

Epidemiology of Migraine in Adolescents and Young Adults in Western Madagascar: A School-Based Study

Rahamefy Odilon Randrianasolo¹, Lala Andriamasinavalona Rajaonarison^{2*},
Julien Razafimahefa², Nomena Finiavana Rasaholiarison², Noel Zodaly²,
Alain Djacoba Tehindrazanarivelo²

¹Faculty of Medicine, University of Mahajanga, Mahajanga, Madagascar

²Faculty of Medicine, University of Antananarivo, Antananarivo, Madagascar

Email: *lalanaval@gmail.com

How to cite this paper: Randrianasolo, R.O., Rajaonarison, L.A., Razafimahefa, J., Rasaholiarison, N.F., Zodaly, N. and Tehindrazanarivelo, A.D. (2025) Epidemiology of Migraine in Adolescents and Young Adults in Western Madagascar: A School-Based Study. *Open Journal of Epidemiology*, 15, 850-855.

<https://doi.org/10.4236/ojepi.2025.154056>

Received: September 7, 2025

Accepted: November 1, 2025

Published: November 4, 2025

Copyright © 2025 by author(s) and Scientific Research Publishing Inc.

This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

Abstract

Background: Data on migraine are scarce in Madagascar and mainly concern the capital of the island. Our objective is to determine the prevalence and characteristics of migraine in adolescents and young adults. **Methods:** A cross-sectional survey among high school students was done in the city of Mahajanga in western Madagascar in January 2021. Structured questionnaires were self-completed under supervision by pupils within their classes. Headache diagnostics were based on ICHD-3. Simple random sampling was carried out with an expected prevalence of 10%, a confidence interval of 95%, a confidence limit of 5%, and a design effect of 3. The annual prevalence of migraine was analyzed. **Results:** The annual prevalence of headaches was 89.4%, with a crude prevalence of 19.30% for migraine. The prevalence of migraine was 24.4% for females and 13% for males. The mean age of migraine sufferers was 16.80 years. Migraine without auras accounted for 57.50% of cases. Headache attacks were severe in 71.25%. The most frequent triggering factors were sleep disturbances and stress. Preventive treatment must be needed for 10% of subjects. **Conclusion:** Migraine is common in adolescents and young adults in Mahajanga. The severity of headache attacks and their frequency could have a significant impact on the quality of life of its students.

Keywords

Adolescent, Headache, Epidemiology, Madagascar, Migraine

1. Introduction

Migraine is the leading cause of recurrent headaches in children and adolescents

[1] [2]. According to the literature, 9.1% of children and adolescents suffered from migraine. It can have significant impacts on the quality of life and education of the child or adolescent [3]-[5]. In Madagascar, the annual prevalence of migraine in the general population was estimated at 19% [6]. In our practice in Madagascar, data on migraine in adolescents are scarce. Knowledge of these data would improve the care of adolescents suffering from this pathology in our context. Our objective was to determine the annual prevalence and characteristics of migraine sufferers in adolescents and Young adults in our population.

2. Methods

Ethical standards applicable to this type of study were upheld, with informed consent obtained from both parents and participating students.

Study design: A cross-sectional survey was carried out in a high school “Notre Dame high school” in the city of Mahajanga. Registered in this high school 416 students with 151 students in the second class, 115 students in the first class, and 150 students in the final class. The city of Mahajanga is a city located 560 km northwest of the capital. It has an area of approximately 57 km² and is an urban, coastal district. With approximately 258,068 inhabitants in 2020.

Recruitment: The survey was carried out in January 2021. The interviewers were registrar were supervised by a neurologist during the survey. Was chosen as interviewer for all the registrars of the neurology department of the Mahajanga university hospital.

Participants: We surveyed without matching high school students at the Notre dame school. The number of study subjects was calculated by simple random sampling with an expected prevalence of 10%, a confidence limit of 5%, and a calculation factor of 3 giving 415 subjects necessary (this approach allowed us to standardize participant recruitment across classes of varying sizes, thereby increasing the study sample and ensuring a more representative population) for a confidence interval of 95%. This expected prevalence of 10% was chosen using as a reference the overall prevalence of migraine in children and adolescents, which is estimated at 9.1%. The choice of survey subject was made exhaustively by all the students were present during the study period. We considered as the case all subjects had at least one episode of headache during the past year. The diagnosis of the headaches was made by a neurologist by reporting the characteristics of the headaches collected on the criteria of the International Classification of Headache Disease version 3. Cases of probable migraine were considered migraine. The severity of headache attacks was assessed by a visual analogue scale included in the questionnaire. Attack scores of 0 to 3 were considered with mild attack, 4 to 6 moderate, 7 to 8 severe and 9 to 10 very severe. The need for preventing treatment was defined by an attack frequency of more than 3 attacks per month.

Data collection and analysis: Used for the survey structured questionnaires that were self-completed under supervision by pupils within the student’s classroom. The questionnaire details the headache characteristics with a multiple-

choice question. A question on a significant event of the year 2019 in Madagascar was added to evaluate the recall. A pre-test of the questionnaire was carried out on 30 students beforehand to assess their understanding of the questionnaire with a completion rate of 100%. Each interviewer was trained to give the same explanation for each paragraph of the questionnaire. Crude and specific annual prevalence of headache and migraine was analyzed.

3. Results

At the end of the study, 415 subjects were surveyed. Women represented 55.71% of our study population. The average age of our population was 16.91 with an extreme of 14 to 24 years. Subjects under 18 years old represented 69.88% of survey subjects and those aged 18 and over 30.12% (**Table 1**). The second, first, and final classes represented respectively 36.4%, 27.9%, and 35.9% of the subjects of the survey. The response rate to the survey was 100%. The annual prevalence of headache was 89.4% (95% CI, 86.2 - 92.1). The crude prevalence of migraine was 19.3% (95% CI, 15.6 - 23.5). Among females, the prevalence was 24.24% (95% CI, 19.1 - 30.0), and among males, 13.04% (95% CI, 8.7 - 18.6). In subjects under 18 years old, the prevalence of migraine was found at 18.96%, and in subjects aged 18 and over at 20%. Migraine without aura represented 57.50% of migraine cases. Ten percent of migraine sufferers had more than 3 migraine attacks per month. Migraine attack was severe in 52.5% and very severe seizures in 27.50% (**Table 2**). The triggering factors found were lack of sleep in 76.3%, stress in 50%, excess sleep in 21.3%, strong emotions in 21.3%, and unspecified factors in 18.8%. The most relieve factor were sleep at 70%, rest at 46.25%, and relaxation at 41.3%.

Table 1. Demographic characteristics of the population study in the city of Mahajanga in western Madagascar in January 2021.

	N (415)	Percentage (%)
Gender		
Male	184	44.33
Female	231	55.66
Age		
Average	16.91 [14 - 24]	45.78
<18 years	190	54.21
≥18 years	225	
Class		
Second	151	36.38
First	115	27.71
Terminal	149	35.90

Table 2. Clinical characteristics of subjects with migraines in the city of Mahajanga, Madagascar in January 2021.

	N = 80	Percentage (%)
Gender		
Male	24	13
Female	56	24.4
Age		
Average	16.8 [14 - 20]	19
<18 years	55	20
≥18 years	25	
Severity of headache attack		
Light intensity	1	1.30
Moderate intensity	22	27.50
Severe intensity	42	52.50
Very severe intensity	15	18.80
Frequency of headache attacks		
Daily	3	3.80
Weekly	5	6.30
Monthly	6	7.50
Others	66	82.50
Migraine type		
Without aura	46	57.50
with aura	34	42.50

4. Discussion

The annual prevalence of migraine was found among high school students higher than our estimate. At the end of the study, 89.40% of the students had headaches during the past year. According to the literature, students would have more headache attacks, and this is because of the presence of several factors favoring headaches such as stress, skipping meals, physical exertion, fatigue, noise, sunlight, and menstruation [7] [8].

The other studies carried out among students of the same age group also showed the same findings. The study carried out among adolescents in a school in Porto Alegre in Brazil by LM Barea *et al.* reported an annual prevalence of headaches among adolescents was 83% [9]. For Antoniuk *et al.* the annual prevalence of headaches in a school was 93.5% [10]. In schools in Karachi in a study by Sarwer Jameel Siddiqui *et al.*, the annual prevalence of headaches among school-children was 85.5% [11]. We found a high annual prevalence of migraine among students, at 19.30%. In the literature, the prevalence of migraine in children and adolescents would be 5% to 10%, but this prevalence varies according to the meth-

odology and the age of the subjects included [2] [12]. In schools, a higher prevalence of migraine was found in children and adolescents ranging from 5.2% to 21.7% [4]. The same result has been reported in African and occidental studies [13]-[16]. This prevalence varied according to age and gender. In our population, women were the most affected with an annual prevalence of 24.4% and 13% for the male gender. It increased with age with a prevalence of 19% for those under 18% and 20% for those aged 18 and over. These results were comparable to those described in the literature with a greater prevalence of migraine in young subjects and females [2] [4] [17] [18].

In our study, severe migraine attacks were found in the majority of cases with infrequent attacks. Ten percent of subjects could indicate preventative treatment [19].

Strength and limits: These results allow us to have an overview of the prevalence of migraine in adolescents in our population. In accordance with ICHD-3 recommendations, cases of probable migraine were included in the migraine analysis. This approach is commonly adopted in epidemiologic studies to capture a broader spectrum of the disorder. This study was carried out in a single center which may limit the generalization of these results even if results are similar to the data found in the general population in Madagascar. Disability data were not collected and should be explored in future work.

5. Conclusion

This high prevalence of headaches and migraine in adolescents and young adults suggests that this is a public health problem because our population is mainly composed of young subjects. We suggest a study in several regions to complete the data to know the impact of the disease at the national level.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

- [1] Khalili, Y.A. and Chopra, P. (2022) Migraine Headache in Childhood. StatPearls Publishing. <https://www.ncbi.nlm.nih.gov/books/NBK557813/>
- [2] Abu-Arefeh, I. and Russell, G. (1994) Prevalence of Headache and Migraine in Schoolchildren. *BMJ*, **309**, 765-769. <https://doi.org/10.1136/bmj.309.6957.765>
- [3] Abu-Arafah, I., Razak, S., Sivaraman, B. and Graham, C. (2010) Prevalence of Headache and Migraine in Children and Adolescents: A Systematic Review of Population-Based Studies. *Developmental Medicine & Child Neurology*, **52**, 1088-1097. <https://doi.org/10.1111/j.1469-8749.2010.03793.x>
- [4] Wöber-Bingöl, Ç. (2013) Epidemiology of Migraine and Headache in Children and Adolescents. *Current Pain and Headache Reports*, **17**, Article No. 341. <https://doi.org/10.1007/s11916-013-0341-z>
- [5] Kernick, D., Reinhold, D. and Campbell, J.L. (2009) Impact of Headache on Young People in a School Population. *British Journal of General Practice*, **59**, 678-681.

- <https://doi.org/10.3399/bjgp09x454142>
- [6] Andriantseho, L., Rafidison, J. and Andriantseho, O. (2008) Prevalence of Migraine in Madagascar: Results of a General Population Survey. *African Journal of Neurological Sciences*, **24**.
<https://doi.org/10.4314/ajns.v24i1.7561>
- [7] Straube, A., Heinen, F., Ebinger, F. and Kries, R.V. (2013) Headache in School Children: Prevalence and Risk Factors. *Deutsches Ärzteblatt international*, **110**, 811-818.
<https://doi.org/10.3238/arztebl.2013.0811>
- [8] Casucci, G., Terlizzi, R. and Cevoli, S. (2014) Headache in School Age. *Neurological Sciences*, **35**, 31-35. <https://doi.org/10.1007/s10072-014-1738-0>
- [9] Barea, L., Tannhauser, M. and Rotta, N. (1996) An Epidemiologic Study of Headache among Children and Adolescents of Southern Brazil. *Cephalalgia*, **16**, 545-549.
<https://doi.org/10.1046/j.1468-2982.1996.1608545.x>
- [10] Antoniuk, S., Kozak, M.F., Michelon, L. and Montemór Netto, M.R. (1998) Prevalence of Headache in Children of a School from Curitiba, Brazil, Comparing Data Obtained from Children and Parents. *Arquivos de Neuro-Psiquiatria*, **56**, 726-733.
<https://doi.org/10.1590/s0004-282x1998000500005>
- [11] Siddiqui, S.J., Shamim, S.M.S. and Hashmi, A.M. (2006) Prevalence and Patterns of Headache in School Children in Karachi.
- [12] Bigal, M.E., Lipton, R.B., Winner, P., Reed, M.L., Diamond, S. and Stewart, W.F. (2007) Migraine in Adolescents: Association with Socioeconomic Status and Family History. *Neurology*, **69**, 16-25. <https://doi.org/10.1212/01.wnl.0000265212.90735.64>
- [13] Diallo, S.H., Maiga, Y., Koné, M., Kayentao, K., Diallo, S. and Camara, M. (2016) Migraine et qualité de vie en milieu scolaire dans le district de Bamako au Mali. *Revue Neurologique*, **172**, A115. <https://doi.org/10.1016/j.neurol.2016.01.274>
- [14] Maiga, Y., Boubacar, S., Kanikomo, D., et al. (2011) La migraine en milieu scolaire à Gao au Mali. *African Journal of Neurological Sciences*, **30**, 49-55.
- [15] Split, W. and Neuman, W. (1999) Epidemiology of Migraine among Students from Randomly Selected Secondary Schools in Lodz. *Headache: The Journal of Head and Face Pain*, **39**, 494-501. <https://doi.org/10.1046/j.1526-4610.1999.3907494.x>
- [16] Unalp, A., Dirik, E. and Kurul, S. (2007) Prevalence and Clinical Findings of Migraine and Tension-Type Headache in Adolescents. *Pediatrics International*, **49**, 943-949.
<https://doi.org/10.1111/j.1442-200x.2007.02484.x>
- [17] Lewis, D.W. (2002) Headaches in Children and Adolescents. *American Family Physician*, **65**, 625-633.
- [18] Dodick, D.W. (2018) Migraine. *The Lancet*, **391**, 1315-1330.
[https://doi.org/10.1016/s0140-6736\(18\)30478-1](https://doi.org/10.1016/s0140-6736(18)30478-1)
- [19] Ha, H. and Gonzalez, A. (2019) Migraine Headache Prophylaxis. *American Family Physician*, **99**, 17-24.