

Self-Management Guidelines: Effect on Knowledge, Fatigue, Self-Efficacy and Medications Adherence among Patients with Multiple Sclerosis

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Abstract

Background: Multiple Sclerosis is an inflammatory-demyelinating disease of the central nervous system that may produce severe levels of disability in the long term. This disease affecting more than 2 million people worldwide and it is the second leading cause of disability in young adults after trauma. Self-management is crucial to managing individuals with multiple sclerosis as advance their prognosis by learning about many aspects of the illness as well as closely monitoring their own health with their care providers. **The study was aimed** to evaluate the effect of self-management guidelines on knowledge, fatigue, self-efficacy, and medications adherence among patients with multiple sclerosis. **Study design:** A quasi-experimental design was applied in the current study. **Setting:** This study was conducted at multiple sclerosis outpatient clinic affiliated to Ain Shams University Hospital; Egypt. **Sample:** A Purposive sample of 75 adult patients from both sex with MS. **Tools of data collection:** data were collected using 7 tools as follow: 1-Patient interviewing questionnaire, 2- Multiple sclerosis knowledge questionnaire, 3-Fatigue severity scale, 4-Self efficacy scale, 5-Morisky medication adherence scale, 6- Self-management scale-revised, and 7- Expanded disability status scale. **Results:** The findings revealed statistically significant relation between self-management, Knowledge, Fatigue, Self-Efficacy and Medications Adherence among patients with multiple sclerosis pre and post implementation of self-management guidelines. While there was a positive statistically significant correlation regarding the measured variables of self-management guidelines. **Conclusion:** The significance of developing effective self-management strategies to reduce the disease consequences and improve therapeutic adherence despite the functional limitation imposed by the disease, greater attention to physiological and psychological aspects might be considerable in ensuring a greater state of well-being. **Recommendations:** Accomplishing a periodic patient's self-management educational program to provide healthy lifestyle among patients with multiple sclerosis. Nurses can act as advocate through aiding patients to overwhelmed physical, cognitive and psychosocial obstacles to treatment.

Key words: Fatigue, Multiple Sclerosis, Medication Adherence Self-Efficacy, Self-Management, Patients' knowledge.

Introduction

Multiple sclerosis (MS) is a chronic demyelinating autoimmune disorder affecting the central nervous system and focuses the myelin sheaths

around nerves, directing to inflammation, myelin loss, and axonal destruction (Safian et al., 2020).

Self-care is the uppermost priority in the medical and health services system. Nurses have a vital role in improving the knowledge of patients and increasing their self-care agency and skills in the field of the disease by applying

exclusive nursing care, emphasizes that the patients themselves should undertake the accountability for self-care as the main agent and player (Afrasiabifar et al., 2016). MS manifests itself in episodes (relapses or relapses) that alter neurological functions. The relapses are followed by partial or total functional recovery and a period of relative constancy (remission) until the next episode (Corallo et al., 2019).

Fatigue is considered as the commonest symptoms in multiple sclerosis patients, reported by 88% of patients and has dramatic impact on all stages of life such as altering in daily living activity or psychosocial/mental

functions. The pathogenesis of fatigue remain poorly understood and how its impact on self-management (Shawli1, Abdulmutalib & AlNagshabandi, 2019).

Patients' behavior regarding treatment is termed adherence or compliance. Unfortunately, there is no treatment for MS, there are several pharmacological strategies that are effective in lessening relapse frequency in MS, preventing new lesion formation in brain, modify the course of the disease, manage symptoms, and recover motor function. Nevertheless, the experiences of many patients show poor adherence to therapy. This has an impact on morbidity and mortality of patients, as well as on the overall cost of patient care (National Multiple Sclerosis Society, 2020).

Self-efficacy is a specific determinant of physical activities, work efficiency, adherence to therapy, fatigue, depression, and anxiety in patients with multiple sclerosis. It is a vital component in social cognitive theory, in which psychosocial functioning is established by reciprocal interactions between personal factors, behavior, and the environment (Wilski et al., 2021).

Significance of the study:

A total of 2.8 million people are estimated to live with MS worldwide (35.9 per 100,000 populations), with mean age of diagnosis is 32 years. Females are twice as liable to live with MS as males (The International Federation Atlas of MS, 2020). Also the prevalence of multiple sclerosis in Egypt was found to be 14.1/100,000 (Hashem et al., 2010).

Self-care programs are an integral part of Multiple Sclerosis management and should be consistent with the symptoms of patients with multiple sclerosis and include all aspects of their care (Safian et al., 2020). Rising patient participation in therapeutic programs is highly necessary to plan the future course of action. This can be achieved by inspiring individuals to ensure active self-

management of their disease (Bassi et al., 2019).

Aim of the Study:

The study was aimed to evaluate the effect of self-management guidelines on knowledge, fatigue, self-efficacy, and medications adherence among patients with Multiple sclerosis.

Research Hypotheses

The study hypothesized that:

H1. Implementation of self-management guidelines would have a positive effect on knowledge among patients with MS.

H2. Implementation of self-management guidelines would have a positive effect on fatigue severity among patients with MS.

H3. Implementation of self-management guidelines would have a positive effect on self-efficacy among patients with MS.

H4. Implementation of self-management guidelines would have a positive effect on medications adherence among patients with MS.

Subjects and Methods

Research design:

One group quasi experimental interrupted time series design was established in this study. This design is one of the experimental designs, in which data are collected from the study subjects before and after implementing the experimental intervention to inspect the effects over the longer term (Rogers & Révész, 2020).

A- Setting:

The study was conducted at MS Outpatient Clinic affiliated to Ain Shams University Hospital; Egypt. The working days including 5 days according hospital

policy (from Saturday to Wednesday) from 8:30 am to 1pm.

B- Subjects:

A Purposive non probability sample of adult patients with MS during a period of six months from the beginning of January 2021 to the end of June 2021, who fulfill the inclusion criteria.

Inclusion criteria:

1. Adults' patients from both genders who had been diagnosed with MS.
2. Willing to participate in the study

Exclusion criteria:

1. Critically ill.
2. Patients with cognitive or psychiatric compromise were excluded.

Sample size:

The sample size is determined according to the power analysis formula as follow:

$$n = \left(\frac{Z_{1-\alpha/2} + Z_{1-\beta}}{ES} \right)^2$$

Standard normal deviate for $\alpha = Z\alpha = 1.960$

Standard normal deviate for $\beta = Z\beta = 1.2816$.

$\alpha =$ Standard normal deviate for $\alpha = 1.9600$.

$Z\beta =$ Standard normal deviate for $\beta = 0.8416$.

$B = (Z\alpha + Z\beta)^2 = 7.8489$.

$C = (E/SA)^2 = 0.1111$.

$N = B/C = 70.6398$.

$n = \left(\frac{1.96+0.84}{0.1111} \right)^2 = 70.6398 \approx 71$ patients

Sample size will be 71 patients to achieve a power of 80% and a level of significance of 5% (two sided), assuming the standard deviation of the differences to be 1.5 between pairs (Rosner, 2016)

D-Tools of data collection

I-Patients' Structured Interview Questionnaire: It was designed by the researchers; after reviewing the related recent and relevant literature (Tomczak, Kleka,

&Wilski, 2020) & (Marin, 2019). This tool composed of 2 parts:

Part 1: demographic data sheet, it was used to collect demographic data regarding age, gender, marital status, educational level, residency area, working status, and smoking.

Part 2: Patients' clinical data: It was reserved from the patients' medical records to collect health related variables as duration of illness, type of MS, number of recurrences, associated clinical manifestations.

II-Multiple Sclerosis Knowledge Questionnaire (MSKQ): It was adapted from (Giordano et al., 2010) to measures MS patients' knowledge about their illness, consists of 25 items with three-choices (True, False, Neutral). The total score of the scale ranges between 0 and 25. Total is graded as "poor<60%, moderate 60 to <75%, good $\geq 75\%$ ".

III- The Fatigue Severity Scale (FSS): A 9-item scale: It was adapted from (Krupp et al., 1989), it is used to measures the severity of fatigue and its effect on a person's certain activities and lifestyle. The items are scored on 7 point Likert scale, 1 indicates "strongly disagree" and 7 indicate "strongly agree." The total mean score of are divided according to fatigue severity into 3 categories: high level from 2.80 to 4.0, medium level from 2.20 up to 2.80, mild level from 1.6 up to 2.20.

IV-Multiple Sclerosis Self-Management Scale-Revised (MS SM-R): It was adapted from (Bishop & Frain, 2011). Aimed to provide a multidimensional assessment of self-management knowledge and behavior among MS patients, it includes five ranked from "Disagree to Agree Completely", scored from 1 to 5 respectively. It included five factor scales; (I) treatment adherence and barriers (7 items), (II) understanding and actively learning about MS (4 items), (III) managing one's health on day to day basis (4 items), (IV) being an active participant in decision making with health professionals (6 items), (V) managing the impact of MS on one's physical, emotional and

social life (3 items). The total mean score of self-management level are divided into 3 categories (from 3.40 to 5.0 consider as high level , from 2.60 up to 3.40 consider as medium level, from 1.0 up to 2.60 consider as mild level).

V-MS Self-Efficacy scale (MS SES): It was adapted from (Rigby et al., 2003). This scale is rated on a 5-point likert scale from “strongly disagree (1) to strongly agree (5)”. The minimum score in independence and activity and concern and interest dimensions is 4 and the maximum is 20. Also in the personal control dimension is a minimum score of 3 and a maximum of 15. Total self-efficacy score is graded from 11 to 55 divided into high or low self-efficacy.

VI-Morisky medication adherence scale (MMAS-8): This scale adapted from Morisky (2008). It contains 8 questions. Each question of the scale has two responses as “Yes for each item was (1) and No was (0)” with total score (8) grades. The total score of the scale ranges from 0 to 8. A score of 8 denotes high adherence scores from 6 to 7 which denote moderate adherence, while scores < 6 denote low adherence.

VII-The Expanded Disability Status Scale (EDSS) is a method of quantifying disability in multiple sclerosis and monitoring changes in the level of disability over time. It's adopted from (Kurtzke, 1983). It ranges from 0 to 10, with half points for greater specificity. Lower numbers indicate less severe disability while higher numbers reflect a greater degree of disability.

Educational Guidelines Booklet:

Developed by the researchers in Arabic language guided by images, based on the results obtained from assessment of the patient & reviewing the recent and relevant literature (Ferri, 2019) & (Ghezzi, 2018). The booklet was handed out for every patient; it is composed of 3 parts as follow: **Part (1):** General information about MS, definition, types, causes, complications & treatment. **Part (2):** Self-care guidelines (How to control the manifestations, fatigue, relapses, and avoid

complications of MS. **Part (3):** Living with MS (diet, exercise, medications...etc).

The educational guidelines booklet was revised by five experts, 4 professors of Medical Surgical Nursing as well as 1 professor of MS unit. Ain Shams University for content validity. Based on the opinion of the expertise some modifications were done, and then the final form was developed.

Tools validity and reliability

Validity:

Assessing face and content validity of the suggested tools through a jury of five experts 4 professors of Medical Surgical Nursing, and 1 medical professor, who reviewed the instrument for clarity, relevance, & comprehensiveness.

Reliability:

Alpha Cronbach test was used to measure the internal consistency of the study tools as following: knowledge questionnaire was reliable at (0.76), fatigue severity scale was reliable at (0.88), self-efficacy scale was reliable at (0.90), Morisky medication scale was reliable at (0.88), self-management scale was reliable at (0.81) & expanded disability scale was reliable at (0.84).

Administrative design:

Letters of request were issued from the Faculty of Nursing - Ain Shams University to the medical and nursing managers after clarifying aim of the study. After approvals are gotten the study established.

Ethical considerations:

In order to protect patients' rights in scope of the study, before the initial interview, a verbal consent was secured from each patient after being informed about the purposes and benefits of the study. Patients were also, informed that participation is entirely voluntary and could extract at any time without giving reasons. Confidentiality and anonymity of the data was assured for purposes of the study.

Pilot Study:

Once permission was granted, a pilot study was carried out on 10% (8 patients) of the patients, who were later excluded of the main sample study recruited of MS unit, Ain Shams University Hospital to ensure clarity, applicability, relevance, feasibility of study tools and time needed for each tool. Some questions and items were edited or rephrased to finalize the tool.

Field work:

The study was carried out from the beginning of January 2021 to the end of June 2021; including development of the tools. The researchers were visiting the MS outpatient clinic for 3-days/week. Purpose of the study was simply clarified to patients who participate in the study. Data collection was done by the researchers after interviewing each patient individually, and using the same tools for the same patient who fulfilled inclusion criteria; before and after the implementation of the guidelines. The tools were filled after confirming the patients' understanding and readiness. *The collection of data is done through three phases:*

Phase 1: Data collected by the researchers after distribution of the (7) tools for each patient individually, collection of data began by the interview questionnaire, and it's fulfilled by the patient within (10-15 min), and then collected. EDDS is then completed by the researchers. After that, the MS knowledge questionnaire was given to the patient to be answered within about (10-20min); self-efficacy scale, fatigue scale, Morisky medication adherence scale, and MS Self-Management Scale are then distributed at the end to be completed by the patient within about 5-10 min for each scale.

Phase 2: 3 sessions for each patient was established for explanation of the self-management guideline, each session will be completed within (30-45 min).

Phase 3: After the final session, the same tools were distributed again for each patient to be answered to evaluate the effect of self-management gridline implementation. This phase started immediately after the guidelines

were implemented for each patient, the researchers assessed effect of the self-management guidelines on patients level of knowledge, fatigue, self-efficacy, and medication adherence by comparing the results pre, post1 & post2, the 2nd measurement (post1) immediately after implementing the guidelines ,then the 3rd measurement (post2-followup) after 1 month from baseline reading, the researchers done evaluation in his first follow up visit after discharged and contact patients by their telephone numbers to determine the other appointments in order to complete data collection process.

Statistical Design:

The data of study was organized, tabulated and statistically analyzed using the Statistical Package for Social Science (version. 20.0) to evaluate the studied subjects throughout the study phases (pre & post). Statistical analysis including: T-test, Chi-square test, Mean±SD, Coefficient correlation & Alpha Chronbach test. Statistical significance relation was categorized as significant while “p-value ≤ 0.05”, and considered highly significant while “p-value <0.001”

Result

Table (1): shows that, 53.4% of the patients were in age group <20 – 40yrs with mean age 32.36 ± 15.07 , Also 80% were married, 40% were read and write with no illiterates ,73.3% of patients were city resident's, and 66.7% were employed ,also 73.3% were living with their families, and 80% %were smokers or passive smokers.

Figure (1): shows that, 66.7% of the patients under the study were females.

Table (2): shows that, regarding duration with MS46.7% were diagnosed since 5-10yrs, also 53.4% were diagnosed with relapsing remitting MS, while 40% suffered of attacks one time per year, 66.6% were receiving immunomodulatory therapy, the most apparent manifestations were fatigue, pain & motor problems (100%,73.3%, &53.4%) respectively.

Table (3): shows that, regarding EDSS, 26.7% of patients were minimally disabled and 26.7% were moderately disabled but can still walk.

Table (4): shows statistically significant relation regarding MSKQ mean & standard deviations among the patients pre&post1 and pre & post2 implementation of self-management guidelines at p value= <0.001*.

Table (5): shows that, regarding FSS 53.3% of patients were have high fatigue level pre guidelines implementation, while 33.3% were have low fatigue level, and 46.7% were have low fatigue level post guidelines . Also it shows statistically significant relation regarding level of fatigue severity pre, post1, & post2 implementation of self-management guidelines at value=0.004.

Table (6): shows that, regarding SES 26.7. % of patients were have high self-efficacy level pre guidelines implementation, while 33.3% were have high self-efficacy level, and 46.7% were have high self-efficacy level post guidelines . Also it shows statistically significant

relation regarding level of self-efficacy pre, post1, & post2 implementation of self-management guidelines at p value=<0.001.

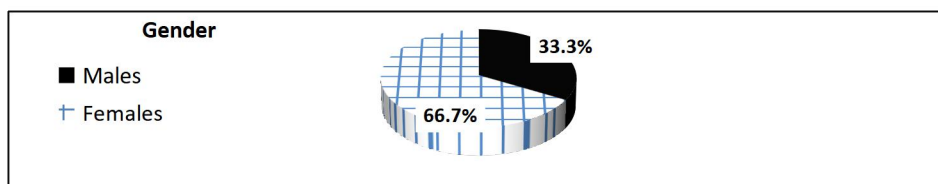
Table (7): shows 60% of patients were have low adherence pre guidelines implementation, while 13.3% were have high adherence, 26.7% were have high adherence post guidelines. Also there is statistically significant relation regarding (MMAS) among the patients pre, post1&post 2 implementation of self-management guidelines at p=0.004*& p=<0.001* respectively.

Table (8): shows that 66.7% of patients were having mild self-management pre guidelines implementation, 26.7% have high self-management, and 40% have high self-management post guidelines. Also there is statistically significant relation regarding ranges of (MSSM) pre&post1 and pre&post2 implementation of self-management guidelines at p=<0.001*.

Table (9): shows there was positive statistically significant correlation regarding all Self- management variables.

Table (1): Characteristics of the patients under the study (No=75).

Items	No	%
Age (In years):		
18 - 20	10	13.3
>20 - 40	40	53.4
40+	25	33.3
Mean±SD	32.36±15.07	
Marital status:		
Married	60	80
Unmarried	15	20
Education:		
Illiterate	0	0
Read/write	30	40
Intermediate/basic	30	40
High	15	20
Residency:		
City	55	73.3
Village	20	26.7
Employment		
Employed	50	66.7
Unemployed	5	6.6
Disability pension	20	26.7
Living status		
With family	55	73.3
Alone	20	26.7
Smoking :		
Yes/Passive smoking	60	80
No	15	20

Figure (1): Gender distribution of the patients under the study (No=75)**Table (2):** Clinical data of the patients under the study (No=75).

Patients' Clinical data	N	%	Mean ±SD
Duration of diagnosis with MS/Years			
<5	10	13.3	
5-10	35	46.7	11.6 ±16.7
10+	30	40	
Type of MS			
Relapsing–remitting	50	66.6	
Primary Progressive	15	20	
Secondary Progressive	5	6.7	
Progressive Relapsing	5	6.7	
Patients' Clinical data	N	%	
Hospital admission /1 year			Mean ±SD
Non	0	0	
1-3	55	73.4	2.3 ±10.7
>3-5	10	13.3	
5+	10	13.3	
Number of relapses /1 year			Mean ±SD
Non	5	6.6	
Once	30	40	
Twice	25	33.4	1.6 ±12.1
More	15	20	
Immunomodulatory therapy			
Yes	50	66.6	
No	25	33.4	
MS current manifestation			
Fatigue	75	100	
Pain	55	73.3	
Visual problems	30	40	
Speech problems	10	13.3	
Motor problems	40	53.4	
Urological problems	15	20	
Gastroenterological problems	20	26.7	
Sexual dysfunctions	10	13.3	
Depression	15	20	
Sleep disorders	15	20	

Table (3): Expanded Disability Status Scale (EDDS) of the patients under the study.

Expanded Disability Status Scale (EDSS)	No	%
0 = Normal	0	0
1<2 = No disability, but some abnormal neurological signs	10	13.3
2<3 = Minimal disability	20	26.7
3<5 = Moderate disability, affecting daily activities, but you can still walk	20	26.7
5<8= More severe disability, impairing your daily activities and requiring assistance with walking	15	20
8<10= Very severe disability, restricting you to bed	10	13.3
10 = Death	0	0

Table (4): Relation among Total Multiple Sclerosis Knowledge Questionnaire (MSKQ) of the patients under the study Pre, Post1 & Post2 implementation of self-management guidelines (No=75).

MSKQ Level	Pre		Post1		Post2		Pre & post1		Pre & post2	
	Mean ± SD		Mean ± SD		Mean ± SD		t-test	P-value	t-test	P-value
Poor	9.7± 4.5		10.2± 7.3		11.8± 5.9		6.441	<0.001*	12.604	<0.001*
Moderate	15.1± 5.2		16.9± 9.7		17.8± 4.6		2.938	<0.001*	17.342	<0.001*
Good	18.8± 7.9		19.5± 8.5		21.8± 4.8		3.699	<0.001*	15.201	<0.001*

Table (5): Relation among Total fatigue severity scale (FSS) of the patients under the study pre&post1 and pre&post2 implementation of self-management guidelines (No=75)

FSS level	Pre		Post1		Post2		Pre & post		Pre & post2	
	No	%	No	%	No	%	X 2	P-value	X 2	P-value
Low fatigue	20	26.7	25	33.3	35	46.7	17.342	<0.001*	18.473	<0.001*
Medium fatigue	15	20	20	26.7	30	40	18.9	0.002*	20.714	<0.001*
High fatigue	40	53.3	30	40	10	13.3	15.3	0.004*	22.473	<0.001*

Table (6): Relation among Self-Efficacy Scale (SES) of the patients under the study pre&post1 and pre&post2 implementation of self-management guidelines (No=75).

SES level	Pre		Post1		Post2		Pre & post1		Pre & post2	
	No	%	No	%	No	%	X 2	P-value	X 2	P-value
High self-efficacy	20	26.7	25	33.3	35	46.7	6.221	<0.001*	9.441	<0.001*
Low self-efficacy	55	73.3	50	66.7	40	53.3	5.625	<0.001*	6.582	<0.001*

Table (7): Relation among Total Morisky medication adherence scale (MMAS) of the patients under the study pre&post1 and pre&post2 implementation of self-management guidelines .

(MMAS-8) level	Pre		Post1		Post2		Pre & post1		Pre & post2	
	No	%	No	%	No	%	X2	P	X2	P
Low adherence	45	60	40	53.3	30	40	2.645	0.004*	3.938	0.002*
Moderate adherence	20	26.7	25	34	25	34	4.587	<0.001*	5.989	0.003*
High adherence	10	13.3	10	13.3	20	26.7	6.441	<0.001*	6.437	<0.001*

Table (8): Relation among Total Multiple Sclerosis Self-Management Scale (MSSM) of the patients under the study Pre, Post1 &Pot2 implementation of self-management guidelines.

(MSSM-R)	Pre		Post1		Post2		Pre &post1		Pre &post2	
	No	%	No	%	No	%	X ²	P-value	X ²	P-value
Mild self-management	50	66.7	45	60	32	42.7	11.241	<0.001*	14.164	<0.001*
Medium self-management	15	20	10	13.3	13	17.3	14.604	<0.001*	22.785	<0.001*
High self-management	10	13.3	20	26.7	30	40	31.074	0.006*	40.021	0.006*

Table (9): Correlation among self-management variables of the patients under the study Pre, Post1 &Pot2 implementation of self-management guidelines (No=75).

Self-management variables	Pre		Post1		Post2	
	r	p	r	p	r	p
MSKQ	0.215	0.025*	0.203	0.035*	0.223	0.020*
FSS	0.195	0.044*	0.215	0.025*	0.193	0.045*
MSSM-R	0.209	0.030*	0.361	<0.001*	0.240	0.012*
SES	0.223	0.020*	0.193	0.045*	0.209	0.030*
MMAS-8	0.204	0.034*	0.215	0.025*	0.223	0.020*

Discussion

Multiple Sclerosis is an unpredictable, difficult-to-control disease with treatment plans focusing mainly on symptom alleviation and delaying disease progression. (Tomczak, Kleka & Wilski, 2020). Several studies show vital proof about the health benefits brought by self-management in people with multiple sclerosis. It is associated with a reduction of fatigue, improvement in health-related quality of life, adherence to medication, and increase in physical functioning (Verdugo et al., 2019).

The characteristics of the studied patients revealed that more than half of MS patients were in the age group <20 – 40yrs with Mean±SD (32.36 ± 15.07), more than two thirds were females, these findings are generally consistent with (Omran et al., 2018) who reported in his study about Early-onset multiple sclerosis that 78% of patients were females at the peak age between 20 and 30 years. As well as (Al Wutayd et al., 2018) who stated that MS usually affects women rather than men, between 20 and 40 years and in their most productive years of life. Moreover (Ortona et al., 2016) in his study about autoimmune diseases, mentioned that

MS is usually diagnosed in young adults and attacks females two to three times as often as males. This is rationalized as MS is assumed linked to females hormones during the bearing age.

Regarding marital status, majority of patients were married, this finding in accordance with (Alhazzani et al., 2018) who revealed that more than half of respondents were married in his study about “Insomnia among non-depressed multiple sclerosis patients”.

According to level of education, it showed that two fifths of MS patients had an Intermediate/basic level and only one fifth with bachelor level, this finding agreed with (Radmehr et al., 2015) who reported in his study about Prevalence & demographics of MS that 78% had diploma degree and below this level of literacy. Also these results in disagreement with (Da Silva et al., 2016) who reported in his study that two fifths of patients had high school level of education.

Regarding residence nearly three quarters of the patients were city residents,

this in contrast with (Flemmen et al., 2020) who found in his study of “Prevalence of MS in rural and urban districts” that an even higher prevalence of MS in the rural areas. Also regarding patients working status, more than two thirds were employed. This is inconsistent with (Radmehr et al., 2015) who stated that, the majority of MS patients were unemployed, also the studies of (Dayapoğlu & Tan (2017), (Goodworth et al., 2014) revealed that more than half of MS patients were unemployed.

According to living situation in this study, the majority of patients lived with family. This finding is coherent with (Da Silva et al., 2016) who confirmed that majority of MS patients was living with family/spouse. Also (Radmehr et al., 2015) mentioned that about half of the patients were living with families.

Regarding to smoking, majority of the patients were smokers or passive smokers, this is supported with (National MS Society, 2020) which stated that smoking is common in patients with MS, and has general negative health hazards, but in addition has been shown to have direct linkages to MS disease activity. This is might be due to that most of the subjects were housewives living with smokers' husbands or relatives.

Regarding duration of diagnosis with MS, nearly half of MS patients had diagnosis durations from five to ten yrs; this result in the same line with (Alhazzani et al., 2018) who reported that the mean duration of disease diagnosis was around five years. While this in contrast with (Omran et al., 2018) who confirmed that mean time interval between the first symptom and disease diagnosis was around two years.

As related to the hospital admission frequency per year, it was recorded that nearly three quarters of MS patients hospitalized at least from one to three times per year, in addition two fifth of patients

have relapses at least once per year. This supported by (Ghafari et al., 2014) who clarified that more than three quarters of MS patients usually undergo hospitalization several times because of relapses phases. Also (Marrie et al., 2014) mentioned that around one third of the MS population being hospitalized annually. Furthermore (Lavery et al., 2016) & (Garland et al., 2017) found the median number of hospitalizations per year was at least from one to two times with a median hospital stay of four days. This is due to the disease deteriorations which causing multiple hospital admission.

According to type of MS, more than two thirds of patients diagnosed with relapsing-remitting MS, this supported with the study of Wilski et al (2021) & (National Health Service, 2021) who referred that relapsing remitting MS affecting about 85% of patients, and more than 8 out of every 10 people with MS are diagnosed with the relapsing remitting type.

In the current study more than two thirds were receiving immunomodulatory therapy this in agreement with the study of (Kalincik, Diouf & Sharmin, 2020) who found in his study of Effect of Disease Modifying Therapy that 69% were of the patients were exposed to immunotherapies, also this finding in agreement with (Alhazzani et al., 2019) who study "The Treatment satisfaction and adherence to medications among MS patients" and found that the most used drug was immunotherapy. This is might be due to that most patients with relapsing-emitting MS follow immunotherapies which directly suppress the immune system.

Regarding the most apparent manifestations were fatigue, pain & motor problems this is in the same line with the Verdugo et al (2019) who study the Adherence to disease-modifying treatments in patients with MS, and found that MS-related symptoms/impairments were reported

by nearly three quarters of patients with mobility impairment. Other symptoms included: fatigue or loss of strength (29%); visual, hearing, or vocal impairments (20%); lack of sensibility or cramps (20%); genitourinary impairments (7%); and cognitive impairments (7%). Help from third parties was required by 42% of patients, mainly for household chores (41%) and assistance in moving (29%). This is due to MS can cause a wide range of symptoms and affect any part of the body, as each person with the disease is affected differently.

Regarding expanded disability status scale of the patients showed that only one quarter were minimally disabled and also one quarter were moderately disabled but can still walk, this is in agreement with (**Shawli, Abdulmutalib & Nagshabandi, 2019**) who study "Fatigue and Self-management among Multiple Sclerosis Patients" and found that only 8% not working (disable) or receive assistance. This is due to the effect of autoimmune disease on the whole body systems.

Regarding relation of Total Multiple Sclerosis Knowledge Questionnaire of the patients under the study through Pre, Post1 & Post2 implementation of self-management guidelines showed a statistically significant relation regarding MSKQ, this in accordance with (**Afrasiabifar et al., 2016**) who studied Fatigue and Self-management among MS Patients, and found that in the intervention group, T-test showed a significant difference before and after the intervention, and a significant difference was observed in the direction of increasing knowledge. This emphasizes that patients awareness is extremely improved by patient orientation and continuous learning.

Regarding relation of Total Fatigue Severity Scale of the patients under the study through Pre, Post1 & Post2 phases, illustrated that more than half of patients were have high fatigue level pre guidelines

implementation, while one third were have low fatigue level post1, and less than half were have low fatigue level post2 with a significant difference regarding level of fatigue severity through pre, post 1 & post 2 implementation of self-management guidelines this agreement with (**Shawli Abdulmutalib, Nagshabandi, 2019**) who clarified that 26% of the Multiple Sclerosis patients are suffering severe cognitive fatigue, 40% with a medium cognitive fatigue While 70% suffering severe physical fatigue, 10% with a medium physical fatigue and 20% with a mild physical fatigue. Moreover that 34% experiencing severe psychosocial fatigue, 46% with a medium psychosocial fatigue and 48% of overall fatigue subscales had sever fatigue level, 44% had medium fatigue level and 8% of had mild fatigue level with statistically significant differences between physical and psychosocial fatigue related to overall self-management. This is due to that fatigue is the most common symptom among patients with MS.

Regarding relation of Self-Efficacy Scale of the patients under the study through Pre, Post1 & Post2 phases, clarified that, only one quarter of patients were have high self-efficacy level pre guidelines implementation, while one third were have high self-efficacy level post1, and about half were have high self-efficacy level post2. Also it showed a significant difference regarding level of self-efficacy through pre, post 1, & post 2 implementation of self-management guidelines this in agreement with (**Maslakpak and Raiesi (2014)**) who found that independent sample showed no significant difference in mean scores of baseline self-efficacy between the control group and the intervention group. However, a significant difference in self-efficacy mean scores was observed between the control group and the intervention group at the end of the study.

In the respect of Total Morisky medication adherence scale of the patients under the study through Pre, Post1 & Post2

implementation of self-management guidelines, showed a statistically significant relation regarding low & high (MMAS) among the patients, this incongruent with Verdugo et al (2019) who stated that nearly three quarters of patients were adherent, in addition there were no differences based adherent on the administration route (oral vs. injectable).

However, in injectable route, there was higher adherence in patients with IV than those with SC. There was also a significantly greater difference between adherence to IV

Regarding relation of Total Multiple Sclerosis Self-Management Scale (MSSM) of the patients under the study through Pre, Post1 & Post2 implementation of self-management guidelines clarified that, a statistically significant relation regarding ranges of (MSSM) pre, post1 & post2 implementation of self-management guidelines, this in agreement with study done by (Morowati et al., 2016) who reported that half of patients with MS performed self-care behaviors. In addition, the participants in the study were those who did not have a long history of illness, the results suggest that the longer the disease duration, the greater the self-care behaviors. (Zarei, Vagharseyyedin & Gorganie, 2015) also emphasized that self-management behaviors in patients can be prompted by several factors, such as age and self-management knowledge, and this requires further studies in the future.

Regarding Correlation among self-management variables of the patients under the study through Pre, Post1 & Post2 phases, showed positive statistically significant correlation regarding all measured variables of self-management. This finding is consistent with (Rommer et al., 2018) in his study about Coping behavior among patients, and clarified that MS causes multiple stressors for patients, in which all required different methods of coping, influenced by the level of impairment, and tackling more intensively with their disease.

and oral treatment. Also this finding in agreement with Alhazzani et al., 2019 who was found that only 9.7% of MS patients were “adherent” to medications while the majority were “non-adherent to medications. This is due to that adherence is an vital aspect of boosting patient care in MS as greater adherence has been shown to be associated with enhancements in relapse outcomes and quality of life, fewer hospitalizations and emergency room visits, decrease in neuropsychological issues, minimum days of work lost & lower MS related medical cost compared with non-adherence.

Furthermore Dehghani & Keshavarzi (2018) mentioned that demonstrating a desirable individual performance such as modulation of activities, appropriate environments, having adequate knowledge about the disease, good, seeking for further information about MS, are all stated that patients can successfully handle with disease through self-management behaviors.

Conclusion:

Our results have shown the significance of developing effective self-management strategies to reduce the disease consequences and improve therapeutic adherence. Despite the functional limitation imposed by the disease, greater attention to physiological and psychological aspects might be considerable in ensuring a greater state of well-being.

Recommendations:

Researchers recommended the following:

Implications for Nursing Practice

- Accomplishing a periodic patient's self-management guidelines program to provide healthy lifestyle among patients with MS.
- Nurses can act as advocate through aiding patients to overwhelmed physical, cognitive and psychosocial obstacles to

treatment. So, they turn out to be active members and participate in decision making and treatment options.

Implication for Future Research

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- The study can be replicated on a larger sample using pre and post assessment intervention design to generalize the results.

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