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Examination of the Effective Factors on the Multiple Sclerosis Diseases

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Abstract

This study was an attempt to examine the effective factors of the Multiple Sclerosis diseases. The participants of the study were selected from among a total number of 45 men and women who were treated in a health center in Azarbayegan and Damavand in Iran. In order to study, the researchers applied various procedures to collect the data of the study. The participants were interviewed and filled out the questionnaires. After categorizing and classifying the collected information and data, it was processed and analyzed and the results are found. To test the research questions, a one-sample T-test was used to analyze the data. The role of hypo vitamin D as a possible risk factor for multiple sclerosis was reviewed. First, it was emphasized that hypo vitamin could be only one of the risk factors for multiple sclerosis and that numerous other environmental and genetic risk factors appear to interact and combine to trigger the disease. The main aim of this study was to examine the effective factors of Multiple Sclerosis diseases. The methodology of this research was to test the research questions; one-sample T-test was used to analyze the data. The findings of this study revealed that the factors of gender, cold weather, vitamin D deficiency, and age (between 30 - 59) were effective on the Multiple Sclerosis diseases.

Keywords

Multiple Sclerosis Disease, Effective Factors

1. Introduction

The increasing incidence of multiple sclerosis (MS) worldwide, especially in women, points to the crucial role of environmental and lifestyle risk factors in determining the disease occurrence. An international multicenter case-control study of Environmental Risk Factors in Multiple Sclerosis (EnvIMS) has been launched in Norway, Sweden, Italy, Serbia and Canada, aimed to examine MS environmental risk factors in a large study population and disclose reciprocal interactions. So, the researchers of this study decided to examine different factors of this disease among Iranian men and women (in Damavand and Azarbayegan).

Multiple sclerosis (MS) is a long-lasting (chronic) disease of the central nervous system. It is thought to be an autoimmune disorder, a condition in which the body attacks itself by mistake. MS is an unpredictable disease that affects people differently. Some people with MS may have only mild symptoms. Others may lose their ability to see clearly, write, speak, or walk when communication between the brain and other parts of the body becomes disrupted. Multiple sclerosis (MS) is an autoimmune disease in which the insulating covers of nerve cells in the brain and spinal cord are damaged [1]. This damage disrupts the ability of parts of the nervous system to transmit signals, resulting in a range of signs and symptoms, including physical, mental, and sometimes psychiatric problems [1] [2] [3]. Specific symptoms can include double vision, vision loss, eye pain, muscle weakness, and loss of sensation or coordination [1] [4] [5]. MS takes several forms, with new symptoms either occurring in isolated attacks (relapsing forms) or building up over time (progressive forms) [5] [6]. In the relapsing forms of MS, between attacks, symptoms may disappear completely, although some permanent neurological problems often remain, especially as the disease advances. [6]. In the progressive forms of MS, bodily function slowly deteriorates and disability worsens once symptoms manifest and will steadily continue to do so if the disease is left untreated [7].

As MS lesions can affect any part of the central nervous system, a person with MS can have almost any neurological symptom or sign referable to the central nervous system. Multiple sclerosis is an autoimmune disease with a combination of genetic and environmental causes underlying it. Both T-cells and B-cells are involved, although T-cells are often considered to be the driving force of the disease. The causes of the disease are not fully understood. The Epstein-Barr virus (EBV) nuclear antigens are known to be causative antigens for multiple sclerosis, but not all people with MS have signs of EBV infection [8]. Dozens Of human peptides have been identified in different cases of the disease, and while some have plausible links to infectious organisms or known environmental factors, others do not [9].

Although genetic susceptibility explains the clustering of multiple sclerosis (MS) cases within families and the abrupt Decline in risk with increasing genetic distance, it cannot explain the geographic differences in MS frequency and the changes in risk that occur with migration. Epidemiological data provide some support for the “hygiene hypothesis,” but with the additional proviso for a key role of Epstein-Barr virus (EBV) in determining MS risk. The researchers show that whereas EBV stands out as the only infectious agent that can explain many of the key features of MS epidemiology, by itself the link between EBV and MS cannot explain the decline in risk among migrants from high to low MS prevalence areas. This decline implies that either EBV strains in low-risk areas have fewer propensities to cause MS, or that other infectious or noninfectious factors modify the host response to EBV or otherwise contribute to determining MS risk. Factors are discussed here; in a companion article, we will examine the possible role of noninfectious factors and provide evidence that high levels of vitamin D may have a protective role, particularly during adolescence. The primary purpose of these reviews is to identify clues to the causes of MS and to evaluate the possibility of primary prevention [10].

The increasing incidence of multiple sclerosis (MS) worldwide, especially in women, points to the crucial role of environmental and lifestyle risk factors in determining the disease occurrence. An international multicenter case—control study of Environmental Risk Factors in Multiple Sclerosis (EnvIMS) has been launched in Norway, Sweden, Italy, Serbia and Canada, aimed to examine MS environmental risk factors in a large study population and disclose reciprocal interactions. To ensure equivalent methodology in detecting age-related past exposures in individuals with and without MS across the study sites, a new questionnaire (EnvIMS-Q) is presented. Materials and methods-EnvIMS-Q builds on previously developed guidelines for epidemiological studies in MS and is a 6-page self-administered postal questionnaire. Participants are de-identified through the use of a numerical code. Its content is identical for cases and controls including "core" and population-specific questions as proxies for vitamin D exposure (sun exposure, dietary habits and supplementation), childhood infections (including infectious mononucleosis) and cigarette smoking. Information on possible confounders or effect modifiers is also obtained. EnvIMS-Q was initially drafted in English and subsequently translated into Italian, Serbian, Norwegian, Swedish and French-Canadian. EnvIMSQ has been tested for acceptability, feasibility and reliability. Results and Conclusions-EnvIMS-Q has shown cross-cultural feasibility, acceptability and reliability in both patients with MS and healthy subjects from all sites. EnvIMS-Q is an efficient tool to ensure proper assessment of age-specific exposure to environmental factors in large multinational population-based case-control studies of MS risk factors [1].

The role of hypovitaminsis D as a possible risk factor for multiple sclerosis is reviewed. First, it is emphasized that hypovitaminsis D could be only one of the risk factors for multiple sclerosis and that numerous other environmental and genetic risk factors appear to interact and combine to trigger the disease. Secondly, the classical physiological notions about vitamin D have recently been challenged and the main new findings are summarized. This vitamin could have an important immunological role involving a number of organs and pathologies, including autoimmune diseases and multiple sclerosis. Furthermore, human requirements for this vitamin are much higher than previously thought, and in medium- or high-latitude countries, they might not be met in the majority of the general population due to a lack of sunshine and an increasingly urbanized lifestyle. Thus, the different types of studies that have helped to implicate hypovitaminsis D as a risk factor for multiple sclerosis are reviewed. In experimental autoimmune encephalomyelitis, vitamin D has been shown to play a significant immunological role. Diverse epidemiological studies suggest that a direct chain of causality exists in the general population between latitude, exposure to the sun, vitamin D status and the risk of multiple sclerosis. New epidemiological analyses from France support the existence of this chain of links. Recently reported immunological findings in patients with multiple sclerosis have consistently shown that vitamin D significantly influences regulatory T lymphocyte cells, whose role is well-known in the pathogenesis of the disease. Lastly, in a number of studies on serum levels of vitamin D in multiple sclerosis, an Insufficiency was observed in the great majority of patients, including at the earliest stages of the disease. The questionable specificity and significance of such results are detailed here. Based on a final global analysis of the cumulative significance of these different types of findings, it would appear likely that hypovitaminsis D is one of the risk factors for multiple sclerosis [11].

The authors determined the relationship between tobacco smoking and the risk of developing multiple sclerosis (MS) in a general population of 22,312 individuals living in Hordaland, Norway in 1997. A total of 87 individuals reported having developed MS. The risk of MS was higher among smokers than among never-smokers (rate ratio 1.81, 95% CI 1.1 to 2.9; p 0.014). Studies on how smoking interacts with disease onset may contribute to determining the causal agents of this disease [12].

Although multiple sclerosis (MS) is recognized as a disorder involving the immune system, the interplay of environmental factors and individual genetic susceptibility seems to influence MS onset and clinical expression, as well as therapeutic responsiveness. Multiple human epidemiological and animal model studies have evaluated the effect of different environmental factors, such as viral infections, vitamin intake, sun exposure, or still dietary and life habits on MS prevalence. Previous Epstein-Barr virus infection, especially if this infection occurs in late childhood, and lack of vitamin D (VitD) currently appear to be the most robust environmental factors for the risk of MS, at least from an epidemiological standpoint. Ultraviolet radiation (UVR) activates VitD production but there are also some elements supporting the fact that insufficient UVR exposure during childhood may represent a VitD-independent risk factor of MS development, as well as negative effect on the clinical and radiological course of MS. Recently, there has been a growing interest in the gut-brain axis, a bidirectional neuro-hormonal communication system between the intestinal microbiota and the central nervous system (CNS). Indeed, components of the intestinal microbiota may be pro-inflammatory, promote the migration of immune cells into the CNS, and thus be a key parameter for the development of autoimmune disorders such as MS. Interestingly most environmental factors seem to play an important role during childhood. Thus, if childhood is the most fragile period to develop MS later in life, preventive measures should be applied early in life. For example, adopting a diet enriched in VitD, playing outdoor activities and avoiding passive smoking would be extremely simple measures of primary prevention for public health strategies. However, these hypotheses need to be confirmed by prospective evaluations, which are clearly difficult to conduct. In addition, it remains to be determined whether and how VitD supplementation in adult life would be useful in alleviating the course of MS, once this disease has already started. A better knowledge of the influence of various environmental stimuli on MS risk and course would certainly allow the development of add-on therapies or measures in parallel to the immunotherapies currently used in MS [13].

This Review summarizes the natural history studies on multiple sclerosis (MS) that have evaluated prognostic factors. Reassessment of prognostic factors is warranted, as our ability to offer patients a reliable prognosis is limited, yet we rely on this knowledge to appropriately design clinical trials and interpret their results. The selection criteria for studies to review included a geographical referral base, duration of at least 9 years, prospective design, and populations of at least 100 patients with MS. For all forms of MS combined, negative prognostic factors included progressive disease, and disability at 2 and 5 years. In relapsing remitting MS (RRMS) and secondary progressive MS (SPMS) combined, negative prognostic factors were the onset of progression, a higher relapse rate, greater disability in the first 5 years, a shorter interval to the second relapse, and the involvement of more systems. Additional negative factors include a shorter time to progression in SPMS and a faster rate of disability in the first 2 and 5 years in primary progressive MS (PPMS). The onset of progression, relapse rate and disability in the initial 5 years could be fruitful therapeutic targets; however, longer-term clinical trials will be required to justify these factors [14].

2. Methodology

The present study sets out to investigate the examination of effective factors on Multiple Sclerosis diseases. The participants of the study were selected from among a total number of 45 men and women that were treated in a health center in Azarbayegan and Damavand in Iran. In order to study, the researchers applied various procedures to collect the data of the study. The participants were interviewed and filled the questionnaire. The questionnaire was designed by some doctors and professors to work on this project and field for several years. The questions of the questionnaire were divided into nine parts in order to be answered by ill persons. The questions are as follows: 1) Lack of vitamin D, 2) living in cold weather, 3) Age, 4) Gender, 5) Diabetes, 6) Hyper activity of Thyroid, 7) Genetic, 8) addicted to hookah and smoking, 9) Lifestyle. After categorizing and classifying the collected information and data, it is processed and analyzed and the results are found. To test the research questions, one-sample T-test was used to analyze the data.

3. Data Analysis

In this dimension, after categorizing and classifying the collected information and data, it is processed and analyzed and the results are found.

To test the research questions, one-sample T-test was used to analyze the data.

Gender composition of the studied population

According to Table 1 and Figure 1, as can be seen, gender was divided into two groups' men and women. The coefficient of T is -5/14 and the standard deviation is 0/38.

According to Table 2 and Figure 2, as can be seen, the age distribution of people is between 15 to 55 years old. The disease is prevalent among 35 - 44.

1) Did you gain more than 30 kg in weight while suffering from MS?

Hypothesis 1: Patients weighed more than 30 kg when they were diagnosed with MS.

$$H_0 : \rho \neq 0$$

Opposite hypothesis: the patients did not weigh more than 30 kg when they were diagnosed with MS.

$$H_0 : \rho = 0$$

Table 1. Number and gender.

Gender composition	Number
Male	9
Female	37

	Number	Standard deviation error (Std. Error Mean)	Average	Coefficient of T	Sig
Population distribution studied	46	0.38	1/19	−5/14	0.00

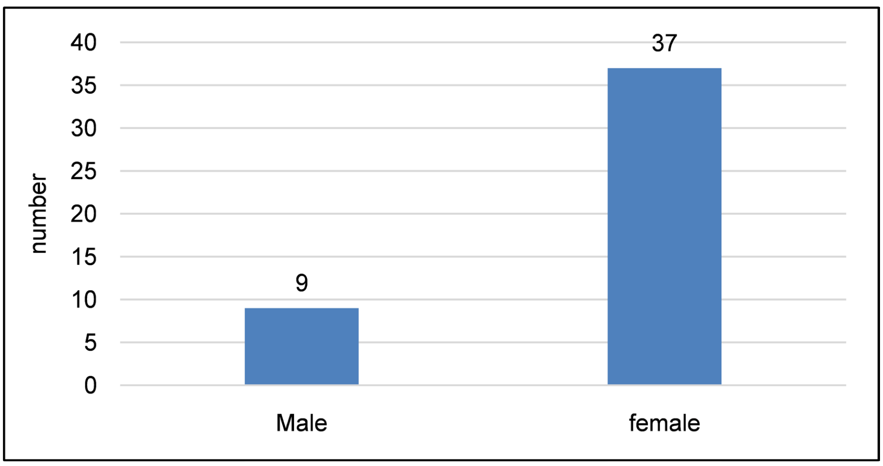

Figure 1. Number and gender.

Table 2. Age: distribution of people (years).

Number	Age distribution of people (years)
24 - 15	2
34 - 25	6
44 - 35	22
54 - 45	13
64 - 55	3

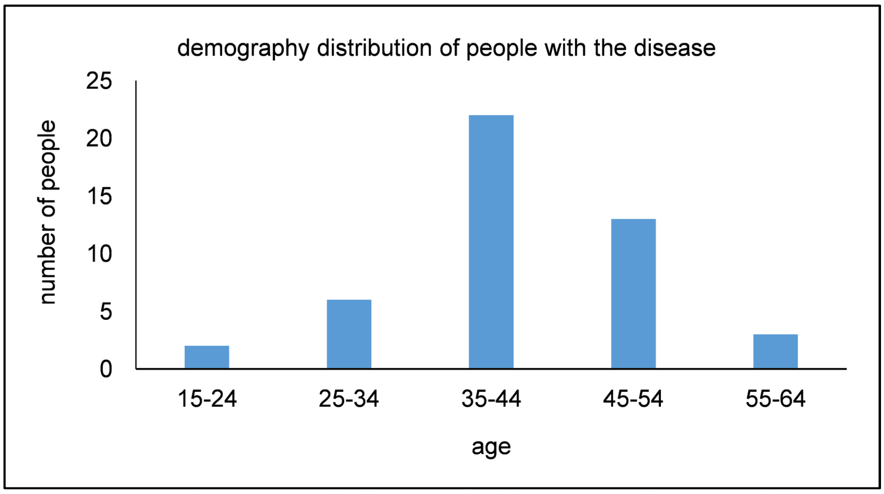

Figure 2. Age distribution of people (years).

According to **Table 3** and **Figure 3**, as can be seen, the calculated test value is significant. That is, the value of sig is smaller than 0.05. Therefore, the opposite hypothesis is accepted and the statistical assumption is accepted with 95% certainty, and the result can be generalized to the society, that is, the patients did not weigh more than 30 kg when they were diagnosed with MS.

2) Are you deficient in vitamin D? (One of the causes of vitamin D deficiency is not being exposed to sunlight.)

Hypothesis 1: Sufferers did not have vitamin D deficiency when suffering from MS.

$$H_0 : \rho \neq 0$$

Opposite hypothesis: sufferers had vitamin D deficiency when they were diagnosed with MS.

$$H_0 : \rho = 0$$

According to **Table 4** and **Figure 4**, as can be seen, the calculated test value is significant. That is, the value of sig is less than 0.05, therefore, the opposite hypothesis is accepted and the statistical assumption is accepted with 95% confidence, and the result can be generalized to the society, that is, the sufferers had vitamin D deficiency when suffering from MS.

Table 3. Having more than 30 kg of excess weight test value.

Variable name	Number	Mean standard deviation error (Std. Error Mean)	Average	T coefficient	Sig
Having more than 30 kg of excess weight	46	0.07	1.95	2.85	0.007

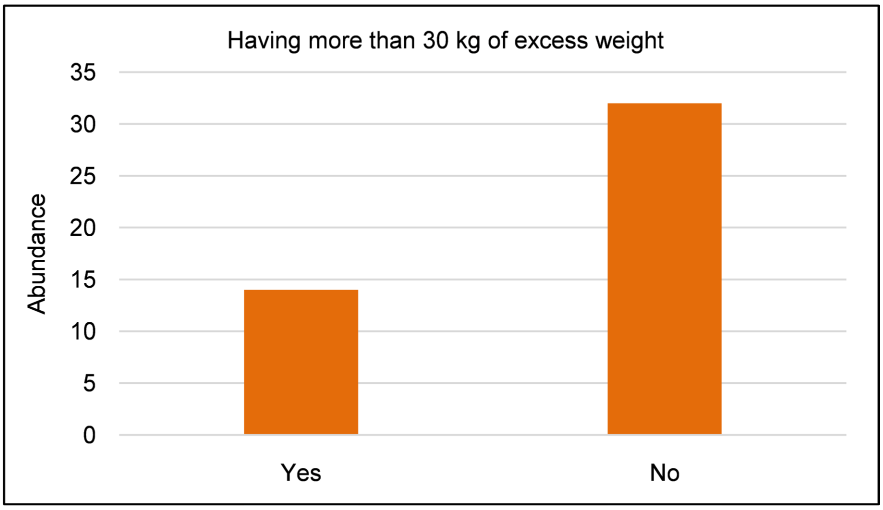

Figure 3. Having more than 30 kg of excess weight test value.

Table 4. Vitamin D deficiency test value.

Variable name	Number	Mean standard deviation error (Std. Error Mean)	Average	T coefficient	Sig
Vitamin D deficiency	46	0.38	1.17	−5.77	0.00

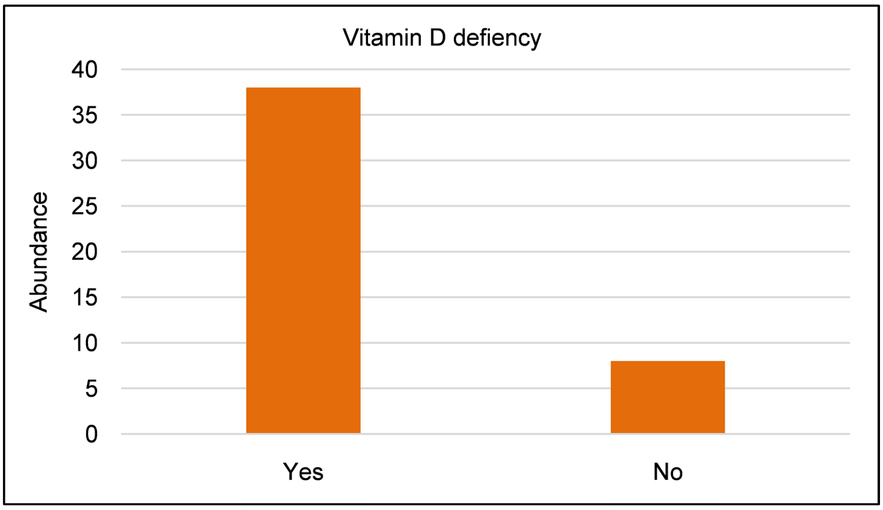

Figure 4. Vitamin D deficiency test value.

3) Do you live in a cold and mountainous area?

Hypothesis 1: Sufferers do not live in cold and mountainous areas when they get MS.

$$H_0 : \rho \neq 0$$

Opposite hypothesis: sufferers live in cold and mountainous regions when they get MS.

$$H_0 : \rho = 0$$

According to Table 5 and Figure 5, as can be seen, the calculated test value is significant. That is, the value of sig is smaller than 0.05. Therefore, the opposite hypothesis is accepted and the statistical assumption is accepted with 95% certainty, and the result can be generalized to the society, that is, the sufferers live in cold and mountainous areas when suffering from MS.

4) Did you have diabetes when you had MS?

Hypothesis 1: Patients were suffering from diabetes when they were diagnosed with MS.

$$H_0 : \rho \neq 0$$

Opposite hypothesis: the patients did not have diabetes when they were diagnosed with MS.

$$H_0 : \rho = 0$$

According to Table 6 and Figure 6, as can be seen, the calculated test value is significant. That is, the value of sig is less than 0.05, so the opposite hypothesis is accepted and the statistical assumption is accepted with 95% confidence, and the result can be generalized to the society, that is, the patients were not suffering from diabetes when they were diagnosed with MS.

5) Did you have an overactive thyroid or an underactive thyroid when you had MS?

Hypothesis 1: Patients had an overactive thyroid or an underactive thyroid when they were diagnosed with MS.

$$H_0 : \rho \neq 0$$

Opposite hypothesis: sufferers did not have an overactive thyroid or an underactive thyroid when they were diagnosed with MS.

$$H_0 : \rho = 0$$

According to Table 7 and Figure 7, as can be seen, the calculated test value is significant. That is, the value of sig is less than 0.05, therefore, the opposite hypothesis is accepted and the statistical assumption is accepted with 95% confidence, and the result can be generalized to the society, that is, the patients did not have an overactive thyroid or an underactive thyroid when they were diagnosed with MS.

6) Does anyone around you (parents, sisters, brothers, aunts, uncles, etc.) suffer from MS?

Table 5. Living in cold and mountainous region test value.

Variable name	Number	Mean standard deviation error (Std. Error Mean)	Average	T coefficient	Sig
Living in a cold and mountainous region	46	0.059	1.19	−5.14	0.00

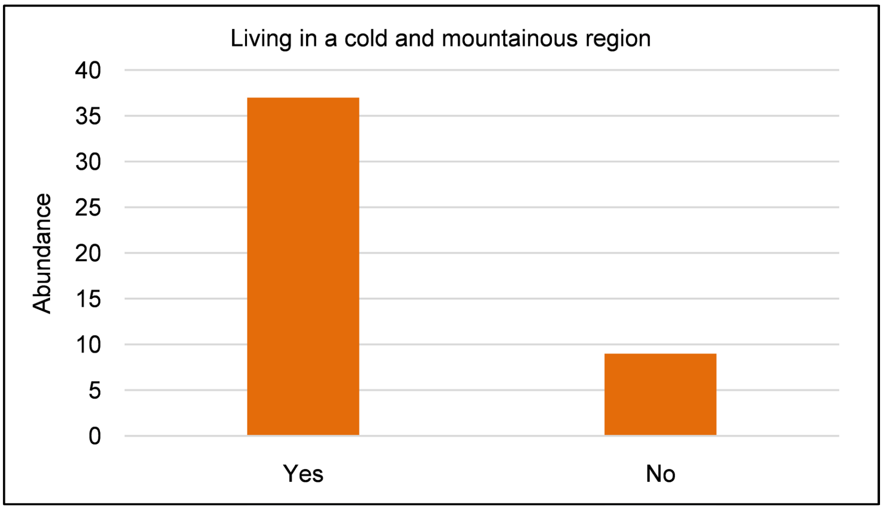

Figure 5. Living in cold and mountainous region test value.

Table 6. Come down with diabetes test value.

Variable name	Number	Mean standard deviation error (Std. Error Mean)	Average	T coefficient	Sig
Come down with diabetes	46	0.042	1.91	9.83	0.00

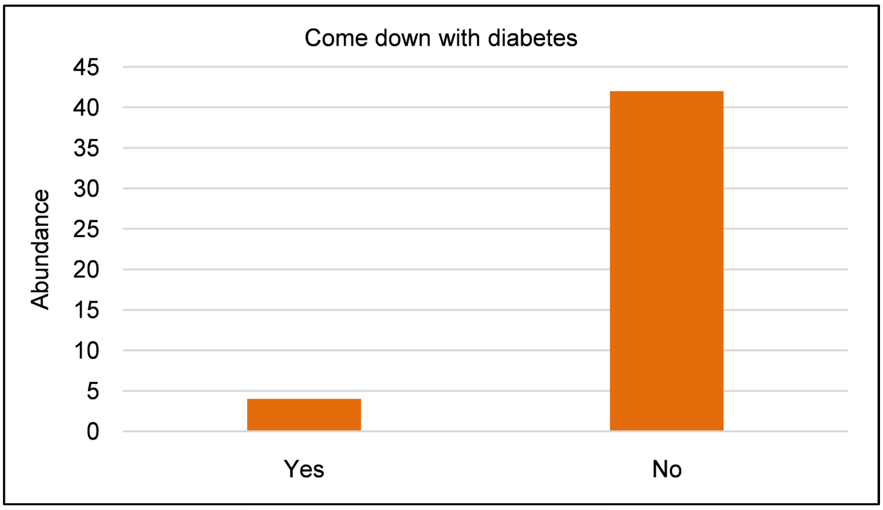

Figure 6. Come down with diabetes test value.

Table 7. Come down with overactive and underactive thyroid test value.

Variable name	Number	Mean standard deviation error (Std. Error Mean)	Average	T coefficient	Sig
Come down with overactive and underactive thyroid	46	0.06	1.76	4.10	0.00

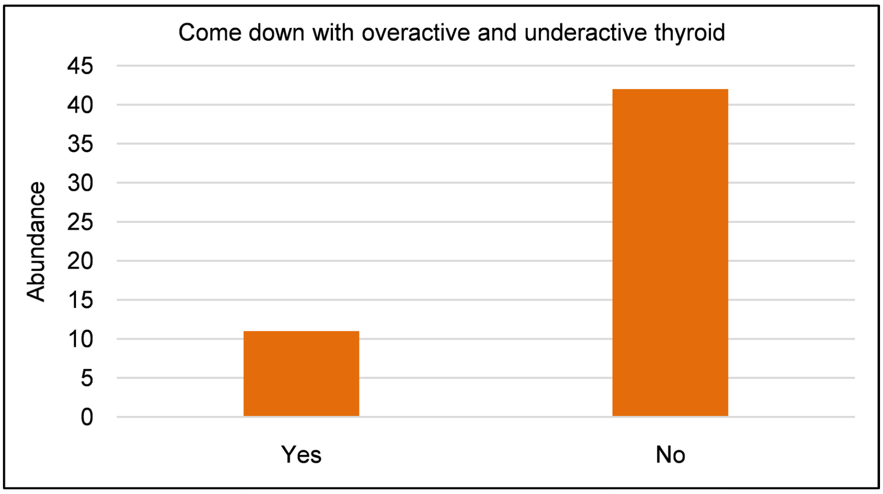

Figure 7. Come down with overactive and underactive thyroid test value.

Hypothesis 1: Someone around the patients is suffering from MS.

$$H_0 : \rho \neq 0$$

Opposite hypothesis: no one in the patients' family is suffering from MS.

$$H_0 : \rho = 0$$

According to Table 8 and Figure 8, as can be seen, the calculated test value is significant. That is, the value of sig is less than 0.05, therefore, the opposite hypothesis is accepted and the statistical assumption is accepted with 95% confidence, and the result can be generalized to the society, that is, no one among the patients' relatives is suffering from MS.

7) Did you smoke or smoke hookah when you had MS or before?

Hypothesis 1: Patients used to smoke or hookah while suffering from MS.

$$H_0 : \rho \neq 0$$

Opposite hypothesis: Patients did not smoke or hookah when they were diagnosed with MS.

$$H_0 : \rho = 0$$

According to Table 9 and Figure 9, as can be seen, the calculated test value is significant. That is, the value of sig is less than 0.05, therefore, the opposite hypothesis is accepted and the statistical assumption is accepted with 95% confidence, and the result can be generalized to the society, that is, the patients did not smoke or hookah when they were diagnosed with MS.

Table 8. Come down with the disease of relative test value.

Variable name	Number	Mean standard deviation error (Std. Error Mean)	Average	T coefficient	Sig
Come down with the disease of relative	46	0.07	1.67	2.49	0.017

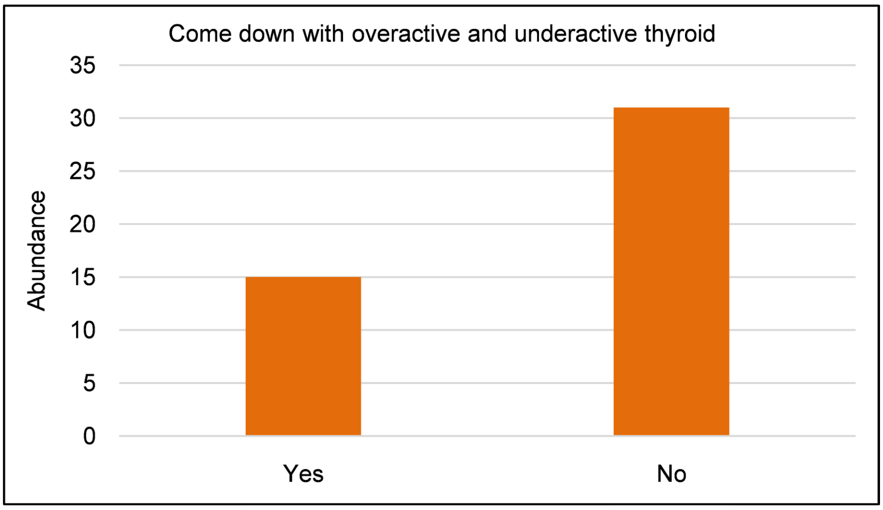

Figure 8. Come down with the disease of relative test value.

Table 9. Cigarette and hookah consumption test value.

Variable name	Number	Mean standard deviation error (Std. Error Mean)	Average	T coefficient	Sig
Cigarette and hookah consumption	46	0.050	1.89	8.43	0.00

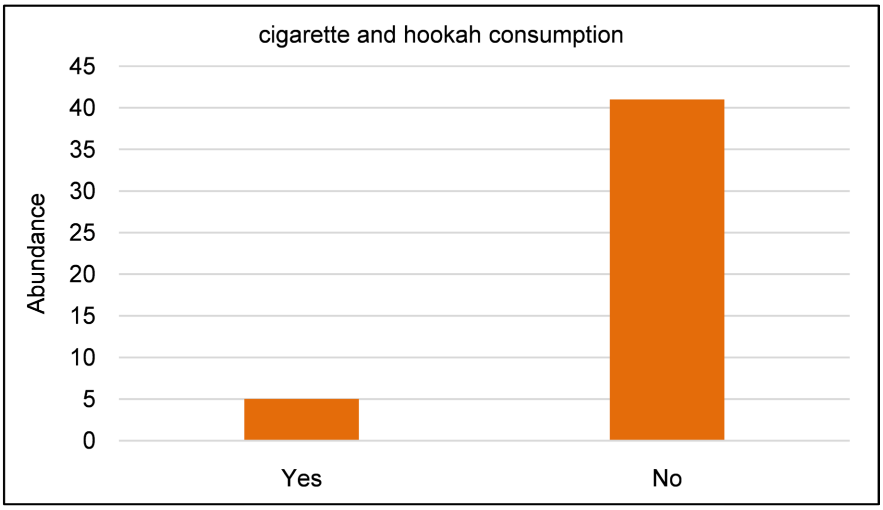

Figure 9. Cigarette and hookah consumption test value.

8) In your opinion, do you have a suitable lifestyle (weekly exercise, avoiding fast food, proper food, etc.)?

Opposite hypothesis: Patients had a suitable lifestyle when they were diagnosed with MS.

$$H_0 : \rho \neq 0$$

Opposite hypothesis: sufferers did not have a suitable lifestyle when they were diagnosed with MS

$$H_0 : \rho = 0$$

According to Table 10 and Figure 10, as can be seen, the calculated test value is significant. That is, the value of sig is greater than 0.05. It means that the lifestyle has no effect on the disease.

4. Discussion

The study was an attempt to examine the effect of different factors on the Multiple Sclerosis diseases. The findings of this study strongly and positively are the same as the previous studies that were mentioned. The previous studies indicate that can be pointed out theoretical and practical notes. Theoretical results can help to recognize the causes and continuing disruption. Moreover, practical results indicate the effect of factors on the Multiple Sclerosis disease. After categorizing and classifying the collected information and data, it is processed and

Table 10. Suitable lifestyle test value.

Variable name	Number	Mean standard deviation error (Std. Error Mean)	Average	T coefficient	Sig
Suitable lifestyle (weekly exercise, avoiding fast food, proper food, etc.)	46	0.07	1.56	21.181	0.382

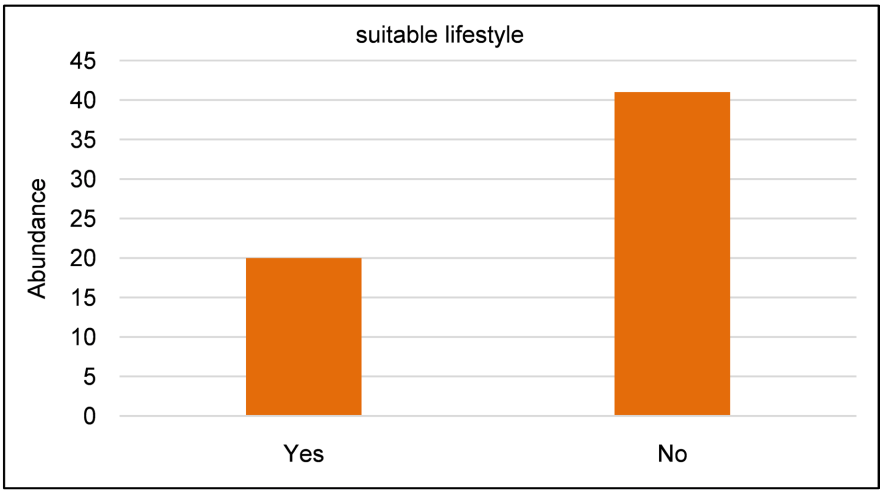

Figure 10. Suitable lifestyle test value.

analyzed and the results are found. Although multiple sclerosis (MS) is recognized as a disorder involving the immune system, the interplay of environmental factors and individual susceptibility seems to influence MS onset and clinical expression, as well as therapeutic responsiveness. Multiple human epidemiological and animal model studies have evaluated the effect of different environmental factors, such as vitamin intake, sun exposure, or gender and age on MS prevalence. According to the previous studies achieved especially lack of vitamin D (VitD) currently appears to be the most robust environmental factor for the risk of MS, at least from an epidemiological standpoint. Ultraviolet radiation (UVR) activates VitD production but there are also some elements supporting the fact that insufficient UVR exposure during childhood may represent a VitD-independent risk factor of MS development, as well as a negative effect on the clinical and radiological course of MS. Summing up the conclusions on Multiple Sclerosis, it should be pointed out that intensified interest to find out on the factors of this disease in order to prevent the illness and help the doctors to cure as soon as possible. In order to analyze the data, researchers chose one-sample T-test to test the research questions.

5. Conclusion

This study attempts to investigate the effect of different factors on Multiple Sclerosis diseases. The factors are age, gender, hookah or smoking, weather, vitamin D deficiency, lifestyle, diabetes, weight, and thyroid. To test the research questions, one-sample T-test was used to analyze the data. The findings of this study revealed that the factors of gender, cold weather, vitamin D deficiency, and age (between 30 - 59) are effective on the Multiple Sclerosis diseases. In general, it can be said that living in cold and mountainous areas and lack of vitamin D had a significant relationship with getting a disease, and smoking and hookah, one's weight, having diabetes, having thyroid disease, and having people around have an effect on MS. There is no chance of people coming down with this disease. The effect of lifestyle on the probability of contracting the disease is not known.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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