The Burden of Migraine in Brazil's Private Healthcare System: Results From the Brazil Migraine Real-World Evidence (BREM) Study

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Objective: to assess the socio-demographic and clinical characteristics, and direct costs and healthcare resource utilization (HCRU) for patients with migraine within Brazil's private healthcare system

Background

- Migraine is a common neurological condition, with a prevalence of 14.4% globally[1] and 15.2% in Brazil[2]
- In addition to causing significant physical, emotional, economic, and social burden to individuals,[3] migraine has a substantial impact on healthcare systems[4]
- Real-world data on migraine-related direct costs and HCRU are needed to determine the burden of this disease on healthcare systems, and build more efficient strategies to reduce its impact[5]
  - This study adds to the limited data on the differences in direct costs and HCRU between those with and without migraine within Brazil's private healthcare system

Methods

- This retrospective claims analysis used private health insurance claim data from Brazil for patients (aged ≥18 years) with a diagnosis code for migraine (International Classification of Diseases, 10th Revision G43.X)[6] between January 2019 until June 2024
  - A control group included patients without migraine matched 1:1 for age, gender, geographical state, health insurance modality, and comorbidities
- Direct costs and HCRU were compared for patients diagnosed with migraine versus controls without migraine
- Kruskal-Wallis and Chi-square tests were used for comparisons between the groups

Socio-demographic and general clinical characteristics

- Of 7,382,457 patients with private health insurance claim data available, 3,159,764 with any International Classification of Diseases (ICD) code were identified
  - Among these, 22,685 (0.7%) were aged ≥18 years with a diagnosis of migraine (ICD-10 G43.X)
- Characteristics were generally balanced between the migraine and control groups (p>0.05 for all comparisons), **Table 1**
  - The most frequent comorbidities in patients with migraine were musculoskeletal disease (female, 24.8%; male, 7.5%), cardiovascular disease (female, 12.6%; male, 4.9%), and depression (female, 12.1%; male, 2.6%)
  - In total, 22.7% of the migraine group had ≥2 comorbidities

Table 1. Socio-Demographic Characteristics and Comorbidities

Category	Migraine (N=22,685)		Control (N=22,685)	
	Female N=16,696	Male N=5,989	Female N=16,696	Male N=5,989
Characteristics*				
Average age, years (SD)	47 (18)	44 (16)	48 (17)	51 (17)
Age distribution, n				
18–20	427	169	578	214
21–30	2,902	1,062	2,940	1,115
31–40	4,226	1,384	4,208	1,375
41–50	3,802	1,254	3,711	1,190
51–60	2,387	834	2,369	869
61–70	1,438	601	1,411	583
71–80	905	447	879	416
>80	609	238	600	227
Geographical state, n[†, ‡]				
São Paulo	21,341		21,423	
Minas Gerais	208		207	
Paraná	255		220	
Rio de Janeiro	221		225	
Health insurance modality, n[†]				
Self-management	158		180	
Medical Cooperative	20,412		20,177	
Group Medicine	59		60	
Philanthropy	2,051		2,263	
Specialized Health Insurer	5		5	
Comorbidities, n (%)[§]				
Depression	2,745 (12.1)	591 (2.6)	2,525 (11.1)	515 (2.3)
Diabetes	1,729 (7.6)	588 (2.6)	1,549 (6.8)	539 (2.4)
Cardiovascular disease	2,857 (12.6)	1,111 (4.9)	2,802 (12.4)	1,080 (4.8)
Lung disease	538 (2.4)	206 (0.9)	423 (1.9)	160 (0.7)
Kidney disease	149 (0.7)	57 (0.3)	76 (0.3)	30 (0.1)
Oncological disease	717 (3.2)	232 (1.0)	647 (2.9)	191 (0.8)
Musculoskeletal disease	5,624 (24.8)	1,698 (7.5)	5,654 (24.9)	1,677 (7.4)
Mental disorder (other)	1,159 (5.1)	217 (1.0)	1,002 (4.4)	163 (0.7)
Two or more comorbidities	4,004 (17.7)	1,144 (5.0)	3,646 (16.1)	999 (4.4)

*p>0.05 for all comparisons; [†]Data available for male and female combined; [‡]Only the most common geographical states are presented; [§]Patients could be included in ≥1 comorbidity group. SD, standard deviation.

Compared with the control group, most costs and HCRU measures were significantly higher for patients with migraine

Table 2. Summary of Total Costs and Costs per Health Service Event by Study Group

	Migraine (N=22,685)	Control (N=22,685)	Migraine – Control Mean difference (95% CI)	p-value*
Total cost (R$)				
Per patient over all health services[†]				
Mean (SD)	8,081.02 (31,213.19)	6,209.55 (20,952.80)	1,871.47 (1,377.04, 2,365.89)	<0.001
Median (Q1, Q3)	3,183.83 (1,499.43, 6,768.58)	1,965.52 (702.75, 5,131.86)		
For all patients and all health services[‡]	183,317,938.70	140,863,641.75	+30.13%[§]	-
Paid cost (R$) per:				
Elective consultation				
Mean (SD)	94.42 (52.81)	94.33 (57.39)	0.09 (–0.93, 1.10)	0.16
Median (Q1, Q3)	100.00 (72.00, 112.35)	100.00 (72.00, 114.22)		
Elective exam				
Mean (SD)	34.79 (87.79)	31.39 (90.23)	3.40 (1.76, 5.03)	<0.001
Median (Q1, Q3)	8.40 (3.64, 25.00)	7.50 (3.61, 22.50)		
Complementary therapy session[¶]				
Mean (SD)	43.56 (256.90)	45.49 (256.69)	–1.93 (–6.65, 2.79)	<0.001
Median (Q1, Q3)	26.18 (10.61, 38.79)	20.86 (9.77, 35.29)		
Elective hospitalization				
Mean (SD)	10,270.75 (12,637.95)	9,982.37 (10,789.90)	288.38 (81.12, 513.62)	0.124
Median (Q1, Q3)	6,069.54 (3,802.45, 12,955.00)	6,519.00 (3,993.66, 13,903.74)		
ER visit				
Mean (SD)	194.75 (289.99)	178.53 (279.39)	16.22 (10.97, 21.46)	<0.001
Median (Q1, Q3)	127.97 (59.75, 246.64)	103.25 (50.00, 223.96)		
Emergency hospitalization				
Mean (SD)	8,631.64 (26,617.57)	8,439.88 (15,797.48)	191.76 (–211.03, 594.54)	<0.001
Median (Q1, Q3)	5,750.00 (3,617.92, 12,691.95)	5,482.68 (3,489.63, 10,380.43)		

*p-values are from a non-parametric (Kruskal-Wallis) test based on distribution, not based on mean difference; [†]Overall costs per patient available from the database, including administrative fees; [‡]Overall cost for all patients, including procedures and administrative fees; [§]Percentage difference; [¶]Physical therapy and psychotherapy. CI, confidence interval; ER, emergency room; Q(1/3), (1st/3rd) quartile; SD, standard deviation.

Table 3. Summary of HCRU per Person by Study Group

	Migraine (N=22,685)	Control (N=22,685)	Migraine – Control Mean difference (95% CI)	p-value*
Elective consultations				
Mean (SD)	12.73 (10.85)	8.42 (8.81)	4.31 (4.13, 4.49)	0.0204
Median (Q1, Q3)	10 (6, 18)	7 (3, 13)		
Elective exams				
Mean (SD)	30.61 (29.65)	25.54 (23.89)	5.07 (4.57, 5.57)	<0.001
Median (Q1, Q3)	24 (11, 45)	20 (9, 40)		
Complementary therapies[†]				
Mean (SD)	6.59 (12.26)	4.85 (11.17)	1.74 (1.52, 1.96)	<0.001
Median (Q1, Q3)	4 (1, 14)	4 (1, 12)		
Elective hospitalizations				
Mean (SD)	0.33 (1.43)	0.30 (1.45)	0.03 (0.003, 0.05)	0.160
Median (Q1, Q3)	1 (1, 2)	1 (1, 2)		
ER visits				
Mean (SD)	3.98 (4.84)	2.20 (3.61)	1.78 (1.70, 1.86)	<0.001
Median (Q1, Q3)	3 (2, 6)	2 (1, 4)		
Emergency hospitalizations				
Mean (SD)	0.14 (1.24)	0.10 (0.86)	0.04 (0.02, 0.05)	<0.001
Median (Q1, Q3)	1 (1, 1)	1 (1, 1)		

*p-values are from a non-parametric (Kruskal-Wallis) test based on distribution, not based on mean difference; [†]Physical therapy and psychotherapy. CI, confidence interval; ER, emergency room; HCRU, healthcare resource utilization; Q(1/3), (1st/3rd) quartile; SD, standard deviation.

Additional results

- The proportion of patients receiving elective and emergency hospitalizations and re-admissions within 30 days was significantly higher for the migraine versus control group, **Table 4**
- Patients with migraine were ~1.6 times more likely to receive individual psychotherapy and physical therapy sessions than patients in the control group (p<0.001)
- Compared with the control group, patients with migraine were significantly more likely to undergo laboratory tests, neuroimaging, and specific electrophysiological exams (p<0.001)

Table 4. Specific Metrics for Elective and Emergency Hospitalizations by Study Group

	Migraine (N=22,685)	Control (N=22,685)	Migraine – Control OR (95% CI)	p-value*
Elective hospitalizations, n (%)				
Hospitalization(s)	4,479 (19.74)	4,306 (18.98)	1.05 (1.00, 1.10)	0.0409
Re-admissions in 30 days	825 (3.64)	651 (2.87)	1.28 (1.15, 1.42)	<0.001
Passage through the ICU	620 (2.73)	621 (2.74)	1.00 (0.89, 1.12)	1.000
Emergency hospitalizations, n (%)				
Hospitalization(s)	2,225 (9.81)	1,775 (7.82)	1.28 (1.20, 1.37)	<0.001
Re-admissions in 30 days	559 (2.46)	229 (1.01)	2.48 (2.12, 2.89)	<0.001
Passage through the ICU	620 (2.73)	621 (2.74)	1.00 (0.89, 1.12)	1.000
Surgical hospitalization	688 (3.03)	570 (2.51)	1.21 (1.08, 1.36)	<0.001

*p-values are from a Pearson Chi-square test. CI, confidence interval; ICU, intensive care unit; OR, odds ratio.

Conclusion

- The findings from this study demonstrate the burden of migraine on Brazil's healthcare system through increase of direct costs and HCRU
- Implementation of targeted treatments, such as calcitonin gene-related peptide pathway monoclonal antibodies, and improved diagnostic and management protocols may alleviate this burden by reducing the frequency and severity of migraine attacks and potentially limiting the need for frequent consultations, diagnostic tests, and hospitalizations

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