

Epidemiology of migraine among students in Mali



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ABSTRACT

Migraine is a debilitating but benign disease that can affect the quality of life of patients, disrupt the emotional relationships and impact on educational and vocational activities. The aim of our work was to study the epidemiology and impact of migraine in schools in the urban district of GAO in Mali.

This is a cross-sectional study among students in the city of Gao. The survey was conducted in 11 schools, each of which represented a cluster. The study involved 733 students and diagnosis of migraine was made according to the 2004 IHS criteria except the criterion for the number of crises.

The overall prevalence of migraine in school was 17.3% (95% CI [14.6% to 20%]). The headache prevalence among students was 20% (95% CI [16.91% to 23.09%]), it was significantly higher 23.0% in girls than in boys 14.8% ($p < 0.01$). About its impact on school life, 63.8% of students had experienced absenteeism due to migraine from 1 to 14 days in the last quarter preceding the survey with a limiting concentration in 19.2% of students with migraine.

In conclusion, migraine is common among students of Gao, it is more important in female. It has a negative impact on academic performance. It is therefore necessary to control its management to reduce the extent of the disease in this environment.

1. Introduction

Migraine is a neurological disorder manifested by attacks of idiopathic and recurrent headaches. Genes on chromosomes 1, 2, 8 and X have linked to migraine [1–3]. The classification established by the International Headache Society (IHS) in 2004 identified two types: migraine without aura (MSA), the most common form, which is isolated headache, and migraine with aura (MA) where the headache is preceded or accompanied by a focal neurological disorder, transient and progressive (visual disturbances, paresthesia, speech disorder, movement disorders) [4,5]. The International Classification of Headache Disorders-3 (ICHD-3) has a more comprehensive classification of migraine including in addition to the previously mentioned two types of migraine: chronic migraine, probable migraine, complications of migraine and episodic syndromes that may be associated with migraine [6].

Based on epidemiological characteristics, the World Health Organization (WHO) ranks migraine among the top twenty diseases with the greatest impact on the general population and among the top ten when focusing only on the female population [7]. When performed, epidemiological studies using the IHS classification give consistent results [8].

However, according to a report of INSERM in France, devoted to migraine, this disease is still often overlooked medical professionals and the general population, with a negative impact on its management [9]. Indeed 85% of migraine sufferers considered their illness as a disability, and 43% thought that there is no solution for them [10].

Approximately 5–10% of children with migraine and only one out of 5 of them are diagnosed by a general practitioner [9]. However, the onset of migraine is most of the time early and 90% of cases begin before age 40 [11]. Factors inherent to school environment seems to favor the occurrence of the disease: stress, changes in lifestyle, sleep disorders,

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anxiety and frustrations are often the cause of migraine attacks. For that reason, sometimes children and adolescents are believed to invent these headaches [12]. In sub-Saharan countries, very few studies have focused specifically on migraine in the school environment. Thus, a study in Togo found headache to be an important reason for consultation in the school infirmary [12]. In addition, an epidemiological study of migraine in the general population in Madagascar has shown a higher prevalence of the disease in young [13]. In Mali, the lack of epidemiological data on a large scale of this disease among young people in general and specifically the school has motivated this study whose objective was to study the prevalence and impact of migraine on quality of School life in the urban district of Gao.

2. Population and method

This was a prospective, cross-sectional, descriptive and analytical study, which lasted 15 months from May 2009 to July 2010. The study held in the region of Gao in the North-eastern Mali, west Africa. This region covers an area of 31,288 km² with a population of 171,253 inhabitants. We performed a cluster sampling on the number of all 11 high schools in Gao, 6 vocational schools and five general education, each school was a cluster. The total population was 4631 pupils we pulled a sample of 733 students to participate in the survey. The selection was made by stratification in every high-school and students in each stratum were randomly selected. Fig. 1 summarizes the different strata.

Data were collected on an individual case report form which is divided three parts:

- The first part included, an anonymous study number, socio demographic information of the respondent (sex, age, educational level, type of education), clinical information (headache heredity, life-style, habits and the characteristics of the headache);
- The second part is related to the diagnosis of migraine. We used the criteria in IHS 2004 [4, and in the Interdisciplinary Research Group on Migraine (GRIM) [14] to diagnose migraine in our study population;
- The third part is on the assessment of the severity of migraine, the impact of disease on quality of life and the shortcomings of the school activity, this part of the form included the MIDAS Migraine Disability Assessment [15,16] and the Headache Impact Test-6 (HIT-6) [17].

2.1. Data processing and analysis

The data collected were entered and analyzed on SPSS version 12.0.

The Chi² test was used for the relationship between qualitative variables and differences were considered significant at a value of $p \leq 0.05$.

2.2. Ethical considerations

The survey was conducted with the permission of the Academy of Gao teaching and administrative authorities of the various schools. Participation in the study was strictly voluntary, the survey form was anonymous and personal and clinical information was collected only after obtaining informed assent from the pupils and informed consent from their school teachers and parents (when reachable). No compensation was given in exchange for the study participation, acknowledgments were sent to the participants for collaboration in this work and a feedback of the results was made to all the structures involved in the study. Students diagnosed with migraine during the study were supported as required according to a logical basis, with the available medications in Gao [12].

3. Results

The prevalence of migraine was 17.3% (127/733) in the school population of Gao. Students participating in the study were 69.7% (511/733) male and 30.3% (222/733) female. The majority (75.4% of cases) of students were aged from 15 to 18 years. Migraine was slightly more frequent in females with a prevalence of 23% (51/222) as compared to 14.8% (76/511) in males ($p \leq 0.027328$) [Table 1].

In students with migraine, first degree family history of headaches was found in 78% of cases: related to the mother in 57% of cases, and related to the father in 17% of cases.

Students in general education represented 80.1% and those in vocational education 19.9%. The frequency of migraine was slightly higher in vocational education. Fig. 2 summarizes the distribution of all participants according to their socio-demographic characteristics and prevalence of headache and migraine in the population of 635 individuals (86.6%) reported having had headaches during the 3 months preceding the survey. The clinical diagnosis of migraine (with or without aura) was established in 127 students e.g. 20% of the population suffering of headache. The rest of the headache cases were distributed as follows: 38% of tension headaches and 42% of symptomatic headache related to a disease or an infection (malaria, ENT or dental affection and others).

The median age of the headache is 3 years. The duration of the most intense crisis was classed as follows: < 24 h (3.9%), 24 h–72 h (71.6%) over 72 h (24.4%).

Characteristics of migraine

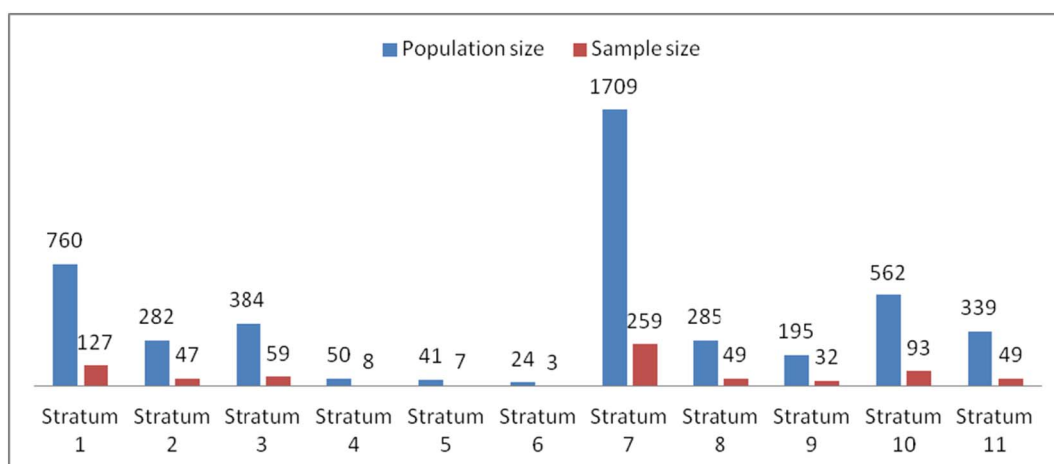


Fig. 1. Representative stratified sampling.

Table 1
Comparison of frequency of migraine between males and females.

Sex	Diagnostic	Frequency (N)	Percent (%)
Male	Migraine	76	14.9
	No migraine	435	85.1
	Total	511	100
Female	Migraine	51	23
	No migraine	171	77
	Total	222	100

($p < 0.027328$).

- The location was frontal and bilateral in 44.8% of cases, and strictly unilateral in 22 and 33% of students described a non-specific location.
- The crisis had the following features: throbbing pain (97.6%), aggravation by physical activity (96.8%), nausea/vomiting (38.6%), phonophobia (30.7%), photophobia (0.8%); phonophotophobia (66.9%), aura (18%). Table II summarizes the clinical characteristics.

Frequency of crises in the last three months (before the survey), measured in days of crisis: There is > 30 days (0.8%) from 15 to 30 days (6.6%) < 15 days (68.8%) no crisis (23.8%).

Impact of migraine on school activity:

Headache disrupted school and social activity, almost two thirds of migraine sufferers were absent from school one to fourteen days in the last term. The majority of students with migraine (71.5%) had a reduction for > 50% of their activity during 1 to 14 days in the last term. More than two thirds of migraine sufferers had reduced home activities over 50% for 1 to 14 days during the past three months. During the last term, the family or social leisure had been lost for 1 to 14 days in two thirds of students suffering of migraine. Twenty percents of migraine sufferers reported to feel very often an excessive fatigue associated with pain that avoid work or daily activities. Twenty-two students or 18.5% had migraine all the time want to lie down during headache. The ability to concentrate on work or daily activities was often limited because of the headache in 19.2% of students with migraine during the past four weeks [Table 2]. An improvement was noted during the holidays in 65% of students with migraine.

4. Discussion

This is the first study carried out to date on migraine in school setting in Mali. It will contribute to start the documentation in schools of this disease relatively common in young adults in sub-Saharan Africa.

The choice of Gao to conduct this study was led by socio-demographic and cultural considerations. Indeed Gao is one of the

Table 2
Frequency table of semeological characteristics of migraines (N = 127 students).

Variables	Frequency	Percent (%)	
Particular characteristics of migraines during the last attack	Pulsatility	124	97,6
	Increasing with physical activities	123	96,9
	Unilateral and fixed	28	22,0
Location of migraine	Unilateral and alternate	57	44,9
	Undetermined	42	33,1
Accompanying signs	Vomiting and/or nausea	49	38,6
	Phonophobia	124	97,6
	Photophobia	86	67,7
Intensity of migraine pain	< 5/10	15	11,8
	5 à 6/10	32	25,1
	7 à 8/10	23	18,1
	9 à 10/10	48	37,8
Long lasting intense pain	Never	10	7,9
	Rarely/occasionally	63	49,6
	Very often/all the time	46	36,2
Date of the last migraine attack	> 15 days	9	7,1
	≤ 15 days	82	64,6
	Present	28	22,0
Number of lost activity days	> 15 days	6	4,7
	≤ 15 days	74	58,3
	No lost	36	28,3
decreased concentration	Never	17	13,4
	Rarely/occasionally	65	51,1
	Very often/all the time	38	29,9
unusual fatigue	Never	34	26,8
	Rarely/occasionally	51	40,1
	Very often/all the time	34	26,8

oldest cities of Mali. It has a strategic position between the Sahara (Algeria and Mauritania) and sub-Saharan Africa. In fact Gao is hub site and a place of mixed population: white population (Tuareg, Arab and Moors) from the Sahara and black population (Aboriginal Songhai and other ethnicities from the south of the country working in Gao as civil servant or military). So the population is fairly cosmopolitan and representative of the general population in Mali. The choice of this city was also based on practical reasons, namely the possibility of conducting this study in all secondary and vocational schools. Finally, secondary education was chosen for convenience because French is not the native language of students, we felt the level of secondary education to be sufficient to understand our questionnaire.

About method, in order to optimize the diagnosis of migraine, we combined the classical criteria of IHS to those of GRIM. Indeed, the interdisciplinary research group on migraine conducted a study to

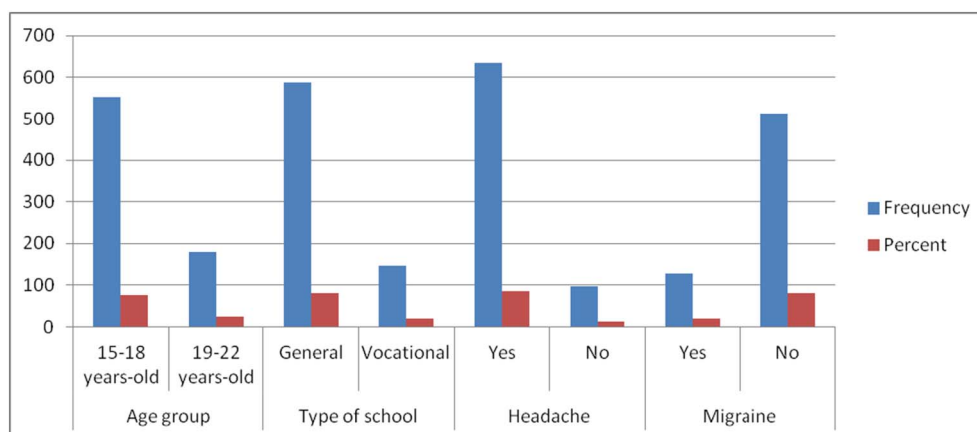


Fig. 2. Socio-demographic characteristics of the study population.

assess the sensitivity and specificity of the IHS criteria usually used in the literature. It appears from this study a good specificity of this tool but sensitivity below 50%. Based on the results of this survey of general practitioners, the GRIM criteria is proposed as a diagnostic tool, because it appears to be less restrictive than IHS and also has a sensitivity of 95% with a specificity of 78% [14].

For the evaluation of pain and its impact on quality of life of students and school dysfunction, we have combined the MIDAS and HIT-6. Both tools are typically used for this purpose in the literature, firstly for their sensitivity and also for their ease of use [15,17].

In our sample, there were more boys than girls; in relation with cultural behaviors, in Mali, particularly in the area of Gao, boys are more often sent to school by parents, while girls are often devoted to household activities.

Students participating in the study were 69.7% (511/733) male and 30.3% (222/733) female. This tendency was observed in Ethiopia with 51.5% (119/231) in males and 48.5% (112/231) in females [18]. We observed slightly significantly higher prevalence of migraine (17.3%) as compared to the average prevalence in the literature except in Ethiopia with 13.06% (94/720) $p = 0.051869$ [19]. This can be attributed mainly to quality of our diagnostic tools combining IHS (conventional tool, usually used in the literature) and GRIM more specific and more sensitive than the IHS but also to our sample of students with some level of understanding (general and vocational secondary education) so answering very accurately to questions.

For the slightly higher prevalence of migraine in females as compared to males, our study confirms previous findings of the literature.

While the prevalence of migraine is 5 to 10%, similar in both sexes in children [20,21], it sharply increases in females in the pubertal period to reach a peak of around 25% around age 40 years old. These age-related variations are much reduced in males [16].

First degree family history of headaches was very common in students with migraine (78% total with 57% on the maternal side and 17% on the paternal side). This association was reported from Benin [22,23].

Indeed, several factors suggest that ovarian hormones must play a significant role in migraine: the frequent onsets of migraines during or after puberty; the triggering role of menstruation that have been found in 46% of our cases and the disappearance of attacks during the latter half of pregnancy in three out of four patients. Probably most of the women, will find after menopause, the end of their migraine compared to “an expected haven” by some authors [24].

In our study we found a higher prevalence of migraine among students attending vocational education as compared to general education. Similarly, an epidemiological study conducted in France showed that intermediate professional categories (nurses, teachers, craftsmen, and merchants, administrative and commercial associate professionals) seemed to be more affected by migraine than the category of intellectuals. About two thirds of patients that suffer of migraine report their attacks to be triggered by specific external circumstances or internal variation, the remaining third felt that their attacks occur suddenly without apparent reason.

Our study confirms the disabling character of migraine among affected students. In fact, bed rest is mandatory in the majority of attack, leading to school absenteeism. A malaise is often observed between attacks, linked to: poor self perception; avoidance behavior toward triggers factors; anticipatory anxiety toward the often unpredictable attack of migraine. In the study of Belo M et al. Togo, the impact of headache on the quality of students' academic life was marked by the inability to concentrate (70.8%), sensation of head heats (63.2%) and attention disorders (50.9%). The magnitude of these disorders due to headaches contributes significantly to poor academic performance. In this Togolese study, 40.35% of students said that the headache had a negative effect on their school performance with a failure rate of over 50%, especially in examination classes. Absenteeism

has been estimated to an average of 5.19 days during the school year [9]. In the study of Abu-Areffeh and Russel on the prevalence of headache and migraine in 1754 pupils from 5 to 15 years, an average absenteeism of 7.8 days was found [21]. Headache disrupted school and social activity, almost two thirds of migraine sufferers were absent from school one to fourteen days in the last term. Inability to participate in outdoor activities, household chores, and school absenteeism were similarly common in Nigeria [25].

The improvement of health condition over the holidays establishes a causal link between school activity and exacerbation of attacks. This has been noted in the study of migraine in schools in France [10].

5. Conclusion

Our study, like the previous in Africa and in the other parts of the world, confirms on the one hand the importance of migraine in school, especially in female, and on the other hand its negative impact on the quality of life of students and on school activities. The management of this debilitating disease for students could easily be improved by appropriate and targeted management. This management will involve a better training of professionals involved in school health care system (school nursing staff, general practitioners) and a better quality information for the general population (students, teachers and parents).

Providing school infirmaries in drug against migraine and training school caregivers on techniques of pharmacological and non-pharmacological therapy of migraine, will improve the quality of life of students with migraine and thus help to better academic achievement.

Conflict of interest

None.

References

- [1] Stephen D. Silberstein, David W. Dodick, Migraine genetics, *Headache* 53 (8) (2013) 1218–1229.
- [2] V. Anttila, et al., Genome-wide association study of migraine implicates a common susceptibility variant on 8q22.1, *Nat. Genet.* 42 (2010) 869–873.
- [3] M. Quintas, J.L. Neto, J. Pereira-Monteiro, et al., Interaction between γ -aminobutyric acid A receptor genes: new evidence in migraine susceptibility, *PLoS One* 8 (9) (2013 Sep 5) e74087.
- [4] International Headache Society, The international classification of headache disorders, 2nd edition, *Cephalalgia* 24 (Suppl. 1) (2004) 1–160 www.i-h-s.org.
- [5] M. El Amrani, H. Massiou, Migraine: clinical aspects and treatment. *Encycl Med Chir (Elsevier, Paris), Neurology* (1998) 7 (17-023-A-50).
- [6] Jes Olesen, ICHD-3 beta is published. Use it immediately, *Cephalalgia* 33 (9) (2013) 627–628.7.
- [7] M. Lanteri-Minet, Epidemiology and impact of headache, in: G. Geraud, N. Fabre, M. Lanteri-Minet, D. Valade (Eds.), *Headaches: 30 Lessons*, Elsevier, Paris, 2009, pp. 16–24.
- [8] Headache Classification Committee of the International Headache Society, Classification and Diagnostic Criteria for headache disorders, cranial neuralgias, and facial bread, *Cephalalgia* 8 (Suppl. 7) (1988) 1–96.
- [9] MIGRAINE descriptive knowledge, treatment and prevention. Expertise collective INSERM Editions INSERM Paris 1998, 280pp.
- [10] P. Henry, J.P. Auray, A.F. Gaudin, et al., Prevalence and clinical characteristics of migraine in France, *Neurology* 59 (2) (2002) 232–237.
- [11] H. Chabriat, M. Levasseur, M. Schaison, et al., Ophthalmoplegia migraine, *Rev. Neurol.* 146 (1990) 682–686.
- [12] M. Belo, K. Assogba, A.M.A.-A. Awidina, et al., Headache and quality of life in schools, in Lome, TOGO, *Afr. J. Neurol. Sci.* 2 (2009) 29–34.
- [13] M. Adriantseho, J.Y. Rafidison, O.P. Andriantseho, Prevalence of migraine in Madagascar: results of a survey in a general population, *Afr. J. Neurol. Sci.* 1 (2005) 13–17.
- [14] P. Michel, J.F. Dartigues, P. Henry, et al., Validity of the International Headache Society Criteria for migraine. GRIM. Interdisciplinary Research Group on Migraine, *Neuroepidemiology* 12 (1) (1993) 51–57.
- [15] M.E. Bigal, A.M. Rapoport, R.B. Lipton, et al., Assessment of migraine disability using the Migraine Disability Assessment (MIDAS) questionnaire: a comparison of chronic migraine with episodic migraine, *Headache* 43 (4) (2003) 336–342.
- [16] W.F. Stewart, A. Shechter, B.K. Rasmussen, Migraine prevalence. A review of population-based studies, *Neurology* 44 (Suppl. 4) (1994) S17–S23.
- [17] H.E. Shin, J.W. Park, Y.I. Kim, et al., Headache Impact Test-6 (HIT-6) scores for migraine patients: their relation to disability as measured from a headache diary, *J. Clin. Neurol.* 4 (4) (2008) 158–63.18.

- [18] Getahun Mengistu, Samson Alemayehu, Prevalence and burden of primary headache disorders among a local community in Addis Ababa, Ethiopia, *J. Headache Pain* 14 (2013) 30.
- [19] E.M. Birru, Z. Abay, M. Abdelwuhab, et al., Management of headache and associated factors among undergraduate medicine and health science students of University of Gondar, North West Ethiopia, *J. Headache Pain* 17 (2016) 56.
- [20] I. Abu-Arafeh, G. Russell, Prevalence of headache and migraine in school children, *Br. Med. J.* 309 (1994) 765–769.
- [21] M.J. Mortimer, J. Kay, A. Jaron, Childhood migraine in general practice: clinical features and characteristics, *Cephalalgia* 12 (1992) 238–243.
- [22] Thierry Adoukonou, Dismand Houinato, Judith Kankouan, et al., Migraine among university students in Cotonou (Benin), *Headache* 49 (6) (2009) 887–893.
- [23] Thierry Adoukonou, Francis Tognon-Tchegnonsi, Kouna Philomène, et al., Prevalence of migraine among university students at Parakou, Benin: a cross-sectional study, *World J. Neurosci.* 4 (2014) 18–24.
- [24] J.C. Baron, M. Hamon, J.M. Launay, Pathophysiology, in: Expertise Collective INSERM (Ed.), *Migraine: Descriptive Knowledge, Treatment and Prevention*, Les Editions INSERM, Paris, 1998(280 p).
- [25] Gabriel E. Ofovwe, Antoinette N. Ofili, Prevalence and impact of headache and migraine among secondary school students in Nigeria, *Headache* 50 (2010) 1570–1575.