Distribution of Clinical Forms of Multiple Sclerosis Patients in Suez Canal University Hospital in Ismailia

Mohamed Abdelfatah Elsamahy, Yasmin Reda ELShrbassy, Mohamed Nabil Hegazy, Samir Elshamly Ali

1. Assistant Professor of Neurology, Faculty of Medicine, Suez Canal University.
2. MBBCh,2017, Neuropsychiatry Resident, Suez Canal University
3. Lecture of Neurology, Faculty of Medicine, Suez Canal University

Abstract

Background: Multiple sclerosis (MS) is a chronic progressive potentially disabling disorder with considerable social impact and economic consequences despite its relatively limited prevalence. It is the major cause of non-traumatic disability in young adults. This study aimed to assess the prevalence of MS disease in SCU hospital in Ismailia.

Methods: This is a descriptive cross-sectional study. This work was carried out at neurological clinic and department, SCU hospital Ismailia and conducted among all patients, who have MS disease diagnosed according to McDonald criteria and attending SCU hospital.

Results: A total sample of 94 consecutive patients were included. The mean age of patients at the first symptom was 28.31 ± 7.74, ranging from 15.0 to 48.0, 32 males (34%) and 62 females (66%).The age of enrolled patients ranged from 15 to 56 years with a mean age of 32.16 ± 9.83, 71 cases were RRMS (75.5%),21 cases were SPMS and only 2 cases were PPMS (2.1%). Oligoclonal bands in the CSF were positive in 68.1%(64 patients),normal in only 2.1%(2 patients) and not done in (29.8%). MRI of the cervical spine was normal in 50% of patients and had MS lesions in 50% of patients. that there's a significant relation between EDSS with the duration of the disease as well as the number of attacks. the mean age of onset of MS in males was 27.22 ± 7.58 and in females was 28.87 ± 7.83. There was no significant relation between the gender of the patient with the age of onset as well as the clinical course.

Conclusions: In conclusion, the mean age of onset of MS was no significant relation between the gender of the patient with the age of onset as well as the clinical course.

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Introduction:

Multiple sclerosis (MS) is a chronic progressive potentially disabling disorder with considerable social impact and economic consequences despite its relatively limited prevalence. It is the major cause of non-traumatic disability in young adults [1].

There are now 2.8 million people worldwide who have multiple sclerosis (MS), according to the most extensive global study to date. That means every 5 minutes, someone, somewhere in the world is diagnosed with MS. Most people with MS are diagnosed between the ages of 20 and 50, and it affects women three times more than men [2].

Pathologically, MS is characterized by numerous, discrete lesions (called plaques) scattered throughout the CNS white matter. The essential feature of these lesions is loss of the myelin sheath with preservation of the axon. The presence of these lesions causes multiple, varied symptoms and signs of neurological dysfunction. One common initial symptom is optic neuritis (ON). Other sensory symptoms may include numbness, tingling in the hands or feet, cold or burning pain, and dizziness. Motor symptoms may include impaired coordination, imbalance, weakness, intention tremor, and spastic tone [3].

While there is no way to predict with any certainty an individual's disease course, four basic MS disease courses (also called types or phenotypes) have been defined by the International Advisory Committee on

Clinical Trials of MS in 2013: clinically isolated syndrome, relapsing remitting, secondary progressive and primary progressive [4].

Finally, Reporting the actual burden of MS by using these cross sectional and longitudinal databases aim to offer significant information that can promote a better understanding of the prognosis and risk-factors, as well as serve as an essential guide for both socioeconomic and clinical decision-making [5].

MS registries represent powerful tools to provide meaningful information on the burden, natural history, and long-term safety and effectiveness of treatments [6].

Aim of the Work

This study aimed to study the clinical characteristics of patients with multiple sclerosis (MS) attending Suez Canal university hospital in Ismailia.

Patients and methods

This descriptive cross-sectional was carried out at neurology department, SCU hospital Ismailia. All patients, who have MS disease diagnosed according to McDonald criteria 2017 and attending SCU hospital.

Inclusion Criteria:

1. Patients with MS attending the hospital on January to

September in 2021, whether for follow up or in a recent attack.

2. Both males and females

Exclusion Criteria:

1. Isolated forms of MS (CIS,RIS)

2. Patients with other medical or metabolic conditions that can mimic MS clinically or radiologically including:

- ADEM(Acute disseminated encephalomyelitis).
- Behcet's disease-other vasculitis.
- Neuromyelitis optica spectrum disorder.
- Post infectious.
- Other inflammatory diseases.

Sampling method: Methods used in Data collection:

Data was collected by using a specifically designed questionnaire form that was designated based on previous studies and experts' opinions.

The questionnaire included(Hillert and Stawiarz, 2015).

- Personal data of the patient (Name, Sex, Age …etc.)
- Questions to find out duration and first symptoms .
- Questions that find out type of MS.
- Questions about clinical and imaginary finding for diagnosis.
- Questions to know the type of treatment that was used and currently used treatment .

Study sample:

Comprehensive sample (all patients have MS) will be drawn.

Sample size:

$$n = \frac{Z^2 P (1-P)}{d^2}$$ (Dawson and Trapp, 2004)

n: sample size Z: statistic for level of confidence (for 95%

confidence level, z value is 1.96) P: prevalence (1.4%) (2) d: precision (0.025)(Charan, 2013).

According to the above formula, the sample size is 85 patients, 10% non-response rate will be added then the number of participants were 94.

Statistical analysis

All Data was processed and analysed using the Statistical Package of Social Sciences (SPSS version 22.0). Data entry and statistical analysis of the collected data was performed by the use of reliable genuine software programme. The collected data were computerized and

statistically analyzed using SPSS program (Statistical Package for Social Science) version 24. Data were tested for normal distribution using the Shapiro Walk test. Qualitative data were represented as frequencies and relative percentages. Chi square test ($\chi 2$) and Fisher exact was used to calculate difference between qualitative variables as indicated. Quantitative data were expressed as mean and standard deviation. All statistical comparisons were two tailed with significance Level of P-value< 0.05 indicates significant while, P≥ 0.05 indicates non-significant difference.

Table (1) The demographic, preoperative and surgical data of the 80 patients types 2 DM Table 1. Distribution of the studied cases according to demographic data (n= 94).

	No.	%
Age (years)		
18 – 20	14	14.9
21 – 30	35	37.2
31 – 40	26	27.7
41 – 50	16	17.0
>50	3	3.2
Min. – Max.	18.0 – 56.0	
Mean ± SD.	32.16 ± 9.83	
Gender		
Male	32	34.0
Female	62	66.0

Table 1 showed that the study included 94 patients with MS, 32 males (34%) and 62 females (66%).
MS is predominant in females than males

The age of enrolled patients ranged from 18 to 56 years with a mean age of 32.16 ± 9.83.

Table 2. Distribution of the studied cases according to age of onset and duration (n= 94)

	No.	%
Age of onset		
17 – 20	21	22.3
21 – 30	43	45.7
31 – 40	26	27.7
41 – 50	4	4.3
>50	0	0.0
Min. – Max.	15.0 – 48.0	
Mean ± SD.	28.31 ± 7.74	
uration Min. – Max.	1.0 – 20.0	
Mean ± SD.	4.13 ± 4.02	

Table 2 showed that the mean age of patients at the first symptom was 28.31 ± 7.74, ranging from 15.0 to 48.0. The mean disease duration was 4.13 ± 4.02 and fluctuated between 1 to 20 years.

Figure 1 showed that in total of 94 patients,71 cases were RRMS (75.5%),21 cases were SPMS and only 2 cases were PPMS (2.1%).

RR is the most common clinical course of MS

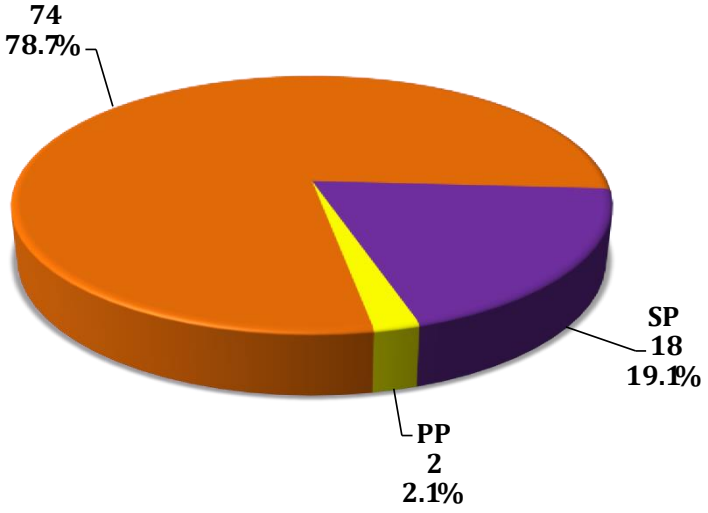

Figure 1. Distribution of the studied cases according to clinical course

Table 3. Descriptive analysis of the studied cases according to EDSS and attacks (n = 94)

	Min. – Max.	Mean ± SD.	Median (IQR)
EDSS	0.0 – 9.0	2.30 ± 2.28	2.0(0.0 – 4.0)
Attacks	1.0 – 8.0	2.85 ± 1.53	3.0(2.0 – 4.0)

IQR: Inter quartile range SD: Standard deviation

Table 3 showed that the average EDSS among the 94 patients with MS was 2.3 ranging from 0 to 9. The average number of attacks was 2.85 ranging from 1 to 8 Table 4. Correlation between EDSS with duration and attacks

	EDSS	
	rs	P
Duration	0.616	<0.001*
attacks	0.625	<0.001*

rs: Spearman coefficient*: Statistically significant at $p \leq 0.05$

Table 4 showed that there's a significant relation between EDSS with the duration of the disease as well as the number of attacks.

Table 5. Distribution of the studied cases according to clinical manifestations (n= 94)

Clinical manifestations	No.	%
Ataxia	28	29.8
Motor	53	56.4
Sensory	28	29.8
Optic neuritis	34	36.2
Vertigo	2	2.1
Dysarthria	4	4.3
Diplopia	4	4.3

Table 5 showed that the most frequent clinical manifestations were motor symptoms (56.4%) then optic neuritis (36.2%), ataxia and sensory symptoms (29.8%), Dysarthria (4.3%), Diplopia (4.3%) and vertigo (2.1%)

Table 6. Distribution of the studied cases according to DMD (n= 94)

DMD	No.	%
Avonex	12	12.8
Gilynea	30	31.9
Marovarex	2	2.1
Ocrevus	3	3.2
Rebif	45	47.9
Rituximab	2	2.1

Table 6 showed the frequency of use of disease modifying drugs in patients with MS. 47.9% (45 patients) using rebif,31.9% (30 patients) using Gilynea,12.8% (12 patients) using Avonex follow by Ocrevus, Marovarex and Rituximab (3.2%,2.1%,2.1% respectively)

Table 7. Relation between clinical course and DMD

DMD	Clinical course						□2	MCp
	RR (n = 74)		SP (n= 18)		PP (n = 2)			
	No.	%	No.	%	No.	%		
Avonex	12	16.2	0	0.0	0	0.0		
Gilenya	17	22.9	13	72.2	0	0.0		
Marovarex	0	0.0	2	11.1	0	0.0		
Ocrevus	0	0.0	1	5.5	2	100.0	□□□□□□*	0.018*
Rebif	45	60.8	0	0.0	0	0.0		
Rituximab	0	0.0	2	11.11	0	0.0		

X2: Chi square test MC: Monte Carlo p: p value for comparing between different parameters
*: Statistically significant at $p \leq 0.05$

Table 7 shows a significant relation between DMD and clinical course as the most common DMD used in RRMS is Rebif and the most common DMD used in SPMS is Gilenya & the only drug used in PPMS is Ocrevus.

Figure 2 showed that among the 94 patients, oligoclonal bands in the CSF were positive in 68.1% (64 patients), normal in only 2.1% (2 patients) and not done in (29.8%).

Positive

64

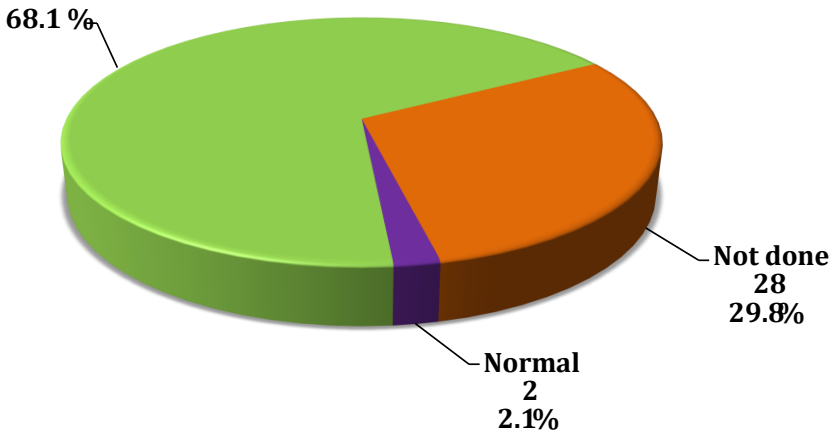

Figure 2. Distribution of the studied cases according to CSF oligoclonal bands

Table 8. Relation between clinical course and CSF

CSF	Clinical course						X2	MCp
	RR (n = 74)		SP (n= 18)		PP (n = 2)			
	No.	%	No.	%	No.	%		
Not done	18	24.3	9	50	1	50.0		
Positive	55	74.3	8	44.4	1	50.0	□□□□□	0.197
Normal	1	1.3	1	5.5	0	0.0		

X^2: Chi square test MC: Monte Carlo p: p value for comparing between different parameters

Table 8 shows that there is no significant relation between the clinical course and the result of oligoclonal bands in CSF

Figure 3 showed that 86.2% of Brain MRI lesions were in the cerebrum,31.9% in the cerebellum and 27.7% in the brain stem

Cerebrum

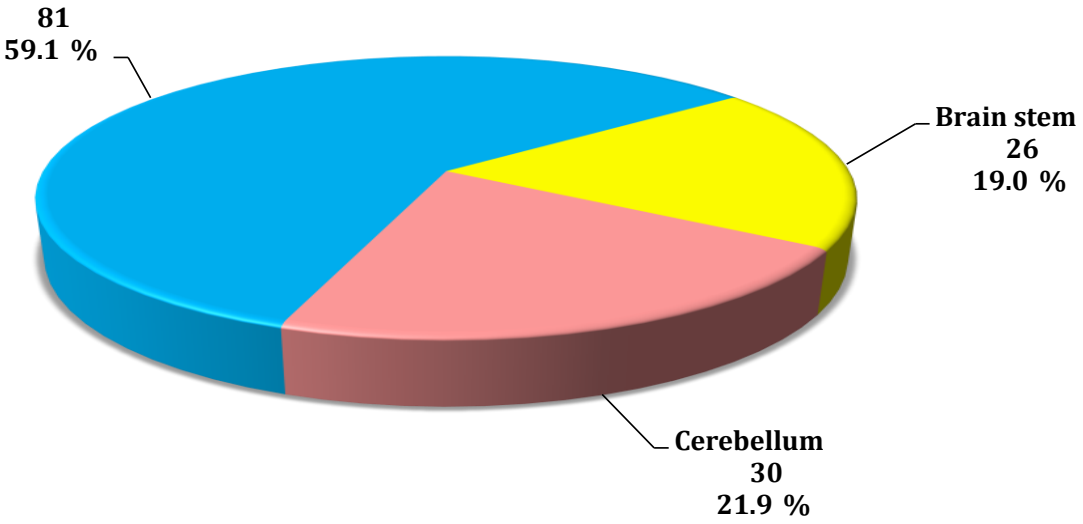

Figure 3. Distribution of the studied cases according to MRI Brain

Figure 4 showed that MRI of the cervical spine was normal in 50% of patients and had MS lesions in 50% of patients.

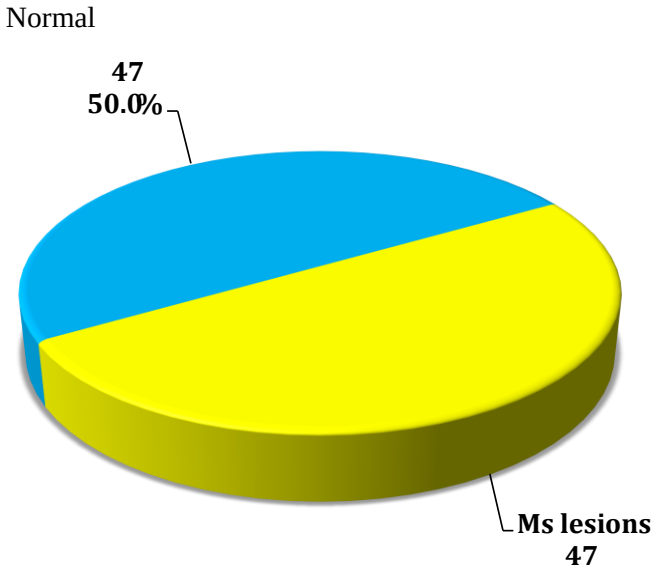

Figure 4. Distribution of the studied cases according to MRI cervical spine.

MS prevalence has increased in every world region since 2013 but gaps in prevalence estimates persist. A total of 2.8 million people is estimated to live with MS worldwide (35.9 per 100,000 population) [2].

This descriptive cross-sectional study was carried out to assess the prevalence and clinical distribution of MS disease in Suez Canal university hospital, Ismailia.

The data collected from 94 MS patients showed that the mean age of the patients at the time of estimating the prevalence was 32.16 years (Mean ± SD 32.16 ± 9.83) which was consistent with the studies conducted in Rafsanjan City, Iran which showed that the mean age was 33.81±8.38 years [7].

In contrast, the mean age of patients during the first symptoms was 28.31 similar to the study performed in Ecuador which reported that, the mean age of patients

during the first symptoms was 31.5 years [8].

In this study,62 of the patients were females (66%) and 32 patients were males (34%) which was consistent with the study of demographic and clinical profile of multiple sclerosis in Kashmir revealed the high prevalence of female patients with male to female ratio 1:3.1 [9].

Also in Salta City, Argentina, an observation study was carried out and reported that 58.2% of MS patients were females [10].

The study findings showed that the mean duration of the disease was 3.13 and ranging from one to twenty years similar to the studies conducted in in Cuenca, Ecuador, Correa E et al. reported that the mean disease duration was 4.1 years (SD3.6; 95% CI 2.6–5.7) and fluctuated between 1 month and 16 year [8].

Studying the distribution of disease stages in MS patients showed that the majority of patients (78.7%) are suffering from relapsing remitting phase, follow by secondary progressive in 19.1% of patients and primary progressive in 2.1% of patients.

Another Egyptian cross-sectional study by Mohamed Hussein et al., revealed that the relapsing remitting phenotype was the commonest phenotype [11].

Also in Rosario, Argentina, a cross sectional study of the prevelance of Multiple seclerosis in that city in 2021 reported that the most frequent phenotype was relapsing-remitting (82.3%) followed by secondary-progressive (15.2%) and primary-progressive (2.5%) [1].

In this study, the mean EDSS score of the patients was 2.3 in the range between 0 and 9 similar to the study conducted in Cuenca, Ecuador which reported that the mean EDSS score was 2.5 [8].

We also observed that the number of attacks and the duration of the disease had a significant correlation with EDSS scores ($p < 0.05$) as in the study of Clinical and epidemiological profile of patients diagnosed with multiple sclerosis in João Pessoa, Paraíba, Brazil which reported that the average of the Expanded Disability Status Scale (EDSS) scores was 3.5 and there was a positive correlation between the number of outbreaks and the duration of the disease with EDSS scores [12].

The prevalence of attacks symptoms was also observed in our samples and showed that the most frequent clinical manifestations were motor symptoms (56.5%) then optic neuritis (36.2%), ataxia (29.8%) and sensory symptoms (29.8%) similar to the study recruited from Al-Azhar university hospitals in Egypt, which showed that the main presenting symptom was motor weakness [11].

Moreover, in Egypt, a multicenter registry study revealed that motor weakness was the most common symptom experienced, followed by sensory symptoms [13].

All studies revealed the high prevalence of motor, sensory & optic neuritis as the first presentation or during the course of the disease with different percentage among the studies.

Distribution of lesions in the brain and spinal cord showed that most MS plaques found in cerebrum (86.2%) follow by cerebellum (31.9%) and brain stem (27.7%) consistent with the study byMoghadamAhmadi A et al., which showed that most lesions on MRI in these patients were observed in pyramidal and juxtacortical areas of the brain [14].

It's not known why some people with MS may have more lesions in their brain than their spinal cord, or vice versa. However, it should be noted that spinal lesions do not necessarily indicate a diagnosis of MS, and can sometimes lead to a misdiagnosis of MS.

Observing the oligoclonal bands in the CSF, we found that they were positive in 68.1% of the patients (64 patients), normal in only 2 patients and not done in 28 patients. Similar to the study of demographic and clinical profile of Multiple Sclerosis in Kashmir which reported that Oligoclonal bands (OCB) were present in cerebrospinal fluid (CSF) of majority of the patients [9].

Also, the Egyptian study conducted by Sherif M Hamdy et al., reported that only 16.2% of their MS sample had CSF analyses performed. Over 30% of patients with MS were oligoclonal bandnegative. They discussed that this high negative percentage was due to the former use of gel electrophoresis in their institutes, which was just recently replaced by isoelectric focusing, raising the sensitivity from 50% to over 95% [13].

In this study, we also assessed the frequency of using disease modifying drugs (DMD) in patients with MS and found that the most used one was Rebif. It was used in 60.8% of patients.

Another study assessed the prevalence of multiple sclerosis in the Middle East North Africa region (MENA) showed that first-line injectables still account for almost half of the DMTs used in that region. This is followed in descending frequency by fingolimod, natalizumab, rituximab and dimethyl fumarate [15].

Moreover,In the Egyptian study by Mohamed Hussein et al., the percentage of patients receiving Interferon was 71.5 % [11].

There was no significant relation between the gender of the patient with the age of onset as well as the clinical course. Similar to the study of age-dependent variation of female preponderance across different phenotypes of multiple sclerosis Which showed that the gender ratio did not show differences considering MS subtype [16].

But the significant result was that the only 2 patients who had primary progressive MS were females as in other study by Marja-Liisa Sumelahti et al., which found that F/M ratios in RRMS were 2.1 (965 women, 454 men) and in PPMS 1.2 (109/89) [17].

But these results were against the study conducted by Andrei Miclea et al., which showed that female preponderance was present in all phenotypes except for primary progressive MS (PPMS), in which men were predominantly affected (F/M ratio: 0.5:1.0) [16].

This difference between the results may be due to our small sample size (94 patients) and only 2 patients with primary progressive MS(PPMS) in comparison to their datasets of 945 patients and 98 patients with PPMS.

Our study limitations include the possibility of missing any severely ill patients who do not make scheduled visits to neurology department, the data cover only patients who had already received a diagnosis or treatment for MS. Patients without a diagnosis or MS-specific treatment (e. g. patients with very inactive MS who have not received medical attention or treatment during the time period surveyed) were not included, possibly underestimating the prevalence of MS. Other limitations were the small sample size and short duration of our study leading to missed patients who didn't present clinical signs during the study period.

Despite these limitations, we expect to contribute to the descriptive epidemiological study of MS and encourage researchers to develop more studies on this disease in Ismailia.

Conclusion

- Reporting the actual burden of MS by using these cross sectional and longitudinal databases aim to offer significant information that can promote a better understanding of the prognosis and riskfactors, as well as serve as an essential guide for both socioeconomic and clinical decision-making. It offers insights into the progression and process of the disease, together with its effect on the morbidity, quality of life and functional status of the patients. Patients' registries are, in general, a valuable source of information as they provide significant data about a disease/disorder that cannot be otherwise captured.

We need more studies on association between CMV seropositivity with a decreased risk for MS.

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