Psychological Burden in People Living with Myasthenia Gravis: Prevalence and Associated Risk Factors of Depression and Anxiety from the MGFA Global MG Patient Registry (MGFAPR) in the US (2017-2022)

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INTRODUCTION AND OBJECTIVE

> Myasthenia Gravis (MG) is a rare and chronic autoimmune disease characterized by fluctuating and rapid muscle weakness and fatigue. [1] People living with MG can be limited in their daily activities and may experience increased psychological symptoms due to reduced quality of life, disease and treatment burden. [2] The objective of this study was to understand the prevalence of depression and anxiety as well as their associated risk factors in MG patients.
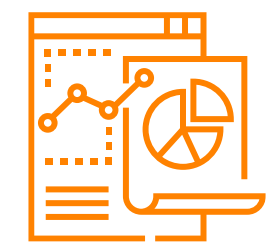
RESULTS

> **Table 1. Demographics**

	Overall (N=1774)	Females (N=1046)	Males (N=728)
Age at enrollment			
Mean (SD)	56.8 (14.8)	51.9 (14.8)	63.7 (11.8)
Age at diagnosis			
Mean (SD)	51.1 (17.4)	45.2 (17.0)	59.6 (14.2)
Race			
White	1525 (86.0%)	863 (82.5%)	662 (90.9%)
African American	72 (4.1%)	59 (5.6%)	13 (1.8%)
Asian	25 (1.4%)	14 (1.3%)	11 (1.5%)
Indigenous	5 (0.3%)	3 (0.3%)	2 (0.3%)
Other	147 (8.3%)	107 (10.2%)	40 (5.5%)
Employment status			
Full-time	585 (33.0%)	359 (34.3%)	226 (31.0%)
Part-time	171 (9.6%)	109 (10.4%)	62 (8.5%)
Unemployed	1014 (57.2%)	576 (55.1%)	438 (60.2%)
Unknown	4 (0.2%)	2 (0.2%)	2 (0.3%)
Household Income (annual)			
Less than 15000	137 (7.7%)	105 (10.0%)	32 (4.4%)
15000-50000	464 (26.2%)	285 (27.2%)	179 (24.6%)
50000-100000	547 (30.8%)	318 (30.4%)	229 (31.5%)
100000 or over	439 (24.7%)	219 (20.9%)	220 (30.2%)
I do not wish to answer	161 (9.1%)	103 (9.8%)	58 (8.0%)
Unknown	26 (1.5%)	16 (1.5%)	10 (1.4%)

> The study included 1,774 MG patients (1,046 (60%) females and 728 (40%) males), mean age at enrollment 56.8 years, mean age at diagnosis 51.1 years. Majority of the study population is White (86%), unemployed (57.2%), with a wide distribution in annual household income.

> **Table 2. Psychological disorders and MG disease severity**

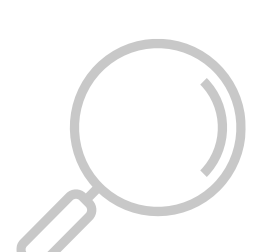|	Overall (N=1774)	Females (N=1046)	Males (N=728)
Depression*			
No	1119 (63.1%)	595 (56.9%)	524 (72.0%)
Yes	598 (33.7%)	423 (40.4%)	175 (24.0%)
Unknown	57 (3.2%)	28 (2.7%)	29 (4.0%)
Anxiety*			
No	1107 (62.4%)	582 (55.6%)	525 (72.1%)
Yes	610 (34.4%)	431 (41.2%)	179 (24.6%)
Unknown	57 (3.2%)	33 (3.2%)	24 (3.3%)
MG-ADL*			
Mean (SD)	6.72 (3.83)	7.35 (3.92)	5.83 (3.51)
Median [Min, Max]	7.00 [0, 19.0]	7.00 [0, 19.0]	6.00 [0, 17.0]
MG-QoL15r*			
Mean (SD)	14.6 (7.66)	15.9 (7.67)	12.7 (7.25)
Median [Min, Max]	15.0 [0, 33.0]	16.0 [0, 33.0]	12.5 [0, 32.0]

Significant difference between females and males (*p<0.001)
Higher score of MG-ADL and MG-QoL15r denotes worse symptoms and quality of life respectively

> At MGFAPR enrollment, the prevalence of self-reported depression and anxiety were 33.7% and 34.4% respectively in the overall population. The prevalence was higher in females in comparison to males in both depression (40.4% vs 24%, p<0.001) and anxiety (41.2% vs. 24.6%, p<0.001).
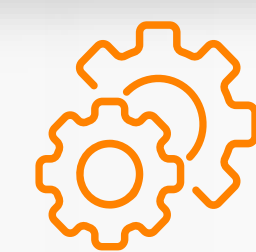
METHODOLOGY

> 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). A cross-sectional retrospective study was conducted with enrollment surveys of MGFAPR from November 2017 to March 2022. Participants were 18 years of age and above, with a self-reported (physician confirmed) diagnosis of MG. Those with incomplete responses to Myasthenia Gravis Activities of Daily Living Scale (MG-ADL) or Myasthenia Gravis Quality of Life 15-item Scale – Revised (MG-QoL-15r) were excluded (n= 4). Descriptive analyses were conducted on demographics and key outcome variables (Table 2). Gender differences were assessed using t-test and Chi-square tests (or Fisher's exact test). Potential factors associated with self-reported diagnosis of anxiety and depression were evaluated in two distinct multivariate logistic regression models. Table 1 and 2 delineates the covariates included in the logistic regression models. MG-QoL15r was removed from the model due to collinearity with MG-ADL scores.

> **Figure 1. Distribution of depression and anxiety levels by gender**
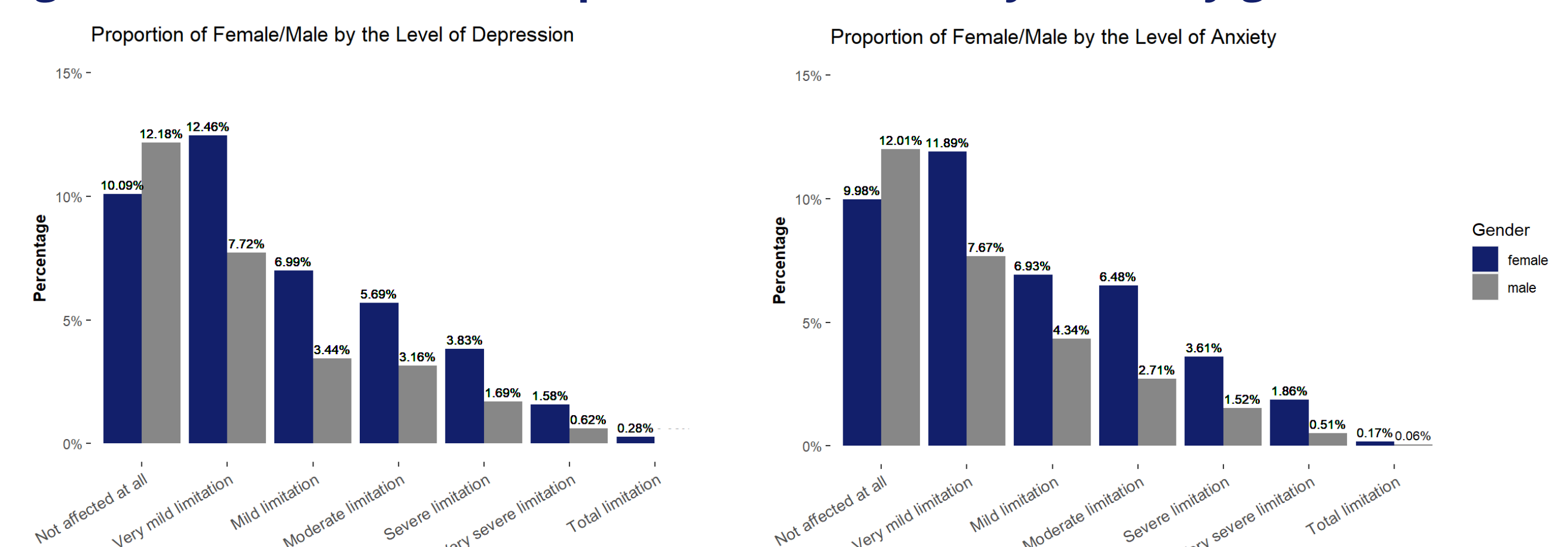
> The histograms show the proportion of respondents from females and males by the level of depression and anxiety. There were consistently higher proportion of female respondents in the response choices of 'very mild limitation' to 'total limitation', while proportion of male respondents only outnumbered that of female in 'not affected at all'.

> **Figure 2. Risk factors of psychological disorders (depression / anxiety)**
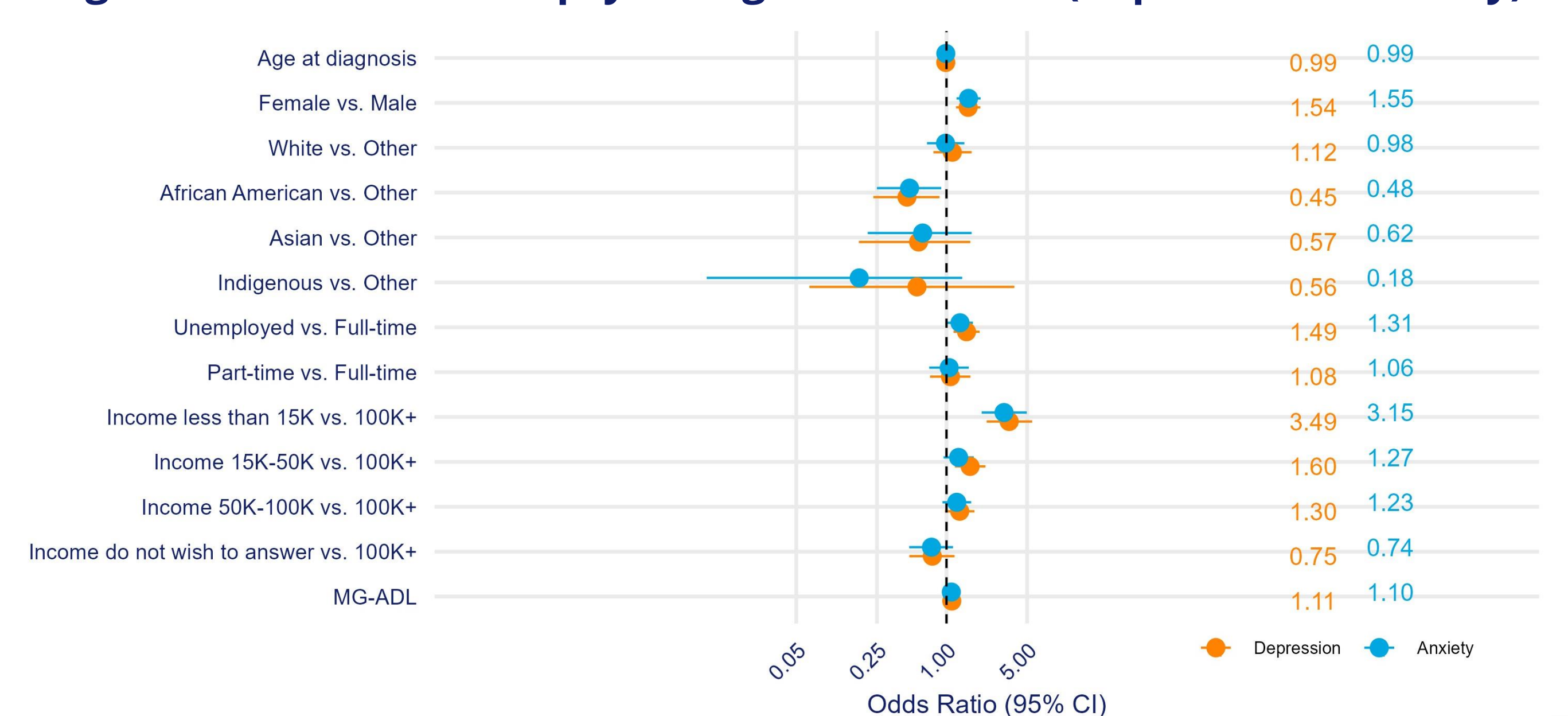
> In the multivariate logistic regression analyses for depression and for anxiety, female gender (OR=1.54; 95%CI: 1.21-1.97, OR=1.55; 95%CI 1.22-1.97, respectively), unemployed (OR=1.49; 95%CI: 1.15-1.94, OR=1.31; 95%CI: 1.02-1.69), lower income (income less than 100K), each point increase in MG-ADL score (OR=1.11; 95%CI: 1.08-1.14, OR=1.10; 95%CI: 1.07-1.13) were statistically significant risk factors.

CONCLUSION

> Around one third of the people living with MG suffer from depression and anxiety. Prevalence of depression and anxiety was observed to be higher in females than males. Female gender, unemployment, lower income, and higher MG-ADL scores are associated with elevated risks of both depression and anxiety.

> MG patients, particularly those with elevated risk of anxiety and depression can benefit from holistic care that addresses anxiety and depression in addition to the physiologic effects of MG.

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2. Lehnerer S, Jacobi J, Schilling R, et al. Burden of disease in myasthenia gravis: taking the patient's perspective. *J Neurol*. 2022;269(6):3050-3063.

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