DOI: 10.1590/0004-282X20150172

ARTICLE

# Headache-related disability among medical students in Amazon: a cross-sectional study

## Incapacidade relacionada à cefaleia em estudantes de medicina no Amazonas: um estudo transversal

*Carlos Mauricio Oliveira de Almeida[1], Paulo Antônio Machado da Silva Lima[2], Rebecca Stabenow[2], Rhea Sylvia de Souza Mota[2], Antônio Luiz Boechat[2], Massanobu Takatani[2]*

**ABSTRACT**

**Objective:** To evaluate the prevalence of headache in medical students, and quantify the degree of disability through HIT-6 and MIDAS scale. **Method:** The criteria established by International Headache Society were used and the HIT-6 and MIDAS, to asses disability. **Results:** 140 medical students from UFAM were evaluated. 16.43% cases of migraine headache, 6.43% of probable migraine, and 23.57% of tension headaches were detected. 6.42% reported an absence of headache; and another 11.42% had secondary headache. According to the HIT-6 questionnaire, in 7.14% and 18.57% of the students, headaches were classified as having substantial to severe impact, respectively. **Conclusion:** Migraine and probable migraine had higher scores than the other types of headache and, therefore, led to higher levels of disability. The present study did not find a significant correlation between student semester, age or extracurricular activities on the impact generated by headache.

**Keywords:** students, headache, disability, Amazon.

**RESUMO**

**Objetivo:** Avaliar a prevalência de cefaleia em estudantes médicos e quantificar o grau de incapacidade através das escalas HIT-6 e MIDAS. **Método:** Os critérios da Sociedade Internacional de Cefaleia foram usados e as escalas Hit-6 e MIDAS foram usadas para medir a incapacidade. **Resultados:** 140 estudantes de medicina da UFAM foram avaliados. 16.43% eram migrânea, 6.43% de provável migrânea e 23.57% de cefaleia tipo tensional. 6,42% relataram ausência de cefaleia e 11.42% possuíam cefaleia secundária. De acordo com o questionário HIT-6 em 7,14% e 18,57% dos estudantes, a cefaleia foram classificadas como impacto substancial e grave respectivamente. **Conclusão:** Migrânea e provável migrânea tiveram escores mais elevados do que os outros tipos de cefaleia e maiores níveis de incapacidade. O estudo não encontrou uma associação significante entre o período de graduação, idade ou das atividades extracurriculares com o impacto gerado pela cefaleia.

**Palavras-chave:** estudantes, cefaleia, incapacidade, Amazonas.

Headache is the oldest pain reported in humans and one of the most common diagnoses in the neurology clinic, occurring in more than 90% of people at some point in their lives[1].

According to estimates by the National Center for Health Statistics, an American Organization related to the CDC, headache was the fourth major cause of medical emergencies in 2009-2010, corresponding to 3.1% of all causes of hospital visits in the USA[2].

Among university students, headache is a common symptom and studies show a great variability of prevalence in this population (33%-98%)[3,4,5,6]. Sanvito et al., for example, reported that 47% of the students at a Brazilian medical school complained of headaches[3]. In a similar study, Costa observed an even higher prevalence (80% among students), with 16% having frequent headaches[5].

Medical students represent a vulnerable group because graduation and specialization require an exhaustive workload, distributed between theoretical and practical activities throughout their training period; gradual deprivation of sleep, sedentary lifestyle, irregular diet, and stress could also be possible triggering factors[3,4,7,8].

Several studies have correlated the presence of headache, especially migraines, to poor academic performance in the student population[9,10,11]. This can be associated with both absenteeism and the impact of pain on daily activities and the loss of cognitive functions during crises[12,13].

[1]Universidade do Estado do Amazonas, Departamento de Neurologia, Manaus AM, Brazil;

[2]Universidade Federal do Amazonas, Manaus AM, Brazil;

**Correspondence:** Carlos Mauricio Oliveira de Almeida; Universidade do Estado do Amazonas; Rua Salvador, 113; 69057-040 Manaus AM, Brasil; E-mail: drcmneuro@gmail.com

**Conflict of interest:** There is no conflict of interest to declare.

Received 12 March 2015; Received in final form 31 July 2015; Accepted 20 August 2015.

Few studies have assessed the impact of this common complaint in this population using specific tools to assess disability such as the Headache Impact Test-6 (HIT-6) or Migraine Disability Assessment Scale (MIDAS)[5,11,14] and data about Brazil's northern region are unknown.

The objective of the study was thus to evaluate the prevalence of headache and its characteristics among medical students attending the first to twelfth semester and residents of the Universidade Federal do Amazonas (UFAM) and quantify the degree of disability using the HIT-6 questionnaire and relate it to factors such as age, sex, semester, and extracurricular activities.

## METHOD

This study was a cross-sectional, observational,and uncontrolled study, with subjects comprising medical students from the first to twelfth semester and residents at UFAM.

Data was collected from September 2012 to May 2013. The study was approved by the Hospital Ethics Committee (CEP-No 02073712.3.0000.5020). A list of these students was supplied by the university, and subjects were selected with randomized sampling. The students were invited to participate in the study and signed a letter of consent.

This study assessed 151 medical students from the UFAM and the Hospital Getúlio Vargas (HUGV). The sample of residents was considered small (N = 11) and statistically inadequate, and therefore, was removed from the analysis, thus leaving 140 students.

A) Inclusion Criteria:

1) Being registered in the course of Medicine at UFAM during the study period.

2) Age higher than or equal to 18 years.

B) Exclusion Criteria:

1) Students who refused to participate in the study at any time of the project.

2) Students who suspended their studies or abandoned the Medical School at UFAM during the study period.

3) Students who had a prior diagnosis of secondary headache.

A questionnaire developed to study the characteristics of headache, based on established guidelines (ICHD-II 2006)[15] and socio-demographic data, was applied inside the classroom. For the present study, we did not classify the migraine and the tensional-type-headache into its existing subtypes.

HIT-6 (Headache Impact Test-6) quantifies the impact of headache on the quality of life of the individual under several conditions: work, studies, home, and social situations. The resulting score indicates the level of impact of headaches: 36 to 49 points = "little-to-no impact"; 50 to 55 points = "moderate impact"; 56 to 59 = "substantial impact"; greater than 60 points = "severe impact"[16,17]. Individuals without headache were classified under little-to-no impact.

The MIDAS (Migraine Disability Assessment Scale) questionnaire aims to quantitatively evaluate the impact of migraine on the reduction of productivity and quality of life, in terms of the number of days for which the effect lasts over a period of three consecutive months. This questionnaire has already been validated for the Portuguese language[18]. The score obtained can be graded as follows: grade I (0 to 5 days) indicative of little or no disability; grade II (6 to 10 days), mild disability; grade III (11 to 20 days), moderate disability; and grade IV (greater than 21 days), severe disability.

### Statistical analysis

Statistical analyses were performed using the Minitab® software version 16.1.1 and MedCalc. A comparison of variables between the groups was performed using the t-test for numerical variables and the $\chi^2$-test for categorical variables. Categorical variables were presented as percentages and frequency, and continuous variables as mean and standard deviation (SD). The level of rejection of the null hypothesis for all analyses was $p < 0.05$.

A multivariate logistic regression was performed with the dependent variable being the HIT-6 score and the independent variables being age, sex, semester, extracurricular activities, and the type of headache. For the dependent variable, values > 56 were regarded as 1 and < 56 as 0.

## RESULTS

The student sample was composed of 77 (55%) women and 63 (45%) man, with a mean age of 22.73 years (SD = 3.12). Women predominated in almost all groups.

During the interviews, we found that 93.5% (131) reported having had a headache over the past 3 months. The absenteeism in the last three months due to headache was 3.1 days (SD ± 2.2). The types of headaches are represented in Figure. The cases of secondary headache were withdrawn because they represented a heterogeneous group for the analysis.

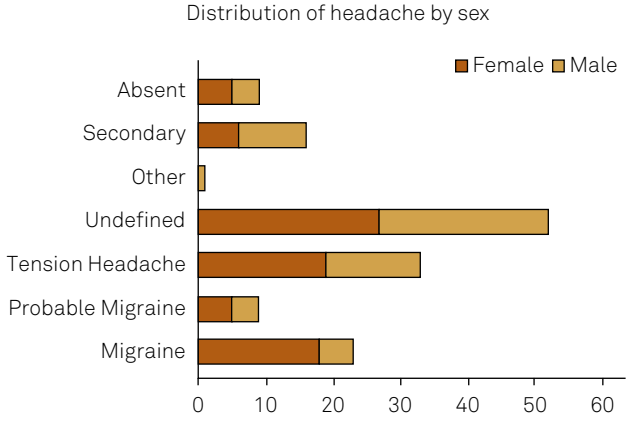


**Figure.** Distribution of headache by gender.

Regarding the intensity of pain, 56.43%, 42.14%, and 1.43% of the individuals reported mild, moderate, and severe pain, respectively. As for the location, holocranial headache was reported in 26.42% of the individuals, frontal and/or occipital in 44.28%, and more than one usual location in 24.4%. About 28.5% (40) suffered pain at least once a week and 7.4% (10), 2-4 times a week. Sixty-five percent of the students described the duration of their headache as between '30 minutes and 4 hours'.

The results of the distribution of all cases of migraine headache between sexes showed a statistical association between the women group and migraine (p = 0.0209, *Odds Ratio* = 3.48). When the tension-type headache group was analyzed, the results did not show a relevant statistical association (p = 0.7338).

When the migraine and non-migraine groups were compared according to the MIDAS score (> 11 points and < 11 points), migraine and moderate and severe disability were statistically associated (p-value = 0.008, *Odds Ratio* = 3.82), with a weak negative correlation (r = -0.258) (Table 1).

The analysis of the data from the HIT-6 questionnaire showed that students from the first to the fifth semester presented an average score of 52.3 points (SD = 7.57); sixth to the ninth semester, a mean of 49.6 (SD = 7.59); and from the tenth to twelfth semester, 50.69 points (SD = 7.49). There was no statistical difference between the groups (p = 0.0673). A total of 7.14% (10) and 18.57% (26) of the students were classified as having substantial to severe impact, respectively, according to the HIT-6.

The table below (Table 2) displays the distribution of the types of headache identified according to the score on the HIT-6 questionnaire. Note that migraine and probable migraine is associated with the highest level of disability compared to the other types of headache (p = 0.001).

Among the students analyzed, only 9 (7.25%) said they had a job. The examination of the variable 'extracurricular activities' revealed that out of 124 students surveyed, 87 (70.16%) stated that they performed extracurricular activities. The average hours of extracurricular activities was 11.52 hours (SD = 6.20).

In order to assess the influence of other variables on the disability measured by HIT-6 in the sample we performed a multivariate linear regression adjusted for age, sex, extra-curricular activity, semester, and the type of headache (Table 3). The disability measured by the HIT-6 was only associated with migraine (OR 5.63), probable migraine (OR 7.38), and gender (OR 2.71), and not with the other variables.

It was found that 73 (55.7%) students used symptomatic medications by their own judgment for pain relief; less than 5% sought specialized medical care and were using prophylatic therapy. The medications most commonly used were dipyrone and paracetamol, and the combination of these with caffeine, dihydroergotamine/orphenadrine, and metoclopramide (Dorflex, Cefalium). Statistical analysis with the chi-square test showed no association between semester and the use of medication (p = 0.832). However, there was no correlation with the degree of disability (p = 0.030).

Table 1. Classification of migraine disability assessment scale (MIDAS) according with type headache.

| MIDAS | | | | p-value |
|---|---|---|---|---|
| | Migraine | Non-migraine | Total | |
| < 11 points | 10 | 73 | 83 | 0.008 |
| ≥ 11 points | 11 | 21 | 32 | |
| Total | 21 | 94 | 115 | |

## DISCUSSION

The present study is the first to assess the characteristics of headaches and their impact on the daily activities of students in the northern region of Brazil by using two questionnaires on specific disability. Our sample represented 28% of the students of our university, which were considered representative.

Primary headaches affect individuals of all ages and genders, and are a serious cause of disability and the most frequent diagnosis at neurology outpatient clinics[2]. They are associated with an impairment of academic and social activity in graduate students[9,10,11].

In a previous study showed that 62.75% of subjects with migraine and 24.4% of those with tension-type headaches have reduced productivity during crises[10].

Our study showed that 93.5% of the students had experienced pain during the last 3 months. Studies in this same population showed frequencies as high as ours, ranging from 33 to 98%[3,4,5,6,10,11,14].

Among primary headaches, tension-type headache (TTH) was more frequent with a prevalence of 23.57%, followed by migraine with a prevalence of 16.43%. Our data are in agreement with published data of similar

Table 2. Analysis of the Headache Impact Test (HIT-6) score according to the types of headache.

| HIT-6 Score | Headache | | | | | p-value |
|---|---|---|---|---|---|---|
| | Migraine | Probable migraine | Tension headache | Undefined* | Total | |
| < 56 Points | 9 (10.34%) | 4 (4.60%) | 20 (22.99%) | 45 (51.72%) | 87 (100%) | 0.001 |
| ≥ 56 Points | 12 (32.43%) | 5 (13.51%) | 12 (32.43%) | 8 (21.62%) | 37 (100%) | |
| Total | 21 (16.94%) | 9 (7.26%) | 32 (25.81%) | 53 (42.74%) | 124 (100%) | |

* Headaches reported as 'Other' were included in the undefined group.

Table 3. Multivariate Linear Regression adjusted for the dependent variable - Headache Impact Test (HIT-6).

| Variable | Constant | OR | 95%CI | p |
|---|---|---|---|---|
| Gender | 1.0 | 2.71 | 1.07-6.85 | 0.034 |
| Age | 0.016 | 1.01 | 0.85-1.20 | 0.846 |
| Extracurricular activities | 0.035 | 1.03 | 0.97-1.10 | 0.278 |
| Semester | 0.023 | 1.024 | 0.85-1.22 | 0.793 |
| Migraine | 1.727 | 5.63 | 1.7-18.6 | 0.004 |
| Probable migraine | 2.0 | 7.38 | 1.46-37.2 | 0.016 |
| Tension headache | 0.995 | 2.70 | 0.92-7.9 | 0.070 |

Model p = 0.0018; Goodness-of-fit – $\chi^2$ Pearson 134.40 (p = 0.357); $\chi^2$ Deviance 141.43 (p = 0.313). ROC AUC 0.78 (95%CI; p = 0.04).

studies: 6.9% to 48.5% for migraines and 12.8% to 59.9% for TTH[5,6,11,14,20,21,22,23,24]. This huge variability occurs because of methodological variations, and probably regional factors, such as the high temperatures that occur in the Amazon region during almost the entire year[25]. However more studies are needed to verify this statement.

The female gender was significantly associated with the diagnosis of migraine (p = 0.0209), which is due to its high prevalence in women[26] and their proportion in our sample.

The high frequency of pain was associated with self-medication together with the lack of appropriate medical follow-up (less than 5% had regular doctor visits and were on prophylaxis ), as was also found in previous studies[6,7]. The excessive use of medications can hamper the correct diagnosis and may be associated with the appearance of medication-overuse-headache[27]. Perhaps the intense workload combined with easy access to health services may have contributed to this observation.

A recent study verified that the ineffectiveness of acute treatment in migraine patients is a predictor for the onset of chronic migraine (OR 2.55; 95%CI 1.98-5.80), independently of age and gender[28]. Perhaps the onset of recurring crises modulates the central pain pathways to lower thresholds of pain by a mechanism of neuroplasticity[29,30]. In our study, most of the students used simple analgesics for the treatment of migraine and none of the last generation drugs, which are more efficient, such as the triptans. However, we did not follow-up these patients to evaluate their condition further.

In our study, the HIT-6 questionnaire showed that migraine and probable migraine are associated with greater disability than other types of headache and this was independent of age, semester, or extracurricular activities. Gender was the only variable that displayed an association with disability (OR 2.17). Souza-e-Silva and Rocha-Filho observed, in a similar study, that in 49% of students, headache was classified as severe/substantial, which is higher than that in this study (25%)[11]. We also observed that migraine was associated with a greater impairment of productivity (in days) than the other types of headache, measured by MIDAS (p-value = 0.008, *Odds Ratio* = 3.82). This was similar to the findings in two other studies[11,14].

The limitations of this study were owing to its cross-sectional nature. The applied questionnaires can cause bias resulting from the subjective evaluation of the scales. The low compliance of the residents precluded the collection of an adequate sample to evaluate this group. Perhaps because of the application mode of the questionnaire, a large proportion of students had their headache unclassified.

In conclusion, headaches are also common complaints among medical students in our faculty located in Brazil's northern region. In 25% of the cases, there was a severe/substantial impact of headache on daily lives. The tension-type headache was the most frequent primary headache; however, migraine and probable migraine led to a greater functional disability associated with a greater loss of productive days and were independent of age, semester or extracurricular activities. Behavioral and educational practices and a better knowledge of their headache and follow up with these patients are important measures to be implemented in medical schools.

## References


1. Raffaelli Jr E, Martins OJ. Dor de cabeça: o que se diz... o que se sabe... 4a ed. São Paulo: Lemos; 2001:25.
2. Burch RC, Loder S, Loder E, Smitherman TA. The prevalence and burden of migrane and severe headache in the Unites States: updated statistics from government health surveillance studies. Headache. 2015;55(1):21-34. doi:10.1111/head.12482
3. Sanvito WL, Monzillo PH, Prieto Peres MF, Martinelli MO, Fera MP, Cruz Gouveia DA et al. The epidemiology of migraine in medical students. Headache.1996;36(5):316-9. doi:10.1046/j.1526-4610.1996.3605316.x
4. Al-Hashel JY, Ahmed SF, Alroughani R, Goadsby PJ. Migrane among medical students in Kuwait University. J Headache Pain. 2014;15(1):26. doi:10.1186/1129-2377-15-26
5. Costa MZG, Soares CB, Heinisch LMM, Heinisch RH. Frequency of headache in the medical students of Santa Catharina's Federal University. Headache. 2000;40(9):740-4. doi:10.1046/j.1526-4610.2000.00129.x
6. Ferri-de-Barros JE, Alencar MJ, Berchielli LF, Castelhano Junior LC. Headache among medical and psychology students. Arq Neuropsiquiatr. 2011;69(3):502-8. doi:10.1590/S0004-282X2011000400018
7. Cheng SH, Shih CC, Lee IH, Hou YW, Chen KC, Chen KT et al. A study on the sleep quality of incoming university students. Psychiatry Res. 2012;197(3):270-4. doi:10.1016/j.psychres.2011.08.011
8. Houle T, Nash JM. Stress and headache chronification. Headache. 2008;48(1):40-4. doi:10.1111/j.1526-4610.2007.00973.x
9. Diniz BS, Alves FO, Dias JR, Vasconcelos LT, Esteves VT, Rezende DF et al. Migrânea e rendimento escolar entre alunos de medicina. Headache Med. 2011;2(1):17-24.
10. Bigal ME, Bigal JM, Betti M, Bordini CA, Speciali JG. Evaluation of the impact of migraine and episodic tension-type headache on the quality of life and performance of a university student population. Headache. 2001;41(7):710-9. doi:10.1046/j.1526-4610.2001.041007710.x

11. Souza-e-Silva HR, Rocha-Filho PA. Headaches and academic performance in university students: a cross-sectional study. Headache. 2011;51(10):1493-502. doi:10.1111/j.1526-4610.2011.02012

12. Waldie KE, Hausmann M, Milne BJ, Poulton R. Migraine and cognitive function: a life-coursestudy. Neurology. 2002;59(6):904-8. doi:10.1212/WNL.59.6.904

13. Farmer K, Cady R, Bleiberg J, Reeves D. A pilot study to measure cognitive function efficiency during migraine.Headache. 2000;40(8):657-61. doi:10.1046/j.1526-4610.2000.040008657.x

14. Falavigna A, Teles AR, Velho MC, Vedana VM, Silva RC, Mazzocchin T et al. Prevalence and impact of headache in undergraduate students in Southern Brazil. Arq Neuropsiquiatr. 2010;689(6):873-7. doi:10.1590/S0004-282X2010000600008

15. Headache Classification Committee of the International Headache Society (IHS). The international classification of headache disorders, 2nd edition. Cephalalgia. 2004;24(1 Suppl):S8-160.

16. Ware JE Jr, Bjorner JB, Kosinski M. Practical implications of item response theory and computerized adaptive testing: a brief summary of ongoing studies of widely used headache impact scales. Med Care. 2000;38(9 Suppl II):73-82. doi:10.1097/00005650-200009002-00011

17. Kosinski M, Bayliss MS, Bjorner JB, Ware JE Jr, Garber WH, Batenhorst A et al. A six-item short-form survey for measuring headache impact: the HIT-6. Qual Life Res. 2003;12(8):963-74. doi:10.1023/A:1026119331193

18. Fragoso YD. MIDAS (Migraine Disability Assessment): a valuable tool for work-site identification of migraine in workers in Brazil. Sao Paulo Med J. 2002;120(4):118-21. doi:10.1590/S1516-31802002000400006

19. Dando WE, Branch MA, Maye JP. Headache disability in orofacial pain pa¬tients. Headache. 2006;46(2):322-6. doi:10.1111/j.1526-4610.2006.00345.x

20. Mitsikostas DD, Gatzonis S, Thomas A, Kalfakis N, Llias A, Papageoergiou C. An epidemiological study of headaches among medical students in Athens. Headache. 1996;36(9):561-4. doi:10.1046/j.1526-4610.1996.3609561.x

21. Kurt S, Kaplan Y. Epidemiological and clinical characteristics of headache in university students. Clin Neurol Neurosurg. 2008;110(1):46-50. doi:10.1016/j.clineuro.2007.09.001

22. Galinovic I, Vukovic V, Troselj M, Antic S, Demarin V. Migraine and tension-type headache in medical students: a questionnaire study. Coll Antropol. 2009;33(1):169-73.

23. Monteiro JM, Matos E, Calheiros JM. Headaches in medical school students. Neuroepidemiology. 1994;13(3):103-7. doi:10.1159/000110366

24. Demirkirkan MK, Ellidokuz H, Boluk A. Prevalence and clinical characteristics of migraine in university students in Turkey. Tohoku J Exp Med. 2006;208(1):87-92. doi:10.1620/tjem.208.87

25. Costa ACL, Silva Junior JDA, Cunha AC, Feitosa JRP, Portela BTT, Guimarães GC et al. Índices de conforto térmico e suas variações sazonais em cidades de diferentes dimensões na região Amazônica. Rev Bras Geogr Física.2013;6(3):478-87.

26. Bigal ME, Lipton RB. The epidemiology, burden, and comorbidities of migraine. Neurol Clin. 2009;27(2):321-34. doi:10.1016/j.ncl.2008.11.011

27. Headache Classification Committee of the International Headache Society (IHS). The International Classification of Headache Disorders, 3rd edition (beta version). Cephalalgia. 2013;33(9) 629-808.

28. Lipton RB, Fanning KM, Serrano D, Reed ML, Cady R, BuseDC. Ineffective acute treatment of episodic migraine is associated with new-onset chronic migraine. Neurology. 2015;84(7):688-95. doi:10.1212/WNL.0000000000001256

29. Burstein R, Cutrer MF, Yarnitsky D. The development of cutaneous allodynia during a migraine attack: clinical evidence for these quential recruitment of spinal and supraspinal nociceptive neurons in migraine. Brain. 2000;123(8):1703-9. doi:10.1093/brain/123.8.1703

30. Bernstein C, Burstein R. Sensitization of the trigemino vascular pathway: perspective and implications to migraine pathophysiology. J Clin Neurol. 2012;8(2):89-99. doi:10.3988/jcn.2012.8.2.89