Introduction

Multiple sclerosis (MS) is a chronic disease of central nervous system. This multifactorial illness is one of the most common causes of disability among young adults. Genetic and environmental factors are two major risk factors have been identified for the development of MS disease [1]. Vitamin D deficiency, previous infection with Epstein-Barr virus (EBV) and smoking are the three recognized environmental risk factors for MS disease [2-5].

Vitamin D deficiency has been recently identified as a potential risk factor for the development of MS disease [6]. Vitamin D is a steroid hormone which continuously transforms to 1, 25 dihydroxy vitamin D3 or calcitriol, in the skin, liver and kidneys. Apart from its role in calcium metabolism, vitamin D has anti-inflammatory and anti-proliferative activities. It also has modulatory effects on the neurotrophins, growth factors and neurotransmitters in the nervous system [7-9].

Major sources of vitamin D are food and sunshine. Recent studies have shown that even in the countries in which seafood is popular (that contains high amount of vitamin D), the amount of vitamin D provided by food rarely reaches 100 units per day [10]. Sunshine remains the main natural source of vitamin D, provides approximately 90% of the body requirements. Although 15 to 30 minutes sunbathing can provide 10,000-20,000 IU of vitamin D, this supply disappears within a few weeks and cannot be replenished all year long, except in the tropical countries [11]. So Vitamin D supplementation seems to be useful for people who have a vitamin D deficiency.

Prior studies reported low vitamin D level in Iranian multiple sclerosis patients [12,13]. All of these reports have compared MS patients with healthy participants, but they have not considered the role of genetic factors in the development of MS disease. To eliminate the role of genetic factors, we have conducted the present study to measure serum vitamin D level in MS patients and their healthy siblings.

Materials and Methods

During the 12 month period (May 2014 - May 2015, sampling took during a whole year to eliminate the seasonal variation in sunshine exposure) in a case-control study, relapsing-remitting multiple sclerosis patients who were attending the neurology clinic of an urban tertiary care university affiliated hospital, were recruited.
Initials patients’ age, sex, disease pattern and Their EDSS (Expanded Disability Scale Score) were recorded. Controls were selected from healthy siblings of the patients. With the same method, their age and sex were recorded. Vitamin D levels (25 hydroxy vitamin D3) were measured by ELISA (Enzyme Linked Immune Sorbent Assay) method. To reduce variability, all samples were analyzed in batched assays.

Based upon current data the risk of extra-skeletal disorders (autoimmune, infectious, cancer and cardiovascular diseases) is higher when 25-hydroxyvitamin D levels are less than 20 ng/ml [14]. we have considered vitamin D levels under 20 ng/ml as vitamin D deficiency. Informed consent was obtained from all participants. The ethics committee of Shahid Beheshti University of medical sciences approved the conduct of the study. Data were analyzed using the statistical software SPSS 18 (SPSS, Chicago, IL).

Results and Discussion

Table 1: Vitamin D level in MS patients and their healthy first degree relatives.

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<th>MS Patients</th>
<th>Controls</th>
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<tr>
<td>Mean Age (year)</td>
<td>30.9 ± 1.4</td>
<td>30.4 ± 1.6</td>
</tr>
<tr>
<td>Male (%)</td>
<td>8 (25.8)</td>
<td>8 (25.8)</td>
</tr>
<tr>
<td>Female (%)</td>
<td>23 (74.2)</td>
<td>23 (74.19)</td>
</tr>
<tr>
<td>Mean Vitamin D level (ng/ml)</td>
<td>12.7 ± 5.5</td>
<td>20.9 ± 8.1</td>
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Several experimental studies on animals showed that vitamin D has a protective effect against induced EAE (an animal model of MS). Moreover, symptoms of EAE significantly improved after administration of vitamin D. These animal studies concluded that vitamin D has both preventive and curative effects in EAE [6].

To our knowledge, there is only one study that directly analysed the risk of development of MS disease based on the serum level of 25(OH) vitamin D. Independent of geographic latitude and the degree of sun exposure, this study has showed a direct correlation between low levels of serum vitamin D and the development of MS disease [20].

In a Finnish study, serum vitamin D levels of 40 patients with newly diagnosed MS (mean EDSS of 1.5) were compared to a healthy control group. Serum vitamin D levels were significantly lower in MS patients during the summer compared to normal subjects (55 nmol/l and 80 nmol/l, respectively). In contrast, during the winter months both groups had low serum vitamin D levels without any significant difference [2]. It seems that such low levels of vitamin D during winter have devastating effects on the members of both groups.

In Charles Pierrot-Deseilligny study, conducted in Paris, serum vitamin D level was measured in 167 relapsing-remitting MS patients. In 83% of these patients, serum vitamin D levels were in the insufficiency range (between 25-75 nmol/l). In the remaining 17% serum vitamin D levels were within deficiency range (below 25 nmol/l) [6]. In Ascheiro A et al. [3] study, it was showed that MS incidence can be reduced by 3/4 by maintenance of serum vitamin D level above 100 nmol/l during childhood and adolescence [3].

In Goldberg P et al. [21] Study MS attacks were reduced by 60% with administration of 5000U/day vitamin D for a two-year period. In a similar study, MS attacks were reduced by 50% with administration of 100U/day vitamin D for 48 weeks. These two studies had no control group [21,22]. The results of a large prospective study on a group of relapsing-remitting MS patients, with different disease durations, showed that an increment of 10 nmol/l in serum vitamin D level could reduce the prevalence of MS attacks by 9-12% [23].

In the present study controls were not selected randomly from the community. To decrease the effect of genetic factors, the controls were selected from the patients’ healthy siblings. To

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reduce the seasonal variation in sunshine exposure we recruited participants during a whole year. All participants were residents of a same city (Tehran). Considering these strict criteria our results more dearly shows the role of low vitamin D in MS patients.

Conclusion

In the present study, serum vitamin D level in MS patients was significantly lower than their siblings (P value< 0.001). This finding is compatible with the results of other similar studies. Nevertheless more research is needed to recommend routine vitamin D supplementation in MS patients.

References