

Multiple Sclerosis



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KEYWORDS

- Multiple sclerosis • Vitamin D • Epstein–Barr virus • Latitude

KEY POINTS

- Multiple sclerosis is a chronic and debilitating disease that can have many devastating effects physically and psychologically.
- Although certain clinical features are typical of MS, the presentation of the disease varies widely in symptoms as well as in pace and progression.
- In addition to a thorough history and physical examination, diagnostic tools required to diagnose MS and exclude other diagnoses include MRI, evoked potential testing, and cerebrospinal fluid analysis.
- Although MS is not curable at this point, quality of life can be improved by minimizing the frequency and severity of disease burden.
- Disease modification, symptom management, preservation of function, and treatment of psychosocial issues are paramount to enhance the quality of life for the patient.

INTRODUCTION

Disease Description

Multiple sclerosis (MS) is a chronic disease characterized by multifocal inflammation, demyelination, gliosis, and neuronal loss of the brain and spinal cord. MS affects approximately 400,000 individuals in the United States and affects 2.5 million individuals worldwide,¹ varying greatly with geography. The incidence peaks at 30 years old and the prevalence peaks at 50.² Patients present with neurologic findings disseminated in space and time, that is affecting differing locations and occurring over multiple episodes. The manifestations of the disease vary greatly, ranging from benign findings to rapidly evolving with the potential for incapacitating disease progression. The course of the disease may be relapsing–remitting, primary progressive, or secondary progressive. The latter is progression after an initial relapsing–remitting phase. Life expectancy in the MS population is reduced by 7 to 14 years compared with the general, healthy population.³

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Prim Care Clin Office Pract 42 (2015) 159–175

<http://dx.doi.org/10.1016/j.pop.2015.01.007>

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Summary/Discussion

MS occurrence varies greatly across the world. It is predominantly found throughout Europe, southern Canada, northern US, New Zealand and southeastern Australia (Fig. 1). For many of these areas, the prevalence is around 100 per 100,000, which is that of the United States.⁴ The greatest prevalence reported is 300 per 100,000 in the Orkney Islands, off northern Scotland.⁴ There is limited incidence of the disease in Africa, Mexico, Puerto Rico, Japan, China, and Philippines, as well as in the Native American population.⁵ Because of the focused distribution, many studies have focused on the risk factors in an attempt to determine a potential link as to the cause(s) of the disease.

Genetic susceptibility to the disease is readily apparent with the 15 to 35 times greater risk in first-degree relatives of those with the disease.⁵ Although the general population has a prevalence rate of 1 per 1000, monozygotic twins have a rate of 270 per 1000 (Table 1).⁶ Interestingly a study completed on half-siblings found that the risk for maternal half-siblings was 2.35% compared with 1.31% for paternal half-siblings, alluding to a substantial maternal effect in transmission.⁵ The strongest genetic effect in MS seems to be the major human histocompatibility system, a region on chromosome 6, responsible for the HLA-DRB1 allele.^{5,7} This area plays a role in creating human leukocyte antigens that present to T cells and may trigger an immune response. The interaction is complex and it is still unclear as to the exact role that interaction may play in the disease process. However, it is known to be associated with other autoimmune diseases, namely, rheumatoid arthritis, type 1 diabetes, sarcoid, and pemphigus.⁸

Although genetics are known to be linked to the development of MS, that does not explain or account for all cases of this disease. Additional risk factors have been identified as having a direct or causal link to MS, including latitude, vitamin D level, and Epstein–Barr virus (Table 2).

Latitude: In areas of temperate climate, there is an increase in the incidence of MS the further north from the equator with increasing latitude.⁹ Interestingly, studies of immigrant populations found that those who migrated before adolescence acquired



Fig. 1. World map showing the distribution of all prevalence estimates included in this meta-analysis. (From Simpson S Jr, Blizzard L, Otahal P, et al. Latitude is significantly associated with the prevalence of multiple sclerosis: a meta-analysis. *J Neurol Neurosurg Psychiatry* 2011;82(10):1136; with permission.)

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