Effect of Self- Care Management Strategy on Self-Efficacy for Patients with Myasthenia Gravis

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Abstract

Myasthenia gravis (MG) is a chronic, auto-immune disease of the neuromuscular junction. The incidence is estimated to be 30 per 1,000,000 people per year worldwide. **Aim:** the study aimed to evaluate the effect of self- care management strategy on self- efficacy for patients with myasthenia gravis. **Design:** Quasi-experimental design was utilized in this study .**Setting** :The study was carried out at the neurological departments and neurology outpatient clinic at Benha University Hospital during the period from the beginning of june2019 to the end of june2020. **Sample :**purposive sample of 50 patients. **Tools**: four tools used to collect the study data .These are structured interview questionnaire to assess patients' knowledge regarding myasthenia gravis, MG Activities of Daily Living Scale, fatigue severity scale and general self-efficacy scale **Results :**showed that the majority of the study sample were females , married , were living in rural area with family and half of them have secondary education, statistically significant difference in term of increased in mean score of total knowledge among study sample, as well as a decrease in total mean score of MG activity of daily living, besides, lower degree of fatigue and improve level of self –efficacy for MG patient after self –care management strategy implementation .**Conclusion :**Implementing a self-care management strategy for patients with myasthenia gravis was effective in improving knowledge, MG activity of daily living score, self-efficacy and decrease level of fatigue. **Recommendation :** Replication of the current study on larger probability sample is recommended to achieve generalizability and broader utilization of the designed program.

Keywords: Myasthenia gravis, self-care- management strategy, self-efficacy

Introduction

Myasthenia gravis (MG) is the most common neuromuscular junction disease, with a prevalence of 50–125 per million population **(Vitturi, et al., 2020)**. it's an immune-mediated neuromuscular junction disorder characterized by fluctuating muscle weakness and easy fatigability **(Che-Wei, et al., 2020).**MG can begin in any age group, with incidence about three times higher in women in the age group up to 40 years, but with an increase in the male proportion in the age group over 50 years. Etiology of the disorder is unknown but the role of circulating antibodies directed against the nicotinic acetylcholine receptor in its pathogenesis is well established **(Vitturi, et al., 2020).**

In addition to muscle weakness, frequent concomitant clinical symptoms of the disease are droopy eyelids (ptosis) — unilateral, bilateral, alternate (in 50–

90% of patients), blurred vision and even diplopia (15% of patients), drooping jaw, weakening voice and slurred speech. About two-thirds of patients have dysphagia and dysarthria. Proximal limb and neck weakness is reported by 20–30% of patients visiting a doctor. A head drop is also a frequently reported symptom. Other symptoms include respiratory insufficiency related to weakness of diaphragm and respiratory muscles **(Kołtuniuk, et al., 2017**). Although advances have been made in understanding of disease pathogenesis and treatment, many patients have MG exacerbations, which often require hospitalization and treatment **(Cutter, et al., 2019).**

Self-efficacy is extremely important to patients living with a chronic disease such as MG. If the developer of an self-management program can incorporate interventions that increase sources of self-efficacy, patients will gain confidence in managing their disease and control it, which can positively impact on effort and perseverance when living with a chronic disease **(Tigner, et al., 2018)**.

Self-management is defined as the day-to-day management of chronic conditions by individuals over the course of an illness. Although self-management is often used interchangeably with terms such as self-care, self-regulation, patient education, and patient counseling, self-management has evolved beyond the practice of merely providing information and increasing patient knowledge **(Clark, et al., 2018).**

The chronic disease self-management program was designed to meet the needs of managing day-to-day treatment and maintaining daily life activities and has proven successful at improving health behaviors and health status, resulting in fewer hospitalizations overall and fewer days spent in the hospital.The feasibility of self-management intervention programs that cut across a variety of chronic illnesses, leading to positive health outcomes. Self-management represents a promising strategy for treating chronic conditions—moving beyond education to teach individuals to actively identify challenges and solve problems associated with their illness and managing it in later life **(Clark, et al., 2018)**

The role of MG nurse is explaining the disease, anticipating potential issues and providing support and guidance. The direct practice skills of nurse, combined with their ability to collaborate, educate and manage patients holistically, are essential to this population and provides added value to an MG self-management program. Given their skills, knowledge and training, also can facilitate effective coping with MG while reacting and responding to disease-specific symptoms that are affecting patient health. And proactively prescribe, order tests and refer to other health-care providers if necessary. It is anticipated that the involvement of a nurse practitioner in a myasthenia gravis self -management program (MGSMP) would result in fewer patient crises and, subsequently, fewer visits to the emergency room **(Hamel & Ciafaloni, 2018).**

MG nurse can play an invaluable role in developing, facilitating and researching an MG-specific self-management program because of their

direct practice skills, combined with the ability to collaborate, educate and manage patients holistically **(Tigner, et al., 2018)**.

Significance of the Study:

Myasthenia gravis is a disease affecting 10–15 per 100 000 people. Myasthenia gravis can affect people of any age, however it most commonly occurs in women aged 20–30 and in men aged 50–60. There are quite frequent cases of familial predispositions to develop myasthenia; however it is not a hereditary disease **(Tigner, et al., 2018)**.

Aim of the study:

This study aimed to evaluate the effect of self- care management strategy on self- efficacy for patients with myasthenia gravis.

Research hypotheses:

The following research hypotheses were formulated to achieve the aim of this study:

Hypothesis (1): Improvement of patient's knowledge after self-care management strategy implementation than before**.**

Hypothesis (2): The mean score of MG - activity of daily living for patients will be improved (disability decreased)after self-care management strategy implementation

Hypothesis (3): The mean score of fatigue of patients with myasthenia gravis will be decreased after self-care management strategy implementation.

Hypothesis (4): The mean score of self – efficacy for patients with myasthenia gravis will be improved after self-care management strategy implementation.

Research Design:

A quasi-experimental research design was utilized to conduct this study.

Setting:

This study was conducted at neurological departments at Benha University Hospital which located in the seventh floor at medical building and containing three rooms, each room containing eight beds.

Subjects:

Type: Purposive sample.

Size: The sample size of patients was calculated based on the previous year census report of admission in the neurology department from Benha University Hospital Census, 2018.

Utilizing the following formula

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

n= sample size

N= total population (58)

e= margin error (0.05)

A purposive sample of **50** patients suffer from myasthenia gravis was recruited

Inclusion criteria: Both gender will participate in the study which their age ranged from 18 to 60 years, they will be conscious, did not have

any educational program, and able to communicate.

***Exclusion criteria*:** Patients with other neuromuscular disease, rheumatologic disease, chronic pain or disabling orthopedic conditions, stroke within the previous year.

Tools of data collection:

Data collected through the utilization of the following tools:

Tool (I): Patients' interviewing questionnaire:

The researchers constructed it after reviewing relevant literature. It wrote in the simple Arabic language. It used to assess patients' knowledge regarding myasthenia gravis and composed of three parts:

Part one; concerned with assessing patients' socio-demographic data as age, gender, educational level, occupation, marital status, residence and living status.

Part two; assessed patients' medical history**:** the researcher designed this tool to collect data related to:

A. Past history which included data about previous hospitalization, previous neurologic problems, history of smoking and previous surgeries.

B. Present medical history including data regarding onset of diagnosis, type of myasthenia gravis, and its symptoms, frequency of symptoms, Activity level, current medication and chronic diseases.

Part three encompassed the patient's knowledge assessment. It was developed by researchers after reviewing the relevant literature **(Jameson, et al., 2018 & Smeltzer, et al., 2010).** It developed in Arabic form in order to prevent misunderstanding. It included 15 Multiple Choose Questions about myasthenia gravis as; definition (1question), causes (1question), symptoms (1question), factors that aggrevate symptoms (1question), diagnosis (2 questions), medication (3 questions), surgery (1 question), complication (1 question), measures to relieve fatigue (1 question), diet and vitamins (2 questions), and exercises (1 question). This tool is distributed three times (before, one month post and after three months of self- management strategy implementation.

Scoring system: Knowledge obtained from patients was scored and calculated. Each question ranged from 0-1 grade. Whereas the correct answer scored 1 grade and scored zero for an incorrect answer.The total score level for the questionnairesheet was 15 grades (equal 100%).

- The patients' knowledge ≥ 60% considered satisfactory knowledge.
- The patients' knowledge < 60% considered unsatisfactory knowledge.

Tool (II): MG Activities of Daily Living Scale: (pre, one month post and after three months of self – care management strategy implementation). It was adopted from **(Wolfe, *et al.*, 1999**). This questionnaire provides a rapid assessment of MG symptom severity. The MG-ADL requires no special equipment or training and can be administered in 10 minutes. The MG-ADL test domains include ocular (2

items), oro-pharyngeal (3 items), respiratory (1 item), and extremity/limb (2 items). It involve 8-item questionnaire, each item is graded on a 4 point symptom severity scale (0 = normal, 1= mild, 2= moderate and 3= severe) .The test–retest reliability coefficient was 93.7%, with a lower 95% confidence interval at 87.3%. **(Muppidi, *et al.*, 2011)**

Scoring system: The total score ranging from 0 to 24, with higher scores indicating severe disability.

- Score ≤ 8 indicating mild disability
- Score range from 9-16 indicating moderate disability
- Score range from 17-24 indicating severe disability

Tool (III): Fatigue Severity Scale (FSS): (pre, one month post and after three months of self-management strategy implementation).It was adopted from **(Krupp, et al., 1988**), it was used to assess the severity of fatigue. It has nine items. For each question, the patient is asked to choose a number from 1 to 7 that indicates how much the patient agrees with each statement, where 1 indicates strong disagreement and 7 indicates strong agreement. A score of 4 or higher generally indicates severe fatigue. Cronbach's alpha test was (0.784)

Scoring system: The total score ranging from 1 to 63, with higher scores indicating severe fatigue.

- Score < 28 indicating mild fatigue.
- Score range from 28-40 indicating moderate fatigue.
- Score range from 41-63 indicating severe fatigue.

Tool (IV) General Self Efficacy Scale (GSE): (pre, one month post and after three months of self-management strategy implementation)**.** It was adopted from **(Schwarzer & Jerusalem, 1995).** This scale is a self - report, it was used to assess self-efficacy for patients with myasthenia gravis. It composed of ten items .Each item is graded on a 4 point (1=Not at all true, 2= Hardly true, 3 = moderately true and 4 =exactly true).The total score is calculated by finding the sum of the all items. Cronbach's alphas between 0.76 and 0.90.

Scoring system: The total score ranges between 10 and 40, with a higher score indicating more self-efficacy.

- Score ≤ 20 indicating low self - efficacy.
- Score range from 21-40 indicating high self –efficacy.

2- Content validity and reliability:

Validity for tool (I) tested through a jury of five experts from the medical-surgical nursing department, faculty of nursing, Benha University. The modification was carried out according to the panel's judgment on the clarity of sentences, appropriateness, and completeness of the content.The reliability of the proposed tool was tested by Cronbach's alpha test (0.751).

Pilot study:

It was conduct on 10% (5 patients) of total patients' sample in order to test simplicity and applicability of the study tools as well as estimation of time needed to fill in the tools. No modifications were done to the questionnaire. Therefore, the sample of the pilot study was included in the total study sample

Ethical Considerations

All ethical issues were taken into consideration during all phases of the

study. The ethical research consideration in this study included the following: the research approval was obtained before implementing self- management strategy, the objectives and aim of the study were explained to all participants and they informed that they could withdraw from the study at any time. Additional oral consent was taken from the patients who participated in the study. The researcher maintained the anonymity and confidentiality of the subjects.

Preparatory phase included reviewing the available literature and different studies related to the research problem and theoretical knowledge of its various aspects of the study, using textbooks, evidence-based articles, internet periodicals, and journals in order to collect data of this study.

Field work:

Permission granted from the Dean of Faculty of Nursing, Benha University, hospital directors, and head of the neurological department at Benha University Hospital. The study's objective and nature explained, so it became possible to carry out the study with minimum resistance. The process of data collection extended over 12 months from the beginning of june 2019 to the end of june2020.

The study was carried out through four phases: assessment, planning, implementation, and evaluation.

Assessment Phase: The researchers visited the neurological department three days weekly (morning and afternoon) to collect the data by using previous tools. Where demographic data and medical history were collected from patients and from their current medical records as baseline data.The researchers assessed the patients' knowledge about myasthenia gravis by using part three of the patients' interview questionnaire. Each patient was interviewing individually. Each interview lasted about 30 - 40minutes

Planning Phase (program development)

A designed self –care management strategy was developed by researchers based on patients' needs assessment, literature review, researchers' experience, and opinions of experts. The researchers designed a booklet. It was written in the Arabic language with illustrations, involving theoretical and practical parts.

The theoretical part included information about the definition of myasthenia gravis(MG) ,causes, symptoms ,factors that aggravate the MG' symptoms, diagnosis, treatments, diet and life style modification to improve activity of daily living and some recommendation for patient with myasthenia gravis to decrease their fatigue.

The practical part included five groups of exercises that strengths patients muscles (exercises for eye muscle, exercises for mouth muscles, exercises for neck muscles ,exercises for arm and hand muscles and exercises for leg and foot muscles).

Implementation Phase: The educational self - care management strategy was implemented for patients with myasthenia gravis through six sessions (two theoretical and four practical). The duration of each session ranged from 30-45 minutes for theoretical sessions and 60 minutes for practical sessions.

The first session was carried out during the assessment phase, which involved definition of myasthenia

gravis(MG), causes, symptoms, factors that aggravate the MG' symptoms and diagnosis) This session took about 30 minutes.

The second session involved (information about treatments, diet and some recommendation for patient with myasthenia gravis) this session took about 45 minutes.

While the third session involved demonstration to patient regarding eye exercises which included four eye exercises such as: Eyelid tightening exercise, exercise closing the eyes and pressing them hard, , an exercise to strengthen the focus of near vision and distant vision ,exercise eyes by moving them in different directions. Also demonstration to patient regarding oral muscle strengthening exercises which included five exercises such as: Patient exercises his face with a smile, cheek lift exercise and pulls it down, exercise to strengthen the jaws, tongue exercise and fish exercise to strengthen the cheeks.

The fourth session involved demonstration to patient regarding exercises to strengthen neck muscles which included seven exercises as: Downward bend of the neck exercise, lifting the head up gradually, Head tilt on the shoulders exercise, turn the head from side to side, move the shoulders, raise the neck when lying on the ground and bending the neck when lying on one side.

The fifth session involved demonstration to patient regarding exercises to strengthen arms and hand muscles and included five exercises as: Grip and stretch the palms of the hand, Raise the palm of the palm up, bend and straighten the fingers, fingers lift and the grip strength exercise.

The sixth session involved demonstration to patient regarding exercises to strengthen leg and feet muscles which included seven exercises as: squatting exercise, calf muscle strengthening, heels raised exercise, legs extension exercise, raise the feet in the air, bending at right angles and standing on fingertips exercise.

Each exercise was done for one minute, and the patient asked to repeat it ten times.The researcher demonstrated exercise for patients. Then the patients instructed to perform the exercise. This session took 60 minutes. The training sessions took place three times a week.

Each session was started with a summary of the previous one and the presentation of the new session's objectives, using the simple Arabic language. Also, the session ended with a content summary and feedback from the patient to ensure that they got the maximum benefit.

The teaching methods were composed of lectures, group discussions, role-playing exercises, and real-life demonstrations. Visual aids included colored printed booklet (handout), Microsoft PowerPoint presentation, illustrated pictures, and videos. Arrangements for the practical training were made with the physician and physiotherapist regarding time, type and number of exercises.

Evaluation phase:

The effect of self- management strategy on patients' knowledge, activity of daily living, fatigue level and self-efficacy were done post one month of self –care management strategy implementation and post third month as

follow up using the same tools. It was done at outpatient clinics.

Administrative design

An Approval to carry out this study was obtained from the dean of faculty of nursing and the director of neurological departments at Benha university Hospital.

Statistical design

Statistical analysis was done by using Statistical Package for Social Sciences (SPSS) version 20. Data were collected, revised, coded, organized, tabulated, and analyzed using frequencies, number, percentage, mean scores, standard deviation and correlation coefficient. Data were presented in the form of tables and figures. Quantitative data was presented by mean ($\overline{X}$) and standard deviation (SD) .Qualitative data was presented in the form of frequency distribution tables, number and percent. It was analyzed by Chi- square test (X^2) & correlation to detect the relation between the variables of the study (P-value.)

Statistical significance was considered as follows:

- P- value > 0.05 Not significant
- P- value < 0. 05 Significant
- P- value < 0.001 highly significant

Result:

Table (1): shows socio-demographic characteristics of patients with MG, it was observed that 58% of the studied sample were in the age group more than forty years old with mean age 44.12 ± 6.32 , the majority (80%) were females as well as, (90%) were married , were living in rural area and (54%) had secondary education

Table (2): Regarding patients' illness-related past history, the majority of the studied sample (86%) were not smokers and (78 %) had Previous hospitalization and previous surgery ,related to present history (84%) had generalized form of MG .(68 %)of them had illness duration of (3<6 years) with primary ocular symptoms as eyelid droop and double vision in (76%) of them and recurrent >4times/month (54%), moreover (56%) of them had Anticholinesterases medication (pyridostigmine) , (45%) had restricted activity and (51.5%) had hypertension.

Table (3): This table reveals that, the mean knowledge score of patient about myasthenia gravis was decreased pre self-care management strategy implementation .While there was increase in mean score of total knowledge with statistical significance after one month and after three months of self-care management strategy implementation.

Table (4) : This table clarifies that, there was decreased in total mean score of myasthenia gravis activity daily living(MG-ADL) with statistical significance after one month and after three months of self- care management strategy implementation.

Figure (1): This figure shows that, pre self- management strategy implementation, 24% of patients have severe disability but after one month 6% only had severe disability and decreased to 4% after three months self-care management strategy implementation.

Table (5) : This table clarifies that, there was decreased in total mean score of fatigue severity scale with statistical significance after one month and after

three months of self-care management strategy implementation.

Figure (2): This figure shows that, 82% of patients suffer from severe fatigue pre self-care management strategy implementation, while after one month and three month of self-management strategy implementation, this percentage decreased to 22% and 18% respectively.

Table (6): This table clarifies that, there was improvement in general self – efficacy for MG patients with statistical significance after one month and after three months of self-care management strategy implementation.With high statistically significant differences with (P value<0.001).

Figure (3): This figure clarifies that, there was improvement in general self – efficacy for MG (34%) with high self-efficacy pre self- care management strategy implementation. While it turned to (72%) after one month and (88%) after three months of self- care management strategy implementation.

Table (7): This table shows that, there was high statistically significant positive correlation between total knowledge and self -efficacy, also, there were negative correlations between MG-ADL, fatigue and total self- efficacy after one month and after three months of self- care management strategy implementation.

Table (1): Frequency and percentage distribution of the studied patients related to their socio - demographic characteristics (No=50).

Socio demographic characteristics	Items	Studied patients (n=50)	
		N	%
Age	< 30	3	6
	− 30- 40	18	36
	>40	29	58
X ± SD		**44.12 ± 6.32**	
Gender	−Male	10	20
	−Female	40	**80**
Level of education	−Illiterate	3	6
	-Read and write	3	6
	−Primary	8	16
	−Secondary	27	54
	−University	9	18
Occupation	−Not work	18	36
	−Worker	11	22
	-employee	19	38
	−Retirement	2	4
Marital status	−Single	3	6
	−Married	45	**90**
	−Divorced	2	4
Residence	−Rural	45	**90**
	−Urban	5	10
Living status	-live alone	2	4
	-With family	48	**96**

Table (2): Frequency and percentage distribution of the studied patients according to their medical data. (No=50).

Medical history	Items	Studied patients (n=50)	
		N	%
Past history			
Previous hospitalization	Yes	39	78
	No	11	22
Nervousness history	Yes	13	26
	No	37	74
Smoking history	Yes	7	4
	No	43	86
Previous surgery	Yes	39	78
	No	11	22
Present history			
Onset of diagnosis	-1<3 years	12	24
	3<6 years	34	68
	>6 years	4	8
Type of MG	Ocular MG	8	16
	Generalized MG	24	84
Primary symptoms	-ocular (Eyelid droop, Double vision	38	76
	-Facial expression	1	2
	- Upper extremity weakness	8	16
	-Lower extremity weakness	2	4
	- Neck weakness	1	2
Recurrence	< 4times/month	10	20
	>4times/month	27	54
	<12 times/year	11	22
	>12times/year	2	4
Medication	Anticholinesterases(pyridostigmine)	28	56
	Corticosteroids	9	18
	Immunosuppressant	10	20
	Plasma exchange	3	6
Thymectoty	-yes	29	58
	No	21	40
Activity level	Full active	11	22
	Restricted active	27	54
	Need help in walk	12	24
Chronic diseases	Yes	33	66
	No	17	34
If yes (no=33)	-hypertension	17	51.5
	Diabetes	13	39.3
	Cardiac	3	9.09

Table (3) Comparison between mean score of studied patients related to their knowledge about myasthenia gravis pre, after one month and after three months of self- care management strategy implementation.

Items	Pre self- care management strategy	After one month of self-care management strategy	After three months of self-care management strategy	T 1 (P 1)	T^2 2 (P 2)
	X ± SD	X ± SD	X ± SD		
Knowledge related to MG	2.74 ± 1.31	6.64 ± 1.19	5.70 ± 0.94	T: 4.96 P <0.001	T: 17.36 P <0.001
Knowledge related to complication, medical and nursing management	2.12 ± 0.93	5.70 ±0.95	6.94 ± 8.16	T: 17.63 P <0.001	T: 4.001 P <0.001
Total	4.78 ± 1.38	12.92 ± 3.036	13.02 ± 2.55	T: 16.46 P <0.001	T: 19.51 P <0.001

T^2 1(P 1) between pre and after one month
T^2 2(P 2) between pre and after three months

Table (4) Comparison between the mean score and standard deviation of studied patients related to myasthenia gravis activity of daily living (MG-ADL) pre, after one month and after three months of self- care management strategy implementation.

Items	Pre self- care management strategy	After one month of self- care management strategy	After three months of self- care management strategy	T test P-value (1)	T test P- value (2)
	X ± SD	X ± SD	X ± SD		
Talking	2.100 ±0 .678	1.600 ± 0.99	1.32 ± 0 .91	T: 4.80 P <0.001	T: 6.56 P <0.001
Chewing	1.70 ±0 .54	1.62 ± 0 .56	1.52 ± 0 .58	T :2.06 P .044	T : 3.28 P .002
Swallowing	1.200 ± 0.81	1.100 ± 0.788	1.04 ± 0.419	T : 1.94 P .058	T : 2.41 P .019
Breathing	1.74 ± 0.77	1.56 ± 0.70	1.42 ± 0.75	T : 2.90 P .005	T: 2.42 P <0.001
Brush teeth	2.30 ± 0 .58	1.98 ± 0 .71	1.78 ± 0 .73	T: 3.85 P <0.001	T: 5.20 P<0.001
Arise from chair	2.40 ± 0 .53	1.96 ± 0.69	1.80 ± 0.95	T: 4.41 P<0.001	T : 4.95 P<0.001
Double vision	1.68 ± 0.79	1.42 ±0.75	1.28 ± 0.75	T: 3.487 P<0.001	T :4.22 P<0.001
Eye lid drop	1.66 ± 0.65	1.38 ± 0.69	1.28 ± 0.70	T: 3.09 P 0.003	T: 3.85 P<0.001
Total	14.78 ± 2.40	12.62 ±**3.18**	11.48 ±3.58	T : 5.16 P<0.001	T : 6.29 P<0.001

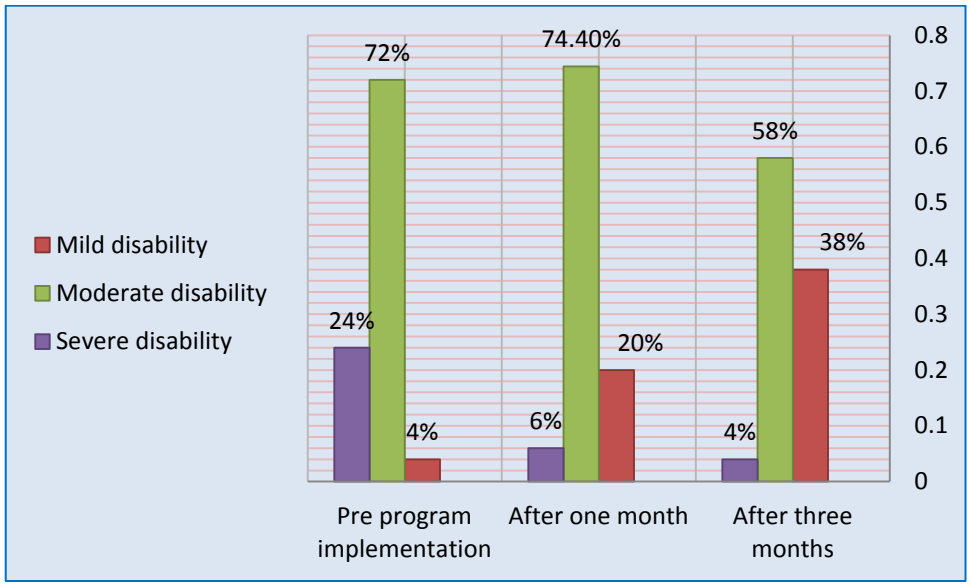

Figure (1) Total percentage score of MG-ADL scale pre , after one month and after three months of self- care management strategy implementation.

Table (5): Comparison of the mean score and standard deviation of studied patients related to fatigue severity scale pre, after one month and after three months self- care management strategy implementation**.**

Items	Pre self- care management strategy	After one month of self- care management strategy	After three months of self- care management strategy	T test P-value (1)	T test P- value (2)
	X ± SD	X ± SD	X ± SD		
1. My motivation is lower when I am fatigued	4.98 ± 1.12	3.28 ±0.12	3.22 **± 1.18**	T: 8.078 P<0.001	T : 8.49 P<0.001
2. Exercise brings on my fatigue	4.12 ±0.92	2.64 ±0.88	2.58 ± 0.88	T:9.74 P<0.001	T : 8.29 P<0.001
3. I am easily fatigued.	4.52 ±0.83	3.44 ±0.99	3.40 ±0.92	T: 6.07 P<0.001	T : 6.39 P<0.001
4. Fatigue interferes with my physical functioning.	5.41±1.16	4.00 ± 1.32	3.90 ± 1.28	T :5.28 P<0.001	T : 5.06 P<0.001
5. Fatigue causes frequent problems for me	4.54±1.16	4.20 ±1.17	4.14 ± 1.21	T : 1.78 P < 0.081	T: 1.66 P .103
6. My fatigue prevents sustained physical functioning.	5.14 ±0.85	4.30 ±0.93	4.28 ± 0.94	T : 4.32 P<0.001	T: 4.43 P<0.001
7. Fatigue interferes with carrying out certain duties and responsibilities	5.58 ± 1.26	3.98 ± 1.27	3.86 ± 1.26	T :6.15 P<0.001	T: 6.49 P<0.001
8. Fatigue is among my most disabling symptoms	4.80 ±0.91	3.70 ± 1.03	3.70 ± 1.02	T: 5.52 P<0.001	T: 5.66 P<0.001
9. Fatigue interferes with my work, family, or social life.	4.80 ±0.90	3.96 ± 1.05	3.82 ± 1.00	T:4.74 P<0.001	T: 5.03 P<0.001
Total	44.06 ±5.57	33 .52 ±5.61	32.86 ± 5.71	T: 10.40 P<0.001	T: 9.82 P<0.001

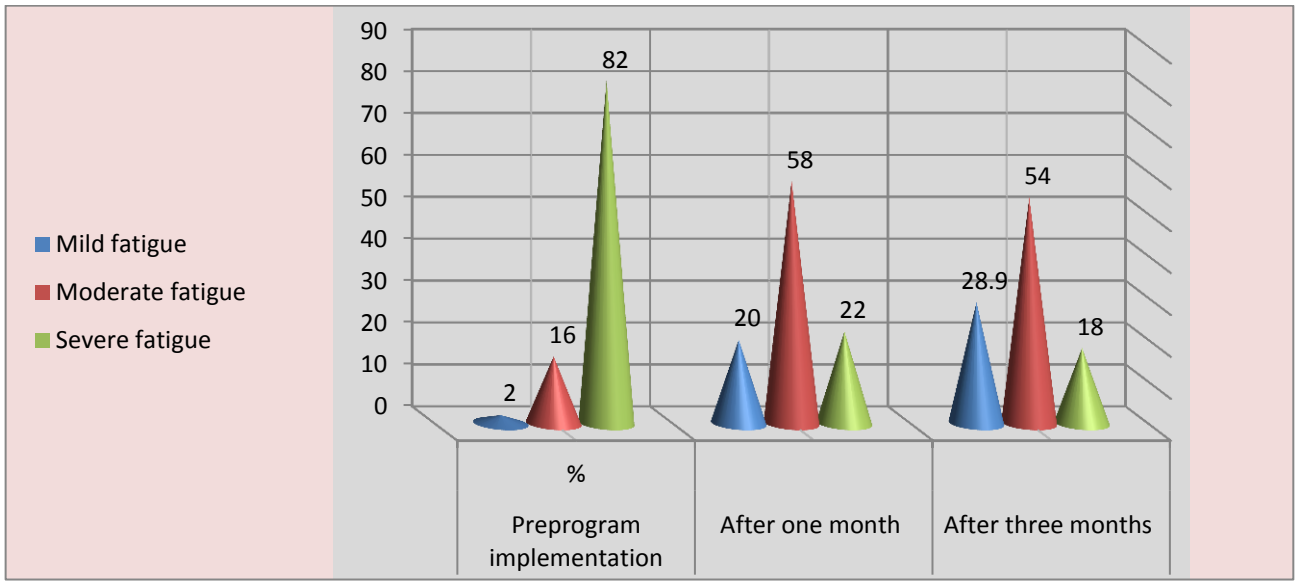

Figure (2): Total percentage score of fatigue severity scale pre , after one month and after three months self- care management strategy implementation.

Table (6): Comparison of the mean score of studied patients' related to general self – efficacy pre, after one month and after three month of self- care management strategy implementation.

Items	Pre self- care management strategy	After one month of self- care management strategy	After three months of self-care management strategy	T - test p- value (1)	T - test p- value (2)
	X ± SD	X ± SD	X ± SD		
1- I can always manage to solve difficult problems if I try hard enough.	1.80 ±0.57	2.94 ± 0.95	3.00 ± 0.92	T : -7.97 P<0.001	T : -7.22 P<0.001
2-If someone opposes me, I can find the means and ways to get what I want.	2.080 ± 0.63	2.92 ± 0.67	2.58 ± 0.9	T :- 6.52 P<0.001	T : - 3.29 P 0.002
3-It is easy for me to stick to my aims and accomplish my goals.	2.12 ± 0.59	2.82 ± 0.78	3.40 ± 0. 93	T: - 4.31 P<0.001	T : - 7.17 P<0.001
4-I am confident that I could deal efficiently with unexpected events.	2.18 ± 0.60	3.02 ± 0 .80	3.088 ± 0.81	T: - 5.73 P<0.001	T: - 5.53 P<0.001
5-Thanks to my resourcefulness, I know how to handle unforeseen situations.	2.24 ± 0.59	2.778 ± 0.93	2.93 ± 0.87	T: - 3.84 P<0.001	T: - 4.39 P<0.001
6-I can solve most problems if I invest the necessary effort.	2.18 ±0.56	2.76 ± 0.80	2.86 ±0.72	T: - 4.225 P<0.001	T: - 4.400 P<0.001
7-I can remain calm when facing difficulties because I can rely on my coping abilities.	1.90 ± 0.61	2.88 ± 1.61	3.00 ± 0.91	T: - 6.018 P<0.001	T: - 6.863 P<0.001
8-When I am confronted with a problem, I can usually find several solutions.	2.080 ± 0.67	2.96 ± 0.67	3.07 ± 0.83	T: - 5.48 P<0.001	T: - 6.78 P<0.001
9-If I am in trouble, I can usually think of a solution.	2.04 ± 0.60	2.86 ±0.83	3.04 ±0.75	T: - 5.55 P<0.001	T: -5.95 P<0.001
10-I can usually handle whatever comes my way.	1.90 ± 0.094	2.86 ±0.93	3.044 ±0.98	T: - 5.94 P<0.001	T: - 7.050 P<0.001
Total	20.52 ± 3.58	28.80 ± 6.72	29.91 ±6.15	T: - 7.58 P<0.001	T: - 8.62 P<0.001

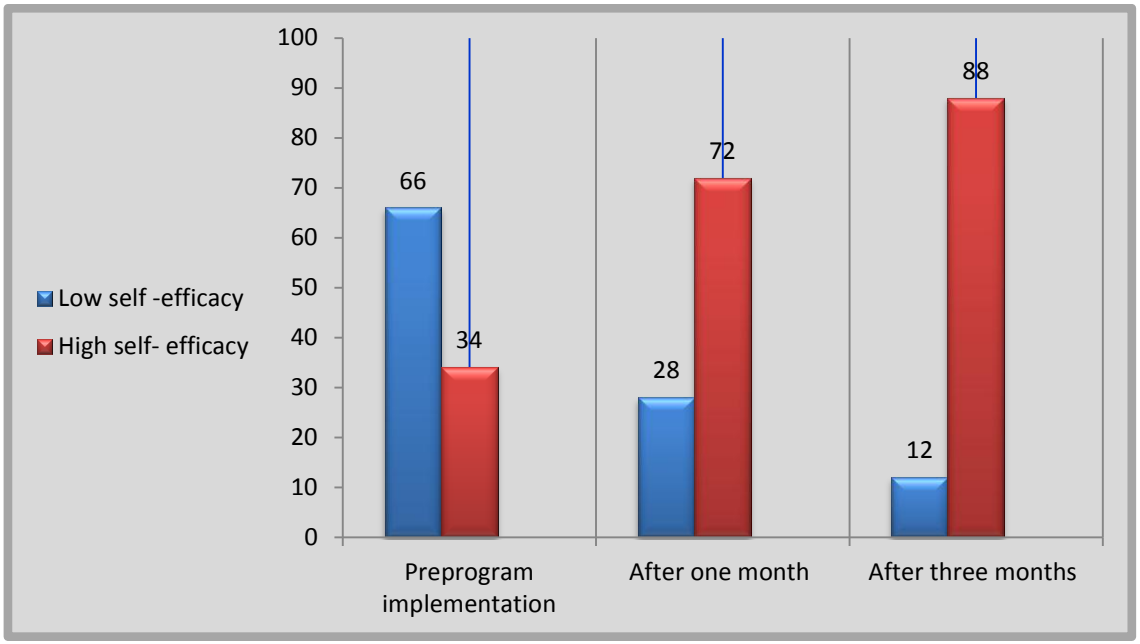

Figure (3) Total percentage score of general self -efficacy scale pre , after one month and three months of self-care management strategy implementation.

Table (7): Correlation coefficient related to total self- efficacy, total knowledge, total MG- ADL and total fatigue after one month and after three months of self- care management strategy implementation

Items	Total self- efficacy			
	after one month		after three months	
	r	p	r	P
Total knowledge	.479	. 000**	.540	.000**
Total MG-ADL	-.286	.044*	-.283	.046*
Total fatigue	-.307	.030*	-.368	.009**

Discussion

Regarding socio- demographic characteristics of the studied patients:The current study showed that ,more than half of the studied patients their age was more than forty years old with mean 44.12 ± 6.32 and most of them were females and married . This result might be due to the fact that myasthenia gravis is an autoimmune disease affects women after age forty and men after age fifty.

This results agreed with ***Alanazy, (2019)*** who studied " Prevalence and associated factors of depressive symptoms in patients with myasthenia gravis: A Cross-sectional study of two tertiary hospitals in Riyadh, Saudi Arabia reported that, more than two thirds of patients were females with mean age 38.0 ± 16. 0 and two thirds of them were married. Also these results were in the same line with ***Leonardi, etal.,(2010)*** whose study was about "The relationship between health, disability and quality of life in Myasthenia Gravis: results from an Italian study" found that, most of the studied patients were females with mean age 47.2 ± 15.7, and supported by ***Raggi, etal.,(2010*)** who was studying "Social support and self-efficacy in patients with myasthenia gravis: a common pathway towards positive health outcomes" reported that, mean age of the studied patients was 48.1±16.3 and more than two thirds of patients were females.

Regarding to level of education and occupation: The present study revealed that, more than half of the studied patients had secondary education and more than one third of them were employees. This results was in accordance with ***Raggi, et al. (2010*)** and with ***Alanazy,(2019)*** found tha,t more than one third of the studied patients were employees.

The present study revealed that, the majority of the studied patients were living in rural areas and lived with their families. This might be due to the people in rural areas preferred to live with their family than living alone as reverse to people in urban. This results agreed with ***Jeong, et al. (2018*)** whose study was about" Factors associated with quality of life of people with Myasthenia Gravis" found that, most people lived with their family.

Concerning to medical history of the patients, the present study showed that, more than two thirds of them had myasthenia gravis from three to six years. This result was in the same line

with ***Alanazy (2019*)** who reported that, duration of myasthenia gravis in more than half of the studied patients was four years or more, but disagreed with ***Vitturi,et al.,(2020)*** who studied "Medication adherence in patients with myasthenia gravis in Brazil: a cross-sectional study" stated that, the mean duration of the disease was 10.6 ± 7.5 years.

As regard to type of myasthenia gravis, the study revealed that, most of studied patient suffered from generalized myasthenia gravis and this result was in the same line with ***Alanazy,(2019)*** who reported that, most of the studied patients in his study had generalized myasthenia gravis. Also , it was supported by ***Jeong, et al.,(2018)***who stated that, more than half of the studied patients suffered from generalized myasthenia gravis. Regarding to primary symptoms, three quarters of the studied patients had ocular symptoms ,this was congruent with ***Vitturi et al.,(2020*)** who found that, the first symptom was occilar in almost three quarter of the studied sample.

The present study showed that, more than half of patients were taking anticholinestraes such as pyridostigmine. This might be due to the ability of pyridostigmine to improve symptoms in patients with MG. Also the current work revealed that, more than half of the studied patients had thymectomy because the thymus gland has a substantial role in the pathogenesis of MG. So, thymectomy is done to improve the muscular weakness associated with MG. This was supported by ***Hoffman, et al. (2016*)** who studied"Fatigue in myasthenia gravis: risk factors and impact on quality of life" stated that, more than half of the studied patients had thymectomy.

Regarding to knowledge of the studied patients about the disease, the present study revealed that, the mean knowledge score of patient about myasthenia gravis was decreased pre self-care management strategy implementation .While there was an increase in mean score of total knowledge with statistical significance after one month and after three months of self-care management strategy implementation. That means education for people living with chronic diseases such as MG is extremely important as this enables them to adapt and cope with the effects of the disease and treatments. This was in agreement with ***Varghese, et al., (2018*)** who studied"Comparison of knowledge on myasthenia gravis and its management among patients, caregivers and other patients in a tertiary health care facility" concluded that, knowledge regarding myasthenia gravis was not adequate among patients and had very poor knowledge on myasthenia gravis. Patients with higher education were found to have better knowledge. Outcome of patients can be improved by providing structured informational material on myasthenia gravis and added nurses 'role is vital in enhancing the home management practices of patients with myasthenia gravis. Also, this was congruent with ***Joni, et al. (2014)*** whose study was about " Care of the Patient with Myasthenia Gravis " stated that, nurses should educate the patient with MG and their family regarding management of the disease; influence of the disease on lifestyle, swallowing, and chewing impairment;

and fatigue and energy conservation. Also,this was in the same line with ***Kołtuniuk, et al.,(2017)*** **who** studied "Nursing Care of Patients with Myasthenia Gravis - Case Report" reported that, the gained knowledge about the disease and its complications helped myasthenia gravis patients' to improve the daily functioning and coping with difficult situations .

As regard to myasthenia gravis - activity of daily living (MG-ADL).The current work revealed that, there was decreased in total mean score of myasthenia gravis activity daily living with statistical significance after one month and after three months of self-care management strategy implementation .Which indicate an improvement in myasthenia gravis symptoms after implementing self –care management strategy .This result was supported by ***Birnbaum, et al.,(2018)*** who studied" The benefits and tolerance of exercise in myasthenia gravis (MGEX): study protocol for a randomized controlled trial" reported that, exercises had a positive effect on improving myasthenia gravis activity of daily living score.

Regarding to total percentage score of fatigue severity scale (FSS), the present study showed that, majority of patient had severe fatigue pre self-care management strategy implementation, however post implementation; minority of them had severe fatigue. This result was supported by ***Hoffman, et al., (2016)*** who found that more than two thirds of the studied sample suffered from fatigue.However post imple-mentation, minority of them had severe fatigue.

Also, the present study showed that, there was decrease in total mean score of fatigue severity scale with statistical significance after one month and after three months of self-care management strategy implementation. This result revealed that education is the key to successful management of patient with chronic disease, and minimize its negative impact on health status .This was in an agreement with ***Farrugia, et al. (2018)*** which was about "A Physical and Psychological Approach to Managing Fatigue in Myasthenia Gravis**"** stated that, the patients scored themselves highly on FSS throughout the study with a suggestion of a small improvement at week 6 and 10 but not reaching significance.

Also, this was supported by ***Lorig et al. (2001*****)** who was studying "Effect of a self-management program on patients with chronic disease concluded that there was statistically significant improvements in self-reported fatigue one year after implementing self - management program (SMP).

As regards mean score of general self-efficacy for patients with myasthenia gravis, the current study clarified that, there was an improvement in the mean score of general self – efficacy for MG patients with statistical significance after one month and after three months of self- care management strategy implementation. It may be indicated that the self- care management strategy could increase the level of self-efficacy in patients with MG because it increase perception of patients regardind their self efficacy. This was in accordance with ***Tigner et al.(2018)*** who studied "Self-efficacy theory, quality of

life and myasthenia gravis self-management" stated that, the goal of SMP for patients with MG would be to increase their self-efficacy so they can manage their disease at home. Also ***Raggi, et al.(2010)*** stated that**,** if the developer of an SMP can incorporate interventions that increase sources of self-efficacy, patients will gain confidence in managing their disease at home, which has positive impact on effort and perseverance when living with a chronic diseases., also, this was in the same line with ***Lorig, et al., (2001)*** who stated that, self -efficacy improvements were statistically significant after implementing SMP. Also this result was supported by ***Maslakpak and Raiesi, (2014)*** whose study was about "Effect of a Self-Management and Follow-Up Program on Self-Efficacy in Patients with Multiple Sclerosis" reported that, the mean of self-efficacy score was significantly improved in the intervention group after implementing a self-management program.

Also ,the results of the current study revealed that there was positive correlation between knowledge and self-efficacy .Also ,there was a negative correlation between fatigue and self-efficacy with highl statistically significance which indicating that education could significantly affect the perceived self-efficacy in the patients with myasthenia gravis regarding their ability to exert control over fatigue.

This was in the same line with ***Abdullah & El Nagshabandi (2017)*** who was studying "Relationship between level of self-efficacy and self-management; hemodialysis versus oncology related fatigue" found that, There was an evident of negative correlation between fatigue and self-efficacy.

Conclusion:

Based on the findings of the current study, it can be concluded that: Implementing a self-care management strategy for patients with myasthenia gravis was effective in improving knowledge, activity of daily living, self-efficacy and decrease of fatigue level.

Recommendations:

This study recommended that, there is a need for continuous monitoring and evaluating fatigue, activity of daily living, self –efficacy and quality of life for myasthenia gravis patients for early detecting and solving any problems.

Replication of the current study on larger probability sample and longer follow-up and longer interval between the intervention and outcome assessment is recommended to achieve generalizability and broader utilization of the designed program.

Developing and implementing training exercise program for patient with myasthenia gravis to improve their functional ability.

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