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Investigation of Multiple Sclerosis in Iraqi Patients: Evaluation of Circulating IL 17α

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Abstract
Multiple sclerosis (MS) is a chronic, inflammatory disorder of the CNS, characterized by demyelination and neurodegeneration of the brain, spinal cord, and optic nerve. It frequently results in cognitive and physical disability. Whereas the precise etiology of multiple sclerosis remains uncertain, it is believed to be an immune-mediated reaction to several environmental stimuli in a genetically vulnerable person.The current study aimed to detect the prevalence of MS in Wasit Governorate, as well as evaluate IL17α levels. A total of 137 cases of patients of both sexes were involved in this study, while only 50 participants subjected to assessment of the proinflammatory cytokine 17a that is expected to be linked to this disease.The results of this study revealed that the percentage of infected females exceeds the percentage of males, 72% versus to 27.7%, and that most of the patients were within the age group (25-34) as 62%, in addition to that sensory and motor symptoms were the most frequent signs. Furthermore IL-17α levels in patients were statistically significantly higher than in controls ($P \leq 0.0003$). It can be concluded that the female more affected with MS and exhibited various complications over time due to neuroinflammation and neurodegeneraion of nerve cells.

Keywords: Multiple sclerosis,Proinflammatory cytokine, IL-17α, Autoimmune disorder

Introduction

Multiple sclerosis (MS) is a chronic, inflammatory disorder of the CNS, characterized by demyelination and neurodegeneration of the brain, spinal cord, and optic nerve. It frequently results in cognitive and physical disability [1]. Whereas the precise etiology of multiple sclerosis remains uncertain, it is believed to be an immune-mediated reaction to several environmental stimuli in a genetically vulnerable person. There are two main categories of known risk factors for multiple sclerosis: genetic and environmental.

The immunemediated response leads to inflammatory damage of the neuronal myelin, or demyelination, causing the formation of plaques (often called lesions), which may result in an MS exacerbation called a relapse. Of importance, not all lesions result in a symptomatic relapse these lesions are often called subclinical MS activity. A patient with MS may have only one clinical relapse for every 10–20 subclinicalbrain lesions, whereas spinal cord lesions more often result in clinical relapses [2]. These asymptomatic changes can be identified with routine MRI.

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Over time, the accumulation of demyelination, together with the lack of remyelination, as well as ongoing immunologic changes often lead to axonal injury and loss, resulting in neurodegeneration and progression of symptoms and disability.

Multiple sclerosis affects about 2.8 million people worldwide, with around 10,000–20,000 new cases diagnosed each year[3]. In the United States alone, almost 1 million people are living with MS, with a higher prevalence in the northern part of the country [4]. Although the onset of MS can occur during childhood or late adulthood, the diagnosis is most often made in those 20-50 years of age, with a peak at around 30 years, and women are given the diagnosis about 3 times as often as men. These diagnostic trends are significant, because the age of diagnosis is commonly amid the productive, middle-aged years of life as well as during the childbearing years.

The Th17 cells are the main source of IL-17 cytokine family which includes six members from IL-17A to IL-17F. IL-17 cytokines are immediately released and contribute to epithelial homeostasis, inflammatory acute responses and B cell stimulation [5,6].Thus,they acting as a bridge between innate and acquired immune responses. IL-17α increased expression was found in the autopsy of brain patients with MS, and in active CNS lesions, abundant IL-17-expressing cells were found [7].

Materials and methods

The present study included 137 cases of multiple sclerosis patients of both sexes, who attended a neurological consultation at Al-Zahra Hospital in Wasit Governorate between 2017 and 2024. Patient information was obtained by creating a suitable questionnaire form through face-to-face meetings or from data recorded in the hospital's database. On the other hand, 50 patients underwent evaluation of the level of one of the inflammatory cytokines associated with the disease. Two and half ml of venous blood were collected from all controls and patients distributed as (30 patients were in RRMS course, 20 in SPMS and 5 in PPMS) by clean venipuncture using plastic disposable syringes then delivered in EDTA-containing tubes to evaluate interleukin in these cases.Data were analysed statistically using the GraphPad Prism Software at $p<0.05$ [8].

Results and discussion

Multiple sclerosis is an autoimmune condition that leads to various disabilities, the severity of which varies depending on the stage of the disease and the clinical form. Through the information obtained, it was found that the percentage of infected females exceeds the percentage of males, 72% compared to 27.7%.

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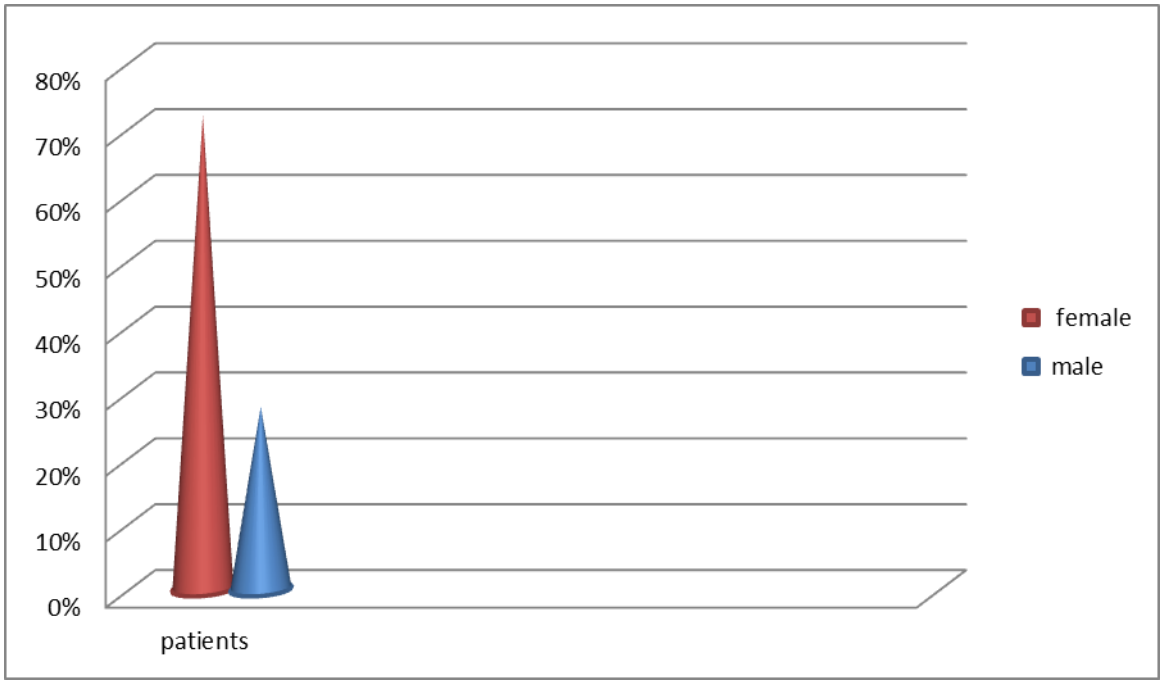
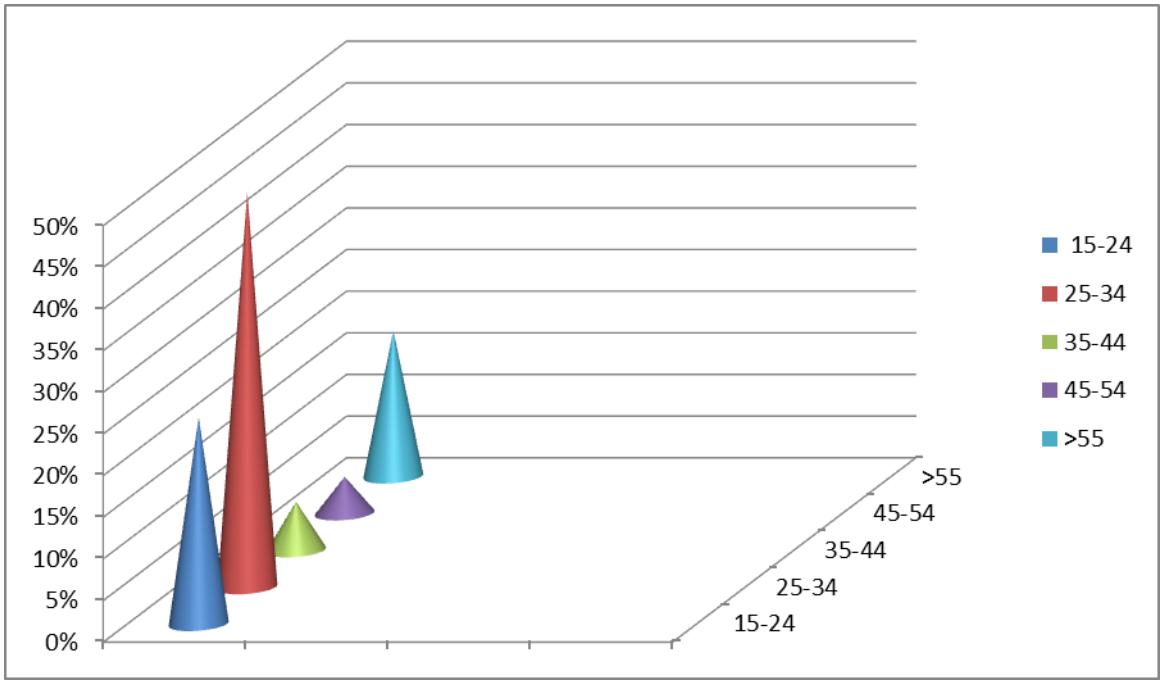


Figure(1): Shows the percentage of patients with multiple sclerosis

In line with the majority of international studies, as [9], it illustrated that females are affected twice as much as males and this related to the effect of consecutive births or may be use of contraceptives. However, this explanation was not scientifically supported and refuted later.Depending on the age ranges, patients were divided into five categories. The percentages represent the distribution of the patient as following 24%, 62%, 8%, 6%, and 24% respectively as displayed in figure(2).



Figure(2): Percentage of age-based distribution of patients

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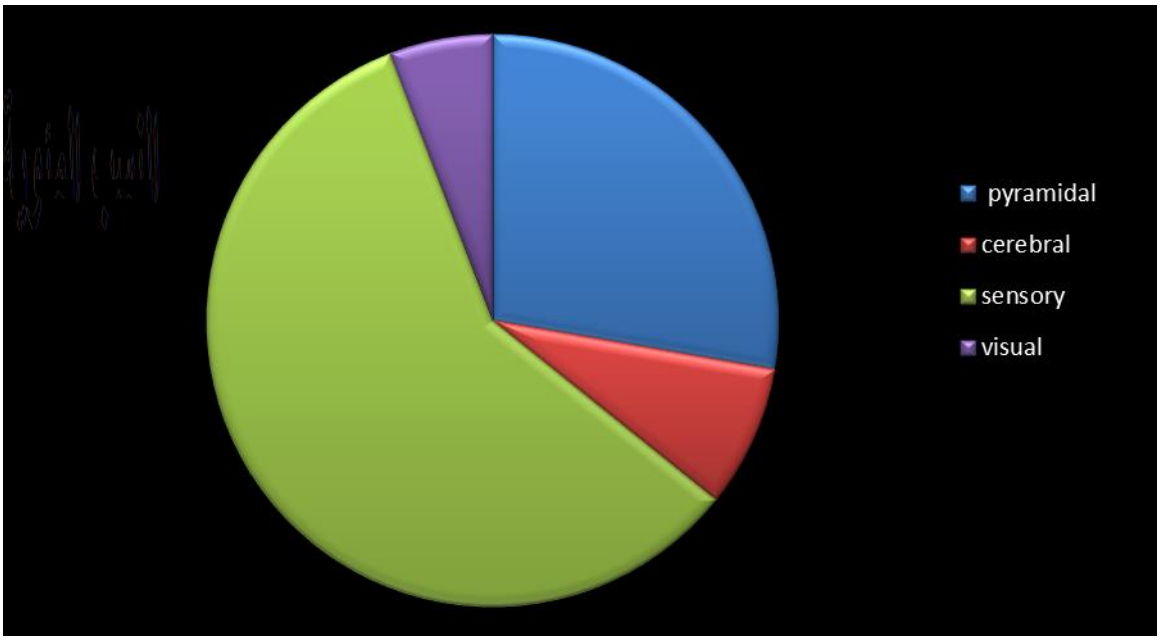
However, the most common symptoms recorded among the studied population were motor and sensory signs as 58.39%, pyramidal signs 27.73%, followed by cerebral symptoms such as personality change and mood changes with an appearance rate of 8%, and visual impairments 5.83% as detailed in figure(3)



Figure(3): Percentages of the most prominent disabilities among MS patients

Table(1): Disabilities recorded in MS patients

Disability(signs)	**No.(percentage)**
Sensory and motor	80(58.39%)
Pyramidal	38(27.73%)
Cerebral	11(8%)
Visual	8(5.83%)

Likewise, the weakness of one of the upper or lower extremities is the most common initial symptom of the disease, followed by balance disorder and then vision disorder as explained by [10].

On the other hand, the most frequent clinical forms, the “relapsing-remitting” type(RRMS) had the highest rate of 78%, followed by primary progressive MS (PPMS) with a rate of 16%, while the" secondary progressive "form (SPMS), It is the least frequent, appearing in8% ofthe studied population, as detailed in Table (2) and figure (4) below.

Table(2): The recorded MS courses in patients

Disease types	**No.(%)**
Relapsing-remitting MS (RRMS)	108(78%)
Secondary progressive MS (SPMS)	22(16%)
Primary progressive MS (PPMS)	7(8%)

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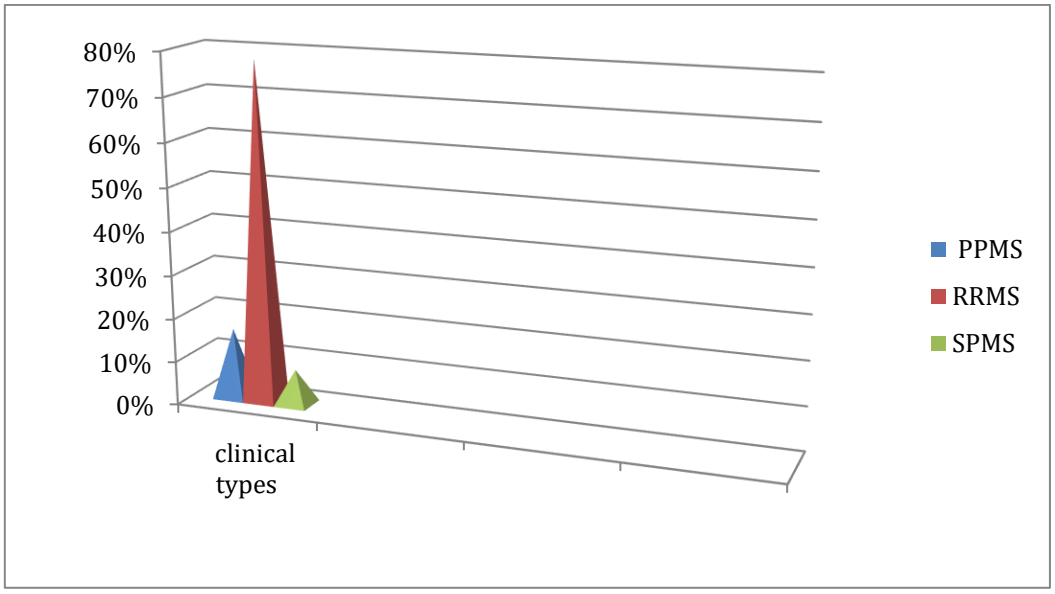

Figure(4): Percentage of clinical types of disease

Conversely,in East Azerbaijan Province in Iran recorded that Primary progressive MS (PPMS) was the most common, at a rate of 67% [11].

On the other hand, a number of inflammatory mediators are thought to contribute to disease progression, including IL 17. The findings of the study revealed the mean of IL-17α within different subtypes groups in patients' was ≥15 pg/ml (ranged 15.18-17.6 pg/ml) and ≥9 pg/ml in controls (ranged 9.01-9.86 pg/ml).

Interleukin 17α elevated in untreated patients from RRMS comparing with other subtypes and control healthy group.

However, the Independent T-tests showed that IL-17α mean levels in patients were statistically significantly higher than in controls(P ≤0.0003), as detailed in table(3). This is consistent with [12-14], where they indicated the role of these chemical messengers in disease development.

Table(3): Mean± SD differences of interleukin-17α in MS subtypes and healthy group

Patients subtypes		**control**	**Independent T- test**	
PPMS	15.18±1.36	9.69±0.66	12.258	0.000018
SPMS	15.68±1.94	9.41±1.43	9.644	0.000001
RRMS	17.60±0.97	9.01±2.55	5.399	0.0003

Conclusion

It can be concluded that the female more affected with MS and exhibited motor and sensory signs due to neuroinflammation. Levels ofIL17α elevatedinRRMS subtype.

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