



Is it time for a new global classification of multiple sclerosis?



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ABSTRACT

Background: The geographic distribution of multiple sclerosis (MS) is classically divided into three zones based on frequency that were established by Kurtzke in the early 1970s. In recent years, an increasing number of epidemiological studies have shown significantly higher MS prevalence and incidence rates.

Objective: The aim of this study was to review and update the geographic distribution of MS using incidence, prevalence and disease duration from the latest epidemiology surveys.

Methods: We conducted a systematic review of articles on MS epidemiology published between January 1, 1990 and December 31, 2012.

Results: MS studies were grouped by continent: the Americas, Europe, Asia, Australia/New Zealand, and Africa. A total of 101 studies were identified according to the inclusion criteria, and 58 reported incidence estimates. Globally, the median estimated incidence of MS was 5.2 (range: 0.5–20.6) per 100,000 p-yrs, the median estimated prevalence of MS was 112.0 (with a range of 5.2–335) per 100,000 p-yrs, and the average disease duration was 20.2 years (range: 7.6–36.2).

Conclusion: In the past few decades, the global prevalence and incidence patterns of MS have changed dramatically. Regardless of the reason of increasing prevalence and incidence rate, we suggest the need for a novel classification system based on global MS disease burden. Adopting such a system would improve economic efficiency and prioritization in health policy planning for MS.

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1. Introduction

epidemiology, or worldwide epidemiology. In addition, we included relevant information from the World Health Organization (WHO), Multiple Sclerosis International Federation, and the 2008 Multiple Sclerosis Resources in the World [4]. More than 150 surveys of MS epidemiology were analyzed. Clusters of MS in small towns were excluded.

We summarized the following information from each study: survey location, latitude, population size and/or number of cases, incidence rate (95% confidence interval [CI]), prevalence rate (95% CI), female–male ratio, and prevalence year or period. Studies were grouped into five continents: America, Europe, Asia, Australia/New Zealand, and Africa.

2.2. Quality evaluation

We included cross-sectional (prevalence studies), longitudinal (incidence studies), population-based, and cohort studies as well as studies using the capture–recapture method; we also included the Rochester Epidemiology Program Project, which collected MS incidence, prevalence, and other related data. MS cases were included if they were classified according to validated criteria (i.e., the Poser criteria or McDonald 2001, 2005, and 2010) [5,6] and had estimated 95% CIs or when the number of MS cases or population denominator were reported.

3. Results

Estimates of MS prevalence were more common than estimates of MS incidence; 101 studies met the inclusion criteria, and 93 of the 101 studies reported MS prevalence while 58 reported MS incidence. The studies reviewed here were considered representative of the current MS literature. MS prevalence and incidence tended to be higher in more recent studies and in studies of North America and northwest Europe. MS prevalence was higher among women with a female–male ratio as high as 4.1 (USA) [11]. In Canada, the female to male incidence ratio has been increasing for at least 50 years and now exceeds 3.2:1. This change must have environmental origins even if it is associated with a gene–environment interaction [12]. The quality of more recent studies was generally higher; more recent studies also tended to use the McDonald criteria.

3.1. Relevant findings

Globally, the median estimated MS incidence and prevalence were 5.2 (range: 0.5–20.6; Table 3) per 100,000 p-yrs and 112 (range: 5.2–335; Table 4) per 100,000 pop., respectively. The mean estimated MS incidence and prevalence were highest in North America (6.5/100,000 p-yrs and 126.0/100,000 pop., respectively), followed by northwest, north, southeast, and south Europe. MS incidence and prevalence was low in east and west Asia, South America, and North Africa.

Globally, the mean disease duration was 20.2 years (range of 7.6–36.2; Table 5). The mean duration of the disease was highest in northwest Europe, followed by North America, north, southeast, and south Europe, and Australia.

3.1.1. North America

Studies conducted after 1990 in Canada observed MS prevalence rates greater than 100/100,000 pop. A study of MS prevalence and incidence in Saskatoon, Canada identified 558 incident cases (female–male ratio: 2.6) between 1970 and 2004 using a population-based registry. The crude MS prevalence on January 1, 2005 was 298.3/100,000 pop., and the average annual incidence rate was 9.5/100,000 p-yrs. The high MS incidence observed in this study confirmed that individuals in Saskatoon are at a high risk for MS and showed that these rates were stable over three decades [7].

MS prevalence between 2000 and 2001 was computed in five regions (Atlantic Canada, Quebec, Ontario, the Canadian Prairies, and British Columbia) using data from the Canadian Community Health Survey. The overall prevalence of MS in Canada was 240/100,000 pop., ranging from 180 to 350 per 100,000 pop. in Quebec and Atlantic Canada, respectively [8]. Data from government health databases were also used to describe MS incidence among First Nations aboriginal people in Alberta between 1994 and 2002. In 2002, MS incidence among First Nations people was 7.6/100,000 p-yrs compared to 20.6/100,000 p-yrs among the general population. MS incidence in females was higher than that in males for both First Nations people (female–male ratio: 1.7) and the general population (female–male ratio: 2.5). These high MS incidence rates are consistent with the high prevalence rates reported for both groups in 2002: 99.9 and 335.0/100,000 pop. for First Nations people and the general population, respectively [9].

In the US, MS epidemiology data in Ol

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