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Effect of nursing intervention on activities of daily living and quality of life for myasthenia gravis patients receiving plasma exchange therapy

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Abstract

Myasthenia gravis is a chronic neuromuscular disease that causes weakness in the voluntary muscles to assess the effect of nursing intervention on activities of daily living and quality of life for myasthenia gravis patients receiving plasma exchange therapy. Research design: Qazi experimental research design (pre- posttest only one group) was utilized in this study. Sample: 40 patients with a diagnosis of Myasthenia gravis receiving plasma exchange therapy. Tool I Patient Interviewing Questionnaire. Tool II Barthel Index of Activities of Daily Living. Tool III Myasthenia Gravis Quality of Life-15 Revised (mythania gravis-quality of life 15r). More than one third of patients their age ranged between 30 and 40 years old and all patients (100%) reported weakness of both sides and had upper respiratory tract infection. The nursing intervention significantly improves patient's activities of daily living and quality of life for mythania gravis patients receiving plasma exchange therapy. An in-service nursing intervention for caring patients with Myasthenia Gravis (MG) receiving plasma exchange therapy is essential to ensure they maintain up- to -date improvements of activities of daily living and quality of life in managing chronic neuromuscular disorder.

Keywords: Activities of daily living, Myasthenia gravis, Nursing intervention, Plasma exchange therapy and quality of life.

Introduction

Myasthenia gravis is a chronic neuromuscular disease that causes weakness in the voluntary muscles. Voluntary muscles include muscles that connect to a person's bones, muscles in the face, throat, and diaphragm. They contract to move the arms and legs and are essential for breathing, swallowing and facial movements. Myasthenia gravis is an autoimmune disease, which means that the body's defense system mistakenly attacks healthy cells or proteins needed for normal functioning. The onset of the disorder may be sudden. Symptoms may not be immediately recognized as myasthenia gravis. The degree of muscle weakness involved varies greatly among individuals (National Organization for Rare Diseases, 2023)

Plasma exchange therapy, also known as plasmapheresis, is a medical procedure that removes a patient's blood plasma, separates it from blood cells, and then returns the blood cells (mixed with a replacement fluid) back to the patient. This process is used to remove harmful substances l ike autoantibodies, abnormal proteins, or other disease-causing agents from the blood. It's a treatment for various conditions, including certain blood disorders, autoimmune diseases, and neurological disorders (American Society for Apheresis, 2022)

Activities of Daily Living (ADL) are routine tasks that people perform on a daily basis, like eating, walking, grooming, dressing and toilet use. However, patients with myasthenia gravis disease experience fatigue and muscle weakness that impairs their ability to perform these tasks, lowering their functional level, degree of dependency, and physical activity (Chakraborty, 2018).

Myasthenia gravis imposes substantial quality-of-life burdens encompassing physical limitations, psychosocial impacts, and treatment-related adverse effects that significantly affect patient well-being. The disease's characteristic fatigable weakness creates unpredictable functional limitations that may not be apparent during clinical examinations but profoundly impact daily activities. Patients frequently cannot

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sustain normal activities such as walking across parking lots, climbing stairs, or maintaining employment, leading to social isolation and reduced independence despite appearing relatively normal at rest (James, et al,.2025)

Nursing interventions play a critical role in the success of plasma exchange therapy and control of myasthenia gravis. Key strategies include providing specialized and comfortable care, implementing evidence-based practices to reduce complications, and managing the increased initial care needs effectively. These interventions not only enhance patient outcomes but also improve overall satisfaction and quality of life (Shi-Ping,2011)

The nursing intervention is aimed to assess patient's response and status for practicing to improving activities of daily living also quality of life and prevent those complications, and learn the specific care.

Significance of study

According to (Assuit university hospital records, 2023) approximately 100 patient diagnosed with MG , some of patients come with MG having varying degrees of skeletal muscle weakness as eyes, face, and difficult swallowing , double vision, drooping eyelids, and difficulties in talking and walking with a high prevalence of psychopathology and depression . Anxiety disorder are frequent comorbid conditions and can also influence quality of life, restrictions in everyday activities and participation in social life. Also, they avoid social contacts due to their muscular impairments. All these restrictions in motor activities and social interaction are associated with decreased life satisfaction. So, our study conducted to improve activities of daily living and quality of life for patients regarding myasthenia gravis and plasma exchange therapy.

Aim of the study

To evaluate the effect of nursing intervention on activity daily living and quality of life among patient with mythania gravis receiving plasma exchange therapy.

Research hypotheses

The following research hypotheses were formulated to achieve the study's aim.

H.1- Quality of life will be improved in patient with mythania gravis receiving plasma exchange therapy after implementation of nursing intervention.

H.2- Activities of daily living in patient with mythania gravis receiving plasma exchange therapy will be improved after implementation of nursing intervention.

H.3- Restrictions in motor activities and social interaction are associated with decreased life satisfaction, (patient outcomes) will be improved in patient with mythania gravis receiving plasma exchange therapy after implementation of nursing intervention.

H.4- The patient's level of dependence on others will be decrease after implementation of nursing intervention.

Patients & Method

Study design: Qazi experimental research design (pre- posttest only one group) was utilized to conduct this study.

Setting: The patients was selected from outpatient clinics& department at Assuit university Neuropsychiatric hospital and plasma exchange therapy unit at the same hospital.

Sample: This study was conducted on 80 patients. They were fulfilling the following criteria, age ranged from 20 -60 yrs. Both male & female patient with mythania gravis who receiving plasma exchange therapy.

Sample size: patients will be selecting by using the 20The sample wasfollowing equation according to Steven K Thompson (2012

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

who attended the -----. During 50 N=total patient population size of- year 2021-2022

Z = confidence levels is 0.95 and is equal to 1.96-

D= The error ratio is = 0.05-

P= The property availability ratio and neutral = 0.50-

Reference

Steven K. Thompson (2012): sample size, pP :59-60-

Tools: Based on relevant literature, the researcher created three tool that were used to gather data:

Tool I: Patient interviewing questionnaire: it was developed by the researcher after reviewing the related literature (Schwartz, 2016). to assessing demographic data of the studied patients. This tool composed of two parts:

Part 1: Patient demographic data: This part was used for assessing demographic data of the studied patients including: age, gender, marital status, educational level and occupation.

Part II: Patient health history: This part concerned with present, past medical and surgical history of the patients and it was including diagnosis, duration of present symptoms, other associated disease, family history and surgical history.

Tool II: Barthel index of activities of daily living: This tool adopted from (Collin, Wade& Davies 1988), it was used to assess patients' physical needs regarding plasmapheresis therapy. It was consisted of 10 items including feeding, bathing, grooming, dressing, bowels, bladder, toilet use, transfers, mobility, and stairs use.

Scoring system: The total scores for whole physical needs assessment were summed up (100 grades then were categorized as following:
-From 80 to 100: patients were live independently.
-From 60 to 79: patients were minimally dependent.
-From 40 to 59: patients were partially dependent.
-From 20 to 39: patients were very dependent.
- < 20: patients were totally dependent.

Tool III: Myasthenia Gravis Quality of Life-15 Revised (Mg-Qol15r) :

The Myasthenia Gravis-Quality of Life 15 (MG-QOL 15) is a brief 15-item disease specific questionnaire that is designed to assess aspects of quality of life in Myasthenia Gravis. It was adopted from (Burns .et al,2011). The 15 items are derived from the larger 60 item Myasthenia Gravis Quality of Life (MGQOL) and were selected based on responsiveness and reliability.

Scoring system: each item is scored on a 3 point Likert scale from 0 to 4 as (0) for not at all, (2) for somewhat, (4) for very much. with higher scores indicating greater disease effect on Quality of Life. Total scores range from 0 to 60 as the following:

-Mild effect from 0 to 29.
- Moderate effect from 30 to 49.
-Sever effect from 50 to 60.

Content validity and reliability: A panel of three expert's professors of medical-surgical nursing staff they also reviewed the tools for clarity, relevance applicability and comprehensiveness. In light of their assessments, minor modifications were applied. Cronbach's alpha coefficient was used to examine the reliability of the tools. Reliability of tool I, II and III was (0.89, 0.86 and 0.85 respectively).

Pilot study: A pilot study was carried out on 10% (8 patients) of the study samples to test the tools' applicability and clarity. The patient study used to test the tools not included in the study. The result of the data obtained from the pilot study helped in the modification of the tools and teaching materials that were prepared.

Ethical considerations

-The research proposal was approved by Ethical Committee in the Faculty of Nursing, Assuit University with reference number (1120240903).
-There was no risk for the study subject during the application of the research.
-Informed consent was obtained from patients that were willing to participate in the study, after explaining the nature and purpose of the study.
-Confidentiality and anonymity were assured.
-The studied patients had the right to refuse to participate and or withdraw from the study without any rationale at any time.
-Studied patient privacy was considered during the

collection of data.

Statistical design

Data entry and statistical analysis were done using SPSS computer program ''version 23.0'' software. The data were tested for normality using the Anderson – Darling test and for homogeneity variances prior to further statistical analysis. Categorical variables were described by number and percent (N, %). continuous variables described by mean and standard deviation (Mean, SD) chi square test used to compare between categorical variables. T-test used to compare between continuous variables used for the numeric variable. N.s P > 0.05 is no significant, and P ≤ 0.05 as a cutoff for significance.

Result

Table (1): Percentage distribution of demographic data among patients (n=80)

%	N	Demographic data
		Age group:
28.8	23	-20 <30yrs
40	32	-30<40yrs
16.3	13	-40<50yrs
15	12	-50 ≤65yrs
		Gender :
28.8	23	-Male
71.3	57	-Female
		Marital status:
23.8	19	-Single
76.3	61	-Married
0	0	-Divorced
0	0	-Widow
		Level of education:
6.3	5	-Illiterate
1.3	1	-Read and write
2.5	2	-Primary school
62.5	50	-Secondary school
27.5	22	-High education
		Occupation:
66.3	53	-Manual
33.8	27	-Intellectual
		Address:
47.5	38	-Rural
52.5	42	-Urban

Table (1): shows that distribution of the study sample according to a set of demographic. More than one third of patients their age ranged between 30 and 40 years old (40%), followed by those in the 20-30 age group (28.8%), while the older age group (40-60 years) represented a smaller percentage. Regarding gender, females predominated in the sample (71.3%) compared to males (28.8%). More than three quarter of patients were married (76.3%), while singles constituted 23.8%. Near two thirds of patients (62.5%) had a secondary education, and 27.5% had a higher education. Manual work constituted the largest percentage (66.3%), compared to 33.8% of those working in intellectual jobs. The sample was evenly distributed between rural (47.5%) and urban (52.5%).

Table (2): Distribution of patient according to health history (n=8)

%	N	Patient Health History
		Chief complain &Present medical history
100	80	-Weakness of both side (ocular and bilateral muscle weakness)
100	80	-Upper respiratory tract infection .
		Duration of present symptoms
31.3	25	1-5 days
55	44	1-2week
10	8	3- less than month
2.5	2	One month
		Chronic disease
13.8	11	-Hypertension.
18.8	15	-Diabetes Mellitus.
1.3	1	- Heart Disease.
0	0	-kidney disease.
		Family history:
0	0	-Yes
100	80	-No
		Surgical history :
6.3	5	-Appendectomy
5	4	-Cesarean section

Table (2): shows that ,all patients (100%) reported weakness of both sides, 100% of the cases had upper respiratory tract infection .Regarding duration of present symptoms, about half of studied sample (55%) experienced symptoms for (1–2) weeks, while 31.3% reported symptoms for (1–5) days, Hypertension (HTN) and diabetes mellitus was present in 13.8% , 18.8% respectively. While only (1.3%) had heart disease.

Table (3): Total score levels of activities of daily living for patient pre and post nursing intervention (n=80):

Total score levels of activities of daily living		pre	post	Sig.
-Independently.	Count	0	72	.000*
	%	0	90	
-Minimally dependent	Count	0	5	
	%	0.00%	6.3	
-Partially dependent.	Count	8	0	
	%	10	0	
-Very dependent.	Count	72	3	
	%	90	3.8	

*= significant

Table (3) and fig (1) summarizes levels of independency in activities of daily living pre and post nursing intervention. The results reveal a statistically significant improvement (p value = .000*), pre the intervention; about (90.0%) of patients were classified as very dependent and only (10.0%) were partially dependent while after the intervention: (6.3%) were minimally dependent and only (3.8%) remained very dependent.

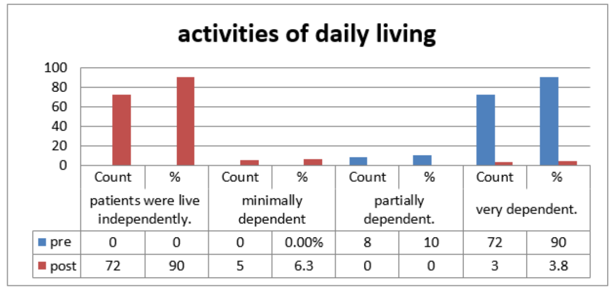

Fig (1). Total score levels of activities of daily Living for patient pre and post intervention n=80

Table (4): Comparison between pre and post nursing intervention regarding patient self-feeling from myasthenia gravis quality of life-15 revised (mg-qol15r) n=80

	Post		Pre		Myasthenia Gravis Quality of Life-15 Revised (Mg-Qol15r)	
SIG	%	N	%	N		
	80.00%	64	0	0	Not at all	1)I am frustrated by my MG
.000*	20	16	8.8	7	Some what	
	0	0	91.3	73	Very much	
.000*	81.3	65	0	0	Not at all	2)I have trouble with my eyes because of my MG(e.g double vision)
	18.8	15	7.5	6	Some what	
	0	0	92.5	74	Very much	
.000*	81.3	65	0	0	Not at all	3)I have trouble eating because of MG
	18.8	15	6.3	5	Some what	
	0	0	93.8	75	Very much	
.000*	88.8	71	0	0	Not at all	4)I have limited my social activity because of my MG
	11.3	9	1.3	1	Some what	
	0	0	98.8	79	Very much	
.000*	87.5	70	0	0	Not at all	5)My MG limits my ability to enjoy hobbies and fun activities
	12.5	10	3.8	3	Some what	
	0	0	96.3	77	Very much	
.000*	91.3	73	0	0	Not at all	6)I have trouble meeting the needs of my family because of my MG
	8.8	7	6.3	5	Some what	
	0	0	93.8	75	Very much	
.000*	90	72	0	0	Not at all	7)I have to make plans around my MG
	10	8	5	4	Some what	
	0	0	95	76	Very much	
.000*	90	72	0	0	Not at all	8)I am bothered by limitations in performing my work (include work at home) because of my MG
	10	8	0	0	Some what	
	0	0	100	80	Very much	
.000*	87.5	70	0	0	Not at all	9)I have difficulty speaking due to MG
	12.5	10	0	0	Some what	
	0	0	100	80	Very much	
.000*	92.5	74	0	0	Not at all	

	7.5	6	0	0	Some what	10)I have lost some personal independence because of my MG (e .g. driving ,shopping, running errands)
	0	0	100	80	Very much	
.000*	91.3	73	0	0	Not at all	11)I am depressed about my MG
	8.8	7	8.8	7	Some what	
	0	0	91.3	73	Very much	
.000*	90	72	0	0	Not at all	12)I have trouble walking due to MG
	10	8	2.5	2	Some what	
	0	0	97.5	78	Very much	
.000*	91.3	73	0	0	Not at all	13)I have trouble getting around public places because of my MG
	8.8	7	7.5	6	Some what	
	0	0	92.5	74	Very much	
.000*	91.3	73	0	0	Not at all	14)I feel overwhelmed by my MG
	8.8	7	6.3	5	Some what	
	0	0	93.8	75	Very much	
.000*	90	72	0	0	Not at all	15) I have trouble performing my personal grooming needs due to
	10	8	7.5	6	Some what	
	0	0	92.5	74	Very much	

*= significance

This table (4) explores how Myasthenia Gravis (MG) affected patient's quality of life pre and post nursing intervention. Each item shows statistically significant improvement (SIG = .000), Pre-intervention: The majority of patients reported "Very much" across all items, indicating severe affection of QOL. For example, :(100%) felt bothered by limitations in work. (100%) had lost personal independence (e.g., shopping, driving).(100%) had trouble speaking**,** walking**,** or felt depressed due to MG. (98.8%) had limited their social activity.(96.3%) had reduced ability to enjoy hobbies**.** Post-intervention: The patient's response shifted to "Not at all" for nearly all items. Most items now show over (90%) of patients reporting no issue at all**: (**92.5%) no longer lost independence. (91.3%–92.5%) reported no depression, no difficulty in public spaces, and no emotional overwhelm. (90%+) no longer had trouble walking, performing grooming, or working. Only a small minority (7.5–12.5%) reported "Somewhat" post-intervention, and (0%) reported "Very much.

Figure (2) shows that: Pre intervention: All patients (100%) were experiencing severe effect of MG on quality of life. Post intervention: The majority of patients (92.5%) moved to a mild effect level, and 7.5% to moderate effect showing significant improvement. A statistical significance difference was found between pre& post intervention regarding total score levels of QOL (p value =.000).

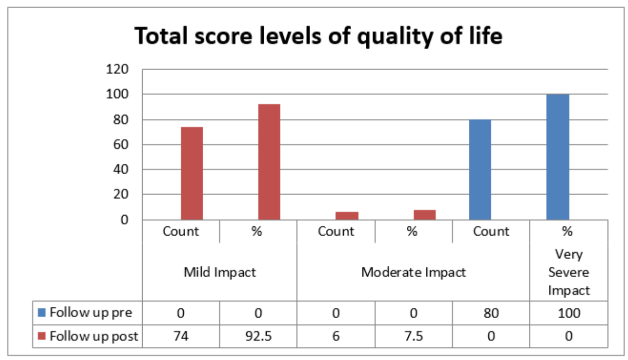

Fig (2). Total score levels of MG effect on Qol pre -post intervention according to myasthenia gravis quality of life-15 revised (mg-qol15r)

Discussion

Regarding the demographic data of the studied patients, the current study revealed that most patients with Mythania Gravis receiving plasma exchange therapy were within the middle-age group, mainly between their thirties and forties. Females constituted the majority of the study patients. Most patients were married and had secondary education. From researcher opinion', this can be explained by the fact that Myasthenia Gravis commonly occurs in middle adulthood and the predominance of females aligns with the well-documented higher incidence of autoimmune diseases among women. Hormonal and immunological factors may contribute to this gender difference in disease susceptibility.

These results are consistent with Hassan et al., (2022) who reported that the mean age of the studied patients was 38.9 ± 11.3 years. Most patients were between their thirties and forties years old. More than half of the patients were females. Nearly half of the patients had a moderate level of education.

Similarly, Elmetwaly et al., (2024) reported that the majority of the patients were married. The mean age of the study group was 39.7 ± 12.3 years. Females constituted the majority. Most patients were married and had secondary education and resided in rural areas.

Likewise, Mohamed & Elesawy, (2025) found that the mean age of the study group was 30.8 ± 8.8 years. The majority of patients were females and most were married. In terms of education, secondary school completion represented the most common level among the patients. Most patients resided in rural areas.

Regarding the health history of patients with Myasthenia Gravis undergoing plasma exchange therapy, the current study revealed that most patients with Myasthenia Gravis undergoing plasma exchange therapy experienced ocular and bilateral muscle weakness, upper respiratory tract infection. More than half of sample reported a short duration of present symptoms (one to fifteen days). The most frequent chronic conditions associated with most patients were hypertension and diabetes mellitus.

This finding was consistent with the results of Ali et al., (2022) who reported that ocular weakness was the most common initial presentation of patients with MG. They further concluded that most patients who initially presented with ocular or bulbar symptoms later developed generalized muscle weakness during the follow-up period.

This finding in contrast with the study of Chien et al., (2023) who reported that approximately small number of MG patients experience myasthenic crisis in the form of respiratory failure and need to mechanical ventilation.

In the current study, hypertension and diabetes mellitus were identified as the most common chronic conditions among patients with Myasthenia Gravis (MG). These results were consistent with those of Nelke et al., (2022), who found that cardiovascular and metabolic disorders particularly hypertension represent the most prevalent comorbidities in MG, while pulmonary and renal diseases are less frequently observed.

Similarly, Raggi et al., (2020) who noted that metabolic disturbances such as diabetes often coexist with MG, likely due to corticosteroid therapy, reduced physical activity, and the chronic inflammatory state associated with autoimmune diseases. The absence of kidney disease aligns with Alanazy, (2019) who indicated that renal involvement is uncommon in MG compared with other autoimmune disorders**.**

From researcher view hypertension and diabetes mellitus are common in myasthenia gravis due to shared autoimmune roots, genetic predispositions, and especially, treatments like corticosteroids, which directly raise blood sugar and blood pressure. These conditions often coexist with MG, with studies showing high prevalence, indicating a need for routine screening of blood pressure and glucose levels in MG patients for early detection and optimize therapeutic outcomes for these diseases (DM & HTN) as these comorbidities worsen prognosis.

Regarding activities of daily living, the results of the study indicate a statistically significant improvement in the patient's level of daily living activities following the nursing intervention. Before the nursing intervention, the majority of patients were classified as very dependent, with a small number being partially dependent, and none able to live independently. But, after the nursing intervention, most patients became fully independent, a few were minimally dependent and only a small number remained very dependent, with no patients partially dependent.

This result is similar to Hassan et al., (2022) who found that prior to the educational intervention, patients with myasthenia gravis exhibited poor fatigue management practices. Post-intervention, significant improvements were observed in their ability to plan activities, balance rest and activity, and adopt healthier behavior.

This demonstrates a clear positive impact of the nursing intervention on enhancing patients' functional independence. This is may be due to improvement of patients' knowledge after implementation of nursing intervention leads to improvement in self-care practices that reflected on physical functions and daily living activities.

This result is in the same line with Elmetwaly et al., (2024) who reported significant improvement in the study group mean and standard deviation of daily living scale in post and follow-up implementation of self-management protocol in the study group compared to pre implementation of self-management.

Also, this is congruent with Ahmed et al., (2022) who revealed that more than one third of patients were partially physically dependent and about one third of them were minimally physically dependent in which MG symptoms had greater effect on performance of activities of daily living (ADLs).

Furthermore, Muslihah et al., (2024) reported that there was decreased in total mean score of activities daily living in patient with MG before intervention with statistical significant improvement after one month and after three months of self-care management strategy implementation. Similarly, Bakhit et al., (2024) who showed a statistically significant improvement in activities of daily living of the patients investigated at follow-up and post-program compared to pre-program.

Regarding myasthenia gravis quality of life, patients with Myasthenia Gravis experienced severe impairment across all aspects of daily life before the intervention, reporting marked physical limitations, emotional distress, and restricted social participation. They struggled with basic tasks such as speaking, walking, working, and maintaining independence, and most reported feelings of depression and social withdrawal.

While, after the nursing intervention, there was a remarkable improvement in all quality-of-life dimensions. Patients regained independence, resumed social and recreational activities, and reported minimal emotional or functional difficulties.

The overall impact of myasthenia gravis on quality-of-life shifted from severe to mild or moderate, reflecting a statistically significant enhancement in physical functioning, emotional well-being, and social engagement.

These findings confirm the effectiveness of the nursing intervention in improving quality of life and promoting holistic recovery among patients with Myasthenia Gravis undergoing plasma exchange therapy.

This result is congruent with Wu et al., (2023) who found a median MG-QOL15 score of 12.5 among myasthenia gravis patients, indicating reduced quality of life, particularly affected by eye symptoms, disease severity, daily life activities, and employment status. Also, in the same route of Szczudlik et al., (2020) who found that MG disease severity affected the QOL of studied patients.

Also, Santos et al., (2025) found that Brazilian patients with Myasthenia gravis had a mean EQ-5D-3L score of 0.55, indicating a reduction in quality of life compared to population norms, significantly impacted by mobility and self-care limitations.

According to, Majigoudra et al., (2023) reported that quality of life in Myasthenia Gravis is significantly affected by the disease.

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