Healthcare resource utilisation and cost burden assessment of patients with myasthenia gravis in Denmark, Finland, and Sweden

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Introduction

- Myasthenia gravis (MG) is a rare chronic autoimmune disease that causes weakness in the skeletal muscles and can lead to life-threatening respiratory insufficiency[1]
- Comprehensive analyses on the economic burden of MG are sparse.[2] Further studies are therefore needed to understand the overall costs associated with MG
- Nationwide health and social care registers in the Nordic countries offer unique opportunities to evaluate healthcare costs at the population-level
- This study examined healthcare resource utilisation (HCRU), and direct and indirect costs in patients with MG in Denmark, Finland, and Sweden

Methods

- The study population included all patients with ≥2 separate diagnoses of MG from inpatient or outpatient specialised care (ICD-10; G70.0*) during 2000–2020, and no history of MG diagnoses before that. The first (incident) MG diagnosis was defined as the index date. The main analysis population was patients within the working age (aged 15–64 years old) based on the OECD classification.[3] Patients in the main analysis population were followed up from the date they turned 15 years of age until death, emigration, or until they turned 65 years of age, whichever came first. For analyses of indirect costs due to lost productivity, patients were followed up from the date they turned 15 years of age until emigration or until they turned 65 years of age, whichever came first
- Individual-level data on patient characteristics, all-cause specialised care HCRU, sickness absences, early retirement and mortality and associated costs as well as costs of prescribed medications were collected from administrative and healthcare registries with virtually complete population coverage in Denmark, Finland, and Sweden
- The outcome measures of the study were (i) specialised care HCRU (total contacts and in subcategories of outpatient and inpatient contacts), (ii) direct costs associated with HCRU and medication, (iii) indirect costs associated with productivity loss due to sick leave, early retirement and death, and (iv) total costs consisting of direct and indirect costs
- Statistical analyses were conducted using R (version 4.2.2)

Results

Patient demographics

- Altogether, 6,415 patients with an incident diagnosis of MG were identified in the study period, where 2,835 patients (44.2%) were within the working age (15–64 years of age; the main study population) at the time of index date
- In the main study population, the mean age at the time of diagnosis was 45.8 years in Denmark, 48.3 years in Finland, and 46.5 years in Sweden. A higher proportion of patients were women (55% in Denmark and Finland and 54% in Sweden) (**Table 1**)

Healthcare resource utilisation

- The mean number of any HCRU type was 2.7 (SD: 9.6) among MG patients in Denmark, 6.9 (SD: 8.9) in Finland, and 3.4 (SD: 4.1) in Sweden per person per year over the total follow-up (**Table 2**)
- The HCRU was highest in the first year of follow-up (**Figure 1**). The mean number of any healthcare contacts was 5.1 in Denmark, 11.2 in Finland, and 6.2 in Sweden in the first year after the index date

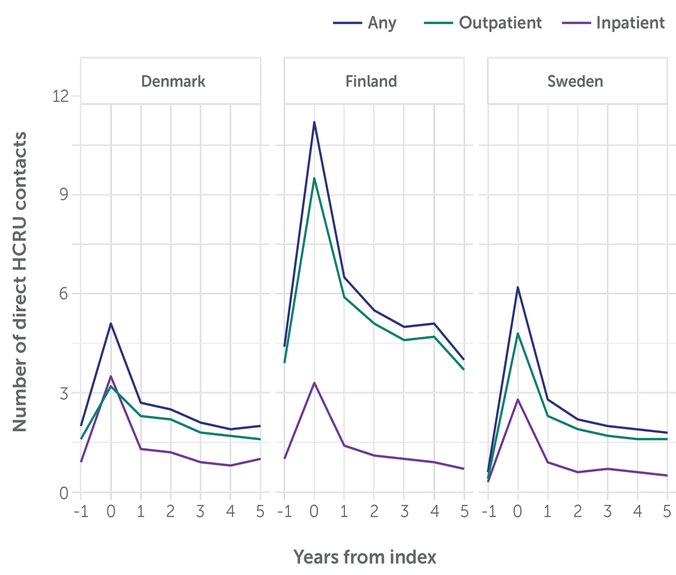
Direct, indirect, and total costs in MG patients

- The mean total cost associated with MG was similar in the three countries [in Denmark: €11,891 (SD: 27,101), in Finland: €11,085 (SD: 11,552), and in Sweden: €11,195 (SD: 12,613) per person per year during follow-up] (**Table 3**).
- Indirect costs were the main contributor to the total costs (62–75% of the total costs depending on the country)
- Direct costs mainly comprised costs from inpatient contacts in all three countries (55–71%)
- Early retirement accounted for the highest proportion of the mean annual indirect cost in Denmark (58%) and Finland (57%). In Sweden, sickness absence was the main contributor to the indirect costs (53%) (**Table 3**)
- Early retirement, sickness absence, and inpatient contacts were the main contributors to costs over time (**Figure 2**)

Conclusions

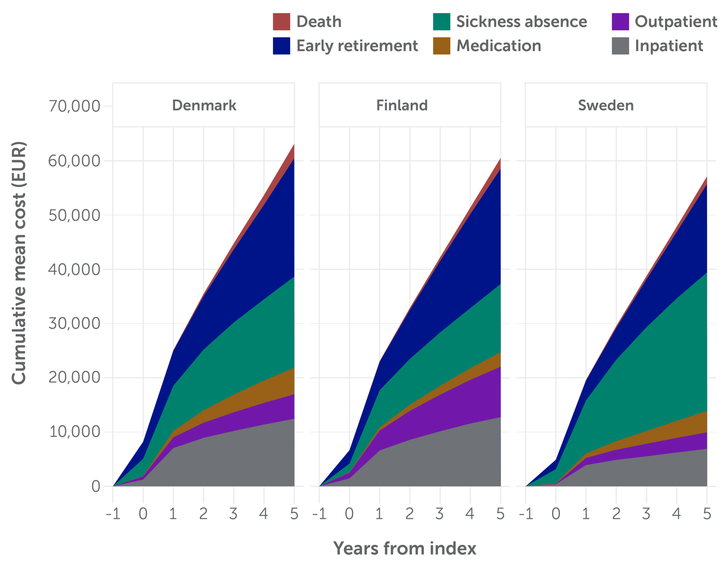
- This study assessed healthcare utilisation and economic burden in patients with MG in the Nordic countries
- MG is associated with a high level of HCRU, peaking around the time of diagnosis, and a significant economic burden mainly driven by indirect costs. Notably, a large amount of costs were contributed by only a fraction of the patients
- A limitation of the study is that harmonizing and comparing costs across countries is challenging because of variations in data sources and data recording practices in the different countries
- These findings should encourage policymakers to prioritise early interventions that would mitigate the effects of MG and its treatment

Figure 1 The mean number of specialised healthcare contacts among MG patients of working age (15–64 years old) in Denmark, Finland, and Sweden



The contacts are shown for one year before and five years after the index date. Incident diagnosis of MG is indicated as year 0. Inpatient, outpatient, and all contacts are presented. The data between annual points are linearly interpolated

Figure 2 Cumulative direct and indirect mean costs per patient among MG patients of working age (15–64 years old) in Denmark, Finland, and Sweden



Direct costs consist of outpatient, inpatient, and medication costs and indirect costs consist of costs of sickness absences, early retirement, and mortality. The costs are shown for one year before and five years after the index date and indicate the end-of-year totals

Table 1 Baseline characteristics of MG patients of working age (15–64 years old) in Denmark, Finland, and Sweden

	Denmark (n=654)	Finland (n=870)	Sweden (n=1,311)
Age at index*			
Mean	45.8	48.3	46.5
Median (Q1, Q3)	48.0 (34.2, 58.3)	51.8 (38.8, 60.1)	49.6 (34.2, 58.9)
Age at MG diagnosis			
Juvenile MG (15–17 years)	11 (2%)	19 (2%)	24 (2%)
Early onset MG (18-49 years)	338 (52%)	382 (44%)	642 (49%)
Late onset MG (50–64 years)	305 (47%)	469 (54%)	645 (49%)
Sex			
Men	296 (45%)	394 (45%)	601 (46%)
Women	358 (55%)	476 (55%)	710 (54%)

*The date of the first outpatient or inpatient contact with an MG diagnosis between 1 January 2000—31 December 2020 (in Denmark, until 31 December 2018)

Table 2 Annual healthcare resource utilisation (HCRU) in the working age MG population (15–64 years of age) during the follow-up

Type of HCRU*	Denmark (n=670)	Finland (n=894)	Sweden (n=1,353)
Any			
Median (Q1, Q3)	1.3 (0.8, 2.2)	4.7 (2.3, 8.7)	2.2 (1.1, 4.1)
Mean (SD)	2.7 (9.6)	6.9 (8.9)	3.4 (4.1)
Inpatient periods			
Median (Q1, Q3)	0.7 (0.2, 1.7)	0.7 (0.2, 1.7)	0.5 (0.0, 1.4)
Mean (SD)	2.1 (9.4)	1.7 (3.9)	1.3 (3.4)
Inpatient days			
Median (Q1, Q3)	0.9 (0.0, 3.2)	0.9 (0.1, 3.2)	0.9 (0.0, 3.4)
Mean (SD)	5.7 (21.8)	5.9 (24.1)	5.5 (20.5)
Outpatient contacts			
Median (Q1, Q3)	0.9 (0.5, 1.4)	4.1 (2.2, 7.4)	1.8 (0.9, 3.3)
Mean (SD)	1.6 (5.3)	6.1 (7.7)	2.7 (3.3)

*HCRU is presented as median (Q1, Q3) and mean (SD)

Table 3 Direct, indirect, and total costs in the working age MG population (15–64 years of age) during the follow-up

Type of cost*	Denmark (n=670)	Finland (n=895)	Sweden (n=1,354)
Total costs, €			
Median (Q1, Q3)	5,219 (2,111, 15,803)	5,862 (2,410, 18,279)	5,145 (1,648, 19,866)
Mean (SD)	11,891 (27,101)	11,085 (11,552)	11,195 (12,613)
Direct costs, €			
Median (Q1, Q3)	1,966 (965, 3,655)	2,718 (1,393, 5,181)	1,614 (659, 3,342)
Mean (SD)	4,479 (23,563)	4,518 (6,083)	2,819 (4,789)
Inpatient			
Median (Q1, Q3)	915 (274, 2,190)	1,010 (357, 2,549)	526 (0, 1,577)
Mean (SD)	3,188 (22,472)	2,419 (4,880)	1,545 (4,233)
Outpatient			
Median (Q1, Q3)	395 (240, 642)	1,118 (612, 2,094)	398 (206, 724)
Mean (SD)	621 (1,516)	1,678 (1,817)	608 (751)
Medication			
Median (Q1, Q3)	346 (59, 884)	332 (92, 613)	310 (45, 917)
Mean (SD)	670 (1,108)	421 (451)	667 (1,155)
Indirect costs, €			
Median (Q1, Q3)	2,533 (0, 10,852)	1,631 (0, 11,212)	2,123 (0, 17,362)
Mean (SD)	7,412 (10,272)	6,567 (8,754)	8,376 (10,851)
Sick leave			
Median (Q1, Q3)	412 (0, 3,091)	380 (0, 2,620)	843 (0, 5,425)
Mean (SD)	2,381 (4,467)	2,178 (4,492)	4,422 (7,436)
Early retirement			
Median (Q1, Q3)	0 (0, 0)	0 (0, 1,785)	0 (0, 0)
Mean (SD)	4,300 (9,262)	3,744 (7,248)	3,474 (7,181)
Death			
Median (Q1, Q3)	0 (0, 0)	0 (0, 0)	0 (0, 0)
Mean (SD)	730 (3,548)	645 (3,156)	480 (2,966)

*Costs are presented as median (Q1, Q3) and mean (SD) annual amount in Euros

Abbreviations: HCRU, healthcare resource utilisation; MG, myasthenia gravis; Q, quartile; SD, standard deviation

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References: 1. Gilhus NE, *et al. Nat Rev Dis Primers*. 2019;5(1):30. 2. Landfeldt E, *et al. Pharmacoeconomics*. 2020;38(7):715-728. 3. OECD. Working age population [Internet]. Available from: https://data.oecd.org/pop/working-age-population.htm