



Research Article

Prevalence, Clinical Features, and Functional Impact of Migraine Among Medical Students in Niamey

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Abstract

Objective: This study aimed to assess the prevalence, clinical features, frequency, severity, duration, and functional impact of migraine among medical students at Abdou Moumouni University in Niamey. **Methods:** We conducted a descriptive cross-sectional study involving 334 medical students. Data were collected using a structured questionnaire inspired by the ID-Migraine tool, focusing on headache characteristics and their impact. A gender-based comparative analysis was also performed. **Results:** Out of the 334 students who participated, 141 met the IHS diagnostic criteria for migraine, corresponding to a prevalence of 42.2% (95% Confidence Interval: 36.9% to 47.5%). The most common symptoms included phonophobia (97.2%), pulsatile headache (89.4%), and photophobia (73%). The average attack frequency was 13.6 days over 3 months, with a mean pain intensity of 6.3/10. Among treated students, 83.7% reported episodes lasting less than 4 hours. The functional impact was significant, with an average of 3.8 days of complete activity interruption and 4.2 days of reduced social engagement. Women reported a higher frequency of attacks (14.5 days) compared to men (11.9 days). **Conclusion:** This study highlights a high prevalence of migraine among medical students in Niamey, along with a considerable functional burden. These findings call for targeted interventions and support strategies to mitigate academic and social consequences in this vulnerable population.

Keywords

Migraine, Headache, Medical Students, Prevalence, Africa, Functional Impact

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1. Introduction

Migraine is one of the leading causes of disability in young adults, especially in academic settings with a high cognitive load [1, 2]. Recognized as the second leading cause of years lived with a disability (YLD) in people under 50 years of age [3], it represents a pathology of growing interest for public

health, especially in resource-limited countries. Medical students are a particularly vulnerable population, exposed to multiple triggers: academic stress, sleep deprivation, work overload, disrupted biological rhythms, and an unhealthy lifestyle [4-6].

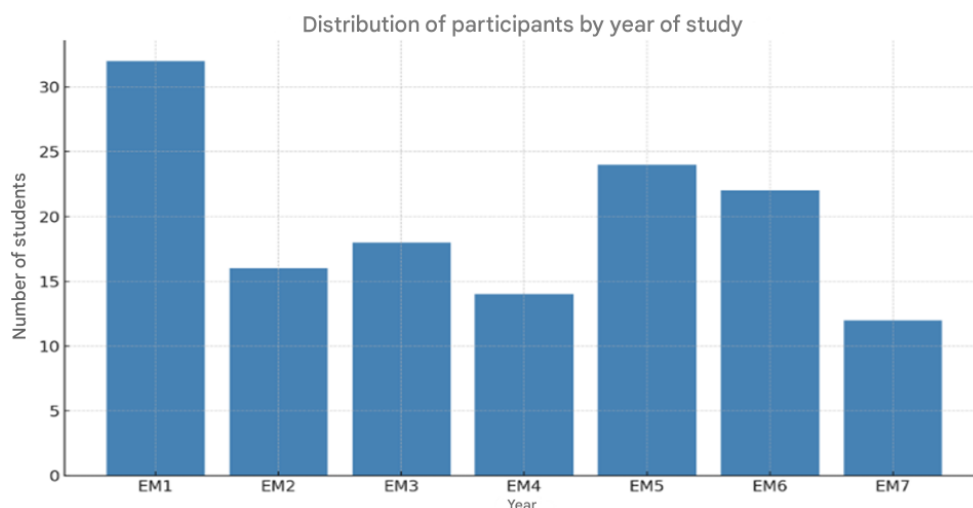


Figure 1. Distribution of participants by year of study.

2. Methodology

2.1. Study Type and Population

This is a descriptive cross-sectional study conducted between January and March 2025. All students enrolled in the Faculty of Medicine of Abdou Moumouni University were invited to participate. A total of 334 students were included, all volunteers, after informed consent.

2.2. Inclusion Criteria

- 1) Be a medical student at Abdou Moumouni University;
- 2) Have had headaches in the last three months;
- 3) Have freely consented to participate.

2.3. Exclusion Criteria

Students whose survey sheets contained incomplete responses were excluded from the study.

2.4. Collection Tool

The data were collected on an individual survey sheet with 3 parts: the first part included, on the one hand, the anonymity number, information on the civil status of the respondent (sex,

age), level of education; the type of education followed, cephalalgic heredity, lifestyle and habitus, and on the other hand the characteristics of the headache (site, evolutionary profile, signs of accompaniment, triggering factors, impact on school life and quality of life). The second part on the diagnosis of migraine using the IHS criteria [8] and those of the Interdisciplinary Research Group on Migraine (GRIM) [13] and the third part on the assessment of migraine severity, its impact on quality of life and on dysfunctions in school activity, included the Migraine Disability Assessment MIDAS [5] and the Headache Impact Test-6 (HIT-6).

2.5. Sampling Method

Our approach for optimal representativeness: To ensure that each student has his or her rightful place in our study, we used a 3-step sampling method:

Breakdown by grade: We divided the 2,712 students into 7 distinct groups (from 1st to 7th year - EM1 to EM7), like well-organized drawers. Each group was represented in proportion to its actual size in the faculty.

Scientific calculation of the necessary size: Using a proven statistical formula (Cochran), we determined that we needed 334 participants to obtain reliable results, with:

- 1) A realistic estimate: 32% migraine sufferers (based on similar studies)
- 2) Surgical precision: margin of error of only 5%
- 3) A high level of confidence: 95% statistical certainty

Random and fair selection: In each year group, the participants were chosen by random draw - just like in a fair lottery. We have even planned an additional 10-15% "safety margin" to anticipate:

- 1) Questionnaires not returned
- 2) Incomplete answers
- 3) Unforeseen events in the field

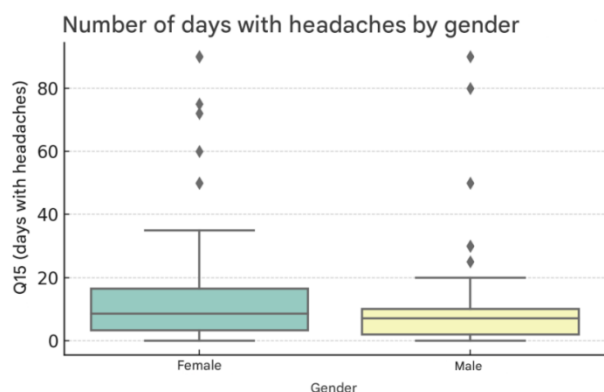


Figure 2. Number of days with headaches by gender.

Concentration Limitation	Number	Percentage
Very Often	40	28.37%
Occasionally	50	35.46%
All the Time	12	8.51%
Rarely	20	14.18%
Never	19	13.48%
Total	141	100.00%

Figure 3. Distribution according to concentration limitation. This distribution shows that the majority of participants (64.54%) experience concentration limitations at least "from time to time", which highlights the significant impact of migraines or headaches on cognitive functions.

2.8. Adjustment to Actual Population Size

Since our target population is well defined (2,712 students), we then adjusted this figure using a corrected version of the Cochran formula. The result gives an adjusted sample size to about 297 participants.

2.6. Detail of the Sample Size Calculation

To determine how many students to include in our study, we used Cochran's classic formula. This makes it possible to estimate the ideal sample size when the total size of the population is not precisely known. We started with an estimate of the prevalence of migraine at 32%, with a confidence level of 95% and a margin of error set at 5%.

2.7. Initial Estimate Based on an Infinite Population

The formula is as follows: $n_0 = (Z^2 \times P \times (1 - P)) / e^2$ where:

- 1) $Z = 1.96$ (95% confidence interval),
- 2) $P = 0.32$ (estimated probability of migraine),
- 3) $e = 0.05$ (margin of error accepted).

Applying this formula: $n_0 \approx 334$, which represents the minimum number of participants to be included if the target population was very large.

2.9. Why Did You Maintain 334 Participants

We have deliberately kept the initial figure of 334 participants for two main reasons:

- 1) *Strengthen the statistical robustness* of the study;
- 2) *Anticipate non-responses* or incomplete questionnaires, which are estimated to be between 10 and 15%. This ensures a safety margin and sufficient power for our analyses.

2.10. Data Analysis

The data collected was rigorously analyzed using the Python language. To do this:

- 1) *pandas* made it possible to organize and manipulate the data,
- 2) *Scipy* and *StatsModels* were used to perform statistical tests and regressions,
- 3) The graphical representations were generated with *matplotlib* and *plotly*.

The normality of the data was tested with the *Shapiro-Wilk* test, and a significance threshold of $p < 0.05$ was applied to all analyses.

3. Results

3.1. Demographic Profile

Participants had an average age of 22.3 years (range: 20–33 years). Females predominated (66.7%). The distribution by year of study showed a good representation of all levels, from EM1 to EM7.

3.2. Prevalence of Headache

A total of 141 students reported having experienced at least one episode of headache in the past three months and who met

the criteria for Migraine, i.e. a prevalence of 42.2% with a 95% confidence interval ranging from 36.9% to 47.5%.

3.3. Migraine Symptoms

The following manifestations have been found:

- 1) Pulsatile headache: 89.4%
- 2) Unilaterality: 19.15%
- 3) Photophobia: 73%;
- 4) Phonophobia: 97.2%;
- 5) Nausea/vomiting: 8.5%;
- 6) Worsening on exertion: 59.6%.

3.4. Intensity, Frequency and Duration

The mean intensity was 6.3/10, indicating moderate to severe pain.

The mean frequency of headache was 13.6 days/3 months.

Without treatment:

- 1) < 4 hours: 39%;
- 2) 4–72h: 39%;
- 3) 72 hours: 7%;
- 4) Don't know: 15%.

Under treatment:

- 1) < 4 hours: 83.7%;
- 2) 4–72h: 14.2%;
- 3) 72 hours: 2.1%.

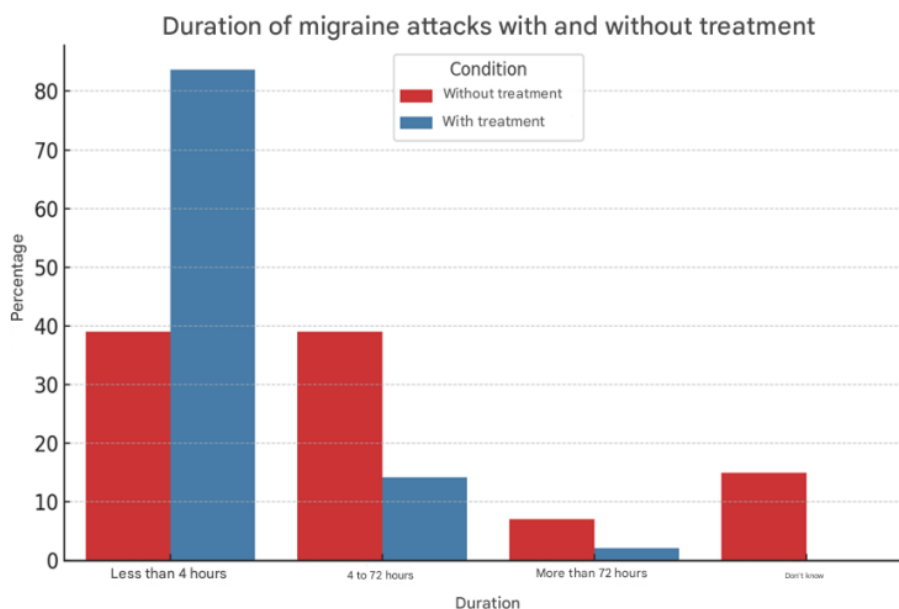


Figure 4. Duration of Migraine attacks and without treatment.

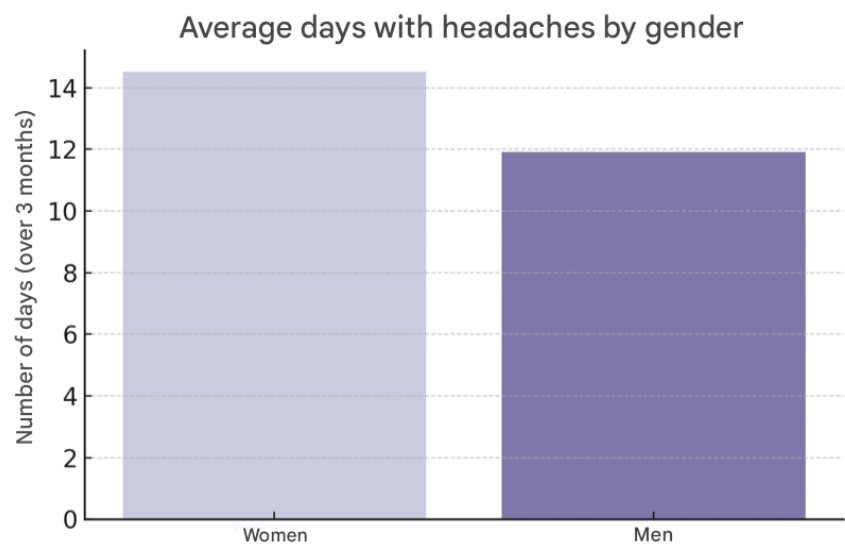


Figure 5. Average days with headaches by gender.

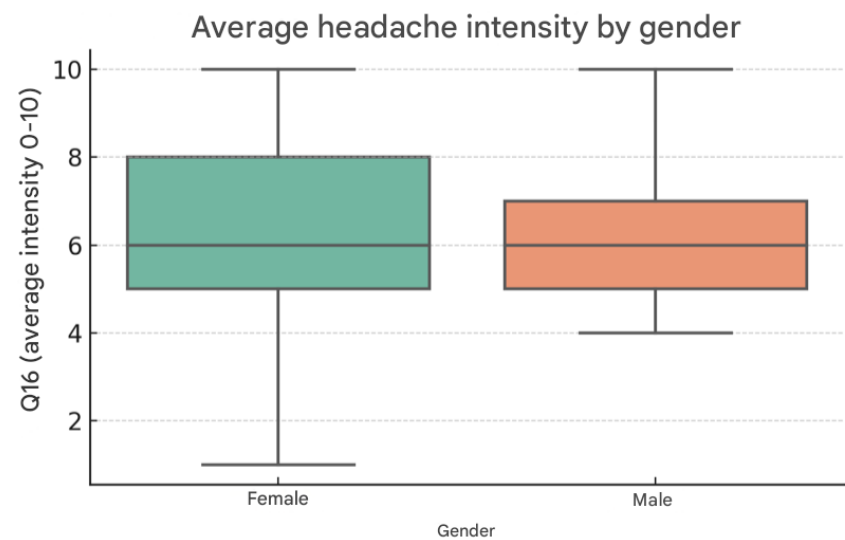


Figure 6. Average headache intensity by gender.

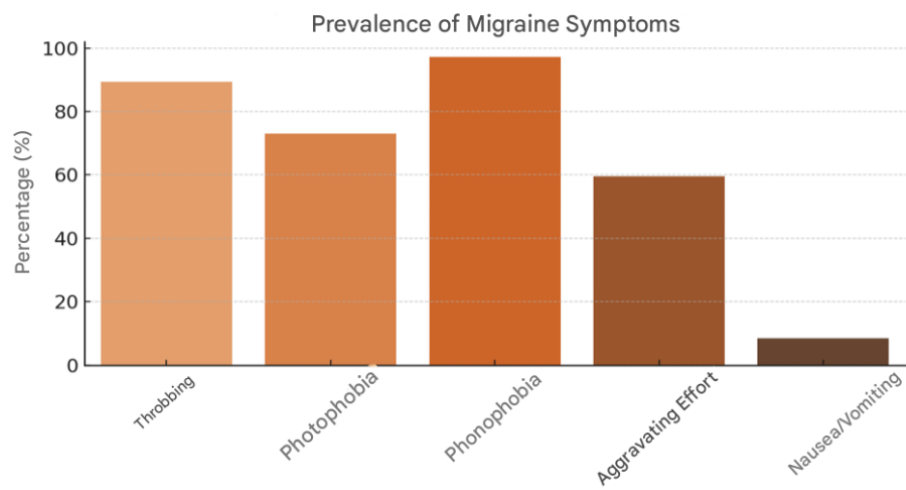


Figure 7. Prevalence of Migraine symptoms.

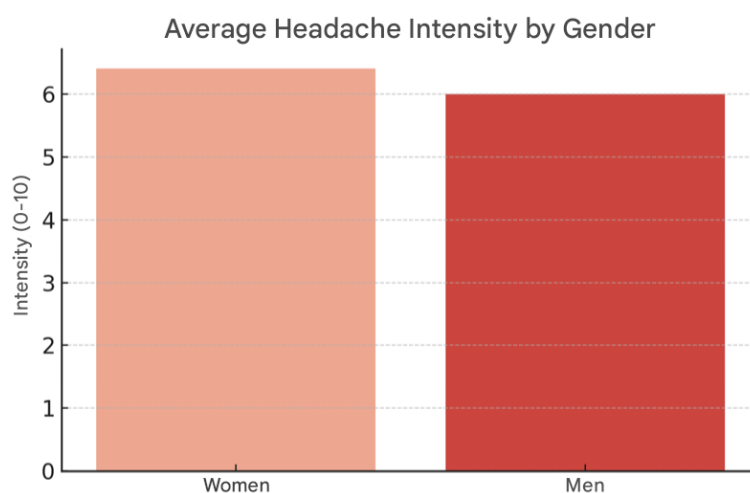


Figure 8. Average headache intensity by gender.

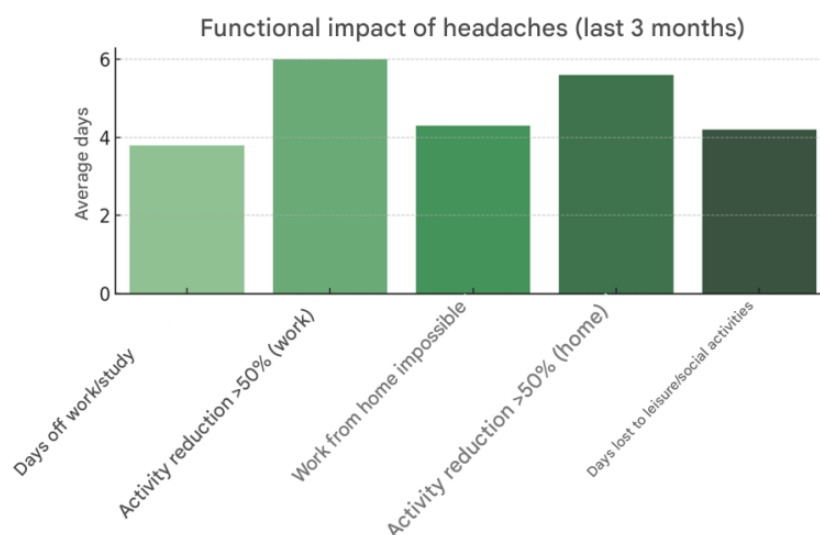


Figure 9. Functional impact of headaches (last 3 months).

3.5. Functional Impact

On average over 3 months:

- 1) 3.8 days of total cessation of activity;
- 2) 6.0 days of >50% reduction in academic activity;
- 3) 4.3 days of inability to work from home;
- 4) 4.2 days of lost social activity/leisure.

3.6. Gender Differences

- 1) Medium intensity: women 6.4 vs men 6.0;
- 2) Mean frequency: women 14.5 days vs. men 11.9 days.

4. Discussion

Numerous studies have identified a higher prevalence of migraine in this group, reaching up to 30% in some European

universities [7, 8], and sometimes more in the African context [2, 9]. The present study reveals a prevalence of migraine of 41.7% among medical students, a relatively high figure compared to several data available in the literature.

This prevalence is much higher than that reported in Turkey (21.6%) [29], Saudi Arabia (31.2%) [30], or Nepal (35.5%) [31]. However, it is comparable to that found in another cohort in Nigeria (53.2%) [32] and Pakistan (42.2%) [33], confirming a more marked trend in low- and middle-income countries.

Several factors could explain this high prevalence: intense academic stress, sleep disorders, fasting, overtime, as well as excessive use of screens and caffeine, elements frequently reported in the healthy student population. In addition, the rigorous use of the International Headache Society (IHS) diagnostic criteria may have contributed to better case detection [12, 15].

The dominant clinical symptoms (pulsatile headache, photophobia, phonophobia, nausea) are characteristic of migraine

according to the ICHD-3 classification [16, 17]. The high intensity of pain (6.3/10) is comparable to the data reported among students in Pakistan [33] or India [5]. The average frequency of attacks, close to 13 days per quarter, is close to the threshold for chronic migraine, defined as >15 days/month [18]. This finding, coupled with a prolonged duration in the absence of treatment, highlights a probable lack of diagnosis and specialized care.

The functional impact is worrying, with an average of 3.8 days of complete cessation and 6 days of reduced activity, in line with the observations of Lipton and Stewart [11, 19]. This invisible disability affects concentration, productivity, and psychosocial well-being [20, 28]. Women are more affected, both in frequency and severity, which is well documented in hormonal and epidemiological studies [7, 21].

These results highlight the need for targeted prevention programs, better mental health awareness and specific support for students, in order to limit the functional impact of migraine on their academic performance and quality of life.

5. Conclusion

This study shows that migraine is highly prevalent, clinically significant and functionally disabling in medical students in Niamey. It underlines the urgency:

- 1) institutional recognition of the problem;
- 2) systematic screening;
- 3) easier access to appropriate treatments;
- 4) and increased awareness of the condition, including in medical education programs.

Abbreviations

EM	Medical Student
GRIM	Research Group on Migraine
MIDAS	Migraine Disability Assessment

Conflicts of Interest

The authors declare no conflicts of interest.

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