

## The Epidemiology of Migraine in Medical Students

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The purpose of this study was to investigate the prevalence of migraine in medical students, as well as its clinical aspects and impact. All 595 medical students of Santa Casa School of Medicine of São Paulo, Brazil were asked if they had experienced any kind of headache in the past year. Those who responded positively were further investigated by an appropriate questionnaire. Diagnosis of migraine was based on the International Headache Society criteria of 1988. Forty percent of students suffered from some kind of headache; 40.2% of these headaches were migraine. The prevalence of migraine was 54.4% in women and 28.3% in men. Migraine headaches were unilateral in 24.2%, had a gradual onset in 69%, and were of a throbbing type in 88.3%. Migraine was considered incapacitating by 53.9% of students. Migraine with aura caused more disability than migraine without aura. Women experienced more intense migraine than men, and migraine with aura was especially more severe than migraine without aura. Photophobia, phonophobia, and nausea were more commonly encountered in migraine with aura. Despite the high prevalence, the high rate of disability, and the need for analgesic medication, only 7.1% of students with migraine had sought medical treatment.

**Key words:** migraine, epidemiology, medical students

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Headaches are the most ancient reported pain in humans. Despite being such a common complaint in medical practice, little is known about the prevalence and epidemiology of headaches in some populations.

In recent years, a greater emphasis has been given to studies in this area, which have tried to shed some light onto a few of the important aspects of migraine, such as identifying the high-risk groups according to sociodemographic, genetic, and environmental aspects; determining its natural history; and understanding its impact on people and society. North American studies have reported a loss of productivity up to \$1 billion per year secondary to migraine. In about 10 million doctors' appointments, patients present migraine as their chief complaint, according to Pryse-Philips et al.<sup>1</sup> This represents about 4% of the total appointments per year.

Andrasik and associates<sup>2</sup> studied the prevalence of migraine in 1200 psychology students from the University of Ohio and noticed that over half of these students reported headaches once or twice a week. Ogunyemi<sup>3</sup> studied the epidemiology of headache in students from the University of Ilorin in Nigeria and found that 61% of women and 59% of men reported recurrent headaches. Attanasio and Andrasik,<sup>4</sup> from New York University, reported that 45% of their students had weekly episodes of headaches and that 35% to 45% of them had their daily routine impaired. They also observed that headaches were more frequent, of greater severity, and of longer duration in women.

All the above-mentioned studies analyzed headaches in general. Some focused on their clinical aspects; however, headaches were not subdivided into their different types, ie, migraine, tension headaches, and so forth. This made comparisons between their findings and our results difficult.

Lipton and Stewart,<sup>5</sup> in 1993, performed an epidemiological study on migraine in the United States, where 20 468 mailed questionnaires were sent to individuals aged 12 to 80 years. Migraines were found with a prevalence of 17.6% in females and 6.0% in males. Studies on the prevalence of migraine in different Eastern and Western under-developed countries have shown that migraine is not as prevalent as in developed countries.<sup>6,7</sup> There seem to be no epidemiological reports from Latin America.

Therefore, the objective of this research was to perform a descriptive epidemiological study of migraine in medical students analyzing the prevalence of this disease, as well as other important clinical aspects.

## SUBJECTS AND METHODS

All 595 medical students from Santa Casa School of Medicine of São Paulo, Brazil were given a questionnaire between April 1994 and April 1995. The questionnaire inquired if any of these students had suffered some kind of headache previously and if they had had any episode during the past year. Those students who responded positively to any of the above questions were submitted to a second protocol which is used in the neurology clinics for the investigation of headaches. Interviewers were seven previously trained medical students. In order to assure the subjects' privacy, interviews were carried out in a private setting. Diagnosis of the types of headaches was made under direct supervision of an attending neurologist and was based on the International Headache Society (IHS) criteria from 1988.

Two hundred ninety-five of the 595 students responded positively to the first questionnaire. Only 280 students were given the second questionnaire; the remaining 15 students were excluded due to incorrect completion of the first questionnaire and also due to medical school drop out and headaches that were difficult to classify. The mean age of the studied group was 22 years (range 17 to 43 years of age).

The Santa Casa Neurology Clinic protocol contains information about students' gender, family history, length of relevant history, site of pain, time of onset, frequency, duration and intensity of the attacks, as well as the degree of incapacity to perform daily activities, the character of pain, accompanying factors, preceding factors and their duration, trigger factors, and factors that improved or worsened the migraine attacks.

Statistical analysis was carried out using the chi-square test with a significance level of  $P < 0.05$ .

## RESULTS AND COMMENTS

It was observed that 47.1% of the 595 students reported some kind of headache. Migraine without aura was diagnosed in 155 (55.3%) of the 280 students submitted to the Neurology Clinic protocol. Migraine with aura was present in 84 students (30%). Episodic tension-type headaches were diagnosed in 28 cases (10%). Thirteen students (4.7%) presented other kinds of headaches, ie, 6 with chronic daily headache (2.2%), and 7 students (2.5%) with unclassifiable headache. Of those 239 (85.3%) students with migraine, 65% had migraines without aura and 35% migraine with aura. Our findings agree with those of Zhao et al<sup>6</sup> who studied the epidemiology of migraine in China. In their study, 54% of migraines were without aura and 44% were with aura. On the other hand, Campbell<sup>8</sup> reported 90% of migraines without aura in his studied population.

The prevalence of migraine was 54.4% in women and 28.3% in men. Migraine without aura had a prevalence of 33.7% in women and 19.7% in men. The prevalence of migraine with aura was 20.7% in women and 8.6% in men. The female/male prevalence ratio was 2:1, which agrees with the literature.<sup>1,5,8-11</sup> Lipton and Stewart,<sup>5</sup> in their recent epidemiological migraine study in the United States analyzing 20468 questionnaires, found a prevalence of 17.6% of migraines in women and 6% in men. Stang and Osterhaus<sup>12</sup> found a lower prevalence: 8.8% in women and 3.9% in men. These authors studied a population quite similar to ours, ie, college students. One may note, however, that these studies differ a lot in their findings. The characteristics and size of the studied groups, the methods, and the diagnostic criteria employed can account for these differences.

A past medical history of allergies was present in 59.4% of our students. The most common complaints were allergic rhinitis, allergic dermatitis, and asthma. Some students reported having more than one of these forms of allergy. There seems to be a relationship between allergies and migraines, and these two diseases have frequently been observed together.

A positive family history was present in 79.9% of students, affecting most often the mother, followed by the father, siblings, and grandparents. Sillanpää<sup>9</sup> observed a positive family history in 77% of the population he studied. One must be aware that such information may not be completely reliable when family history of headaches has been given by the student, who is obviously not qualified to make a correct diagnosis.

As for the length of the history, the largest percentage of the studied group (34.7%) reported symptoms of 4 to 7 years' duration, 32.7% had a history of 8 to 11 years, 18.4% had 0 to 3 years of history, and 11.7% reported a history of 12 to 15 years. The mean age at onset was 14.5 years.

Motion sickness was the most common symptom in childhood (34.7%) preceding the onset of migraine. Sleep disorders, hyperactivity, and "growth pains" were also reported in childhood.

**Migraine Characteristics.**—The locations of pain are shown in the Table. The most common sites are frontal, temporal, and the whole head. No statistical differences were observed in these sites when comparing migraines with aura to migraines without aura. Some students reported more than one site of pain. Only 24.2% of migraines were said to be unilateral. Linet et al<sup>10</sup> reported 25% of mi-

### Location of Head Pain

Site of Pain	No. of Students (%)
Frontal	127 (45.3)
Temporal	87 (31.1)
Holocranial	78 (27.8)
Unilateral	68 (24.2)
Hemicranial	39 (13.9)
Orbital	31 (11.1)
Parietal	18 (6.4)
Occipital	18 (6.4)

graines as unilateral. Zhao et al<sup>6</sup> reported 34.3% as unilateral, which agrees with our findings. Sillanpää<sup>9</sup> reported 61% of unilateral migraines in his study on headaches during prepuberty. Unilateral pain is considered an important clinical aspect, as it is one of the diagnostic criteria of migraines, and bilateral pain is a criteria for the diagnosis of tension-type headache.

Daytime migraines were encountered more often (44.3%) than nighttime attacks (13.4%), morning attacks (12.6%), or late night attacks (21%). The time of onset of the attacks varied in 27.6% of students.

As for the onset of the attacks, 69% of students reported gradual onset and only 31% had sudden onset migraines. This is extremely valuable history data, which assists in the differential diagnosis of, for example, a headache secondary to subarachnoid hemorrhage ("thunderclap headache"), which is usually of sudden onset. In 64.3% of the studied group, migraine attacks with aura were incapacitating for daily activities, whereas only 48.4% of migraines without aura were incapacitating. When considering migraine with and without aura together, they were temporarily incapacitating in 53.9% of students. Migraine with aura was more incapacitating than migraine without aura. Lipton and Stewart<sup>5</sup> reported that 82% of men and 85% of women had some kind of disability caused by their headaches; Rasmussen et al<sup>11</sup> observed that 43% of the individuals with headache skipped work at least once a year during the time they were evaluated. These are indeed very high rates that prove the importance of headaches as a public health concern. Costs due to loss of productivity secondary to temporary disability caused by migraine add up to \$1 billion a year, according to Pryse-Phillips et al.<sup>1</sup> Migraines are the main cause of work absence in men and the second most common cause in women.

Throbbing pain was the most common type reported (88.3%) followed by "heavy" pain (32.2%), "pressure" pain (28.9%), sharp pain (24.7%), and finally "squeezing" pain (23%). Some students reported having more than one type of pain during the same attack. Post and Gubbles<sup>13</sup> studied headaches in a farming population in Holland and found the throbbing type of pain in 43% of cases. There seems to be a consensus in the literature that the throbbing type of pain is characteristic of migraine, especially when it is unilateral, worsens upon exertion, and is of moderate or severe intensity. All these aspects of pain are important diagnostic criteria for migraine.<sup>14</sup>

The most common accompanying symptoms in patients having migraine with aura were difficulty concentrating (88.1%), photophobia, mood swings, phonophobia, blurring of vision, nausea, and vertigo. In migraine without aura, the most common complaints were mood swings (74.2%) followed by difficulty in concentrating, photophobia, phonophobia, and nausea. Photophobia, phonophobia, and nausea were more commonly reported by students having migraine with aura than migraine without aura ( $P<0.005$ ). Analysis of the accompanying factors is also very important, as they are also part of the IHS diagnostic criteria for migraines.<sup>14</sup> Pryse-Phillips et al<sup>1</sup> reported 74% of subjects had phonophobia, 65% had photophobia, 61% had nausea, and 35% reported vomiting. Sillanpää<sup>9</sup> recorded a 42% incidence of nausea and vomiting, while Post and Gubbles<sup>13</sup> reported a 25% incidence of the same symptoms, which agrees with our findings.

Students having migraine with aura reported the following preceding phenomena: blurring of vision (33.3%), light flashes (28.6%), drowsiness (17.8%), and fortification spectrum (7.1%). Most of these phenomena had a duration of less than 60 minutes (79.6%). Visual symptoms are reported to be the most prevalent aura in migraine.<sup>1,6,8,9</sup>

The main trigger factors of migraine attacks were emotional "stress" (72.8%), sleep deprivation (54.8%), fasting (51.5%), visual tasks (41.8%), sunlight exposure (39.7%), and penetrating odors (33%). Zhao et al<sup>6</sup> also reported emotional stress as the most important triggering factor (40%). The difference in results is probably due to variability in the samples studied.

The most important factor that improved the migraine attacks was the use of analgesic medication (84.5%). Other beneficial factors were reported by 77.4% of students and consisted of silence (68.6%), sleep (65.3%), and darkness (53.1%). It was found that 94.5% of students used some kind of analgesic medication to treat their migraine; 68.8% took only one pill per attack; 19.3% took two pills per attack; 5.4% took three pills; and only 3% took more than four pills per migraine attack. Lipton and Stewart<sup>5</sup> reported that over 95% of Americans use some kind of medication for their migraines.

Noise was reported as the most common factor causing worsening of symptoms (70.3%). Movements of the head (69.9%), bright light (62.8%), and physical exertion (52.7%) were also reported. Although the worsening of pain with exposure to noise and bright light is not considered a diagnostic criteria for migraine unlike photophobia and phonophobia, they should be considered relevant in the diagnosis of migraine.

Distribution of students according to the severity of their migraine attacks was analyzed sepa-

rately in women and men, both with and without aura. Migraine of moderate intensity was found in 54.4% of cases, regardless of sex or type of migraine. Women reported more severe attacks than men (statistically significant). These findings agreed with those of Attanasio.<sup>4</sup> Migraine with aura was also significantly more severe than migraine without aura.

The mean duration of migraine attacks was less than 6 hours in 67.4% of students. Duration ranged from 6 to 12 hours in 22.6%, from 12 to 24 hours in 7.1%, and from 24 to 72 hours in 2.9%. Migraine without aura had a statistically significant lower mean duration.

As for the frequency of migraine attacks, 26.4% of students reported a migraine episode every other week, 25.1% had an attack once a month, 19.2% had weekly attacks, 11.7% had attacks every other month, and 10.9% reported a migraine attack twice a week. Overall, 81.6% of students had attacks at least once a month.

The prevalence of migraine comparing students from several different years of medical school showed no statistical difference. It was found that the most "stressing" years of medical training, ie, the first and the two clinical years, did not result in increased prevalence in migraine.

Finally, we noted that only 7.1% of students sought medical assistance for their migraine despite the high prevalence of these headaches, their mean frequency of two attacks per month, the need for medication, and the temporary disability caused. Linet et al,<sup>10</sup> as well as Lipton and Stewart<sup>5</sup> also found that only 6.5% of men and 15% of women sought medical attention and that only 5% sought a neurologist.

## CONCLUSION

The results of this prospective study show that 47.1% of the total 595 medical students questioned reported some kind of headache. The prevalence of migraine was 54.4% in women and 28.3% in men. Migraine was unilateral in 24.2%, throbbing in 88.3%, and of gradual onset in 69% of students. Migraine attacks were incapacitating in 53.9% of students, especially those attacks with aura. Women experienced more severe attacks than men. Migraine with aura was more intense than migraine without aura. The most common accompanying symptoms of migraine without aura were photophobia, phonophobia, and nausea. Migraine without aura attacks were shorter when compared to those with aura. Drowsiness was a significant phenomenon in our students and preceded or accompanied the attacks. Only 7.1% of students sought medical assistance for their migraine.

## REFERENCES

1. Pryse-Phillips W, Findlay H, Tugwell P, Edmeads J, Murray TJ, Nelson RF. A Canadian population survey on the clinical, epidemiologic and societal impact of migraine and tension-type headache. *Can J Neurol Sci*. 1992;19:333–339.
2. Andrasik F, Holroyd KA, Abell T. Prevalence of headache within a college student population: a preliminary analysis. *Headache*. 1979;19:384–387.
3. Ogunyemi AO. Prevalence of headache among Nigerian university students. *Headache*. 1984;24:127–130.
4. Attanasio V, Andrasik F. Further examination of headache in a college student population. *Headache*. 1987;27:216–223.
5. Lipton RB, Stewart WF. Migraine in the United States: a review of epidemiology and health care use. *Neurology*. 1993;43(suppl 3):S6–S10.
6. Zhao F, Tsay JY, Chang XM, et al. Epidemiology of migraine: a survey in 21 provinces of the People's Republic of China, 1985. *Headache*. 1988;28:558–565.
7. Stang PE, Yanagihara PA, Swanson JW, et al. Incidence of migraine headache: a population-based study in Olmsted County, Minnesota. *Neurology*. 1992;42:1657–1662.
8. Campbell JK. Manifestations of migraine. In: Mathew NT, ed. *Neurologic Clinics (Headache)*. Philadelphia: WB Saunders; 1990:841.
9. Sillanpää M. Prevalence of headache in prepuberty. *Headache*. 1983;23:10–14.
10. Linet MS, Stewart WF, Celentano DD, Ziegler D, Sprecher M. An epidemiologic study of headache among adolescents and young adults. *JAMA*. 1989;261:2211–2216.
11. Rasmussen BK, Jansen R, Olesen J. Impact of headache on sickness absence and utilisation of medical services: a Danish population study. *J Epidemiol Community Health*. 1992;46:443–446.
12. Stang PE, Osterhaus JT. Impact of migraine in the United States: data from the National Health Interview Survey. *Headache*. 1993;33:29–35.
13. Post D, Gubbles JW. Headache: an epidemiological survey in a Dutch rural general practice. *Headache*. 1986;26:122–125.
14. Headache Classification Committee of the International Headache Society. Classification and diagnostic criteria for headache disorders, cranial neuralgias and facial pain. *Cephalalgia*. 1988;8(suppl 7):10–73.