

## Multidimensional Assessment of Tremors in Patient with Multiple Sclerosis

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### Abstract

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**Background:** Tremors can result in negative consequences on physical, emotional, and cognitive status in patients with multiple sclerosis, which may affect patient satisfaction, clinical recovery, and hospital length of stay. **Aim:** This study aimed to assess multidimensional of tremors in patients with multiple sclerosis. **Design:** A descriptive exploratory design was utilized. **Setting:** Multiple Sclerosis Outpatient Clinic at Ain Shams University Hospitals/Egypt. **Study subject:** A purposive sample of one hundred and fifty patients checked in the previous mentioned setting. **Tools of data collection:** Two tools were used for data collection: An interviewing questionnaire, multidimensional assessment of tremors in patients with multiple sclerosis. **Results:** 54.66% of the studied patients had tremors in right upper extremities while, 40% had intentional tremors. In addition, there was positive correlations between tremors severity scale and age. There was correlation between tremors and self-care. There were positive correlations between self-care productivity activities. There was positive correlation between productivity activities, leisure activities and also there was positive correlation between leisure activities and other activities among the studied patients suffering from multiple sclerosis. **Conclusion:** Patients with multiple sclerosis experienced tremors related to the patient's related factors such as psychological factors, physical factors and personal habits related factors. **Recommendations:** Health education should be given to MS patients with tremors on how to improve their quality of life with more efforts to improve awareness of patients regarding the techniques that can relieve pain or stress.

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**Key word:** Multidimensional- Tremors- Multiple Sclerosis

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### Introduction

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Multiple sclerosis (MS) is a chronic inflammatory demyelinating disease of the central nervous system that usually affects young adults. The disease affects about 2.5 million people worldwide. Women are three times more likely to develop MS than men (Baum & Rothschild, 2016; Lublin & Reingold, 2017)

Multiple sclerosis is one of the most common disabling neurological disease that affects the brain and spinal cord. Based on the clinical disease pattern, four types of MS are recognized: relapsing–remitting MS (RRMS), secondary progressive MS (SPMS), primary progressive MS (PPMS), and progressive relapsing MS (PRMS) (Madell, 2019).

The etiology of this potentially debilitating disease is still unknown but both environmental and genetic factors interact in disease development and progression. Many environmental factors such as vitamin D deficiency, viral infections such as Epstein Barr Virus and smoking have been mentioned as triggering factors in genetically susceptible people **(Goldenberg, 2016)**.

Early symptoms include numbness, paraparesis, double vision, optic neuritis, ataxia, and bladder control problems. Subsequent symptoms also include prominent upper motor neuron signs as increasing spasticity, increasing para- or quadriparesis. Vertigo, incoordination and other cerebellar problems, depression, emotional lability, abnormalities in gait, dysarthria, fatigue and pain are also common symptoms **(Compston, Wetherall, Leadingham & Warrell, 2017)**.

Treatment is symptomatic, but recent disease-modifying drugs that attenuate the body's immune response delay disease progression in many patients. However, a number of medications can be used to treat the disease symptomatically. Corticosteroids are medications of choice for treating exacerbations. Interferon are successfully used to reduce the frequency and severity of relapses **(Derwenskus, 2016)**.

Tremors is an involuntary rhythmic muscle movement caused by repetitive contraction and relaxation of paired muscle groups. Tremors was recognized as a common feature of MS. In MS patients the two most prevalent tremors forms are postural tremors and intention tremors **(Goldman & Kelly, 2016)**.

Multi dimensions of tremors in multiple sclerosis include (physical, social and psychological) domains. Physical domain refers to performance of activities of daily living, such as feeding, toileting, bathing, dressing and the ability of patient with multiple sclerosis to deal with disease symptoms and treatment related problems. physical weakness and impairment disturb most aspects of life like psychological, social, sexual, spiritual and other daily activities of life **(Reich, Lucchinetti & Calabresi, 2018)**.

Social domain refers to communicative contexts which influence and are influenced by the structure of such contexts, whether social, institutional, power-aligned. aimed at improving the quality of life for patients and their families who are confronted with life-threatening illness by providing support and care for pain, physical symptoms, psychological and social stress, and spirituality **(Omerhoca, Akkaş & Icen, 2018)**.

Psychological domain is the case in which distress may be indicative of physical and mental health. Due to physical deterioration most patient become frustrated of their life and do not want to live. end up with sadness, loneliness, anxiety due to hospitalization and they worried about the prognosis of disease **(Tremlett, Paty, & Devonshire, 2017)**.

Multiple sclerosis nurse should maintain an environment in which patient confidentiality is assured. Act as an advocate to help patient meet needs. Assist patients to achieve optimal level of comfort, using an interdisciplinary approach. Support family involvement in accordance with patient's wishes regarding caregiving and decision making. Identify need of patient/family for

support systems/resources and make appropriate referrals (Kister, et. al, 2017).

### **Significance of the study**

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Multiple sclerosis is the third most common neurological diagnosis cited as the cause of disability and it affect young adults. The recent prevalence indicating that MS directly affects 2.5 million people worldwide. Global annual incidence estimates range from 10 to 15 per 100000 (Miller, Rudick, Cutter, Baier & Fischer, 2019).

Multiple sclerosis (MS) is the most frequently seen demyelinating disease, with a prevalence that varies considerably, from high levels in North America and Europe (>200/100,000 inhabitants) to low rates in Eastern Asia and sub-Saharan Africa (5/100,000 population). The prevalence of MS varies with location and increases with distance from the equator (Leray, Moreau, Fromont & Edan, 2016; Anderson, 2019).

Tremors in multiple sclerosis (MS) is a common and disabling symptom. Epidemiological data suggest that tremors affects 26–58% of people with MS and can significantly impact their quality of life. MS tremors most commonly affects the upper limbs, but has also been observed in the legs, head and trunk (Pittock, 2018).

### **Aim of study**

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The aim of the study is to assess multidimension of tremors in patients with multiple sclerosis .

### **Research questions :**

What are the multidimension of tremors in patients with multiple sclerosis?

### **Subjects and Methods**

#### **Research design:**

A descriptive exploratory design was used in conducting this study to meet the aim of study. Exploratory research often forms the basis for descriptive research and the knowledge acquires through selecting respondents, setting priority issues, framing and asking questions as well as setting the time and place for the respondents like when and where to ask questions (Hunter, McCallum & Howes, 2018).

#### **Setting :**

This study was conducted at MS outpatient clinic at Ain Shams University Hospitals. The MS outpatient clinic located in first floor and consists of two rooms, each room consists of two chaise longue, two desks, three chairs and medical supplies for examination.

#### **Subject:**

A purposive sample comprised of 150 adult patients, from both genders, free from any other chronic disease with different educational levels from previously mentioned setting

The sample size was determined considering the total number of patients (450) who had admitted during the year 2016 in the previous mentioned setting, based on the power analysis that indicate

150 patients would be enough to conduct this study. Considering alpha type I error ( $\alpha$ ) = 5% with confidence level 95% and significance level ( $\alpha$ ) at 0.05 and power of study (power of test) 90% with type II beta error ( $\beta$ )= 10%.

**The sample size was calculated through the following equation:**

$$N = \frac{N_1}{1 + N_1(e)^2}$$

Where n= Sample Size, N= Total Population Number (1200), e= margin Error ( 0.05).

Confidence level 97%.

#### **Tools of data collection :**

Two tools were used in this study as the following:

**An interviewing questionnaire for patient with multiple sclerosis**

**Multidimensional assessment of tremors in patients with multiple sclerosis**

**I. An interviewing questionnaire for patient with multiple sclerosis:** This tool was developed by the researcher and written in Arabic language after reviewing the related literature (Murray, 2016; Polman, Thompson, Murray, Bowling & Noseworthy, 2017; Lublin, 2017). It was used to assess two parts:

**Part 1 : Demographic characteristics of the patients** including age, gender, marital status, level of education, residence and occupation .

**Part 2 : Patient clinical data** was developed by the researcher after reviewing related literature (Donna, 2016;

Remington, Rodriguez, Logan, Williamson & Tread away, 2016; Janice & Hinkle, 2018). It was written in English language. It was used to assess:

**A- Maintenance drugs:** composed of corticosteroids, Immunomodulatory, Immunosuppressant, Cholinergic, Anticholinergic, Acetylcholinesterase inhibitor and Muscle relaxant.

**B- Neurological assessment:** composed of restlessness, irritability, numbness, dizziness, episode of uncontrollable laughing/crying, speech problem, headache, ability to learn and remember new information and bed hove signs .

**II. Multidimensional assessment of tremors in patients with multiple sclerosis:** was adopted from (Daudrich, Hurl & Forwell, 2016) to measure the severity and functional impact of tremors in people with MS. It included 57 statements for multidimensional assessment of tremors in patients with MS. It was translated into Arabic language and back translation was done. These statements distributed as the following four parts:

**Part 1 : Description of tremors:** This part was a subjective description of tremors and how it affects a person's activities of daily living. It was composed of 6 statements asking about parts of the body affected by tremors, type of tremors, factors affecting tremors, times during the day tremors is worse, activities make tremors worse& activities make tremors better .

**Part 2 :Psychosocial aspect of tremors:** This part was used to assess the effect of tremors on patients' emotional

and social condition. It was composed of 5 statements asking about patient feeling during attacks of tremors as depressed, how tremors stop from engaging in activities, embarrassed, how tremors stop from engaging in activities & frustrated.

#### ❖ Scoring system:

Each statement answered by the patient through using two options, which were Yes= 1 or No= 0. The total score of psychological factors affecting tremors among patients with MS was equal 5 grades.

**Part 3 :Tremors severity scale:** It was used to assess the severity of postural, intentional, task related and subtotal tremors and in different body parts as head, trunk, upper and lower limbs .

#### ❖ Scoring system :

This tool consisted of 24 items, which answered by a Likert Scale (0-4).

Zero indicates there is no tremors, 1 indicates there is a slight tremors, 2 indicates there is a mild tremors, 3 indicates there is a moderate tremors& 4 indicates there is a severe tremors.

**The severity of tremors on the body parts are scored as follow:**

- 0 = No tremors.
- 5 to 24= Slight tremors.
- 4 to 20= Mild tremors.
- 1 to 15= Moderate tremors.
- 1 to 3= Severe tremors

**Part 4: Functional severity scale (self-reported scale):** It was used to assess the level of difficulty to perform each tasks listed as self-care, productivity activities, leisure activities and other activities .

#### ❖ Scoring system :

This tool consisted of 26 items, which answered by a Likert Scale (0-4).

Zero indicates the patient can perform activity without difficulty,1 indicates the patient can perform activity with slight difficulty,2 indicates the patient can perform activity with moderate difficulty,3 indicates the patient can perform activity with considerable difficulty,4 indicates the patient can perform activity with extreme difficulty or cannot perform activity at all .

**The effect of tremors on performing daily activity are scored as follow:**

**6 to 18** = The patient can perform activity without difficulty.

**4 to 20** = The patient can perform activity with slight difficulty.

**1 to 12** = The patient can perform activity with moderate difficulty.

**1 to 4** = The patient can perform activity with considerable difficulty.

**0** = The patient can perform activity with extreme difficulty or cannot perform activity at all.

#### 2 -Operational Design :

The operational design included preparatory phase, validity, pilot study and field work.

#### Preparatory phase:

It included reviewing of related literature, different studies and theoretical knowledge of various aspects of the study using books, articles, internet, periodicals and magazines to the theoretical part of the study and tools for data collection .

#### Validity and reliability :

**Content validity:**

Was done by a group of 7 experts in medical surgical nursing, Ain Shams University, (4 professors and 3 assistants' professor) to determine whether the tools measure what supposed to measure. The expertise reviewed tools for clarity, relevance, applicability, comprehensiveness, simplicity and minor modifications were done .

**Reliability:**

The study tools was done by alpha Cronbach test. Alpha for patient's present medical history is 0.873 and for past medical history is 0.868 as well as surgical history is 0.795 in addition, special habit was 0.719 and for maintenance drugs was 0.840 and for physical assessment was 0.798.

**Pilot Study :**

The pilot study was conducted on 15 patients (10% of the total study sample) to test clarity, feasibility, validity, reliability and applicability of the tools used in this study. The patients who were included in the pilot study were included to the sample because no modification was done after conducting pilot study .

**Field work:**

The purpose of the study was simply explained to the patients' who agreed to participate in the study prior to any data collection. The actual work of this study started from the 1st of September 2018 and completed by the end of March 2019. Data were collected by the researcher during patients' interview three days per week (Sunday, Monday and Tuesday), at the morning

shift in neurological outpatient clinic at Ain Shams University Hospitals .

The time needed for completing the tools was about (45-50) minutes for every patient. The researcher collected the data from three patients every day. And about 36 forms completed by the researcher with in a month.

**Ethical consideration:**

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Ethical approval was obtained from the scientific ethical committee in the faculty of nursing at Ain Shams University before starting the study. The researcher clarified the objective and aim of the study to the patients included in the study. The researcher assured maintaining anonymity and confidentiality of the subject data. Patients were informed that they allowed choosing to participate or not in the study and that they have the right to withdraw from the study at any time without giving any reasons. Values, culture and beliefs were respected.

The patients assured that the information collected would be treated confidentially and that it would be used only for the purpose of the study (verbal consent was taken from the patients) .

**3-Administrative Design :**

An official approval to carry out the study was obtained from the Dean of the faculty of Nursing, Ain Shams University and Medical director of MS outpatient clinic at Ain Shams University Hospital.

**4-Statistical Design:**

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The collected data were organized, tabulated, graphically and statistically analyzed using the statistical package for social science (SPSS). Descriptive statistics including frequency, distribution, mean median, standard deviation and inter-quartile range were used to describe different characteristics. The statistical analysis was done using percentage, **Result**

**Table (1):** showed that 57.33% of the studied patients had aged from 20 to 30years old, while 70% were female and also 60.67% were married. Moreover, 32% of the studied patients were in the secondary school. Also, 68.67% were coming from rural area and 38.67% of the studied patients worked office work.

**Table (2):** showed that 60% of the studied patients treated with disease modifying therapies, while 55.33% of patients treated with corticosteroids, and 46.67% of the them treated with muscle relaxant.

**Table (3):** showed that 68.67% of the studied patients had headache, and 53.33% had numbness in extremities, and also 47.33% had dizziness.

**Table (4):** showed that 54.66%of the studied patients were experienced tremors in right upper extremities, while 84%were have intermittent tremors and also 61.33%were worse in the morning. Moreover, 40% of the tremors affected by stress and stressful event, and there were 86.66% activities make tremors worse. Also, 73.33% of activities make tremors better.

**Table (5):** illustrated that 93.33%of the studied patients were feel

range and Pearson correlation coefficient .®

**Significance of results was considered as follow:**

Non-significant (NS)  $P > 0.05$

Significant (S)  $P \leq 0.05^*$

down due to tremor, while 96.66%were embarrassed by tremor and also 96%were frustrated by tremor.

**Table (6):** revealed that 13.33% of the studied patients had slight intentional tremors in head, while 16.66% had mild intentional tremors in trunk and also 16% of the studied patients had slight intentional tremors upper limb. Moreover 14% had slight intentional tremors lower limb.

**Table (7):** revealed that 7.33% of the studied patients can perform dressing with slight difficulty, and 8% can perform meal preparation from scratch with slight difficulty, while 9.33% can perform dressing with slight difficulty, and also 13.33% can watch TV with slight difficulty, also 10% can use telephone with slight difficulty. As well as 11.33% can perform key in lock with slight difficulty. Moreover 10% can insert CD with slight difficulty.

**Table (8):** revealed that there was a positive correlation between tremors severity scale, age, gender and self-care.

**Table (9):** showed that there was a positive correlation between self-care productivity activities. There was a weak positive correlation between productivity activities, leisure activities and also there was strong positive correlation between leisure activities and other activities.

**Table (1):** Percentage distribution of the studied patients' regarding demographic characteristics (n. =150).

Items	No.	%
<b>Age</b>		
20≥30	86	57.33%
30≥40	51	34%
>40	13	8.67%
Mean(age)	30.78±6.66	
<b>Gender</b>		
Male	45	30%
Female	105	70%
<b>Marital status</b>		
Single	36	24%
Married	91	60.67%
Widowed/divorced	23	15.33%
<b>Level of education</b>		
Illiterate	35	23.33%
Read and write	46	30.67%
Secondary	48	32%
University	21	14%
<b>Residence</b>		
Rural	103	68.67%
Urban	47	31.33%
<b>Occupation</b>		
Not working	57	38%
Working		
Manual	35	23.33%
Office work	58	38.67%

**Table (2):** Percentage distribution of the studied patients' regarding maintenance drugs (n. =150).

Items	No.	%
Corticosteroids	83	55.33%
Immunomodulators	57	38%
Immunosuppressant	30	20%
Cholinergic	45	30%
Anticholinergic	20	13.33%
Disease modifying therapies.	90	60%
Muscle relaxant	70	46.67%
<b>*Results are not mutually exclusive</b>		



**Table (3):** Percentage distribution of the studied patients' regarding nervous system assessment (n. =150).

Items	No.	%	
Restlessness	65	43.33%	
Irritability	40	26.66%	
Numbness\tingling	Face	45	30%
	Extremities	80	53.33%
Dizziness\vertigo	71	47.33%	
Episodes of uncontrollable laughing\crying	50	33.33%	
Speech problem	57	38%	
Headache	103	68.67%	
inability to learn and remember new information	30	20%	
Bed hove signs (heat intolerance)	47	31.33%	

\*Results are not mutually exclusive

**Table (4):** Percentage distribution of the studied patients' regarding description of tremors (n. =150).

Items	No.	%
<b>Parts of the body do you experience tremors</b>		
Head	68	45.33%
Trunk	10	6.66%
Right UE	82	54.66%
Left UE	70	46.66%
Right LE	44	29.33%
Left LE	35	23.33%
<b>Is your tremors present throughout the day?</b>		
Intermittent	126	84%
Persistent	24	16%
<b>Any times during the day when your tremors is worse?</b>		
Morning	24	16%
Afternoon	92	61.33%
Evening	34	22.66%
<b>Do any of the following affect tremors?</b>		
Fatigue	45	30%
Stress or stressful event	60	40%
Heat	11	7.33%
Overstimulation	34	22.67%
<b>Are there any activities make tremors worse?</b>		
Yes	130	86.66%
No	20	13.33%
<b>Are there any activities make tremors better?</b>		
Yes	110	73.33%
No	40	26.66%

**Table (5):** Percentage distribution of the studied patients' regarding psychological aspect of tremor: (n. =150).

Items	No.	%
Do you ever feel down due to tremor?		
Yes	140	93.33%
No	10	6.66%
Do you ever feel embarrassed by tremor?		
Yes	145	96.66%
No	5	3.33%
Do you ever feel frustrated by tremor?		
Yes	144	96%
No	6	4%

**Table (6):** Percentage distribution of the studied patients' regarding tremors severity scale (n. =150).

Items	Slight tremors		Mild tremors		Moderate tremors		severe tremors	
	No	%	No	%	No	%	No	%
<b>Head</b>								
Postural	18	12%	15	10%	7	4.66%	-	-
Intentional	20	13.33%	19	12.66%	9	6%	2	1.33%
Task related	13	8.66%	20	13.33%	7	4.66%	1	.66%
Subtotal	9	6%	6	4%	5	3.33%	-	-
<b>Trunk</b>								
Postural	15	10%	9	6%	6	4%	-	-
Intentional	20	13.33%	25	16.66%	12	8%	3	2%
Task related	19	12.66%	23	15.33%	6	4%	2	1.33%
Subtotal	5	3.33%	4	2.66%	1	.66%	-	-
<b>R upper limb</b>								
Postural	20	13.33%	15	10%	5	3.33%	-	-
Intentional	24	16%	20	13.33%	15	10%	1	.66%
Task related	13	8.66%	10	6.66%	5	3.33%	2	1.33%
Sub total	10	6.66%	6	4%	4	2.66%	-	-
<b>L upper limb</b>								
Postural	20	13.33%	15	10%	5	3.33%	-	-
Intentional	24	16%	20	13.33%	15	10%	1	.66%
Task related	13	8.66%	10	6.66%	5	3.33%	2	1.33%
Subtotal	10	6.66%	6	4%	4	2.66%	-	-
<b>R lower limb</b>								
Postural	20	13.33%	12	8%	8	5.33%	-	-
Intentional	21	14%	20	13.33%	7	4.66%	2	1.33%
Task related	15	10%	19	12.66%	5	3.33%	1	.66%
Subtotal	9	6%	7	4.66%	4	2.66%	-	-
<b>L lower limb</b>								
Postural	20	13.33%	12	8%	8	5.33%	-	-
Intentional	21	14%	20	13.33%	7	4.66%	2	1.33%
Task related	15	10%	19	12.66%	5	3.33%	1	.66%
Subtotal	9	6%	7	4.66%	4	2.66%	-	-

**Table (7):** Percentage distribution of the studied patients' regarding functional severity scale (n. =150).

Items	Patients can perform activity without difficulty		Patients can perform activity with slight difficulty		Patients can perform activity with moderate difficulty		Patients can perform activity with considerable difficulty	
	No	%	No	%	No	%	No	%
<b>Self-care</b>								
Dressing	10	6.66%	11	<b>7.33%</b>	7	4.66%	2	1.33%
Feeding	7	4.66%	9	6%	8	5.33%	1	.66%
Bathing	8	5.33%	7	4.66%	3	2%	1	.66%
Toileting	9	6%	8	5.33%	5	3.33%	-	-
Grooming	6	4%	9	6%	3	2%	-	-
Make up or shaving	8	5.33%	10	6.66%	2	1.33%	-	-
Brushing teeth	7	4.66%	5	3.33%	4	2.66%	-	-
<b>Productivity activities</b>								
Meal preparation from scratch	9	6%	12	<b>8%</b>	10	6.66%	3	2%
Meal preparation prepared foods	6	4%	4	2.66%	-	-	-	-
House work	11	7.33%	14	<b>9.33%</b>	12	8%	4	2.66%
Shopping	10	6.66%	3	2%	5	3.33%	1	.66%
Computer typing	8	5.33%	5	3.33%	3	2%	-	-
Computer mouse use	9	6%	8	5.33%	3	2%	-	-
<b>Leisure activities</b>								
Eating out	8	5.33%	6	4%	-	-	-	-
Watching TV  remote use	18	12%	20	<b>13.33%</b>	2	1.33%	-	-
Social outing	9	6%	6	4%	3	2%	-	-
Reading	7	4.66%	5	3.33%	3	2%	-	-
Telephone use	12	8%	15	<b>10%</b>	4	2.66%	-	-
Exercise	8	5.33%	5	3.33%	2	1.33%	-	-
Hobbies	9	6%	6	4%	2	1.33%	-	-
<b>Other activities</b>								
Key in lock	16	10.66%	17	<b>11.33%</b>	5	3.33%	-	-
Plug in socket	11	7.33%	8	5.33%	3	2%	-	-
Insert CD DVD	13	8.66%	15	<b>10%</b>	2	1.33%	-	-
Handling money(bills and coins)	10	6.66%	13	8.66%	3	2%	-	-
Using scissor	4	2.66%	5	3.33%	1	.66%	-	-
Writing	10	6.66%	12	8%	2	1.33%	-	-

**Table (8):** Correlation between the Tremors Severity Scale (TSS), age, gender and self-care among the studied patients suffering from multiple sclerosis (n. = 150).

Items	Tremors severity scale (TSS)	
	r- value	p-value
Age	0.583	<0.0001*
Gender	0.186	<b>0.023*</b>
Self-care	0.293	<b>0.002*</b>

\*significance at P&lt; 0.05

**Table (9):** Correlation between self-care, productivity activities, leisure activities and other activities with each other's among the studied patients suffering from multiple sclerosis (n. = 150).

Items	Self-care		Productivity activities		Leisure activities	
	r- value	P-value	r- value	P -value	r- value	P-value
Productivity activities	0.418	<0.0001*	--	--	--	--
Leisure activities	--	--	0.172	0.036*	--	--
Other activities	--	--	--	--	0.784	<0.0001*

\*significance at P< 0.05

### Discussion:

Concerning maintenance drugs, the current study showed that two third of studied sample treated with disease modifying therapy, that have been used to reduce the frequency and severity of relapses, reduce the development of new lesions in the brain and spinal cord, slow the development of MS disabilities and prevent permanent damage to the nervous system, these result is consistent with **Koltuniuk and Rosinczuk (2018)** who stated in research titled " Adherence to disease-modifying therapies in patients with multiple sclerosis" the research findings revealed that Disease-modifying therapies (DMTs) constitute the current first-line treatment option for relapsing-remitting and secondary progressive MS because they reduce the relapse rate and slow disability progression .

Another study showed that, one third of the studied patients treated with corticosteroids this findings consistent by **Myhr and Mellgren (2017)** who stated in research title " Corticosteroids in the treatment of multiple sclerosis " which founded that corticosteroids are used to manage acute exacerbations or relapses, prevent new relapses and progression of disability in people with MS by controlling inflammation and halt acute damage. High dose short-term oral or

intravenous methylprednisolone for 3-5 days speed up recovery from relapses .

Also another study showed that about more than one third of the studied sample treated with muscle relaxant, as spasticity happens because of an imbalance in the electrical signals coming from the brain and spinal cord as multiple sclerosis damaged the nerves there, this result was in the same line with **Lava (2018)** who stated in research titled " Spasticity and MS: How to Control Your Muscles." and reported that muscle relaxants as baclofen are used to treat muscle spasm. If pills don't work, your doctor might be able to put a pump inside your body to deliver the medication directly to your spinal fluid (such as the baclofen pump).

As regard to nervous system assessment, the current study showed that, more than two third of the study sample had headache this is might be due to emotional stress prior to the hospitalization this finding in the same line with **Gebhardt, Kropp, Jurgens, Hoffmann and Zetl (2017)** who stated in research title " Headache in the first manifestation of Multiple Sclerosis – Prospective multicenter study " that headache develop as a result of a shared factor, such as a common environmental and genetic link that fluctuates with endocrine changes, headache was worse during MS exacerbation .

Another study showed that more than one third of the studied patient complained from tingling in extremities, the present study is consistent with **Garlit (2018)** who stated in research titled "How Numbness, Tingling Are Connected to Your Multiple Sclerosis." which revealed that one third of the studied subject had numbness in the limbs caused by stripping of myelin which surrounds our nerve fibers. Paresthesia, dysesthesia and hyperpathia are all frequently seen at various times and to various degrees in people with MS. steroids (such as cortisone) may improve the condition by reducing inflammation .

Also another study showed that about one third of the studied patient complained from dizziness and vertigo contribute to balance problems, which are common in people with MS, the present study is consistent with **Pietrangelo, (2018)** who stated in research titled "Dizziness and Vertigo in Multiple Sclerosis." which revealed that one third of the studied subject had dizziness and vertigo contribute to balance problems, which are common in people with MS, caused by lesions in the complex pathways that coordinate visual, spatial and other input to the brain needed to produce and maintain equilibrium. Dizziness treated by an anti-motion-sickness drugs.

As regard description of tremors, the current study showed that the more than half of the studied sample had tremors in right upper extremities, these might be caused by damage to the nerve fibers that are responsible for controlling movement and coordination, in addition to lesions in the cerebellum a specialized region of the brain that controls movement and coordination, this finding in agreement with **Carpinella, Davide Cattaneo and Ferrarin (2017)** who

stated in research" Quantitative assessment of upper limb motor function in Multiple Sclerosis using an instrumented Action Research Arm Test " and showed that more than one half of people with multiple sclerosis experience upper limb dysfunctions mainly related to tremors, because MS is a multifocal disease with lesions appearing in cerebellum. Upper limb intention tremors is a common cause of disability in MS patients and increase difficulty to perform a variety of daily activities and these symptoms have been shown to highly reduce the quality of life .

Another study conducted by **Hardesty, Maraganore, Matsumoto, & Louis (2017)** who stated in research titled" Increased risk of head tremors in women with essential tremors: Longitudinal data from the Rochester Epidemiology " which founded that head tremors often develops after arm tremors, and its appearance in patients with essential tremors may therefore be a function of duration of follow-up. Head tremors was present in more than half of women and less than one fifth of men.

Regarding to tremors present throughout the day, the current study showed that, majority of the studied patients the tremors present throughout the day was intermittent tremors this findings consistent by **Alusi, Worthington, Glickman and Bain (2017)** who stated in research title" A study of tremors in multiple sclerosis " which founded that MS patients had an intermittent tremors occurring at separate times, with breaks .

As regard times during the day when your tremors is worse, it was founded that two thirds of the studied subject tremors was worse in the afternoon this might due to heightened

emotion, stress, fever, physical exhaustion, or low blood sugar may trigger tremors, These was in the same with the study conducted by **Daudrich, Hurl and Forwell (2016)** who stated research title" Multidimensional Assessment of Tremors in Multiple Sclerosis " which founded that tremors became worse in the afternoon this was because the patient was more stressed, exhausted, tired and anxious by daily activities.

Concerning activities make tremors worse, the current study revealed that majority of the studied sample most environmental and life style factor which affect tremors was stress or stressful event, this result was consistent with **Riise, et. al (2017)** who conducted a study to examine whether stress affect essential tremors under a research titled" Stress and the risk of multiple sclerosis "The results of this study indicated that stressful life events are associated with a subsequent significant increase in risk of multiple sclerosis exacerbations. This may be due to increase mast cell activation at the start of stressor, glucocorticoid resistance in immune cells when stress become chronic.

Another study showed that two third of the patients included in the study perform activities as deep breathing and other relaxation techniques that make tremors better, this finding is in agreement with **Ong, Deng and Tan (2019)** who stated in research titled" Etiologic links between environmental and lifestyle factors and Essential tremors " which revealed that relaxation techniques has been suggested to play a role in improving tremors in multiple sclerosis patient.

Concerning psychological aspects of tremor, the current study showed that

all of the studied sample suffered from feel down, embarrassment and frustration due to fear from physical impairment, disabilities or deformity resulting from tremor, these results is in consistent with **Huang, et. al (2019)** who stated in research titled" Prevalence and Risk Factors of Depression and Anxiety in Essential Tremor Patients: A Cross-Sectional Study in Southwest China " a study was carried out on 245 Chinese patients relieved that frustration, depression, embarrassment were common emotional symptoms among those with essential tremor.

In the current study, it was noticed that one fifth of the studied subject suffered from slight intentional tremors in right upper extremities, these result was in the same line with **Lamers, Kelchtermans, Baert and Feys (2017)** who stated under research titled "Upper Limb Assessment in Multiple Sclerosis: A Systematic Review of Outcome Measures and their Psychometric Properties" which reported that there were a number of possible reasons for the high prevalence of upper limb intentional tremors resulting from physical environmental problems including exposure to environmental products containing lead, mercury, manganese, solvents and beta-carbolines, and exposure to agricultural work, lack quality of rest, anxiety and stress ..

This was in the same line with **Pellegrino, Coscia, Muller, Solaro, & Casadio, (2018)** Which stated in research titled " Evaluating upper limb impairments in multiple sclerosis by exposure to different mechanical environments" and founded that intentional tremors is most common type in upper limb in patient with multiple sclerosis.

Another study showed that less than one fifth of the patients included in the study had mild intentional tremors in trunk, this finding is in agreement with **Koch, Mostert, Heersema and Keyser (2017)** who stated in research titled "Tremors in multiple sclerosis" which revealed that essential tremors is the comments cause your hands, head, trunk, voice, and/or legs to shake rhythmically and trunk tremors occurs in minimum multiple sclerosis patients.

Moreover, a study conducted **Hardesty et al, (2017)** who stated research titled "Increased risk of head tremors in women with essential tremors: Longitudinal data from the Rochester Epidemiology Project" which founded that women with ET were six times more likely to develop head tremors over the course of their illness than were men. The reason for the association between gender and head tremors is gender differences in the distribution of disease pathology within the brain.

Also another study relived that one fifth of the patients included in the study had mild intentional tremors in head, this finding is in consistent with **Sabra, Hallett, Sudarsky and Mullally, (2016)** who stated in research titled "Treatment of action tremors in multiple sclerosis with isoniazid" which revealed that minimum of the multiple sclerosis patient had intentional tremors in head.

As regard patient's self-care, it was founded that one fifth of studied subject can perform dressing, make up or shaving with slight difficulty, This result was in the same line with a study conducted by **Dehghani, Khoramkish and Isfahani (2019)** who stated in research titled "Challenges in the Daily Living Activities of Patients with Multiple Sclerosis" which founded that

people with MS face a number of ADL challenges such as fear of an ambiguous future. Therefore, health care personnel especially nurses can improve ADL and compromise patients with the disease as much as possible by providing conditions for application of the self-care activities and their implementation by patients.

Another study relived that one fifth of the patients included in the study can perform meal preparation from scratch, and perform house work with slight difficulty, this finding is in consistent with **Mansson and Lexell (2017)** who stated in research titled "Performance of activities of daily living in multiple sclerosis" which revealed that moderate to severe MS reduces the ability to perform both personal activity as toileting, dressing, eating, grooming, ambulation and bathing and instrumental activity that refers to more complex tasks as communication, shopping, transportation and domestic activities (i.e., cooking, housekeeping and laundry). Individual with MS can be independent in personal activity but still unable to perform instrumental activity satisfactorily.

Also another study showed that one fifth of the patients included in the study can watch TV, use telephone and insert CD with slight difficulty as fatigue, lack of motivation, and costs were the biggest barriers for people with MS to engage in leisure activities, this finding was in the same line with **Sikes, Richardson, Cederberg and Motl (2019)** who stated in research titled "Use of the Godin leisure-time exercise questionnaire in multiple sclerosis research: a comprehensive narrative review" the findings founded that hiking, traveling, reading, gardening, music and dancing lower levels of apathy and depression, improved cognition and self-efficacy,

higher levels of physical and mental quality of life, positive effects on interrelated MS symptoms.

Concerning relation between tremors severity scale and age among the studied patient, the result revealed that there was highly statistically significant correlation between TSS and age, these results was in the same line with **Hafeman, et. al (2016)** who stated research titled " Tremors severity and age: A cross-sectional, population based study of 2,524 young and midlife normal adults" which founded that there was a significant relation between patients age, TSS. Although the magnitude of the correlation coefficient was modest, these data suggest that an age dependent increase in tremors amplitude is not restricted to older people but occurs in all age groups .

Another study conducted by **Deuschl, Petersen, Lorenz and Christensen (2017)** who stated in research titled " Tremors in the Elderly: Essential and Aging-Related Tremors " this study undertook with 276 patients by trained interviewers from the Danish National Institute of Social Research, the tremors severity was measured with the Fahn-tremors scale was exponentially related to the spiral score and revealed that the prevalence of tremors increases steeply with increasing age, tremors increases in severity with age and tremors is more prevalent at younger age.

Concerning correlation between tremors severity scale and gender, there were statistically significant positive correlations between TSS and gender among patient with multiple sclerosis, these result was in the same line with **Peckel (2018)** who stated in research titled " Gender and Multiple Sclerosis: How It Influences Prognosis and Future Treatment" which reported that MS is affected significantly by gender. Female gender is considered an independent risk factor for MS, at a commonly reported ratio of 3:1

over men. Estrogen plays a continued role in promoting inflammation throughout the disease. Testosterone is generally protective, and in fact, men with MS tend to have lower testosterone levels than men who do not have MS.

Another study conducted by **Deuschl, Petersen, Lorenz and Christensen (2017)** who stated in research titled " Tremors in the Elderly: Essential and Aging-Related Tremors " this study undertook with 276 patients by trained interviewers from the Danish National Institute of Social Research, the tremors severity was measured with the Fahn-tremors scale was exponentially related to the spiral score and revealed that the prevalence of tremors increases steeply with increasing age, tremors increases in severity with age and tremors is more prevalent at younger age .

Concerning correlation between tremors severity scale and self-care, there were statistically significant positive correlations between TSS and self-care among patient with multiple sclerosis, these results was in the same line with **Heldman, et. al (2017)** who stated in research titled "Essential Tremors Quantification During Activities of Daily Living " and founded that there was a significant correlation between tremors and daily activities in multiple sclerosis patients.

It was found that there was a significant relationship between self-care, productivity activities, leisure activities and other activities with each other's. The patients with multiple sclerosis had poorer ability to perform activity of daily living. This result in the same line with **Plow, Finlayson, Gunzler and Heinemann (2016)** who stated in research titled" Correlates of participation in meaningful activities among people with multiple sclerosis " the findings showed that the more the duration of multiple sclerosis, the higher the chances of in ability to perform daily activities would be .

Also, another study conducted by **Hosseini, Asgari, Rassafiani, Yazdani, and Mazdeh, (2016)** who stated in research titled " Leisure time activities of Iranian patients with multiple sclerosis " the result revealed that leisure activities composing of physical, social, individual, art/cultural, educational and spiritual/religious activities have positive correlation with productivity activities. There is more chance of contractures and disfigurement with larger International Classification of Functioning, Disability and Health (ICF), MS patient may have physical, emotional and psychological consequences which may affect performance of daily activities **Squillace (2020)** who stated in research title" Relationship Between Fine Motor Skills and Occupational Performance and Satisfaction Among Young Adults with Multiple Sclerosis " which founded that young adults with multiple sclerosis perceive difficulties with occupations that require fine motor skills measured by the Purdue Pegboard Test and the Grooved Pegboard Test.

### **Conclusion:**

One half of the studied patients with multiple sclerosis had tremor in right upper extremities and less than one third of patients had postural tremor. MS relapses impact on physical ability, financial and social circumstances and also influence treatment decisions. A multidisciplinary approach to rapid-access care is likely to benefit patients and allows most relapses to be managed in the outpatient setting. Finally, tremor severity scale was positively correlated with age, gender, and self-care and also there was a positive correlation between self-care, productivity activities, leisure activities and other activities.

### **Recommendations:**

According to the findings of the current study, the following recommendations are proposed :

1-Health education should be given to multiple sclerosis patients with tremors about ways to improve their quality of life, with more efforts to improve the awareness of the patients regarding techniques that can relieve pain or stress.

2-Patients during acute phase and after the discharge should seek counseling to help identify and treat their tremors disorders. Moreover, health care providers pay close attention to patient's with tremors during and after the acute MS phase.

3-Developing an instructional booklet to reduce stress, anxiety and improving patient knowledge about multiple sclerosis.

4-Tremors should be addressed in clinical visits in patients with multiple sclerosis and during rehabilitation and interventions should be tested to optimize tremors in long-term MS survivors.

5 -Planning for education sessions and workshops for health care to raise awareness about MS and its consequences for effective manipulation.

6-Further researches are needed to clarify the consequences of tremors on the quality of life of multiple sclerosis patients and consequences of tremors on prognosis to determine to what extent interventions to improve general health.

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