33.95 (10.14)	<1 (0-1) [167]	91 / 5 / 4	68 / 26 / 7	100	0.4	3
Honduras*	5.1 (100)	100	85.0	32.30 (11.31)	<1 (0-1) [96]	95 / 5 / 0	67 / 23 / 10	73	0.5	4
Nicaragua	0.9 (56)	56	75.0	32.45 (9.08)	<1 (0-2) [54]	95 / 5 / 0	43 / 48 / 9	87	0.3	2
Panamá	8.9 (351)	351	74.9	33.92 (10-71)	<1 (0-4.5) [208]	91 / 5 / 4	62 / 28 / 10	98	0.6	2
República Dominicana	1.6 (166)	166	76.5	32.27 (12.47)	<1 (0-1) [166]	88 / 9 / 3	54 / 34 / 12	99	1.0	8
Sub-total	6.6 (3016)*	1092	75.0	33.71 (10.95)	<1 (0-4) [916]	90 / 6 / 4	57 / 35 / 8	94	0.6	5
Costa Rica	8.9 (428)								0.8	7
El Salvador	2.8 (172)								0.9	4
Puerto Rico	77.7 (2701)								2.7	15
Total	10.1 (6317)*								0.7	5

**Table 1:** Multiple Sclerosis Characteristics and neurological health service coverage in Central America and Spanish Caribbean Region 2016.

<sup>#</sup>Crude estimate prevalence: Numerator = MS cases reported/Denominator=Population by Country (106; estimated at July 1, 2016); C = 11.4; G = 11.3; SPSS = 1.9; N = 6.1; P = 3.9; RD = 10.5; CR = 4.8; ES = 6.1; PR = 3.4 by 100000. (<http://datos.bancomundial.org/?locations=L4-MX> consults: 03112016). Excluded data from San Pedro de Sula, Honduras to estimated final crude prevalence.

<sup>##</sup>Patients included by Neurologists of Central America and Caribbean Multiple Sclerosis Registry (RECEM-ICGES, 2012-2016). Cuba did not participate in RECEM; their data was supplied from national registry.

\*San Pedro Sula Region population (Total population of Honduras is 8.1 millions)

<sup>&</sup>Type of MS n = 1030; RRMS = Relapsing Remitting; SPMS = Secondary Progressive; PPMS= Primary Progressive.

<sup>§</sup>EDSS n = 933

<sup>\*\*</sup>Data provided by Neurology Association of each country.

year) was possibly due to the application of the 2010 Mc Donald Criteria. This occurred in the case of Panama [4]. Hazards present in the region are the shortage of neurologists in contrast to what is observed in the United States ( $2.1-6.2 \times 10^5$ ) and Europe ( $6.6 \times 10^5$ ) [8]; access to diagnostic technology, recognition of the disease by the health care system and the community, and social determinants are also limitations [9].

Six percent of patients with RRMS did not receive treatment, this proportion varying from 1% to 27% in some countries, suggesting lack of access to Disease Modifying Therapies in this population [10].

Although, some under reporting of cases may be present, the data from this study suggest, that MS in this region is a health problem. Additional studies should be carried out to determine the therapeutic response, disease burden, immunologic and genetic characterization, as well as, the development of educational programs for the scientific community, the general population and health decision makers.

## Acknowledgements

We thank all the personal of the Universidad Interamericana de Panama and the Gorgas Memorial Institute of Health Studies.

## Disclosure Statement and Sources of Funding

The authors have declared that no competing interests exist. FG and BA were supported by the DI-UIP633800 Dirección de Investigación, Universidad Interamericana de Panama and Gorgas Memorial Institute of Health Studies. BA is member of the SNI (Sistema Nacional de Investigación from SENACYT of Panama).

## References

1. Nylander A, Hafler DA. Multiple sclerosis. *J Clin Invest*. 2012;122: 1180-1188. doi:10.1172/JCI58649.1180.

- Browne P, Chandraratna D, Angood C, Tremlett H, Baker C, Taylor B V, et al. Atlas of Multiple Sclerosis 2013: A growing global problem with widespread inequity. *Neurology*. 2014;83(11):1022-4. doi: 10.1212/WNL.0000000000000768.
- Cristiano E, Rojas J, Romano M, Frider N, Machnicki G, Giunta D, et al. The epidemiology of multiple sclerosis in Latin America and the Caribbean: a systematic review. *Mult Scler*. 2013;19: 844-854. doi:10.1177/1352458512462918.
- Gracia F, Castillo LC, Benzadón A, Larreategui M, Villareal F, Triana E, et al. Prevalence and incidence of multiple sclerosis in Panama (2000-2005). *Neuroepidemiology*. 2009;32: 287-293. doi:10.1159/000204912.
- Rivera VM, Medina MT, Duron RM, Macias MA. Multiple sclerosis care in Latin America. *Neurology*. 2014;82: 1660-1. doi:10.1212/WNL.0000000000000376.
- Polman CH, Reingold SC, Banwell B, Clanet M, Cohen JA, Filippi M, et al. Diagnostic Criteria for Multiple Sclerosis: 2010 Revisions to the McDonald Criteria. *Ann Neurol*. 2011;69(2):292-302. doi: 10.1002/ana.22366.
- Centers for Disease Control and Prevention. Epi Info™. In: Epi Info [Internet]. 2017. Available from: <https://www.cdc.gov/epiinfo/pc.html>.
- Somoza MJ, Melcon MO. Número de neurólogos y carga de enfermedades neurológicas en Argentina. *Neurología Argentina*. Elsevier; 2015;7: 89-94. doi:10.1016/j.neuarg.2014.12.001
- Melcon MO, Melcon CM, Bartoloni L, Cristiano E, Duran JC, Grzesiuk AK, et al. Towards establishing MS prevalence in Latin America and the Caribbean. *Mult Scler*. 2013;19(2):145-52. doi: 10.1177/1352458512441985.
- Rivera VM, Macias MA. Access and barriers to MS care in Latin America. *Mult Scler J Exp Transl Clin*. 2017;3(1):2055217317700668. doi: 10.1177/2055217317700668.

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