

## Migraine Prevalence and Impact among Medical Students of the University of Calabar, Southern Nigeria

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**Abstract:** Migraine among medical students further compounds the demanding nature of medical training. The global campaign against headache burden seeks to determine the nature, scope and magnitude of the burden of headache worldwide. This study aimed to determine migraine prevalence, associated absenteeism and headache-related health-seeking roles among undergraduate medical students of the University of Calabar, Nigeria. In this cross-sectional descriptive study, we used a structured questionnaire incorporating the International Headache Society criteria for migraine to identify migraine among the aforementioned students, besides obtaining data on headache-related absenteeism and health-seeking behavior. Two hundred and twenty participants, comprising 62.3% males and 37.7% females, completed the study. Overall, 5.9% of them had migraine headaches, with gender-specific prevalence values of 4.4% and 8.4% for males and females, respectively. 53.8% of the affected persons had migraine with aura. The age at migraine onset ranged from 11 to 16 years, with a mean (SD) and median ages of 13.6 (1.92) years and 13.5 years, respectively. All the students diagnosed with migraine reported being absent from scheduled activity because of headaches. More than half of those with migraine relied on self-medication; whereas, only a quarter had consulted a physician for their migraine attacks. From the obtained results, it could be concluded that migraine was common among this set of medical students, with frequent headache-induced absenteeism. There was poor utilization of available healthcare resources, for migraine treatment, even among the medical students with access to tertiary health care.

**Key words:** Headaches • Migraine • Epidemiology • Absenteeism • Students

### INTRODUCTION

Headache is an acknowledged common cause of disability with migraine as one of the major contributors, besides other primary headaches [1]. The World Health Organization (WHO) regards primary headaches to be of significant public health importance due to the wide geographic and age distribution and associated socioeconomic and morbidity burden [2].

Migraine is the third leading specific cause of years of life lost to disability (YLDs), responsible for 8.3% of all YLDs and more than half of all YLDs from neurological disorders in persons less than fifty years old [3]. In Africa, migraine was reported to be the 13<sup>th</sup> leading cause of years lived with disability in 2010, GBD Study Group [4]. About 56 million people in Africa are estimated to have migraine, with higher prevalence rates reported by studies

on student cohorts and urban areas [5]. Furthermore, Africa will have a projected 10% increase in migraine burden by the year 2030, Woldeamanuel *et al.* [5].

Genetic and environmental factors are believed to be involved in the etiology of migraine [6]. Also; some psychological conditions are associated including depression, anxiety and bipolar disorders as well as many biological events and triggers such as stress, certain foods, fatigue and weather [7-9].

Migraine headaches lead to a reduction in productivity due to accumulated disability and high levels of absenteeism [10, 11]. Medical students whose training exerts high levels of stress are susceptible to severe migraine episodes [11, 12]. Furthermore, the demanding nature of medical training is further compounded in migraineurs as migraine episodes hinder sufferers from carrying out their daily activities [11, 13]. One of the major

aims of the global campaign against headache burden is to know the nature, scope and magnitude of the burden of headache in all parts of the world [14]. It has been reported that the prevalence of headache disorders is barely known for more than half of the global population, including most of Africa [14, 15].

A good understanding of challenges posed by migraine headaches to populations at risk, in a locality, would help to optimize the design and implementation of measures to mitigate the burden. This study aimed to determine the prevalence of migraine and related impact on absenteeism among medical students at the University of Calabar, in southern Nigeria.

### MATERIALS AND METHODS

This cross-sectional descriptive study was conducted in Calabar, the capital city of Cross River state, located in southern Nigeria. The University of Calabar is the sole federal government-owned tertiary educational institution accredited for medical education, in the southeastern Nigerian state. Beginning from the fourth year of medical school to time of graduation, successful medical students undergo clinical rotations at the affiliated teaching hospital of the university. Usually, the daily proceedings begin with one to two hours of early morning didactic lectures, for the students, before they disperse to their respective clinical postings.

**Study Population:** The study participants were recruited from undergraduate clinical students at the University of Calabar, Nigeria, who met the study criteria. The inclusion criteria include:

- Medical students in the Clinical level classes during the 2018/19 academic session.
- Those on clinical rotations, who were present for the morning didactic lectures at the University of Calabar Teaching Hospital during the time of data collection.
- Those who gave informed written consent.

Those who were absent from the hospital at the times of data collection, those that did not fully complete the study questionnaire and those who did not give informed written consent, were excluded from the study.

**Data Collection:** All eligible students who met the eligibility criteria were serially recruited over a period of one week until the pre-determined sample size of 236, derived from the prevalence of 18.9% obtained in a

previous Nigerian study, was met [16]. A pre-designed structured self-administered questionnaire was used to obtain information from the recruited participants. The initial section of the questionnaire accessed information on the demographics of the participants and incorporated a question used to identify those who reported experiencing any form of headache unrelated to fever or underlying medical morbidity within the previous three months. The next section was based on the International Headache Society (IHS) criteria for episodic migraine [17]. The last section of the questionnaire was used to collect information on absenteeism, limitation of planned activity and health-seeking behavior related to headaches.

Copies of the questionnaire were distributed to the participants during the morning didactic lectures of their clinical postings and the investigators were available to provide needed clarifications. Completed questionnaires were retrieved on the spot from the participants as soon as they were filled. At the time of the questionnaire administration, the migraine status of each participant was not obvious as the diagnosis of migraine was made during the phase of data analysis.

**Definition of Terms:** A participant was identified for migraine headaches if he or she reported having headaches with a pattern that fulfills the following International Headache Society (IHS) criteria [17]:

- A. At least five attacks fulfilling criteria B to D
- B. Headache attacks lasting 4 to 72 hours (untreated or unsuccessfully treated)
- C. Headache has at least two of the following characteristics:

- Unilateral location
- Pulsating quality
- Moderate or severe pain intensity
- Aggravation by or causing avoidance of routine physical activity such as walking or climbing stairs

- D. During headache at least one of the following:

- Nausea and/or vomiting
- Photophobia and phonophobia

Out of convenience, we classified a participant to have migraine with aura if besides fulfilling the above criteria used for migraine diagnosis; the nature of his or her headaches further meets the following criteria [17]:

- At least two attacks fulfilling criteria B and C
- One or more of the following fully reversible aura symptoms:
  - Visual
  - Sensory
  - Speech and/or language
  - Motor
  - Brainstem
  - Retinal

C. At least two of the following four characteristics:

- At least one aura symptom spreads gradually over 5 minutes or more and/or two or more symptoms occur in succession
- Each aura symptom lasts 5 to 60 minutes
- At least one aura symptom is unilateral
- The aura is accompanied or followed within 60 minutes, by headache

D. Not better accounted for by another diagnosis.

**Data Management:** This was done using version 20 of the Statistical Package for the Social Sciences (SPSS) software. Simple proportions were used for categorized data, whereas means and standard deviation were used for continuous variables. Independent sample t-test and bivariate analysis were used to compare numerical variables and explore the association between variables, respectively. The level of significance was set at  $p < 0.05$ .

**Ethical Considerations:** We obtained ethical approval of this study from the Health Research Ethics Committee of the University of Calabar Teaching Hospital, with the assigned protocol number as UCTH/HREC/33/683. We conducted this study in compliance with the Helsinki Declaration of 1975, as revised in 2013. The purpose and process of the study was explained to the participants and assurance of confidentiality given before proceeding with data collection.

## RESULTS

220 participants successfully completed the study, giving a response rate of 93.2%, the rest were excluded because of incomplete data. The participants comprised 137 (62.3%) male and 83 (37.7%) female medical students

in the clinical classes. The mean ages (SD) were 25.4 (4.57) years and 24.1 (3.97) years for the males and females, respectively, with an overall mean age (SD) of 24.9 (4.39) years ( $p = 0.024$ ). One hundred and thirty-five (61.4%) and 85 (38.6%) were in the first and final clinical class levels, respectively. Two hundred (90.9%), 18 (8.2%) and 2 (0.9%) of the participants were single, married and divorced respectively.

Overall, 71.8% of the students reported experiencing any form of headache unrelated to fever or underlying co-morbidity, within the past 3 months. Non-migrainous headaches constituted headache symptoms in 65.9% of them, as shown in Figure 1. Migraine headache was diagnosed in 5.9% of the students in this study, with the details of the gender distribution of affected persons being 4.4% among the males and 8.4% among the females ( $p = 0.246$ ).

The mean ages (SD) of the identified migraineurs and non-migraineurs were 24.6 (4.58) years and 24.9 (4.39) years, respectively ( $p = 0.790$ ). The self-reported age of onset of migraine headaches in affected students ranged from 11 years to 16 years, with mean (SD) and median ages of 13.6 (1.92) years and 13.5 years, respectively. The self-reported mean age (SD) at puberty among those identified to have migraine headaches was 12.8 (1.66) years, with median and modal pubertal ages of 13 years, respectively.

53.8% of the students diagnosed with migraine had migraine with aura, which was seen in 57.1% of the affected females and 50% of affected males ( $p = 0.764$ ). Visual symptoms (71.8%), paraesthesia (42.9%), reversible dysphasia (28.6%) and numbness (14.3%) were the reported aura manifestations experienced by those identified to have migraine with aura, in the course of their recurrent migraine headache attacks. Positive visual symptoms (flickering lights and visual spots) and Negative visual symptoms (a brief loss of vision) were reported by 57.1% and 42.9% of those who had migraine with aura, respectively; whereas 28.6% reported having experienced both positive and negative visual symptoms.

All (100%) of the students who were identified to have migraine headaches, in this study, reported being absent from a scheduled activity as a result of headaches compared to 36.7% of those who do not have features of migraine headaches ( $p < 0.001$ ). (Table 1).

The headache-related health-seeking behavior as reported by the participants is shown in Table 2.

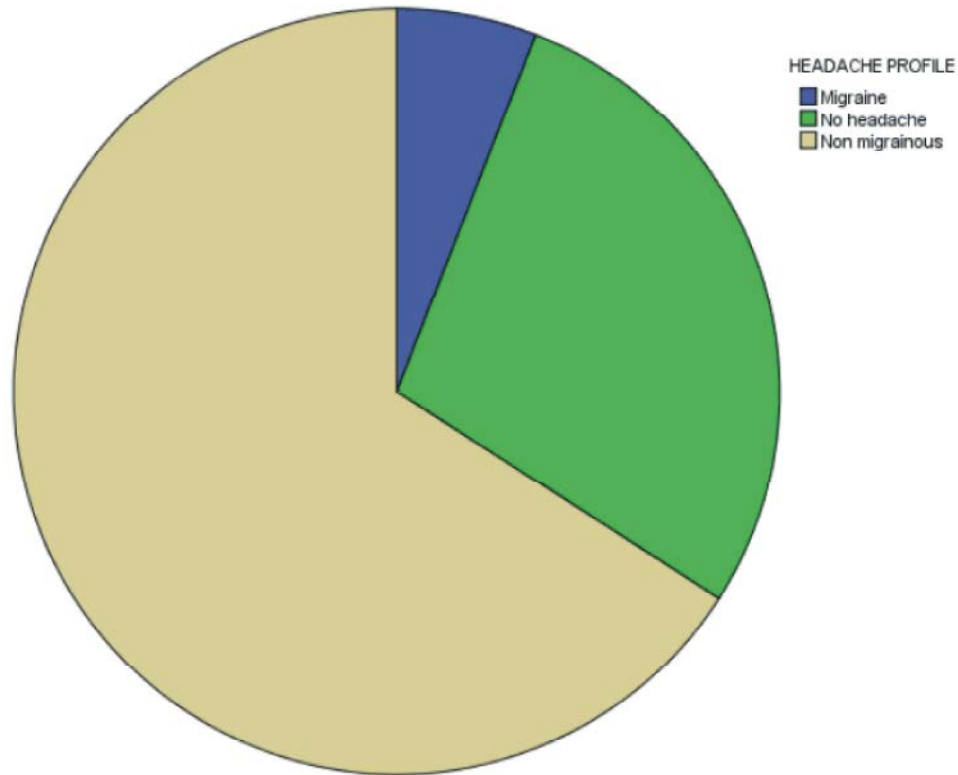


Fig. 1: Pie chart showing profile of headaches within the past 3 months among the participants  
No headache = 28.2%; Migraine headaches = 5.9%; Non migrainous headaches = 65.9%

Table 1: The proportion of participants who missed scheduled activities because of headaches

Type of activity missed	Identified Migraineurs (n = 13)	Non-migraineurs (n = 204)	p-value
Class lecture	65.5%	20.3%	0.001
Examination	15.4%	2.4%	0.010
Scheduled activity with friends	92.3%	32.9%	<0.001
Any occasion or schedule	100%	36.7%	<0.001

Table 2: Headache-related health-seeking behavior among the affected students

Activity	Percentage
Medical consultation	53.8%
Health worker consulted	
Physician	23.1%
Pharmacist	15.4%
Nurse	7.7%
Others	7.7%
Use of medication for headaches	100%
Who mainly prescribes medication?	
Self-medication	53.8%
Healthcare professionals	38.5%
Friends and relatives	7.7%

## DISCUSSION

Varying values have been reported regarding the prevalence of migraine headaches among medical

students in diverse regions [18 - 20]. The value of 5.9% we got in our study is less than those from some other regions. Prevalence figures from similar studies, as reported by investigators in the Asian regions, are about two folds the value we found in our study, or more [18-20]. However, the prevalence from our study falls within the range of figures reported by available, albeit few similar studies from other parts of Nigeria. A perusal of these latter studies yielded reported prevalence figures from as low as 2.4%, obtained among medical students in the northern parts of the country, to as high as 9.6% among medical students from Edo; an area in southern Nigeria [21, 22].

It is believed that environmental, socioeconomic and nutritional factors may have played some roles in the within and inter-country variations in figures. Besides the favorably comparable prevalence value of 6.4% from

Lagos in southwestern Nigeria, our study location in the riverine Niger delta region of southeastern Nigeria shares certain economic and geographical similarities with Lagos, located off the Atlantic coast, with seafood making up a significant proportion of regular diets in both cities. This contrasts with the typical Sahel savannah setting of the northern Nigeria region, with lower values [21, 23].

Although the underlying cause of migraine is not fully known. The interplay of environmental and genetic factors are believed to play significant contributions in the etiology of migraine headaches, in which activation of certain processes in the brain results to the elaboration of pain-producing pro-inflammatory substances which act on intracranial blood vessels and nerves, resulting in peripheral and central sensitization, with the involvement of the trigeminovascular system in the conveyance of nociceptive information [24-26].

Variations in sampling and study design could explain the disparities in values from other regions and ours. Some investigators in India, who got higher values, restricted their study to a population of students who had complained of headaches [20]. Moreover, the studies from the Middle East and India, with higher prevalence values, had more female participants than males in contrast to the comparatively low prevalence yielding studies from Nigeria which had more male participants, as exemplified by the index study [18-20].

The relationship between migraine prevalence and gender has been observed, with some reported female prevalence rates as high as two to threefold of the obtained values for males. The variations are thought to be conferred by hormonal influences [27, 28]. Fluctuations in estrogen levels are believed to promote migraine attacks in susceptible women [29, 30]. Female sex hormones can influence pain processing pathways and vascular endothelium implicated in the pathophysiology of migraine headaches [31]. Estrogen which correlates with neurotransmitters such as serotonin, endorphins, norepinephrine and dopamine, can promote neuronal reactivity by facilitating glutamergic pathways in contrast to GABAergic mediated suppression of neuronal activity by progesterone [31, 32]. The observed pattern among the participants in our study unsurprisingly depicts an outcome that skews towards higher migraine rates in females. Furthermore, the influence of sex hormones on migraine can be inferred from the closeness between reported age at puberty and age at onset of migraine symptoms, observed in our study, an observation that lends credence to reports that migraine headache often starts around the time of puberty [6].

The pattern of migraine headaches we observed among the affected medical students reveals a balance between migraine with aura and migraine without aura, although there was a non-significant tilt towards a greater proportion of migraine with aura, with predominantly visual aura manifestations, among the female participants compared to the males. A predominant occurrence of the migraine with aura variant, which was the experience of investigators at Jazan University in Saudi Arabia, is of clinical importance, as migraine with aura has been associated with greater severity of symptoms and disability compared to migraine without aura [33].

The disruptive impact of migraine on the productivity, efficiency and quality of life among affected persons have been robustly acknowledged and documented [3, 4, 13]. Unsurprisingly, all those identified as migraineurs in our study reported having missed scheduled activities as a result of migraine headache attacks. Such burdensome impact of migraine on the wellbeing of affected individuals and the society necessitated the WHO campaign to lift the burden of migraine and headache disorders [2, 14].

Despite the high rate of headache induced absence from scheduled activities among the students who suffer migraine attacks, a minority reported accessing professional medical care on account of their symptoms. This tendency to refrain from seeking professional treatment in the face of high disability and prevalence rates among medical students has been acknowledged by other investigators [19, 20]. Many of the affected students relied on self-medication, with over the counter medicines, to control their headache attacks. However, over the counter procurement of medicines for migraine is likely to be restricted to NSAID analgesics, with the benefits largely limited to the abortive phase of migraine treatment. Failure to seek proper professional medical care could be a significant contributor to the observed high rate of absenteeism, as the variety of medications employed in migraine prophylaxis are mostly medicines which cannot be legally obtained from drug stores, without a physician's prescription.

**Limitations:** The somewhat restricted criteria we employed for identifying migraine with aura, by insisting on initial fulfillment of migraine without aura criteria, could have led to the inadvertent exclusion of some cases of migraine; especially migraine with aura in our study. It has been reported that the pattern of headaches in migraine with aura does not always fulfill that of migraine without aura. Moreover, migraine with aura can occur without headaches, in some cases [17].

## CONCLUSION

Our study shows that migraine headache is not uncommon among medical students in Calabar, Nigeria, with a prevalence of 5.9% and the onset of symptoms tend to occur within the peri-pubertal period. The migraine headache prevalence observed in females was two-folds the value obtained among the male participants. Migraine with aura type was common among the female participants with predominantly visual manifestations. Almost all the identified migraine sufferers reported headache induced absence from a scheduled activity. Furthermore, there was poor utilization of available healthcare resources for migraine headache treatment among the participants, despite being on clinical rotations in a tertiary health facility.

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**Conflict of Interests:** We have none to declare.

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