Is it time to revise the classification of geographical distribution of multiple sclerosis?

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Multiple sclerosis (MS) is a chronic inflammatory demyelinating disease of the central nervous system (CNS). Although the precise mechanisms involved in MS pathology have remained unclear, it is generally thought to be an autoimmune disease that targets myelin in the CNS. It afflicts more than one million persons worldwide.[1] MS is the leading cause of disability in young and middle-aged people and adversely affects employment, social relationships and quality of life. It is also one of the best studied and epidemiologically well-defined neurological diseases.[2,3]

The most striking epidemiological characteristic is the apparent uneven distribution of the disease across the world.[4] The frequency of MS follows a general north–south gradient in the northern hemisphere, reversing in the southern hemisphere, such that MS is uncommon near the equator.[5] Thus, the prevalence of MS tends to be higher the further you move from the equator. At high latitudes (> 55°N), prevalence exceeded 200 per 100,000 in some studies, but values less than 100 per 100,000, and even less than 50 per 100 000 have been found at 70°N.[4] However, it was suggested in 1922 that there is a latitudinal effect as well as a possible racial effect.[6] Distribution of MS in the latter half of the 20th century was reviewed by Kurtzke.[7] He described MS prevalence geographically in three zones: High prevalence areas (> 30/100,000) include all of Europe (including Russia), southern Canada, the northern United States, New Zealand, and the southeastern portion of Australia; Medium prevalence areas (5-30/100,000) comprise most of Australia, the southern United States, the Mediterranean basin (other than Italy), the Balkans, Ukraine, Siberia parts of South America, and the white population of South Africa. Low prevalence areas (< 5/100,000) include large areas of Asia and Africa.

The differences support the reported geographic heterogeneity of MS prevalence. Some researchers showed differences in the distribution of genetically susceptible populations, as determined by racial and ethnic backgrounds and differences in environmental risk.[8] Although some etiologies have been proposed for different geographic regions, such questions cannot be answered with this ecologic analysis. Recent data suggests that MS incidence is increasing. In regions where incidence is on the rise, including France and Iran, the increased frequency appears

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to result from excess females.[9-11] The escalation in MS rates has occurred relatively rapidly over the past century, implicating environmental or genetic-environmental factors.[11] Several studies suggest an increasing prevalence of MS in eastern and western regions of Canada, a nation recognized to have a high prevalence of MS.[3] In recent decades, increasing prevalence of MS has changed classification based on prevalence zones of MS. It follows an increasing pattern that moves most of geographic region from low and medium to the higher zone. Even prevalence of some area in high zone continues to increase.

In many of high prevalence areas, the prevalence is more than 100 per 100,000, with the highest reported rate of 300 per 100,000 occurring in the Orkney Islands.[12] Prevalence estimates for MS vary from 58 to 95 per 100,000 population in the United States. In the past 25 years, prevalence studies of specific US locales have produced a range of estimates, up to 177 per 100,000 population in Olmstead County, Minnesota. Kuwait among low prevalence zone showed slower but still rising pattern in which the total prevalence rate increased from 6.68/100,000 in 1993 to 14.77/100,000 in 2000.[13]

The reasons of these changes are unknown. Prevalence (number of patients with MS alive at a specific date per 100,000 population) can be indicative of several other factors besides the true frequency of MS, including diagnostic accuracy and revised diagnostic criteria, ascertainment probability, and socioeconomic structure, including availability of medical facilities both of which are connected with the level of medical services in the country. The early diagnosis and better treatment also accounts for another important component of prevalence: survival time. The rising prevalence with minimally changing incidence suggests improving survival.[4] These factors have improved in most parts of the world throughout the past five decades.

However, regardless of the reason of increasing prevalence it seems this is time to change striking epidemiological estimation for geographically description of three zones. According to this classification some discrepancy would come about. For example, some countries with rising prevalence such as Iran (about 51.9/100,000 on March 2009 and 73/100,000 on October 2011 in the capital)[14] are in such a zone that some regions like the Manitoba (32.6 in 1984 to 226.7 in 2006)[3] or Orkney Islands (300/100,000)[12] are. We think considering this updated information, revision of this epidemiologic categorization is needed. It could lead to better estimation of burden of disease and health policy.

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