Effect of an Educational Program about Management on Relapse Multiple Sclerosis Patients

[1] Sara Lmloum Noaman , [2] Eman Saleh Mohamed Shahin, [3] sherief M. Al. shazly,[4] Mona Abed El-Rahman Mohammed

[1] Clinical instructor at Faculty of Nursing, Damietta University
[2] Professor of Medical Surgical Nursing, Faculty of Nursing- Port Said University,
[3] Professor of neurology, Faculty of Medicine - Al-Azhar University, Damietta
[4] Professor of Medical Surgical Nursing, Faculty of Nursing - Port Said University.

Abstract: -Background: Multiple sclerosis (MS) is the leading cause of neurologic disability in young adults. Although not generally a fatal disease, the social impact of disability caused by MS is substantial. MS results in loss of employment, causes dependency on care providers, and often leads to social isolation .

Subjects and Method: Design This study will employ a single group quasi-experimental research design (pre and post).

Setting: The investigation was carried out in the neurology department and clinics of Al-Azhar University Hospital in Egypt, Damietta.

Subjects: 150 patients, both male and female, were included in the a purposive sample.

Tools: The Multiple Sclerosis Functional Composite Scale (MSFC) was one instrument used to gather the current study data, In addition to personal characteristics. **The Results**: The result of the present study reveals that ,53.3% of the patients in the study were female, and 81.3% of the patients were older than 40 years old The study variables before and after the intervention showed a statistically significant difference, with a P value of 0.00 for the 25-foot walk time, nine-hole peg test, and cognitive function.

Conclusion: The results of the current study concluded that the educational program intervention could led to a reduction in relapses.

Recommendations: creating and carrying out ongoing programs based on patients' requirements and understanding to reduce relapses.

Key words: Educational program , Management , Relapse, multiple sclerosis

INTRODUCTION

Multiple sclerosis (MS) is the leading cause of neurologic disability in young adults. Although not generally a fatal disease, the social impact of disability caused by MS is substantial. MS results in loss of employment, causes dependency on care providers, and often leads to social isolation. MS affects women two to three times as often as

men. MS is rare in the pediatric population, but its risk increases steadily from adolescence up to the age of 35 and then gradually decreases. MS is rarely diagnosed after the age of 65 [1]

Relapses represent episodes of new or worsening neurological symptoms and are a major determinant of disease progression, disability, and reduced quality of life. The management of relapses in MS patients requires not only medical treatment but also active patient engagement in self-care, lifestyle modifications, and adherence to therapeutic regimens [2].

Between 50% and 80% of patients report experiencing fatigue, which is one of the most common and incapacitating signs of MS [3]. One of the most common problems among MS patients is loss of balance, which can result in falls and serious injuries. MS patients may require regular treatment interventions and have years of severe mobility impairments because they usually live long lives. Poor route integration may affect postural response in maintaining proper balance, increasing the risk of falls for MS patients due to the extensive distribution of brain damage in the disease[4].

One of the primary variables that may influence the onset and course of MS is lifestyle. According to the World Health Organization (2008), the term "lifestyle" refers to specific and measurable behavior that is composed of responses to environmental factors, socioeconomic circumstances, social relationship reactions, and individual characteristics. In the meantime, MS patients should maintain and improve their health, avoid relapses, and avoid exaggerating their symptoms by leading healthy lives and engaging in certain activities. These include eating a balanced diet, getting enough sleep, exercising, managing body weight, and abstaining from smoking [5] .

Educational programs are recognized as essential components of chronic disease management, as they provide patients with knowledge, coping strategies, and skills to actively participate in their care. For MS patients, education about relapse management can improve awareness of early warning signs, enhance treatment compliance, and promote behaviors that reduce relapse frequency and severity. Nurses play a central role in delivering such programs due to their direct involvement in patient education, counseling, and support. [6]

The fundamental objectives of nursing management for MS patients are to teach patients about the disease process, prognosis, and necessary treatments, as well as to motivate them to maintain healthy lifestyles in order to enhance their health and avoid relapses. Increasing physical mobility, easing weariness, lowering discomfort, preventing injuries and enhancing cognitive function are some of these objectives [7]

A healthy lifestyle is crucial for preserving the health of MS patients, preventing relapses, and slowing the disease's course, according to recent studies . Nurses are essential in helping MS patients and their families comprehend the course and prognosis of the condition as well as the need to maintain a balanced lifestyle that enhances their health. In addition, the nurse coordinates the creation of care plans for MS patients that involve every member of the family. Additionally, the nurse collaborates with physiotherapists, psychologists, and dietitians to create treatment plans for MS patients that support them in adopting healthier lifestyles. [8] - [9] - [10]

Significance of the study:

Multiple sclerosis (MS) is a chronic neurological disease that significantly impacts patients' physical, emotional, and cognitive functioning. In Egypt and many developing countries, there is still limited awareness about MS and

insufficient access to continuous patient education and self-management strategies. The disease imposes a considerable burden not only on the patient but also on caregivers and the healthcare system [11].

Ultimately, the significance of this study lies in its potential to promote patient-centered care and encourage the integration of health education as a standard component in the nursing management of MS. By enhancing patient knowledge and encouraging proactive behaviors, nurses can play a vital role in improving long-term outcomes and reducing the disease burden on both individuals and the healthcare system [12] .

Incorporating structured education programs into the nursing care plan helps patients better understand their condition, adhere to treatment regimens, and make informed decisions about their lifestyle. Given that MS is a lifelong condition with no known cure, education becomes a cornerstone in managing symptoms and preventing complications [13]

The study aimed to

explore the effect of an educational program about management of the relapse in multiple sclerosis patients.

Objectives

1) Determine the level of disability in patients with relapsed multiple sclerosis.

2) implement a planned educational program for MS patients who experience relapses into action.

3) Assess the impact of the educational program's implementation on MS patients who experience relapses.

Research hypotheses

- Patients with multiple sclerosis will experience fewer relapses following the implementation of an educational program.

Subjects and methods

Subjects and methods for the study will be portrayed under the four main designs as follows:

1. Technical design.
2. Operational design.
3. Administrative design.
4. Statistical design.

I. Technical design

A description of the research design, environment, subjects, and data collection instruments are all included in the technical design.

Research design

One group Quasi-experimental research design (pre and post) will be used in this study**.**

Setting:

The neurology department and clinics (multiple sclerosis unit and clinic) of Al-Azhar University Hospital, Damietta served as the site of this inquiry.

Sample

A purposive sample of both male and female patients admitted to the aforementioned data collection setting.

Inclusion criteria

Adult patients, Both genders (male and female), Patients with different educational level and able to comprehend instructions, Patients who were in clinical remission or after 3 weeks of acute relapse, to avoid the effect of steroids given for treatment of

acute relapse, on mood, Expanded disability scale < 4, Mild Cognitive and memory impairment according to mini mental state examination, Patients who didn't receive any educational guidelines about relapsing.

Exclusion criteria:

Severe Cognitive and memory impairment according to mini mental state examination, Patients with history of head trauma, Patients with severe psychiatric disorder , and patients their Expanded disability scale ≥ 4.

Sample Size Calculation

Using the following formula, the researcher will determine the sample size using Steven K. Thompson's (2018) equation:

$$n = \frac{N \times p(1-p)}{\left[\left[N-1 \times \left(d^2 \div z^2\right)\right] + p(1-p)\right]}$$

$$n = \frac{(246 * 0.5)(1-0.5)}{(246-1)\left(\frac{0.0025}{3.8416}\right) + (0.5)(1-0.5)} = 150.2056$$

Where,

n: sample size (150)

N: Population size (246)

Z: confidence level at 95% (1.96)

d: Error proportion (0.05)

p: Probability (50%)

Tool for data collection:

Tool (I):

Multiple Sclerosis Functional Composite Scale (MSFC): was created by Richard Rudick and the National MS Society (NMSS) in 1996. is a three-part, multidimensional performance scale used to evaluate the level of impairment in MS patients. Part I measures ambulation and lower extremity function, Part II measures upper extremity (hand and arm) function, and Part III measures cognitive function, which allows for the evaluation of focus, auditory information processing speed, flexibility, and calculation [14]. In addition to personal characteristics and clinical data e.g., age, sex, marital status, the patient's monthly income, work, education level, duration of the disease, what are the causes that led to this disease, suffering from other chronic diseases, smoking, the number of smoking times per day, disease modifying treatment , follow-up appointments inside the clinic and frequency of visiting the clinic.

Scoring system of multiple sclerosis functional composite:

Formula For Creating the MSFC Score:

average MSFC Score = {Zarm+ Zleg+ Zcognitive} / 3.0

Where Zxxx=Z-score.

There are three components to the MSFC:

The average scores from the four trials on the 9HPT (two trials for each hand are ave raged, converted to the reciprocals of the mean times for each hand, and then the two reciprocals are averaged); the average scores of two trials on the 25Foot Timed Wal k; and the number of correct answers from the PASAT3 comprise the MSFC.The MS FC is predicated on the idea that assessments of arm, leg, and cognitive function are aggregated to produce a single score (the MSFC), which can be used to identify chan ges over time in a cohort of MS patients.This is accomplished by calculating Zscores for every MSFC component, as detailed below, and averaging them to get the MSF

C score, an overall composite score. The notion that patients who improve or deteriorate on all three component measures will have a greater overall change than those who only change on one of the three variables is implied in this method. Additionally, because the MSFC is the average change across the three tests, patients who improve in one area but deteriorate in another may not show any change on the MSFC. [15]

(2) Operational design

The operational design includes fieldwork, pilot research, content validity, and the preparatory stage. In order to develop techniques for gathering data, it involves assessing literature, a large number of studies, and theoretical knowledge of many aspects of the topic through the use of books, research papers, journals, magazines, the internet, and other sources. Visit the official websites of Ebesco, the Cochrane Library, and PubMed.

B- Validity

It was ascertained by a Jury consisting of eleven experts 4 in the field of medical surgical nursing who were from the Faculty of Nursing at Port Said University , 4 in the field of medical surgical nursing who were from the Faculty of Nursing at Damietta University, 3 in the field of medical department who were from the faculty of medicine at Al-azhar New Damietta University . They were requested to express their opinions regarding the clarity, relevance, and construction of the translated tools. The required modifications according to experts' opinions were done.

C-Reliability

Cronbach’s Alpha coefficient was calculated to assess the internal consistency reliability of the tool. This reliability testing was conducted over a one-month period.

The Multiple Sclerosis Functional Composite (MSFC) demonstrated excellent intra-rater reliability, with an intraclass correlation coefficient (ICC) of 0.97, and strong inter-rater reliability (ICC = 0.95), alongside sustained repeatability (ICC = 0.96) over a six-month interval .[16]

D- Pilot study

To assess the tools' applicability, pilot research was conducted on 10% of patients who would not be included in the sample. Based on the findings, the necessary adjustments will be made, and the time required for data collection will be estimated.

E-Field work:

Using a pre-built instrument, the researcher will begin data collection and expect it to be finished within six months from the date of 1/7/2024 to 30/12/2024 ,The researcher will complete the questionnaire sheet. Before receiving the questionnaire, the goal of the study will be described. The following actions will be of concern to the researcher during this phase:

1. **Assessment phase:** this includes the assessment of multiple sclerosis patients functions using Multiple Sclerosis Functional Composite Scale (MSFC). .
2. **Planning and designing phase:** based on the pre-assessment data and related literature review [17], [18] ,the researcher will design an educational program about healthy lifestyles to reduce physical disability levels among MS patients.
3. **Implementation phase:** the program will be carried out in 4 sessions. Sessions will be given in the form of group teaching classes and discussions in the waiting area. The duration of the sessions will be about 30 minutes. The

number of sessions may be increased according to the participant's understanding. The summary will be given after each session and at the end of the program. A handout/booklet containing the main points will be distributed to MS patients at the end of the program. Educational program aides (posters and PowerPoint presentations) will be utilized to enhance education.

4. **Evaluation phase:** evaluating the effect of the educational program on MS patients will be done in this phase. The same tool of pre assessment phase was applied immediately to a post-program with the MS patients that participated in the study to evaluate the adapted evidence-based program among MS patients after the program.

(3) Administrative design:

The chosen area of study was getting an official letter from the Dean of the Faculty of Nursing at Port Said University before any stage in the study is begun (New Damietta – AlAzhar university). The director of each set will be contacted and informed to obtain permission to include the nurses and patients in the present research.

Ethical consideration

Approval was taken from the research ethic committee of the faculty of nursing, at Port Said University. Ethical code NUR (4/6/2023) (26) Moreover, approval will be taken from hospital directors to participate in the study after an explanation of the study's aim. Moreover, approval was taken from each participant (patients) after an explanation of the study's aim and a detailed data collection process to be familiar with the importance of his / her participation. In addition, a brief and comprehensive explanation of the study was given to assure nurses that the information obtained will be confidential and used only for the study.

The studied participants (patients) were informed that their participation is voluntary & they have the right to withdraw from the study at any time without rationalization. Additionally, all data collected from the subjects studied was processed in total confidentiality. Moreover, the process of data collection was not disturb the harmony of the work of the above-mentioned setting.

(4)-Statistical design:

Upon completion of the data collection, collected data was managed, coded, arranged, entered and analyzed according to the type of data to answer the research questions using SPSS version 18. Data presentations were done using suitable tables, graphs and appropriate statistical tests to realize the research objective.

RESULTS

Table (1): reveals that, 81.3% of the patients in the study were over 40 years old , with a mean score of 54.07 ±15.40 , 53.3% were females, 67.3% were married, 42.7% had only a basic education, and 72% of the patients had no job while 28% had a job.

Table (2): Shows that regarding trail 1, there was a statistical significant difference related to time of 25-foot walk test between pre and post intervention among studied patients with P-value of 0.001. Concerning trail 2, there was a statistical significant difference related to time of 25-foot walk test between pre and post intervention among studied patients with P value of 0.001.

Table (3): Regarding trail 1, there was statistical significant difference related to nine-hole peg test between pre and post intervention among studied patients with P-value of 0.001. Concerning trail 2, there was statistical significant difference related to nine-hole peg test between pre and post intervention among studied patients with P-value of 0.001.

Table (4): Regarding trail 1, there was statistical significant difference related to cognitive function test between pre and post intervention among studied patients with P-value of 0.001. Concerning trail 2, there was statistical significant difference related to cognitive function test between pre and post intervention among studied patients with P-value of 0.001.

Part I: Demographic characteristics of the multiple sclerosis patients

Table (1): Demographic characteristics of studied patients (n=150)

Demographic characteristics	No	%
Age		
≤30 yeas	6	4.0
30 to 40 years	22	14.7
≥ 40 years	122	81.3
Mean/SD	54.073±15.404	
Gender		
Male	70	46.7
Female	80	53.3
Marital status		
Single	21	14.0
Married	101	67.3
Divorced	12	8.0
Widower	16	10.6
Education level		
Can't read or write	34	22.7
Basic education	64	42.7
Secondary education	38	25.3
University education and above	14	9.3
Work		
Works	42	28.0
Does not work	108	72.0

Part II: Multiple sclerosis functional composite

Table (2): Comparison the time for 25-Foot Walk between the pre and post intervention among studied patients (n=150)

Items	Pre				Post			
	Yes		No		Yes		No	
	N	%	n	%	n	%	n	%
Did patient wear an ankle foot orthosis	56	37.3	94	62.7	42	28.0	108	72.0
Was assistive device used	92	61.3	58	38.7	69	46.0	81	54.0
Unilateral assistance device	**n=52**				**n=48**			
Cane	32	61.5	20	38.5	28	58.3	20	41.7
Crutch	20	38.5	32	61.5	20	41.7	28	58.3
Bilateral assistance device	**n=40**				**n=21**			
Cane	12	30.0	28	70.0	15	71.4	6	28.6
Crutch	23	57.5	17	42.5	4	19.1	17	80.9
Walker/Rollator	5	12.5	35	87.5	2	9.5	19	90.5
Trial 1								
Time Mean±SD /sc	81.2200±25.454				65.173±25.112			
Completed trial	96	96.0	54	36.0	134	89.3	16	10.7
Unable to complete trial due to phys limitations	35	23.3	115	76.7	16	134	89.3	82.0
P-Value	0.001**							
Trial 2								
Time Mean±SD /sc	82.62±23.830				62.25±24.603			
Completed trial	99	66.0	51	34.0	142	94.7	8	5.3
Unable to complete trial due to phys limitations	35	23.3	115	76.7	8	5.3	142	94.7
Did it take more than two attempts to get two successful trials?	36	24.0	114	76.0	29	19.3	121	80.7
P-Value	0.001**							

** Statistically significant at P<0.05

Table (3): Comparison the nine-hole peg test between the pre and post intervention among studied patients (n=150)

Items	Pre				Post			
	Yes		No		Yes		No	
	No	%	no	%	no	%	no	%
Trial 1								
Time Mean/Sc	99.153±43.413				65.420±17.355			
Completed trail	86	57.3	64	42.7	126	84.0	24	16.0

Unable to complete trial due	**n=64**				**n=24**			
dropped a peg	6	9.4	58	90.6	0	0.0	24	100.0
difficulty seeing pegs	11	17.2	53	82.8	10	41.7	14	58.3
unable to use right hand	12	18.8	52	81.2	4	16.7	20	83.3
Numbness or tingling	44	68.8	20	31.2	10	41.7	14	58.3
P-value	0.001**							
Trial 2								
Time Mean/Sc	99.153±43.413				58.96±19.323			
Completed trail	86	57.3	64	42.7	126	84.0	24	16.0
Unable to complete trial due Specify:	**n=64**				**n=24**			
dropped a peg	8	12.5	56	87.5	0	0.0	24	100.0
difficulty seeing pegs	16	25.0	48	75.0	10	41.7	14	58.3
unable to use right hand	10	15.6	54	84.4	4	16.7	20	83.3
Numbness or tingling	30	46.9	34	53.1	10	41.7	14	58.3
Did it take more than two attempts to get two successful trials?	42	28.0	108	72.0	6	4.0	144	96.0
If yes, please specify the reason(s) for more than two attempted trials	**n=42**				**n=6**			
difficulty seeing pegs	5	11.9	37	88.1	3	50.0	3	50.0
unable to use right hand	16	38.1	26	61.9	2	33.3	4	66.7
Numbness or tingling	21	50.0	21	50.0	1	16.7	5	83.3
P-value	0.001**							

** Statistically significant at P<0.05

Table (4): Comparison the cognitive function between the pre and post intervention among studied patients (n=150)

	Pre	Post

PASAT 1	Yes		No		Yes		No	
	No	%	no	%	no	%	no	%
Correct answer Mean±SD	23.893±14.8708				38.780±11.449			
Completed PASAT	49	32.7	101	67.3	87	58.0	63	42.0
Unable to complete trial due to physical limitations	**n=101**				**n=63**			
Problems with memory	52	51.5	49	48.5	31	49.2	32	50.8
Problems with concentration	41	40.6	60	59.4	21	33.3	42	66.7
Troubles with understanding information	23	22.8	78	77.2	12	19.1	51	80.9
P-value	0.001**							
PASAT 2								
Correct answer Mean±SD	24.48±14.565				38.38±10.305			
Completed PASAT	50	33.3	100	66.7	88	58.7	62	41.3
Unable to complete trial due to physical limitations	**n=100**				**n=62**			
Problems with memory	50	50.0	50	50.0	30	48.4	32	51.6
Problems with concentration	44	44.0	56	56.0	21	33.9	41	66.1
Troubles with understanding informat	22	22.0	78	78.0	12	19.4	50	83.8
Did it take more than one attempt to get one successful trial	62	41.3	88	58.7	22	14.7	128	85.3
Reason(s) for more than one attempted trial	**n=62**				**n=22**			
Problems with memory	35	56.5	27	43.5	10	45.5	12	54.5
Problems with concentration	43	69.4	19	30.6	13	59.1	9	40.9
Troubles with understanding information	26	41.9	36	58.1	9	40.9	13	59.1
P-value	0.001							

** Statistically significant at P<0.05

DISCUSSION

The findings of the current study revealed that more than half of patients were females, this goes in the same line with the study of (Kamali et al., 2022) which found that approximately 75% of Patients were females. This significant gender difference may be due to several factors as biological, environmental, and hormonal which contributing to increased susceptibility in women [19] .

The results of the current study highlighted the 25-foot walk test, demonstrating that there was a statistically significant difference in the time spent on the test between the

pre and post-intervention periods for both trial 1 and trial 2. This finding is supported by the result of a study conducted by Stellmann et al. (2021) who supported the reliability and sensitivity of the T25FW in detecting subtle changes in mobility over time Moreover and (Kalinowski et al., 2022) demonstrated that rehabilitation strategies focusing on strengthening, balance training, and endurance can markedly improve walking capacity, highlighting the importance of structured interventions [20] [21].

improvements in walking ability are not only related to physical training but also to psychological factors such as motivation and patient engagement. For example, Learmonth et al. (2023) found that repeated walking assessments provide a motivational effect, encouraging patients to push their physical limits and perform better over successive trials[22].

From researcher`s point of view, these outcomes may be explained by MS patients' walking abilities gradually increasing over time as a result of repeated trials, which enhance gait efficiency and functional mobility among patients with multiple sclerosis (MS). Walking impairment is one of the most disabling symptoms of MS, and interventions targeting mobility have been shown to significantly influence functional outcomes.

Concerning the Nine-Hole Peg Test, a statistically significant difference was observed in both trail 1 and 2 for the upper extremities between pre and post intervention among studied patients. These results were in the same track with (Grange et al.,2023) who confirmed a significant correlation between the 9-HPT scores and patient-reported upper limb function in individuals with multiple sclerosis [23].

It can be explained that the benefits of repeated learning and demonstration for MS patients include improving skills and increasing their confidence. Therefore, repeating the test led to a clear improvement in the patient`s upper extremities performance.

According to cognitive function test, there was a statistically significant difference observed in trail 1 between pre and post intervention among studied patients. This result disagreed with a study carried out by Dubois et al. (2025), who found that there were no significant cognitive changes in individuals with mild cognitive impairment after a comparable intervention [24].

From the researcher's point of view, the variation in results could be explained by differences in sample characteristics, the severity of cognitive dysfunction. These results can be explained by the fact that the arithmetic process is one of the most important things that measures patient concentration and his/her ability to remember, and this led to improve patient memory and cognitive function.

Finally, from researcher`s perspective ,this difference of three components of Multiple sclerosis functional composite tool in results may be attributed to cultural abilities. Therefore , the researcher-initiated lifestyle changes for patients by guiding them regarding both a healthy diet and its importance, as well as strength and balance. Rest and sleep are also recommended, and patients are provided with an information booklet containing all these tips and instructions.

CONCLUSION :

There was more than half of patients were females. There was a significant positive correlation between the time required to complete the Timed 25-Foot Walk (T25FW), the Nine-Hole Peg Test (9HPT), and cognitive function scores observed in both trail 1 and 2 . The results of the current study have proven that the educational program intervention led to a reduction in relapses of the MS patients.

RECOMMENDATIONS:

Based on the results of the present study, the following recommendations were suggested:

Regular educational programs are essential for MS patients to increase their awareness, improve their health and prevent recurrency of relapses. Further cognitive and behavioral studies should be undertaken to strengthen social support mechanisms, increase the supportive participation of family members and to develop motivational techniques to increase the MS patient`s compliance and motivation.

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