

**Original Article****Risk factors for multiple sclerosis in Pakistani population- A cross-sectional study**Nasir Raza Zaidi<sup>1</sup>, Mian Waheed Ahmad<sup>1</sup>, Mahesh Gautam<sup>1</sup>, Riffat Mehboob<sup>2\*</sup><sup>1</sup>Department of Radiology, King Edward Medical University/Mayo Hospital, Lahore, Pakistan<sup>2</sup>Department of Biomedical Sciences, King Edward Medical University, Lahore, Pakistan

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**Abstract**

Multiple sclerosis (MS) is an inflammatory disease of the brain and spinal cord where it damages the myelin sheath protecting the neurons. Many environmental and genetic factors have been associated with MS. The aim of this study is to identify the possible risk factors that are linked to MS in Pakistani population. This study was conducted in Department of Radiology, Mayo Hospital Lahore from 2013 to 2014. The first hundred patients who came for reporting MRI of the brain and had positive findings of MS were retrospectively evaluated. Mean age of the patients was 43.07±13.88 years, with youngest patient as 18 years old and eldest as 65 years. Our study depicted 19% cases of MS were smokers. 8% of the patients had positive history for viral infections. 8 % of the patient had low level of serum vitamin D and 30% of the patients had positive family history. Current study shows viral infections, smoking, and hypovitaminosis D as frequently associated with MS.

**Keywords:** Multiple sclerosis (MS), hypovitaminosis D, Epstein-Barr virus, Smoking**To cite this article:** ZAIDI, N.R., AHMAD, M.W., GAUTAM, M. AND MEHBOOB, R., 2016. Risk factors for multiple sclerosis in Pakistani population- A cross-sectional study. *Punjab Univ. J. Zool.*, **31**(2): 177-180.**INTRODUCTION**

**M**ultiple sclerosis (MS) or disseminated sclerosis, or encephalomyelitis (Compston and Coles 2008), is one of the commonest factor causing neurological deficit in young people affecting around 0.4 million individuals in the United States only and more than 2.5 million across the world (Tullman 2013). It is considered to be a cell mediated autoimmune inflammation leading to demyelination of the brain and spinal cord which is triggered by an unknown factor. Some environmental factors may be the western life style which seems to be somehow associated with such demyelinating diseases. Such factors may be dietary habits and "Western diet" or "Fast food" such as burgers, French fries and processed meat which is getting very popular among younger generation and it contains high saturated fat and salt content (Jorg *et al.* 2016). In Asia, Iran is the most prevalent country in terms of MS (Nasr *et al.*, 2016).

Its prevalence is much more in people who live away from the equator (Runia *et al.*, 2012). Genetic factors have been linked to

this variation in incidence of MS but the risk of MS changes with migration of common ancestor from area of high to low risk suggesting a role for environmental factors (Ascherio and Munger, 2007) such as smoking, ultraviolet radiation, hypovitaminosis-D and viral infections like Epstein-Barr (Ascherio and Munger, 2007; Milo and Kahana, 2010).

Socioeconomic structure of the society and the healthcare facilities available may also alter the prevalence of MS (Jorg, *et al.*, 2016). Many studies have shown an increased risk of MS among the smokers (Hawkes, 2007). It is thought that exposure to sunlight, ultraviolet radiation and the intake of vitamin D lowers the MS incidence (Mowry *et al.*, 2010; Ramagopalan *et al.*, 2011). However, the association between vitamin D and MS is still not understood. Furthermore, exposure to EBV in childhood lowers the incidence of MS whereas the infection in adulthood elevates the risk (Serafini *et al.*, 2007).

Several bacterial infections like chlamydia, pseudomonas, and mycobacteria are supposed to elevate the risk of MS but strong data are not available to support this fact (Milo and Kahana, 2010). Therefore, the purpose of

this study is to highlight the possible risk factors that are associated with MS in Pakistani population. Some of the risk factors, as reported

in literature, are summarized in flow chart below (Fig. 1).

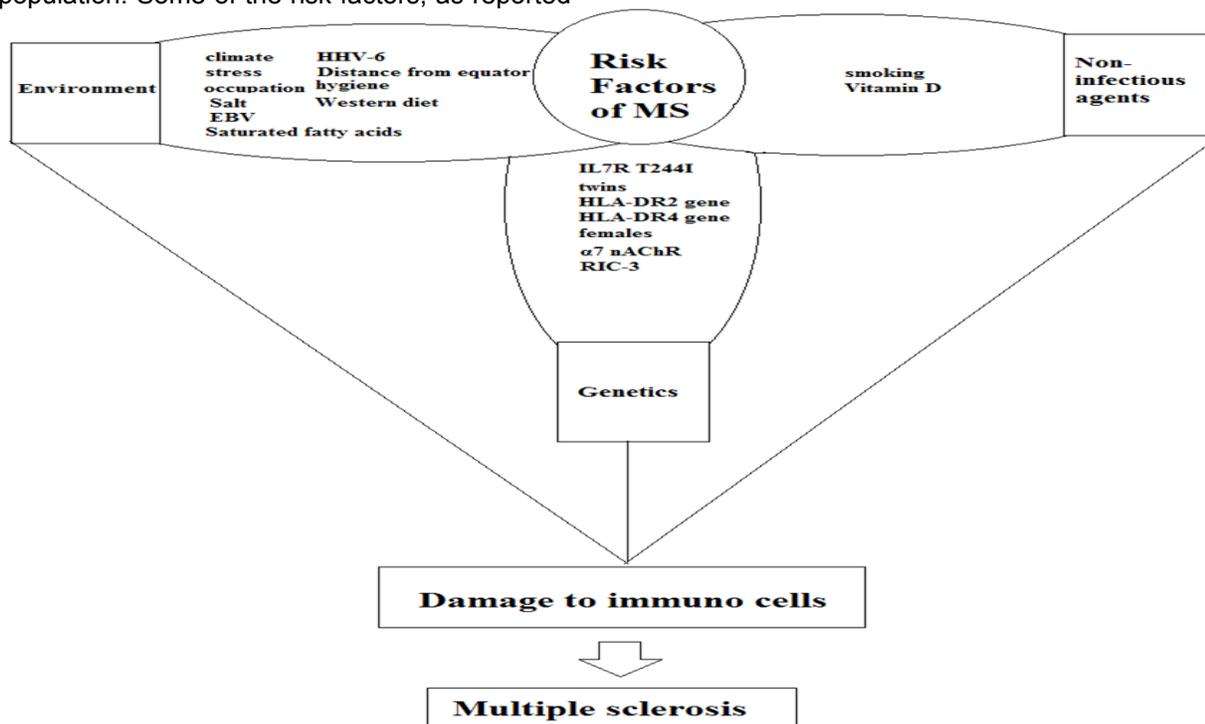


Figure 1: Summary of risk factors of MS reported from literature

**MATERIALS AND METHODS**

This study was conducted in Department of Radiology, Mayo Hospital Lahore from 2013 to 2014. The first hundred patients of both gender, aged 18 - 65 years who came for reporting MRI of the brain and had positive findings of MS were retrospectively evaluated for the risk factor for multiple sclerosis. Imaging was performed on MR system acquiring T1W, T2W, Proton density, FLAIR and T1W post gadolinium sequences. The study plan was approved from ethical committee of King Edward Medical University. Their detailed clinical history was taken and recorded in a preformed proforma. All the data were coded and analyzed using SPSS version 21.

**RESULTS**

Mean age of patients was 43.07 ± 13.88 years (Fig. 2). 57 % were females and 43 % were males. 8 % of the patients had low level of serum vitamin D (Fig. 3). Vitamin D deficiency was mainly reported in females. The reason may be less sunlight exposure in females because of

social and cultural norms in our region. The 30 % of the patients had positive family history. Environmental factors e.g. viral infections such as Epstein Barr Virus (EBV) were associated with MS. There were 8% patients with positive history for viral infection (Fig. 4). 19% cases of MS were smokers (Fig. 5). Increased smoking trends in females have resulted in an increase in prevalence of MS among females worldwide but in our study MS was predominant in males and smoking too.

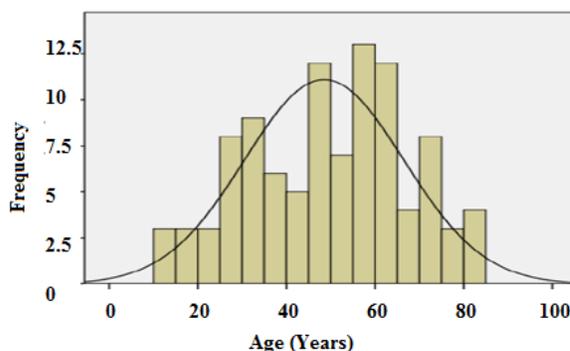
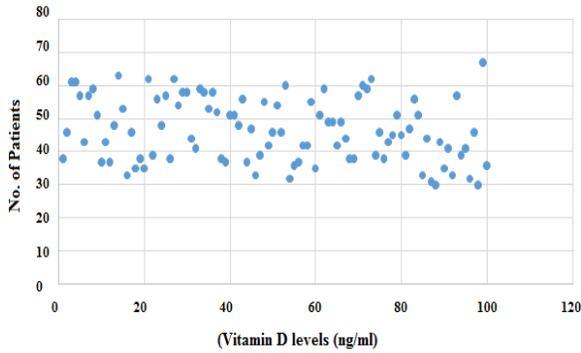
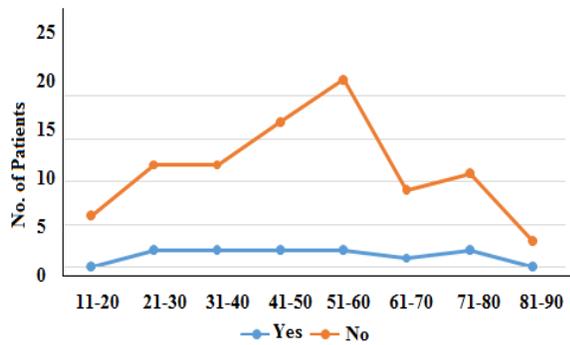


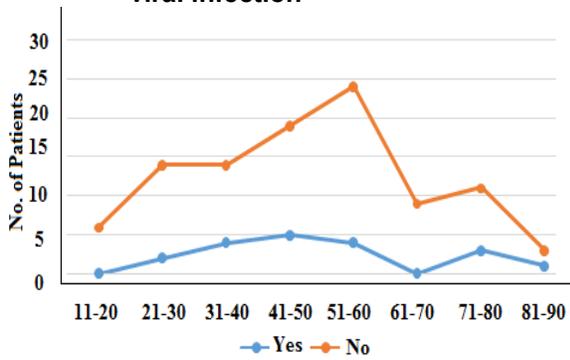
Figure 2: Histogram showing age of patients with MS patients



**Figure 3: Histogram showing vitamin D levels in MS patients**



**Figure 4: Frequency of MS patients with viral infection**



**Figure 5: Frequency of MS patients with smoking history**

**DISCUSSION**

The actual cause of MS is still not clear, however many genetic and environmental factors are thought to play role in it’s etiology depending on the region. In some studies, it has been reported that monozygotic twins may have chances of up to 30% of being affected with MS (Mumford *et al.*, 1994). Migration alters the risk of MS (Ebers *et al.*, 1986) and distance from equator also affects its prevalence (Kurtzke,

1980). Multiple Sclerosis is relatively more common in females as compared to males 3.2:1 in developed countries (Orton *et al.*, 2006), while it is 1.3:1 in Pakistani population which is comparatively less. It shows slightly more involvement of males as with respect to other countries. The mean age of onset of MS in other countries is about 30 years, and maximum chances of onset is 23-24 years. Approximately, 70% of the patients get affected between the ages of 20 to 40 years (Orton *et al.*, 2006). The data about average age in Pakistani population, found in our study was more than 30 years as compared to lower average age (>30 years) in Western countries. Several environmental factors affect the prevalence of MS. Vitamin D levels affect female preponderance regarding the MS. Some studies conducted in Norway suggested an increase in MS incidence in fish farming regions, apart from the fact that fish oil is rich in vitamin D which relatively compensates the deficiency of UV or vitamin D supplements (Kampman and Brustad, 2008). Maghzieh *et al.* (2010) suggested that the ratio in females increased because of environmental factors including vitamin D insufficiency (Maghzieh *et al.*, 2010). Viral infections have also been associated with MS. Several infections have been suggested to have a link with MS such as previous history of EBV infection, causing Infectious Mononucleosis (IM). Increased smoking trends in females have resulted in an increase in prevalence of MS among females. Previous studies have shown that smoking is linked with increased incidence of secondary progressive disease (D’Hooghe *et al.*, 2012).

Awareness regarding exercise, sun exposure and healthy life style should be promoted as a prevention measure for MS. Due to scarcity of already available data regarding MS in Pakistan, there is much needed to improve human health awareness among the masses for identifying all the possible risk factors and early diagnosis and detection with the help of latest techniques like MRI.

**Conclusion**

The etiology of MS is a complicated interplay between environmental and genetic factors. Although, the causative agents of MS are unclear, this study shows that viral infections, smoking, and hypovitaminosis D are frequently associated with MS.

**Conflict of Interest**

Authors declare no conflict of interest.

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