PCR180

THE LIFE WITH MYASTHENIA GRAVIS: SOCIOECONOMIC IMPACT OF THE DISEASE ON PATIENTS IN THE CZECH REPUBLIC

Authors: **Danielisova M[1], Mlcoch T[1], Volfova G[1], Bruhova H[2], Malachova M[2], Horakova M[3,4], Dolezal H[1], Chlad R[1], Dolezal T[1,5]**

[1]VALUE OUTCOMES, Prague, Czech Republic
[2]MYGRA-CZ (myasthenia gravis patient association)
[3]Faculty of Medicine, Masaryk University, Brno, Czechia
[4]Department of Neurology, University Hospital Brno, Brno, Czechia
[5]Department of Pharmacology, Faculty of Medicine, Masaryk University, Brno, Czech Republic

V/O Value Outcomes

Background

Myasthenia gravis (MG) is a rare autoimmune disease with a prevalence of 15–20 individuals per 100,000 people, approximately 2800 patients in Czechia. Specific antibodies attack neuromuscular junctions resulting in fluctuating fatigue and weakness of the ocular, bulbar and skeletal muscles. In addition to motor symptoms, psychosocial functions are also affected in MG patients. (1) Antibodies to the acetylcholine receptor are present in 85% and antibodies to muscle-specific kinase or lipoprotein 4 receptor are present in 1–10% of patients. (2–4)

In the first stage of the disease, certain muscle groups become weak. Ocular symptoms appear, including drooping eyelids, double vision, ptosis, diplopia and blurred vision. Other common symptoms include facial muscle weakness, difficulty speaking, chewing, swallowing and shortness of breath. (5) 80% of patients with ocular symptoms progress within 2 years to the generalised form of myasthenia gravis characterised by constant muscle weakness, breathing and mobility problems. (5,6) In addition to motor symptoms, psychosocial functions are also affected in MG patients. (1) Factors contributing to the high burden of disease include disability, treatment-related adverse effects, surgery, the occurrence of myasthenic crises, hospitalizations and comorbidities. (7,8)

Objectives

The objective of this study was to collect local data on the socioeconomic burden of myasthenia gravis on patients as well as on society, the health insurance system and the social system and thus describe burden of MG in Czechia.

Methods

A cross-sectional questionnaire survey was conducted to observe local Czech data on the socioeconomic impact on MG patients. Data were collected between 17 Jan 2023 and 15 Feb 2023 in cooperation with the patient association (MYGRA-CZ) and the Neuromuscular Centre of the University Hospital Brno.

We collected demographic, clinical, healthcare resource use data, out-of-pocket and social transfer costs, and responses to validated specific questionnaires: WPAI (Work Productivity and Activity Impairment) and EQ-5D-5L. For the EQ-5D-5L questionnaires, the UK tariff tables (value set) were used to evaluate and obtain utility values. (9,10) Productivity loss costs were assessed using a human capital approach and discounted by 3%. An average retirement age of 64 years was assumed. In this study, the mean age of all patients was 58.8 years and the overall proportion of working patients was 44% (n=36). For the working cohort of patients, the mean age was 52 years (n=36). For the retired patients (n=35), a calculation of productivity loss was not performed. The gross wage on which the costs were calculated is based on the Wages and Labour Costs statistics published by the Czech Statistical Office (CZSO) as of the Q3/2022, which were the most recent statistics available. (11) The average gross wage was equal to CZK 39,858 (€1,682), the amount of employer contributions is equal to 33.8% (9.0% health and 24.8% social insurance), the resulting average total cost per employee including all contributions is then equal to CZK 53,331 (€2,251). The "super-gross" wage reflects the total cost of the employee from the perspective of the employer and the state, where this amount includes all taxes paid to the state and the net wage. (12)

For the WPAI questionnaire, the relevant parameter for our purposes was work impairment (WI). In the case of productivity loss, we conservatively assumed that the patient would have this fixed productivity loss until the time of retirement. The productivity loss costs were calculated for the entire cohort of patients based on the mean age, wage and work productivity loss. These values were then calculated per patient. The unemployment rate of patients in the study was only slightly higher than the unemployment rate of the general population in the Czechia (2.4% vs. 2.2% in Q4/2022). For this reason, it was assumed that there is no additional work productivity loss due to excessive unemployment in patients with MG. When calculating productivity loss of patients with disability pension, the proportional reduction of work productivity for the 1st, 2nd and 3rd level of disability pension as defined by Decree No.359/2009 Coll. was considered.

All costs were recalculated from Czech Crowns (CZK) to € using the average exchange rate in Jan 2023 to June2023 equal to 23,690 CZK/€. (13)

Results

In total, 82 patients completed the questionnaires. The mean age was 58.8 years, most were females (61%) and the mean age at diagnosis was 44.7 years (Table 1). Patients were questioned about employment status with multiple answers. 23% of patients received a disability pension due to the MG. 28% experienced a myasthenic crisis and of these patients 30% required mechanical ventilation during crises. Most patients were classified as MGFA (Myasthenia Gravis Foundation of America) class II (48%), where non-ocular muscles and mild muscle weakness are present. Acetylcholinesterase inhibitors were used in 79% patients, 60% were on corticosteroid therapy and 43% on immunosuppressive therapy. 44% of patients had hypertension and 30% had dyslipidaemia. Thymectomy was performed in 48% of patients.

In relation to the MG, 52 of 82 (63%) patients used their own car for the purpose of transport to the medical appointments. The mean monthly costs per patients for this car transportation was 20.12 €. 33 (40%) patients used other transport (train, bus etc.) with an average monthly cost of 2.9 € per patient. Patients paid an average of 10.3 € per patient for prescribed medicines, 13.5 € for over-the-counter medicines, vitamins and other supplements (Table 2).

Table 1. Baseline characteristics of MG patients

Demographic characteristics (N=82)	N (%)
Mean age (years)	58.8
Mean age at diagnosis (years)	44.7
Female and Male	50 (61%) and 32 (39%)
Employment status (N=108; multiple answers)	N (%)
Freelance contract	9 (11%)
Part-time	13 (16%)
Full-time	20 (24%)
Pension	35 (43%)
Casual contract	4 (4%)
Disability pension	19 (23%)
Parental leave	3 (4%)
Unemployed	2 (2%)
Clinical information	N (%)
Clinical event	
Mean frequency of exacerbations in the last 12 months (N=19)	4.2 per 12 months
Previous myasthenic crisis anytime in the past (N=82)	23 (28%)
Mechanical ventilation during crisis (N=23)	7 (30%)
MGFA classification (N=65)	
Class I	13 (20%)
Class II	31 (48%)
Class III	17 (26%)
Class IV	4 (6%)
Current treatment (N=166; multiple answers)	
Cholinesterase inhibitors	65 (79%)
Corticosteroids	49 (60%)
Immunosuppressants	35 (43%)
Rituximab	1 (1%)
Eculizumab	2 (2%)
Other drug in a clinical trial	6 (7%)
Other drug (omeprazole, ezetimibe, IVIG etc.)	3 (4%)
None	5 (6%)
Comorbidities and other disease (N=169; multiple answers)	
Other autoimmune diseases (multiple sclerosis, rheumatoid arthritis, autoimmune form of thyroid disease)	12 (15%)
Hypertension	36 (44%)
Dyslipidaemia	25 (30%)
Diabetes	10 (12%)
Chronic obstructive pulmonary disease	2 (2%)
None	18 (22%)
Unknown	2 (2%)
Other (cervical spine pain, cataracts, arthrosis, non-specific skin disease, overactive bladder, osteopenia, macrocytic anaemia, depression, incontinence, migraine, cataract, anxiety disorders)	42 (27%)
Thymectomy (N=82)	39 (48%)

Table 2. Direct monthly costs per MG patient (N=82)

Transportation costs (N=82)	Mean costs per month
Transport using own car	20.12 €
Transport other than by car – train, bus, taxi	2.9 €
Drugs costs (N=82)	
Prescription drugs	10.3 €
Over-the-counter drugs/supplements/vitamins	13.5 €
Other costs (N=82)	
Rehabilitation, housekeeping services etc.	12.6 €
Total direct monthly costs of MG/month/patient	59.4 €

Table 3. Social security costs of MG patients

Disability pension level* (N=79)	N (%)
None	55 (70%)
1st level	10 (13%)
2nd level	4 (5%)
3rd level	10 (13%)
Total number of patients on disability pension	24 (30%)
Social security costs in patients (N=82)	Mean costs per month
Disability pension	149.8 €
Mobility allowance	5.5 €
Mean total social security costs per month per patient	**155.4** €

*According to the decree, the productivity reduction for the first level of disability is at least 35% and no more than 49%. The midpoint of this interval is equal to a 42% reduction in work productivity. The midpoint of the interval for level 2 of disability is equal to a reduction in work productivity of 60%. The midpoint of the interval for level 3 of disability is equal to a reduction in work productivity of 85%.

Disability pension is received by 30% of the patients. 13% of 82 patients reported 1st level of disability pension, 5% reported 2nd level and 13% reported 3rd level (Table 3). Only 12 patients reported the amount of disability pension, which the mean was 512.1 € per month, recalculated for the whole cohort of patients (N=82) it was 149.8 € per month. Mobility allowance (N=82) was 5.5 € per month on average.

The quality of life (QoL) of myasthenia gravis patients was assessed using the EQ-5D-5L questionnaire. The mean reported quality of life in the cohort of patients (n=82) was 0.706. The mean EQ-5D-5L Visual Analogue Scale (VAS) score in the patient cohort (n=82) was 72 (Table 4). The mean quality of life of myasthenia gravis patients (0.706) is lower than that of the general population in the 55–64 age group (0.804) and lower than that of the 65–74 age group (0.785) according to the study by Janssen et al. 2014. (14)

In this study, a total of 44% of patients were working and their overall productivity loss was 26%. Absenteeism (work absenteeism) was equivalent to 8%. Presentism (reduction in productivity while working) was 23%. There was a 30% reduction in normal daily activities, e.g. activity impairment (Table 4).

Table 5 shows the mean productivity loss costs in each cohort of MG patients and the total lifetime productivity loss costs for all MG patients in Czechia, which are estimated to 173,078,751 €. The lifetime costs per average patient are then equal to 55,095 €.

Table 4. Quality of life and WPAI in MG patients

Quality of life (N=82)	Mean
EQ-5D-5L	0.706
EQ-VAS	72
WPAI in patients	%
Absenteeism (N=36)	8%
Presenteeism (N=36)	23%
Work impairment (N=36)	26%
Activity impairment (N=82)	30%

Table 5. Productivity costs of the whole MG cohort in Czechia

	Proportion of patients in the study	Number of patients in cohort	Productivity costs/ patient	Productivity costs/cohort
Employed	44%	1229	64,988 €	79,887,873 €
Disability pension	23%	649	143,640 €	93,190,978 €
Unemployment	2%	68	0 €	0 €
Pension	43%	1195	0 €	0 €
Total costs per the whole cohort	**112%***	**3141**	**–**	**173,078,751** €
Total costs per one patient	**–**	**–**	**–**	**55,095** €

*Patients were able select multiple answers, so the total is more than 100%. The total number of patients with MG in the Czech Republic is approximately 2800.

Conclusions

The results of this questionnaire survey confirmed that myasthenia gravis carries a large societal burden. The disease is associated with many inconveniences caused either by the disease itself or by its treatment. Patients' quality of life, their ability to work and their ability to carry out normal daily activities are severely affected. The high burden on the health and social systems is, of course, not negligible and might be alleviated by improved therapy for MG patients.

Given the probably slightly lower severity of those participants involved, the real burden of work disability and productivity loss is likely to be even higher. The lower severity of the participants is mainly due to the fact that it is more difficult for patients who are in higher severity classes to participate in the study and answer the questions.

To conclude, MG brings a significant socioeconomic burden to patients, caregivers, social system as well as to the whole society. As there are currently limited innovative treatment options and high unmet medical need, there is a potential for decreasing this burden in future with new therapies. Our study might be useful while preparing future economic analyses in MG.

References

1. Lehnerer S, Jacobi J, Schilling R, Grittner U, Marbin D, Gerischer L, et al. Burden of disease in myasthenia gravis: taking the patient's perspective. J Neurol. červen 2022;269(6):3050–63. • 2. Juel VC, Massey JM. Myasthenia gravis. Orphanet J Rare Dis. prosinec 2007;2(1):44. • 3. Gilhus NE, Skeie GO, Romi F, Lazaridis K, Zisimopoulou P, Tzartos S. Myasthenia gravis – autoantibody characteristics and their implications for therapy. Nat Rev Neurol. květen 2016;12(5):259–68. • 4. Dresser L, Wlodarski R, Rezania K, Soliven B. Myasthenia Gravis: Epidemiology, Pathophysiology and Clinical Manifestations. J Clin Med. 21. květen 2021;10(11):2235. • 5. Grob D, Brunner N, Namba T, Pagala M. Lifetime course of myasthenia gravis. Muscle Nerve. únor 2008;37(2):141–9. • 6. Wendell LC, Levine JM. Myasthenic crisis. Neurohospitalist. leden 2011;1(1):16–22. • 7. Schneider-Gold C, Hagenacker T, Melzer N, Ruck T. Understanding the burden of refractory myasthenia gravis. Ther Adv Neurol Disord. 2019;12:1756286419832242. • 8. Boscoe AN, Xin H, L'Italien GJ, Harris LA, Cutter GR. Impact of Refractory Myasthenia Gravis on Health-Related Quality of Life. J Clin Neuromuscul Dis. červen 2019;20(4):173–81. • 9. Dolan P. Modeling valuations for EuroQol health states. Med Care. listopad 1997;35(11):1095–108. • 10. The measurement and valuation of health. Final Report on the Modelling of Valuation Tariffs. MVH Group. Centre for Health Economics. University of York. January 1995. Dostupné online na https://www.york.ac.uk/media/che/documents/reports/MVH%20Final%20Report.pdf. • 11. Wages and labour costs. Average gross wages for Q3 2022 [Internet]. Dostupné z: https://www.czso.cz/documents/10180/165384786/pmzcr090522_1.xlsx/e0ffe740-337a-4582-8e73-6b03ffce861d?version=1.0 • 12. Recommended procedures for health economic evaluations in the Czech Republic: the Czech Society for Pharmacoeconomics and Health Technology Evaluation (ČFES). [Internet]. Dostupné z: https://farmakoekonomika.cz/wp-content/uploads/2020/06/GUIDELINES_CFES_kv%C4%9Bten-2020.pdf • 13. Exchange rate EUR/CZK 01/2023-06/2023 [Internet]. Dostupné z: https://www.cnb.cz/cs/financni-trhy/devizovy-trh/kurzy-devizoveho-trhu/kurzy-devizoveho-trhu/prumerne_mena.html?mena=EUR • 14. Szende A, Janssen B, Cabases J, editoři. Self-Reported Population Health: An International Perspective based on EQ-5D [Internet]. Dordrecht (NL): Springer; 2014 [citován 27. únor 2023]. Dostupné z: http://www.ncbi.nlm.nih.gov/books/NBK500356/

Corresponding author: *tomas.mlcoch@valueoutcomes.cz*

ISPOR EUROPE 2023, November, Copenhagen, Denmark