▪ Headache Medicine 2024, 15(1): 25-29 ▪ p-ISSN 2178-7468, e-ISSN 2763-6178

Headache Medicine

▪ DOI: 10.48208/HeadacheMed.2024.6

Original

Profile of hospital admissions for migraine and headache disorders in children and adolescents in Brazil between 2013 and 2023

Bianca dos Anjos Piloni, Luan Lopes da Silva Almeida, Raimundo Pereira Silva-Néto

[1]Federal University of the Parnaíba Delta, Parnaíba, Brazil

Bianca dos Anjos Piloni
bianca.piloni@gmail.com

Edited by:
Marcelo Moraes Valença

Abstract

Introduction
Migraine is a chronic neurological disease, with a prevalence of 15.2% in Brazil. It is defined as an abnormal neurovascular reaction that occurs in a genetically vulnerable individual. Clinically manifests itself in recurrent episodes of headache associated with other symptoms, dependent on triggering factors.

Objective
To describe the epidemiological profile of hospital admissions of children and adolescents for migraine and other headache disorders.

Methods
This was a retrospective and descriptive epidemiological study carried out with data extracted from the Brazilian Unified Health System's Hospital Information System (SIH/SUS), indexed to the Department of Informatics of the Unified Health System (DATASUS). Hospital admissions were selected based on age groups, with an emphasis on children under nine years old and adolescents between 10 and 19 years old, residing in Brazil, between July 2013 and June 2023.

Results
Of 93,821 hospital admissions, there were 16,149 hospitalizations (17.2%) of children and adolescents (62.5% women and 37.5% men) due to migraine and other headache disorders. There was a predominance of the age group between 15 and 19 years old (50.2%), with a higher number of cases in the Southeast region (35.9%) and of brown ethnicity (42.6%). Over 10 years, there was a progressive increase in the number of hospital admissions, reaching a peak in 2019 (1,925/16,149; 11.9%), followed by a decline in 2020 and increasing again in subsequent years. Twenty-four deaths were found (24/16,149; 0.1%), 13 men and 11 women, with a predominance in the age group of 15 to 19 years (45.8%), coming from the Northeast region (58.3 %) and of brown ethnicity (58.4%). Deaths occurred predominantly in the years 2022 and 2023 (46.6%).

Conclusions
There is an increase in the number of hospital admissions of children and adolescents due to migraine and other headache disorders with a consequent increase in the number of deaths.

Keywords:
Migraine
Headache
Child
Adolescent
Health information systems

Submitted: January 30, 2024
Accepted: March 25, 2024
Published online: March 31, 2024

Introduction

Migraine is a chronic neurological disease, with a prevalence of 15.2% in Brazil (1). It is defined as an abnormal neurovascular reaction that occurs in a genetically vulnerable individual. Clinically manifests itself in recurrent episodes of headache associated with other symptoms, dependent on triggering factors (2).

According to the diagnostic criteria of ICHD-3, migraine attacks last from 4 to 72 hours, presenting some characteristics, such as unilateral location, pulsatile character, moderate to severe intensity and worsening with routine physical activities. In addition, headache is accompanied by nausea and/or vomiting, photophobia and phonophobia. However, in children and adolescents, migraine attacks are shorter and more often bilateral; when unilateral, it usually appears in late adolescence or early adulthood. Furthermore, due to limited verbal expression, in younger children photophobia and phonophobia can be inferred from their behavior (3).

It is considered a common condition in the general population and, according to the World Health Organization (WHO); it is one of the most disabling diseases in the world, with a higher prevalence in females after puberty. In children and adolescents, migraine is a recurrent form of headache that can significantly affect their quality of life, affecting their education, socialization and family life.

Occasionally, it may be necessary to hospitalize a patient with chronic migraine, due to lack of response to outpatient treatment, treatment complications, medication side effects or concomitant health conditions, and even to review the diagnosis (4).

Therefore, it is important to understand the characteristic epidemiology of headaches in children and adolescents due to their relevance in medical practice and to help guide the development of public health initiatives aimed at effective prevention, diagnosis and treatment for those affected by this condition, with the objective to improve general well-being and reduce the associated health burden of this target audience.

This study aimed to describe the epidemiological profile of hospital admissions of children and adolescents for migraine and other headache disorders, between July 2013 and June 2023.

Methods

This was a retrospective and descriptive epidemiological study carried out with data extracted from the Brazilian Unified Health System's Hospital Information System (SIH/SUS), indexed to the Department of Informatics of the Unified Health System (DATASUS) (5). Hospital admissions were selected in the "Hospital Morbidity of SUS" section, by place of admission with emphasis on the age group of children under nine years old and adolescents between 10 and 19 years old, residing in Brazil, between July 2013 and June 2023.

In this section, subsequent combinations of age groups and the Content marker "Admissions" were made with the indicators: Region: "All categories"; ICD-10 Morb List: "Migraine and other headache syndromes"; Sex: "Female" and "Male"; Color/race: "All categories". The process was repeated by changing the "Admissions" Content marker to "Deaths" in the same section "SUS Hospital Morbidity" (SIH/SUS), by place of hospitalization.

Descriptive statistical analysis was carried out to present the results. The collected data was transcribed into an Excel spreadsheet. They were used to create tables and graphs with frequency distribution.

As this is a research carried out through the collection of information in the DATASUS database, whose information is aggregated, without the possibility of individual identification and public access, the study did not need to be submitted to the Research Ethics Committee, in accordance with the Resolution No. 510, of April 7, 2016 (6).

Results

Of 93,821 hospital admissions, there were 16,149 hospitalizations (17.2%) of children and adolescents (62.5% women and 37.5% men) due to migraine and other headache disorders. There was a predominance of the age group between 15 and 19 years old (50.2%), with a higher number of cases in the Southeast region (35.9%) and of brown ethnicity (42.6%) (Table 1). Over 10 years, there was a progressive increase in the number of hospital admissions, reaching a peak in 2019 (1,925/16,149; 11.9%), followed by a decline in 2020 and increasing again in subsequent years (Table 1 and Figure 1).

Table 1. Distribution of hospital admissions of 16,149 children and adolescents hospitalized for headache from July 2013 to June 2023, according to age group, Brazilian region and ethnicity

Parameters	Hospital admissions		
	Female (n; %)	Male (n; %)	Total (n; %)
Age range (years)			
< 1	44 (0.4)	71 (1.1)	115 (0.7)
1-4	362 (3.6)	442 (7.3)	804 (5.0)
5-9	1,503 (14.9)	1,471 (24.3)	2,974 (18.4)
10-14	3,117 (30.9)	1,956 (32.3)	5,073 (31.4)
15-19	5,061 (50.2)	2,122 (35.0)	7,183 (44.5)
	n		%
Brazilian region			
Midwest	942		5.8
North	1,146		7.1
South	3,429		21.2
Northeast	4,841		30.0
Southeast	5,791		35.9
Ethnicity			
Indigenous	18		0.1
Yellow	314		1.9
Black	356		2.2
White	5,725		35.5
Brown	6,877		42.6
No information	2,859		17.7
Year of admission			
2013 (from July)	811		5.0
2014	1,450		9.0
2015	1,512		9.4
2016	1,511		9.4
2017	1,833		11.3
2018	1,857		11.5
2019	1,925		11.9
2020	1,234		7.6
2021	1,286		8.0
2022	1,791		11.1
2023 (until July)	939		5.8

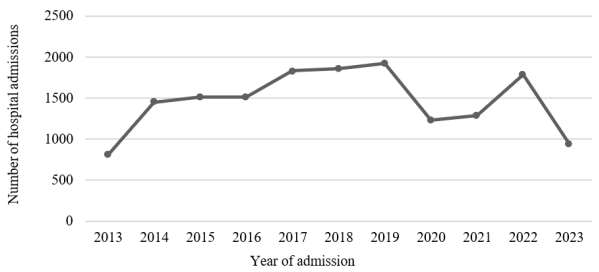

Figure 1. Number of hospital admissions related to migraine and other headache syndromes per year of hospitalization.

Twenty-four deaths were found (24/16,149; 0.1%), 13 men and 11 women), with a predominance in the age group of 15 to 19 years (45.8%), coming from the Northeast region (58.3 %) and of brown ethnicity (58.4%) (Table 2). Deaths occurred predominantly in the years 2022 and 2023 (46.6%) (Table 2 and Figure 2).

Table 2. Distribution of deaths of 24 children and adolescents hospitalized for headache from July 2013 to June 2023, according to age group, Brazilian region and ethnicity

Parameters	Deaths		
	Female (n; %)	Male (n; %)	Total (n; %)
Age range (years)			
< 1	1 (9.1)	3 (23.1)	4 (16.7)
1-4	2 (18.2)	3 (23.1)	5 (20.8)
5-9	2 (18.2)	1 (7.7)	3 (12.5)
10-14	0 (0.0)	1 (7.7)	1 (4.2)
15-19	6 (54.5)	5 (38.4)	11 (45.8)
	n		%
Brazilian region			
South	1		4.2
Midwest	1		4.2
North	2		8.3
Southeast	6		25.0
Northeast	14		58.3
Ethnicity			
Black	0		0.0
Yellow	0		0.0
Indigenous	0		0.0
White	5		20.8
Brown	14		58.4
No information	5		20.8
Year of admission			
2013 (from July)	1		4.2
2014	1		4.2
2015	1		4.2
2016	1		4.2
2017	2		8.3
2018	3		12.5
2019	3		12.5
2020	2		8.3
2021	0		0.0
2022	6		25.0
2023 (until July)	4		16.6

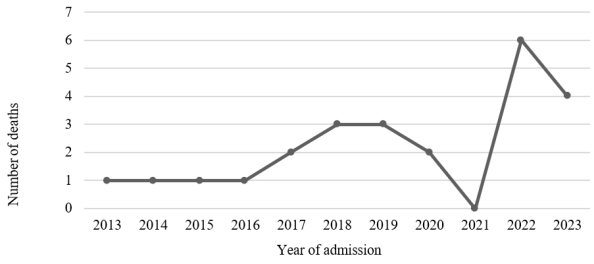

Figure 2. Number of deaths related to migraine and other headache syndromes per year of hospitalization

Discussion

In this study, observed that in children under 4 years of age, hospital admissions due to migraines predominated in men. However, from the age of 10 onwards, a considerably greater number of women were hospitalized due to migraines. As children approach puberty, there is an increased prevalence of migraines in women. This increase in prevalence is possibly due to hormonal changes that occur in this age group. Consequently, there will be more hospital admissions for women (1, 7-9).

The brown race was the most prevalent in hospital admissions, followed by white, black, yellow and indigenous people. These data are in accordance with the most recent census by the Brazilian Institute of Geography and Statistics (IBGE), from 2022, which found that the Brazilian population is predominantly made up of browns (45.3%) and whites (43.5%). In addition to these two ethnicities, there are also black people (10.2%), indigenous people (0.6%) and yellow people (0.4%) (10). In a retrospective descriptive study carried out in the city of Teresina, Brazil, with medical students, a higher frequency of migraines was observed in patients who declared themselves brown race (60.7%) and white (34.5%) (11).

Brazil has 203,080,756 inhabitants distributed across five regions: Southeast (41.8%), Northeast (27%), South (14.7%), North (8.5%) and Midwest (8%).[9] There was a greater number of hospitalizations for migraines in the southeast region because it is the most populous region. A nationwide population-based study of migraine in Brazil showed that the southeast region has the highest prevalence rate of people with migraines (20.5%).[1] Another descriptive epidemiological study on emergency hospital admissions in all age groups showed a predominance in Brazilian regions, in this order: Southeast (30.3%), Northeast (29.4%), South (29.1%), North (6.1%) and Midwest (5.4%) (12). These values are very close to those found in our study related to children and adolescents.

During the COVID-19 pandemic, guidelines were established to prevent the spread of this disease. As part of these adaptations, face-to-face services related to medical consultations, surgeries and diagnostic tests were suspended. These prevention measures and the population's fear of becoming infected with the coronavirus have possibly had a notable impact on the number of hospital and emergency care visits unrelated to this disease (13, 14). Therefore, we observed a decrease in hospitalizations for migraines in 2020 and 2021 when compared to pre-pandemic (2018 and 2019) and post-pandemic (2022) years.

We did not find in the literature a causal relationship between migraine and deaths in children and adolescents. No increase in overall mortality or cardiovascular mortality was observed in patients with migraine (15). On the other hand, there are studies that have demonstrated an increased risk of stroke, both ischemic and hemorrhagic, associated with migraine with aura, especially adult patients (16, 17).

The DATASUS database does not discriminate the etiology of headache, therefore there is no way to measure the number of hospital admissions for primary or symptomatic headache, the latter secondary to defined pathologies. There are numerous secondary causes, such as central nervous system infection, systemic infection, head trauma, headache attributed to the use of a substance such as alcohol, food and/or additives (such as monosodium glutamate), excessive use of painkillers or even caffeine deprivation. or substances of chronic use, high blood pressure, fasting, as well as disorders in the skull, neck, eyes, ears, nose, paranasal sinuses, teeth and mouth, among others. The correct management of the patient depends on their proper diagnosis, in secondary cases it must be directed to their underlying cause and in cases of primary cause, the identification of triggering factors, the treatment of acute pain and the use of preventive medications, if necessary. Necessary (18).

It is also important to highlight that the quality of secondary data in information systems, where factors such as data condition, under-registration and disaggregation can interfere, is capable of presenting itself as a limitation of the study (19).

Conclusions

In the last 10 years, there has been an increase in the number of hospital admissions of children and adolescents due to migraine and other headache disorders in Brazil with a consequent increase in the number of deaths with the exception of 2020 and 2021, years relating to the COVID-19 pandemic.

Contribution authors: All authors had the same contribution.

Funding: No

Conflict of interests: The authors report no conflict of interest.

Bianca dos Anjos Piloni
http://orcid.org/0009-0007-3108-4170
Luan Lopes da Silva Almeida
http://orcid.org/0000-0001-8838-3015
Raimundo Pereira Silva-Néto
https://orcid.org/0000-0002-2343-9679

References

1. Queiroz LP, Peres MFP, Piovesan EJ, Kowacs F, Ciciarelli MC, Souza JA, ... and Zukerman E. A nationwide population-based study of migraine in Brazil. *Cephalalgia* 2009;29(6): 642-649 Doi:10.1111/j.1468-2982.2008.01782.x 2
2. Sanvito WL and Monzillo PH. O livro das cefaleias. São Paulo: Atheneu, 2001.
3. Headache Classification Subcommittee of the International Headache Society (IHS). The International Classification of Headache Disorders, 3rd edition. *Cephalalgia* 2018;38(1): 1-211 Doi:10.1177/0333102417738202
4. Giacomozzi ARE, Vindas AP, Silva Junior AA, Bordini CA, Buonanotte CF, Roesler CAP, ... and Moreira Filho PF. Latin American Consensus Guidelines for the Treatment of Chronic Migraine. *Headache Medicine* 2012;3(4):150-161 Doi:10.48208/HeadacheMed.2012.25
5. Brasil. Ministério da Saúde. Departamento de Informática do SUS (DATASUS). Available in: <https://datasus.saude.gov.br/acesso-a-informacao/morbidade-hospitalar-do-sus-sih-sus/> Accessed on: 20 Jan. 2024
6. Brasil. Ministério da Saúde. Conselho Nacional de Saúde. Resolução Nº 510, de 07 de abril de 2016. Diário Oficial da União, 2016. Available in: < https://conselho.saude.gov.br/resolucoes/2016/Reso510.pdf> Accessed on: 18 Mar. 2024.
7. Pavlovic JM, Akcali D, Bolay H, Bernstein C and Maleki N. Sex-related influences in migraine. *J Neurosci Res* 2017;95:587-593 Doi:10.1002/jnr.23903
8. Finocchi C and Strada L. Sex-related differences in migraine. *Neurol Sci* 2014;35:207-213 Doi:10.1007/s10072-014-1772-y
9. Okamura MN, Goldbaum M, Madeira W and Cesar CLG. Prevalence of headache and associated factors among adolescents: results of a population based study. *Rev Bras Epidemiol* 2020;23:e200067 Doi:10.1590/1980-549720200067
10. Instituto Brasileiro de Geografia e Estatística (IBGE). Censo Brasileiro de 2022. Available in: <https://censo2022.ibge.gov.br/panorama/> Accessed on: 20 Jan. 2024
11. Moura LC, Pereira LBM, Moura LC and Pimentel LHC. Prevalência de incapacidade por enxaqueca em estudantes de medicina. *Headache Medicine* 2016;7(4):137-144.
12. D'Almeida SFF, Marinho LR, D'Almeida Filho LF, Barbosa LRB, Alves MA, Carlos AM, ... and Oliveira ECT. Perfil epidemiológico do SUS: enxaqueca em caráter de urgência no Brasil, entre 2017 e 2021. *Braz J Dev* 2022;8(8):58586-58598 Doi:10.34117/bjdv8n8-241
13. Silva NCA, Moroço DM and Carneiro PS. O impacto da pandemia de COVID-19 no atendimento eletivo: experiência de um Hospital de nível terciário e Centro de Referência para a doença. *Revista Qualidade HC* 2021;2:70-80.
14. Souza Jr JL, Teich VD, Dantas ACB, Malheiro DT, Oliveira MA, Mello ES, ... and Cendoroglo Neto M. Impacto da pandemia da COVID-19 no volume de atendimentos no pronto atendimento: Experiência de um centro de referência no Brasil. *Einstein* (São Paulo) 2021;19:Eao6467 Doi:10.31744/einstein_journal/2021AO6467
15. Asberg NA, Stovner LJ, Zwart JA, Winsvold BS, Heuch I and Hagen K. Migraine as a predictor of mortality: The HUNT study. *Cephalalgia* 2016;36(4):351-357 Doi:10.1177/0333102415593090
16. Gudmundsson LS, Scher AI, Aspelund T, Eliasson JH, Johannsson M, Thorgeirsson G, ... and Gudnason V. Migraine with aura and risk of cardiovascular and all cause mortality in men and women: prospective cohort study. *BMJ* 2010;341:c3966 Doi:10.1136/bmj.c3966
17. Liu H, Zhang S, Gong Z, Zhao W, Lin X, Liu YY, ... and Dong Z. Association between migraine and cardiovascular disease mortality: A prospective population-based cohort study. *Headache* 2023;63(8):1109-1118 Doi:10.1111/head.14616.
18. Brito AR. Cefaleias na adolescência. *Residência Pediátrica* 2015;5(3)s1:47-9.
19. Silva MS, Alves GES, Silva JTL, Leite AFB and Santos ERR. Internações por enxaqueca: olhar epidemiológico sob população economicamente ativa no Brasil. *Jornal Memorial da Medicina* 2019;1(2):57-65 Doi:10.37085/jmmv1.n2.2019.pp.57-65