

Understanding the Impact of Physical Exercise in People Living with Myasthenia Gravis from the MGFA Global MG Patient Registry (MGFAPR) in the US (2013-2023)

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OBJECTIVES

Myasthenia Gravis (MG) is an autoimmune condition involving antibodies targeting neuromuscular junctions, resulting in fatigue-induced muscle weakness.¹ This research aims to assess the impact of physical activity on patients with MG, recognizing the imperative for further research after the exclusion of physical exercise from the last International Consensus Guidance for Management of MG recommendations due to the low quality of previous evidence.²



METHODOLOGY

The Myasthenia Gravis Foundation of America (MGFA) Global MG Patient Registry (MGFAPR) is an online longitudinal patient-reported registry (started in 2013) hosted on the Health Storylines platform (since 2022). We conducted a cross-sectional retrospective study on the enrollment surveys collected from MGFAPR between July 2013 and March 2022. Participants were 18 years of age and above at time of enrolment, with a self-reported (physician confirmed) diagnosis of MG. Only participants with complete response to physical activity were included (n=3,530). Those who reported no engagement in any physical activity were categorized as "No Exercise" (NE), whereas participants that reported exercising more than 30 minutes, five or more times a week were categorized as "High-level Exercise" (HE). All other participants were categorized as "Moderate Exercise" (ME). Descriptive statistics (Kruskal-Wallis test for continuous variables and Chi-square tests or Fisher's exact test for categorical variables), Bonferroni test, and two multivariate logistic regression models were run to explore the association of physical exercise to MG-ADL score and exacerbations individually, controlling for gender, age at enrollment, income, and BMI.



RESULTS

> **Table 1. Demographics and Disease Characteristics**

Variable, mean (SD) or %	Overall (N = 3,530)	NE (N = 1,470)	ME (N = 1,290)	HE (N = 770)	p-value
Gender					<0.001*
Male	1,376 (39%)	509 (35%)	484 (38%)	383 (50%)	
Female	2,154 (61%)	961 (65%)	806 (62%)	387 (50%)	
Age at enrollment (years)	55.8 (14.9)	55.6 (14.2)	55.6 (14.8)	56.6 (16.1)	0.043
BMI	30.8 (7.5)	32.5 (8.3)	30.4 (7.1)	28.2 (5.6)	<0.001*
Annual income (USD)	62,657.3 (30,749.5)	56,831.3 (30,721.5)	64,957.1 (30,330.1)	69,977.9 (29,446.8)	<0.001*
MG-ADL	6.5 (3.9)	7.7 (3.8)	6.1 (3.7)	5.1 (3.7)	<0.001*
MG-QoL15	14.3 (7.7)	17.3 (7.2)	13.1 (7.3)	10.5 (7.1)	<0.001*
Depression and/or anxiety					<0.001*
Yes	1,490 (42%)	749 (51%)	527 (41%)	214 (28%)	
No	2,024 (57%)	715 (49%)	757 (59%)	552 (72%)	

> The study included 3,550 patients with MG: 42.7% in NE, 36.5% in ME, and 21.8% in HE groups. The Patients with HE had lower MG-ADL (HE:5.1; ME:6.1; NE:7.7, p<0.001), lower MG-QoL-15r (10.5; 13.1; 17.3, p<0.001), lower rate of exacerbations, lower BMI (28.2; 30.4; 32.5, p<0.001), lower prevalence of depression/anxiety (28%; 41%; 51%, p<0.001) and higher income (\$69,978; \$64,957; \$56,831, p<0.001) compared to ME and NE. Bonferroni test results showed statistically significant differences between each pair of groups for all variables except for "age at enrollment", where only it was statistically significant between NE and HE.



CONCLUSION

> This study shows that physical activity may be positively associated with MG disease symptoms. Patients exhibiting higher levels of activity reported associations with lower severity of disease burden, higher quality of life, and other favorable outcomes.

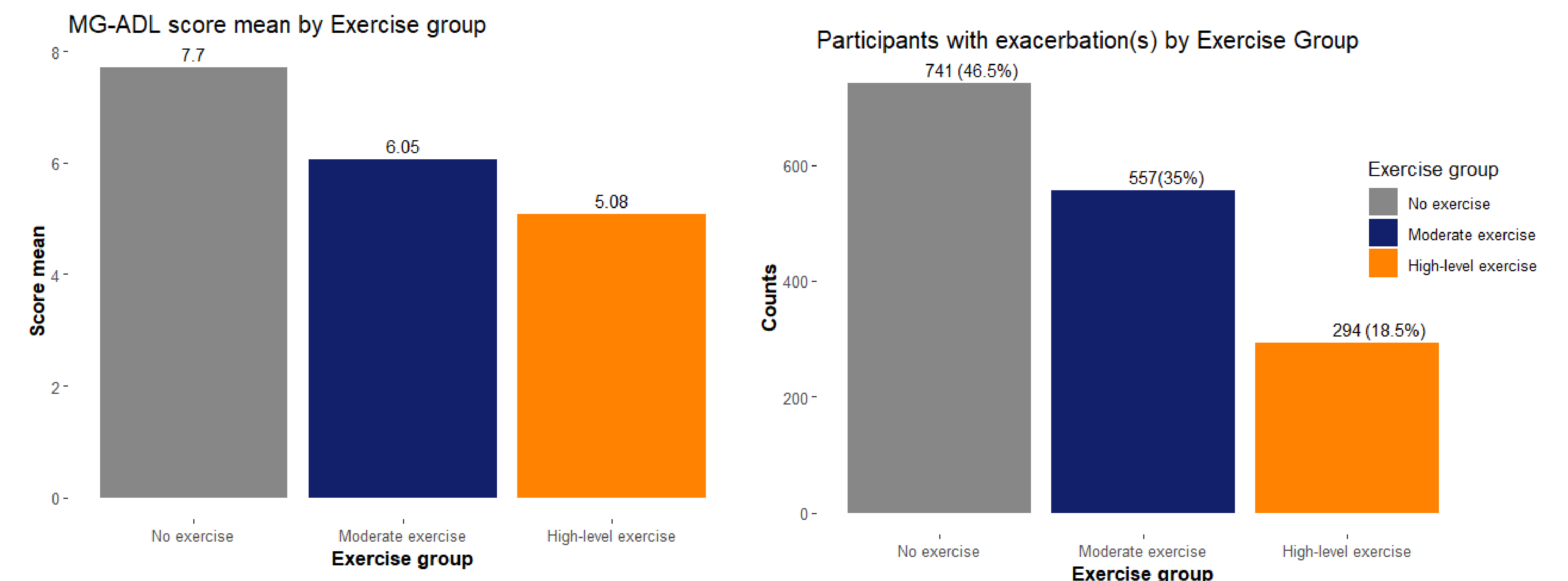
> Further research, including a longitudinal study to understand the causal effects of physical exercise on MG disease outcomes is needed to strengthen evidence to update MG management guidelines.



REFERENCES

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> **Figure 1. MG-ADL and Exacerbation(s) Distribution by Exercise Group**



> **Table 2. Association of Exercise and Covariates with MG-ADL score of >5**

	OR	95% CI	p-value
Exercise group			
ME vs. NE	0.5	0.42, 0.60	<0.001
HE vs. NE	0.4	0.29, 0.44	<0.001
Gender			
Female vs. Male	1.6	1.32, 1.85	<0.001
Age at enrollment	0.9	0.98, 0.99	<0.001
Income group			
Median vs. Low	0.6	0.47, 0.76	<0.001
High vs. Low	0.5	0.37, 0.60	<0.001
BMI	1.0	1.01, 1.03	<0.001

Patients with ME and HE had a statistically significant lower risk of having an MG-ADL score of over 5 in comparison to NE (OR 0.5, 95% CI 0.42-0.60; OR 0.4, 95% CI 0.29-0.44, respectively).

> **Table 3. Association of Exercise and Covariates with Exacerbation**

	OR	95% CI	p-value
Exercise group			
ME vs. NE	0.8	0.65, 0.90	0.001
HE vs. NE	0.7	0.54, 0.82	<0.001
Gender			
Female vs. Male	1.3	1.12, 1.56	<0.001
Age at enrollment	0.9	0.98, 0.99	<0.001
Income group			
Median vs. Low	1.0	0.78, 1.40	0.8
High vs. Low	1.0	0.79, 1.44	0.7
BMI	1.0	1.00, 1.02	0.063

Patients with ME and HE had a statistically significant lower risk of exacerbation in comparison to NE (OR 0.76, 95% CI 0.65-0.9; OR 0.67, 95% CI 0.54-0.82, respectively).