Review article

Epidemiology of Multiple Sclerosis: A Narrative Review

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Abstract:

Multiple Sclerosis (MS) is an autoimmune, inflammatory, and chronic disease that develops due to Myelin destruction lesions in the white matter of the brain, the spinal cord and the optic nerve. Due to the impact of the effect of cognition and the epidemiology of MS, our aim is to review the epidemiology of MS. In this review, by using keywords including Multiple Sclerosis and through searches on valid scientific databases such as Google Scholar, PubMed, ScienceDirect, Web of Science, Ovid Medline and WHO site, articles and dissertations from 1990 to 2019 were found and reviewed. The studies show that many factors such as age, gender, geographical location, etc. influence the increasing incidence of MS. In this review, we aimed to review the epidemiology of MS.

Keywords: Multiple Sclerosis, Epidemiology, Chronic disease, Central nervous system.

Introduction:

Multiple Sclerosis (MS) is one of the most common inflammatory diseases of the central nervous system (CNS) that affects a wide range of nervous functions (1). The disease is caused by the destruction of the myelin sheath (2). MS is one of the most common neurological diseases and occurs mainly in young adults and more commonly in women. MS is a chronic inflammatory disease characterized by demyelinating lesions in the brain, spinal cord and optic nerve (3). Unfortunately, many people around the world have this disease and the number is increasing day by day. More than 2.5 million people are involved in the world and 40,000 in Iran (4, 5, 6). Fatigue in MS patients is often mild and severe at the onset of the disease that accompanies the disease process (7). Fatigue can also occur as symptoms of intolerable lethargy, premature fatigue, and energy depletion in patients who, despite the unknown mechanism of its occurrence, consider neuronal hormonal factors and autoimmune mechanisms to be among the most important factors in fatigue development in these patients (8). Given the increasing prevalence of deaths due to this disease, high costs, and the many complications and problems of drug therapy, the use of non-pharmacological approaches that can reduce problems and improve the performance of MS patients seems reasonable (9). In several regional studies, especially in countries located in the Middle East, the disease has been reported to differ geographically from different environmental and climatic conditions, so that the ethnic and climatic distribution of the inhabitants of the south, north, west, and east have significant differences. One of these

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differences is latitude. According to evidence from studies in countries with high prevalence and low prevalence of MS, the prevalence of the disease increases with increasing latitude. This finding has been reported even in one country in provinces and states with such differences (10). Studies of the epidemiology of MS patients have been conducted, and Motl et al., in a study called Epidemiology of MS, found that MS has been reported worldwide and is the most common cause of neurological disability in young adults. Comparison of the prevalence of this disease in different populations and ethnic groups confirm that genetic and environmental factors are both contributing to MS disease (11). But in reports from the Middle East and North Africa, recent data suggest that the prevalence of MS in these areas is dramatically increasing (12). The findings of many studies show that the prevalence of MS has increased over time and provides evidence that the main reason is the increase in MS rates among women (13). Increased prevalence of MS in different ethnic groups appears to be a multifactorial phenomenon. A number of these factors include genetic background and environment, infection, autoimmunity, travel to the continents, and changes in vitamin D and calcium levels in different communities and among patients (14). The epidemiology of the MS has been controversial, and some believe it may lead to an increased incidence of injury-related diseases. But new research shows the benefits of screening patients with MS. Regarding the necessity of investigating the remedial factors in patients with MS by recognizing the factors and course of the disease, this study aimed to review the epidemiology of MS.

Methods:

In this narrative review, by using keywords including Multiple Sclerosis and epidemiology, through searches on international scientific databases such as: Pub Med, Web of Science, Google Scholar, Scopus, Elsevier; and Iran's domestic scientific databases including: Barakatkns, Academic Jihad Database, Iranian Medical Library (Medlib), Magiran Database and Civilica; and also search on the WHO site, a total of 75 scientific sources including books, articles, dissertations, and reports published in 1989 to 2019 in both Farsi and English about MS and epidemiology were collected. Unrelated articles and references were excluded and references related to our review were studied.

Findings :

According to the results, MS is the most common disease of myelin degradation with very variable prevalence (15-17). It is more prevalent in North America and Europe (more than 100 cases per 100,000 people) and in East Asia and South Africa is less prevalent (2 cases per 100,000 people) (18, 19). In France, the prevalence of MS in 2004 was 94.7 per 100,000 people, with the highest prevalence in north and east of the France (20, 21). A study in Spain reported an annual incidence of MS in the North Seville region of 4.6 per 100,000 people and its prevalence in the region was 90.2 per 100,000. A study examining the prevalence of MS in the countries of the Middle East and North Africa (22, 23) has shown that the

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prevalence ranges from 14.77 per 100,000 people in Kuwait to 101.4 per 100,000 people in Turkey. The mean prevalence in the whole region was 51.52 per 100,000 people. In these areas, the age of onset was 25.2 years in Kuwait up to 32.5 years in northeastern Iran and the overall mean age was 28.54 years. In most countries, the prevalence of MS in women is two to one to three to one in comparison with men. In a study in the Middle East and North Africa, the prevalence of MS among women than in men was 0.8 in Oman to 4.3 in Saudi Arabia (21, 24, 25). In one large study, mortality studies showed that there was no difference between these patients and controls in the first 20 years. However, life expectancy in these patients is reduced by 6-7 years (26).

Discussion and Conclusion:

MS is a chronic and debilitating disease of the nervous system characterized by inflammation in any location of the spinal cord and brain (27). The prevalence of the disease in women is twice that of men (28). Patients with MS have a physical activity phobia; lack of balance during the walking, tremor, unstable walking, and dizziness, sudden movements of the limbs, body inconsistency and weakness prevent patients from attending society (3). In a study in Jordan, the prevalence of family history of MS was reported in 9.4% of patients. In a study by Fricska-Nagy et al, The genetic prevalence of MS is estimated at between 5% and 10% (29). According to the results of the study, the findings showed that the prevalence of MS among non-biological relatives of patients with MS was not higher than the general population but was significantly lower than biological relatives. These findings indicate the role of genetic factors in MS (30). These findings indicate a genetic background of the disease. Studies have shown that age-related factors also increase the risk of relapses in the patient's siblings. This may support the notion that people with genetic susceptibility to MS are more likely to start early, meaning that genes that influence susceptibility are also involved in the early onset of the disease (31). Most etiologic studies are mostly focused on environmental factors and rarely examine genetic causes. Some researchers believe that environmental factors provide the context for the disease, while genetic factors exacerbate the environmental impact. The risk of MS among first-degree relatives increases by more than 2-4%. The risk for other family members was 0.1%. Another study in 2007 rejected the cause of the homogeneity of MS and reported that two genes were responsible for the disease (32-34).

The higher prevalence of the disease among the educated people can be due to our young population. The average duration of the disease was 8 years. In similar studies, the difference was higher and about 15 years (35). It can be attributed to environmental factors as well as late diagnosis of the disease due to lack of access to specialist physicians. This study showed that the onset of the disease is often gradual, which is similar to other studies in most cases and was in poly-symptomatic form. Global studies have often described the onset of the disease as mono-symptomatic which can be because of geographical and genetic differences or, of course, differences in

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sample size. However, according to the history, most patients reported sensory-motor onset, which may be justified by the type of patient's expression. In terms of mortality in MS, it can be said that this disease has no effect on normal life span (33, 36). A study by Bergamaschi et al showed that mortality and disability in MS decreased over a number of years with respect to age and degree of disability at onset (EDSS). The disease was associated with higher disability in older age, although other studies have the same result about this, which has rarely been reported to the contrary, which may be related to the underlying and environmental conditions of the population under study, and there was a significant relationship with the duration of illness with a degree of disability. The longer the duration of the illness is, the disability can be greater (37). Other studies have reported conflicting results by Aronson. Which may be related to the relative benignity of the disease or place of study and the specific circumstances of life there (38). There was also a significant association between sex and disability in most other studies and EDSS was higher in men than women, which may indicate a More severe course of the disease in men for unknown reasons. The results of studies in this area are inconsistent (39). There was no significant relationship between duration of interferon use, disease onset, marital status, the season of onset of disease and first symptom with disability rates, but other studies have shown that disability would be greater if the patient had multi-systemic onset. If there is an early involvement of the pyramid or cerebellar system, the disability also will be greater (40, 41). The above results indicate a stronger association of genetic factors with MS. Our study provided descriptive evidence of the prevalence of MS. However, analytical studies are needed to prove its inference. Unfortunately, due to inadequate studies, we were not able to estimate the integration prevalence by gender and geographical region. Significant heterogeneity between the results of earlier studies was another limitation for the present study. Geographical area may be one of the factors related to this heterogeneity that was not studied due to lack of sufficient information. Our findings showed that the prevalence of MS is relatively high in patients worldwide. Further studies have been conducted to investigate the influence of genetics, age, gender, and geographical conditions as an influencing factor on the progression and development of MS. These findings suggest the involvement of genetic factors and consultation with a genetic specialist for people with a positive history of MS.

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