Social determinants of health are associated with suboptimal treatment among individuals with myasthenia gravis

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Introduction

- In healthcare delivery, medical unmet needs include delays in diagnosis, delayed initiation of treatment, suboptimal treatment (i.e., failure to follow standard of care treatment guidelines), poor access to specialty care, insufficient monitoring, and poor care coordination
- SDoH are "the conditions in the environments where people are born, live, learn, work, play, worship and age that affect a wide range of health, functioning and quality-of-life outcomes and risks"[1]
- Evidence also suggests that adverse SDoH increase the likelihood of medical unmet needs[2–4]

Objective

- To investigate the association between SDoH and suboptimal therapy among individuals with MG

Methods

Study design

- Retrospective observational cohort study

Study periods

- Case findings: October 1, 2018 to September 30, 2020
- Index: Date of initial MG diagnosis
- Baseline: 12 months prior to index
- Follow-up: 24 months following (and including) index

Eligibility

- Inclusion
  - Diagnosed with MG, defined by two outpatient claims 90+ days apart or one inpatient claim (ICD-10-CM: G70.xx)
  - Ongoing utilization, defined by at least one medical or pharmacy claim, every 6 months from baseline through follow up
  - At least one pharmacy claim during the study period (baseline through follow-up)
  - 18+ years of age at baseline
  - Residing in one of sixteen US states included in the Socially Determined dataset (**Figure 1**)
- Exclusion
  - MG diagnosis in baseline
  - MG-specific medication pharmacy claim at baseline
  - Unable to be assigned to a ZIP5 based on primary care provider address

Data sources

- IQVIA Longitudinal Access and Adjudication Data (LAAD)
- Socially Determined[5]

Measures

Exposure measures

- SDoH community risk indices, measured at ZIP5, for
  - Economic climate
  - Food landscape
  - Housing environment
  - Transportation network
  - Health literacy
  - Digital landscape
  - Social connectedness

Each community risk index is scored from 1 to 5, with a score of 4 or 5 deemed high risk

Covariate measures

- Age, sex, insurance type (Medicare, Medicaid, Commercial, other), CCI, diagnosing provider specialty (neurologist, other specialty) and delayed therapy. Therapy was deemed delayed if MG treatment was initiated more than 30 days after initial diagnosis

Outcome measures

- Suboptimal treatment either present or absent, defined as: 1) initial therapy was not acetylcholinesterase inhibitor; 2) >10mg/day of corticosteroids for 6 months; 3) >300 mg/day of azathioprine for 24 months or d) >3000 mg/day of mycophenolate for 12 months

Analysis

- Descriptive comparison of individuals with and without suboptimal treatment, with significance testing performed by difference of proportions test or Chi-square test. Logistic regression model, with patient demographics, insurance type, comorbidities (CCI) and diagnosing provider regressed on suboptimal treatment (present vs. absent)

Results

- Of 8839 participants, 3091 (35.0%) showed evidence of suboptimal treatment
- Compared with individuals with no evidence of suboptimal treatment, individuals with evidence of suboptimal treatment were more likely male (52.9% vs 46.4%, p<0.01), to have fewer comorbidities (CCI 0.41 vs 0.46, p<0.01) and to initiate treatment within 30 days of diagnosis (64.6% vs 47.7%, p<0.01) **(Table 1)**
- Study populations did not vary by age, insurance type or diagnosing provider specialty
- The geographic distribution of the study population in the sixteen eligible states in the United States is shown in **Figure 1**. More than half of the study population resided in one of four states: Florida (16.0%), Texas (14.5%), California (13.6%) and Pennsylvania (8.3%)
- With regard to the high-risk community index scores among individuals with and without suboptimal treatment (**Figure 2**), individuals in the suboptimal treatment group are more likely to reside in high-risk food landscape (27.5% vs 25.4%, p<0.05) and housing environment (25.8% vs 23.7%, p<0.05) communities
- Community risks associated with health literacy, economic stability, social connectedness, digital landscape and transportation were not associated with receiving suboptimal treatment (**Figure 2**)
- **Figure 3** gives adjusted odds ratio and 95% confidence intervals for community risk indices as factors associated with an individual receiving suboptimal therapy
- After adjustment for patient age, sex, insurance, type, CCI and diagnosing provider specialty, individuals who resided in regions with high-risk (vs low-risk) housing environment index score (OR 1.17; 95% CI: 1.02, 1.35) and high-risk (vs low-risk) food landscape index score (OR 1.13; 95% CI: 0.99, 1.28) had elevated risk of suboptimal therapy

Table 1 Distribution of demographics, insurance type and select clinical variables, overall and by suboptimal therapy

	Population (N=8839) n	%	Suboptimal therapy Present (%) N=3091	Absent (%) N=5748	p-value
Sex					
Female	4535	51.3	47.1	53.6	<0.01
Male	4304	48.7	52.9	46.4	<0.01
Age, years, mean	63		63	63	NS
Insurance*					
Commercial	2256	25.5	25.5	25.5	NS
Medicaid	352	4.0	3.8	4.1	NS
Medicare	6227	70.4	70.6	70.4	NS
CCI, mean	0.44		0.41	0.46	<0.01
Delayed therapy					
Present	4102	46.4	35.4	52.3	<0.01
Diagnosing HCP					
Neurologist	2384	27.0	26.1	27.4	NS
Other specialty	5718	64.7	64.5	64.8	NS
Other	737	8.3	9.4	7.8	NS

*Data of 4 patients missing.

Figure 1 Geographic distribution of study population in the sixteen eligible states in the United States

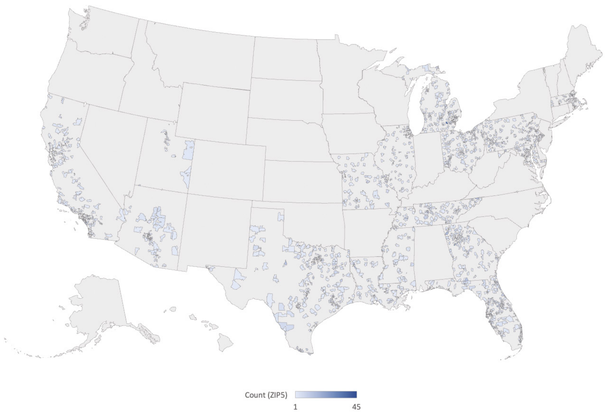
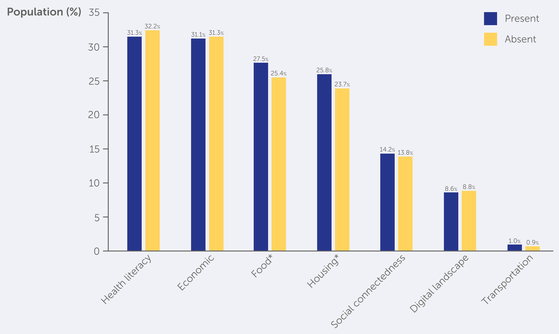
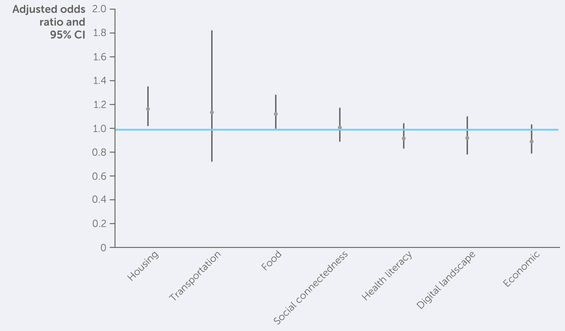


Figure 2 Percent of high-risk community index scores among individuals with (present) and without (absent) suboptimal treatment



*p<0.05.

Figure 3 Adjusted odds ratio and 95% confidence intervals for the seven community risk indices as factors associated with an individual receiving suboptimal therapy*



*Logistic regression model includes patient age, sex, insurance type, CCI and diagnosing provider specialty.

Conclusions and implications

- This preliminary evidence indicates that SDoH are associated with the receipt of suboptimal treatment among individuals with MG
- Geo-mapping individuals to identify measures of SDoH may have both research and clinical applications
- Providers may need to identify patients from at-risk communities to determine if they require additional support
- Future research is focusing on the association between SDoH and other gaps in care, such as delays in diagnosis and treatment and overuse of corticosteroids

Abbreviations: CCI, Charlson Comorbidity Index; HCP, healthcare professional; MG, myasthenia gravis; NS, not significant; OR, odds ratio; SDoH, social determinants of health.

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