

# Prevalence and Pattern of Migraine, Tension Type Headache and Chronic Daily Headache among Medical and Nursing Students in Enugu, South East Nigeria

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## Abstract

**Aim:** To assess the lifetime prevalence of tension-type headache, migraine and chronic daily headache, including the primary headaches in a student population. **Methods:** This is a cross-sectional descriptive study. Data were collected from consecutive consenting students by means of a semi-structured questionnaire. The questionnaire was designed to assess demographic data, headache profiles and medical consultation. **Results:** Four hundred and forty-nine (89.8%) out of 500 students who were interviewed were analyzed. The lifetime prevalence of primary headache was 89.8%; it 90.5% and 88.6% in females and males respectively. The overall prevalence of migraine was 8.9%, with a prevalence of 10.6% in females and 6.5% in males. Migraine without aura was most commonly seen at 73%. The prevalence of migraine without aura was 7.6% in females and 4.9% in males. Tension type headache (TTH) had an overall prevalence of 22.9%, with a prevalence of 28.4% in females and 15.1% in males. Migraine and tension type headache co-existed in 5.8% of the students. About 8.5% suffered from chronic daily headache: chronic migraine 2.9%, chronic tension headache 3.1%. The rate of medical consultation was 54.8% (males 49.7%, females 58.3%). **Conclusions:** Headache is a common health problem among medical and nursing students in Enugu South East Nigeria where 89.8% of respondents have had primary headaches. The prevalence of migraine, TTH and chronic daily headache was 8.9%, 22.9% and 8.5% respectively. Headaches therefore, represent one of the most challenging neurological disorders in Sub-Saharan Africa where most sufferers do not have access to specialist care.

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## Keywords

Primary Headache, Migraine, Tension Headache, Chronic Daily Headache

## 1. Introduction

Headache is a common neurological disorder with variable intensity [1]-[15], and one of the commonest reasons for neurology outpatient clinic consultation in Nigeria [2] [5] [6] [8]. Globally, the percentages of the adult population with an active headache disorder are 46% for headache in general, 11% for migraine, 42% for tension-type headache and 3% for chronic daily headache [15]. In Africans, the mean prevalence of current headache is 21% for headache in general and 5% for migraine with a corresponding lifetime prevalence of 51% and 5% respectively [15]. The reported prevalence rates and pattern of primary headache disorders in Nigeria are shown in **Table 1** and varied from between studies and the sample population studied.

Headache burden may vary depending on the group studied. Special groups medical and nursing like students are exposed to a lot of mental and physical stress because of the type of the profession they have chosen. Studies among students generally have shown high rates of primary headaches [1] [2] [3] [7].

Few studies have reported on the prevalence of chronic daily headache (CDH) in Sub Saharan Africa (SSA). Hainamot *et al.* [16] reported a low prevalence of 1.7% in Ethiopia while higher prevalences of 11.5% and 17% were reported in Zambia [17] and Nigeria [1]. Chronic tension type headache (CTTH) and

**Table 1.** Headache studies in Nigeria.

	Year	Sample size	Population studied	Primary headache (%)	Migraine (%)	TTH (%)	CDH (%)
Osuntokun [9]	1982	903	GP*	ns <sup>β</sup>	4.6	ns <sup>β</sup>	ns <sup>β</sup>
Osuntokun [11]	1992	18,954	GP*	51	5	ns <sup>β</sup>	ns <sup>β</sup>
Longe [10]	1988	2925	GP*	ns <sup>β</sup>	6.3	ns <sup>β</sup>	ns <sup>β</sup>
Orji [12]	1997	4398	Children	ns <sup>β</sup>	6.4	ns <sup>β</sup>	ns <sup>β</sup>
Kolawale [3]	2009	1513	USt**	ns <sup>β</sup>	29.9	ns <sup>β</sup>	ns <sup>β</sup>
Ojini [7]	2009	523	MS***	46	6.4	18.1	ns <sup>β</sup>
Ofovwe [14]	2010	1679	SS##	19.5	13.5	ns <sup>β</sup>	ns <sup>β</sup>
Oshinaike [8]	2013	402	HW <sup>#</sup>	39.3	7.4	28.6	ns <sup>β</sup>
Onwuekwe [6]	2014	133	HW <sup>#</sup>	64.7	ns	ns <sup>β</sup>	ns <sup>β</sup>
Ezeala-Adikaibe [1]	2012	180	MS***	88.3	18.1	36.8	17
Ezeala-Adikaibe [13]	2014	940	GP*	66.7	6.4	13.8	ns <sup>β</sup>
<b>Ezeala-Adikaibe<sup>δ</sup></b>	<b>2016</b>	<b>499</b>	<b>MNS***</b>	<b>89.9</b>	<b>8.9</b>	<b>22.9</b>	<b>8.5</b>

\*GP general population; \*\*USt University students; \*\*\*MS medical students; ##Secondary school students; <sup>#</sup>HW hospital workers; <sup>β</sup>ns not specified; <sup>δ</sup>current study; \*\*\*MNS Medical and nursing students.

chronic migraine (CM) account for approximately 60% - 99% among the CDH population [18]-[24] and may pose a considerable challenge to the sufferers and physicians especially in resource poor settings with few headache specialists [3] [25] [26] [27] [28] [29].

Although one study documented a prevalence of 17% for CDH in Nigeria [1], the prevalence of CM and CTTH in the country is not known. The current prevalence of primary headaches among Africans may be underestimated because patients suffering from chronic neurological disorders present very late to doctors and sometimes never do so [30].

The aim of this study therefore was to determine the prevalence and pattern of primary headache: migraine, TTH and CDH among medical and nursing students in Enugu, South East Nigeria.

## 2. Methods

### 2.1. Study Sample.

This study was carried out among medical and nursing students in two Medical and Nursing schools in Enugu metropolis, South East Nigeria. The students were selected from two Teaching hospitals in the city. Medical students who were doing clinical postings from both schools and all nursing students were selected for the study. The total number of students in this category was estimated to be 650 - 750 from both schools. This study was part of a health awareness campaign in June 2015. Study duration was 2 weeks.

### 2.2. Study Design

Sample size was calculated using the formula:  $N = D \times Z^2 \times P(1 - P)/d^2$ . Where N = desired sample size. P = prevalence rate of migraine 6.4%, D = design effect = 2, and d = desired precision limit assumed at 5%.  $N = 2 \times (1.96)^2 \times 0.064 \times 0.936/0.0025 = 2 \times 3.8416 \times 0.040704/0.0025 = 125$ . Assuming 10% attrition, a sample size of 137 and above was used. A meeting was first organized with the class leaders for proper sensitization of the students before the data collection. On the day of the study, informed consent was obtained from students after explaining to them the aims and objectives of the study. A custom designed multiple-choice questionnaire designed by one of the authors (BAE) (with sections on general information about the students such as age and sex, general information on headache pain characteristics and headache profiles according to ICHD-III beta [31] and medical consultation) was self-administered and retrieved the same day. A clinic-based validation of a subset of a random sample of 30 screened individuals (20 positives, 10 negatives) was assessed by a neurologist. The questionnaire exhibited an overall 98% sensitivity (100% for migraine and 95% for tension headache) and 95% specificity (100% for tension headaches and 95% for migraine). False-positive screens occurred primarily among individuals who had experienced headaches hours to days before developing a febrile illness (for example, malaria). Validation of the screening questionnaire was car-

ried out in Neurology clinic of the department of medicine, University of Nigeria Teaching Hospital Enugu [13].

Data obtained were manually sorted and coded into a personal computer. The study protocol was approved by the ethics committee of the University of Nigeria Teaching Hospital Enugu.

Case definition: A diagnosis of migraine or TTH was made using ICHD-III beta [31]. If a subject responded “ $\geq 15$  days” to the question “on the average, how often do you have such headaches in a month over the past 3 months?”, he/she was classified as having CDH. A diagnosis of CM or CTTH was assigned if a CDH subject’s headaches met the diagnostic criteria for chronic migraine and chronic tension type headache [32]. See **Figure 1**.

### 2.3. Analyses

For database management and statistical analyses, we used the SPSS version 22 (Chicago IL, USA). Data were presented in tables. For continuous variables, mean values and 95% confidence interval were calculated. The prevalence of different types of headache was expressed as percentages and the odds ratio calculated. Mean values were compared using the independent t test. For multiple comparisons ANOVA was used. In all, p value of  $< 0.05$  was regarded as significant with 95% confidence interval. Conclusions were drawn at the level of significance.

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#### Silberstein and Lipton Revised Criteria for Chronic Migraine\*

- A. Daily or almost daily ( $> 15$  days/month) head pain for  $> 1$  month
- B. Average headache duration of  $> 4$  hours/day (if untreated)
- C. At least one of the following:
  - 1) History of episodic migraine meeting any International Headache Society (IHS) criteria 1.1 to 1.6
  - 2) History of increasing headache frequency with decreasing severity of migrainous features over at least 3 months
  - 3) Headache at some time meets IHS criteria for migraine 1.1 to 1.6 other than duration
- D. Does not meet criteria for new daily persistent headache or hemicrania Continua
- E. Not attributed to another disorder

#### New International Headache Society Criteria for Chronic Tension-Type Headache<sup>33</sup>

- A. Headache occurring on  $\geq 15$  days per month on average for  $> 3$  months ( $> 180$  days per year) and fulfilling criteria B–D
  - B. Headache lasts hours or may be continuous
  - C. Headache has at least two of the following characteristics:
    - 1. bilateral location
    - 2. pressing/tightening (nonpulsating) quality
    - 3. mild or moderate intensity
    - 4. not aggravated by routine physical activity such as walking or climbing stairs
  - D. Both of the following:
    - 1. no more than one of photophobia, phonophobia, or mild nausea
    - 2. neither moderate or severe nausea nor vomiting
  - E. Not attributed to another disorder
- 

**Figure 1.** Diagnostic criteria for chronic migraine and tension type headache [32].

### 3. Results

Out of the 500 questionnaires distributed during the survey, 449 (89.8%) were returned and were analyzed. Most of the respondents were females 264 (58.8%). The male to female ratio was 1:1.4. The age range was 19 - 33 years with a mean of 23.2 years (95% CI, 22.9 - 23.5): (males-24.2 (95% CI, 23.7 - 24.7) and females 22.5 (95% CI, 22.2 - 22.8) years,  $p = 0.012$ . The age and sex distribution is shown in **Table 2**.

#### 3.1. Primary Headache

The gender distribution of primary headaches among the students is shown in **Table 2**. The lifetime prevalence of primary headache was 89.8% (95% CI 87 - 92.6); similar in males 88.6% (95% CI 84.1 - 93.2) and females 90.5% (95% CI 87 - 94.1)  $p = 0.52$ .

#### 3.2. Migraine and Tension Type Headaches

The distribution of migraine, TTH and their characteristics is also shown on **Table 3** and **Table 4**. The prevalence of migraine was 8.9% (95% CI 6.3 - 11.5) while for females 10.6% (95% CI 6.9 - 14.3) and males 6.5% (95% CI 3.3 - 10),  $p = 0.13$ . Migraine without aura in this study took the higher proportion of migraine headache (73%). The proportion of migraine with aura was 27% of migraine headache in general. TTH had an overall prevalence of 22.9% (95% CI 19.1 - 26.8), males 15.1%, (95% CI 10 - 20.3) and females 28.4%, (95% CI 23 - 33.8)  $p < 0.01$  among the student population.

Migraine and TTH headaches (MTH) co-existed in 5.8% (95% CI 3.6 - 8) of the students (males 3.8%, 95% CI 0.7 - 5.8, females 7.2%, 95% CI 4.1 - 10.3). The gender distribution of primary headaches is shown in **Table 3**.

#### 3.3. Chronic Daily Headache

The overall prevalence of CDH was 38 (8.5%); CM was 2.9% (95% CI 1.3 - 4.4) and CTTH was 3.1% (95% CI, 1.5 - 4.7) (**Table 4**). The male to female ration of CM was 0.8:1 and of CTTH it was 1:1. There were no significant differences in the sex distribution of CM and CTTH. The overall rate of medical consultation was 54.8%. In all headache categories the consultation rate was more than 80% (**Table 4**).

**Table 2.** Sex distribution of characteristics of headache among the students.

	Males N (%)	Female N (%)	Total N (%)	p Value
<b>*Age Groups (years)</b>	-	-	-	-
<20	25 (13.5)	69 (26.1)	94 (20.9)	-
20 - 24	85 (45.9)	151 (57.2)	236 (52.6)	-
25 - 29	62 (33.5)	41 (15.5)	103 (22.9)	-
>30	13 (7)	3 (1.1)	16 (3.6)	<0.01
-	-	-	-	-
<b>Total</b>	185 (41.2)	264 (58.8)	499 (100)	<0.01

\*Sample population.

**Table 3.** Sex distribution of migraine and other types of headache.

Types of headache	Males N (%), 95%CI)	Female N (%)	Total N (%)	OR	95% CI	p-value
Primary headache	164 (88.6, 84.1 - 93.2)	239 (90.5, 87 - 94.1)	403 (89.8, 87 - 92.6)	1.224	0.663 - 2.260	0.52
CDH	19 (10.3, 5.9 - 14.6)	19 (7.2, 4.1 - 10.3)	38 (8.5, 5.9 - 11)	0.678	0.348 - 1.318	0.25
Migraine	12 (6.5, 2.9 - 10)	28 (10.6, 6.9 - 14.3)	40 (8.9, 6.3 - 11.5)	1.710	0.846 - 3.459	0.13
<i>Migraine with aura</i>	3 (1.6, 0.2 - 3.4)	8 (3, 1 - 5.1)	11 (2.4, 1 - 3.9)	2.105	0.475 - 9.338	0.24
<i>Migraine without aura</i>	9 (4.9, 1.8 - 8)	20 (7.6, 4.4 - 10.8)	29 (6.5, 4.2 - 8.7)	1.618	0.718 - 3.648	0.32
CM	6 (3.2, 0.7 - 5.8)	7 (2.7, 0.7 - 4.6)	13 (2.9, 1.3 - 4.4)	1.264	0.330 - 4.843	0.73
Tension headache	28 (15.1, 10 - 20.3)	75 (28.4, 23 - 33.8)	103 (22.9, 19.1 - 26.8)	-2.225	1.373 - 3.606	<b>&lt;0.01</b>
CTTH	6 (3.2, 0.7 - 5.8)	8 (3, 1 - 5.1)	14 (3.1, 1.5 - 4.7)	0.932	0.318 - 2.733	<b>0.9</b>
Migraine/TTH	7 (3.8, 1 - 6.5)	19 (7.2, 4.1 - 10.3)	26 (5.8, 3.6 - 8)	1.972	0.812 - 4.792	<b>0.13</b>
Unclassified	152 (82.2, 76.6 - 87.7)	179 (67.8, 62.2 - 73.4)	331 (73.7, 69.6 - 77.8)	0.457	1.064 - 0.782	<b>&lt;0.01</b>
CH	10 (5.4, 2.1 - 8.7)	8 (3, 1 - 5.1)	18 (4, 2.2 - 5.8)	0.655	0.182 - 2.356	<b>0.52</b>
Total	185 (41.2)	264 (58.8)	449 (100)	--	--	<0.01

Odds ratio for headache and no headache.

**Table 4.** Age distribution and consultation pattern in different types of headache.

	Migraine N (%)	Tension N (%)	Migraine and Tension N (%)	Chronic Headache N (%)	Chronic Migraine N (%)	Chronic TTH N (%)
<b>Age Groups (years)</b>						
<20	7 (7.4)	24 (25.5)	4 (15.4)	13 (13.8)	4 (4.3)	6 (3.2)
20 - 24	24 (10.2)	59 (25)	18 (7.6)	16 (6.8)	4 (1.7)	5 (1.3)
25 - 29	8 (7.8)	18 (17.5)	4 (3.9)	6 (5.8)	4 (3.9)	3 (1)
≥30	1 (6.2)	2 (12.5)	-	3 (18.8)	1 (6.3)	-
<b>Consultation</b>	36 (90)	84 (81.6)	23 (88.5)	34 (89.5)	12 (92.3)	13 (92.8)
Total	40 (8.9)	103 (22.9)	26 (5.8)	38 (8.5)	13 (2.9)	14 (3.1)

## 4. Discussion

Headache is a common neurologic disorder worldwide [1]-[14]. The lifetime prevalence of primary headaches among medical and nursing students in this study was higher than the regional and continental average [15] and previous studies from Nigeria [1] [3] [6]-[13]. Similar to a previous study from the region there was no significant difference between males and females [13]. Wide differences exist in the prevalence of primary headaches in Nigeria. This may be due to the period studied (1-year versus lifetime prevalence), genetic, environmental factors, the age group studied, work place environment and weather conditions. Stressful academic activities and rigorous students' life may be contributory to high prevalence of primary headache among the students.

The lifetime prevalence of migraine in this study (as well as in males and females) is within the range reported among undergraduates elsewhere in SSA [1] [2] [3] [7] [15] [33]. The male: female of 1:1.4 is similar to the continental average as well as local reports [13] [14] [17]. Migraine without aura had the higher proportion than migraine with aura in the study. Similar results have been ob-

tained from earlier studies [13] [34].

The prevalence of TTH (22.9%) was similar to the prevalence range previously reported from studies conducted among students in SSA [1] [2] [3] [7] [33], and within the global range of 12% - 78% [14]. TTH was almost 3 times more prevalent than migraine; however unlike migraine it was significantly more common among females. The epidemiology of TTH has been shown to differ from region to region [15]. In South East Nigeria, the prevalence of TTH ranged from 13.8% - 36.8% [1] [13]. See **Table 1**. The prevalence of TTH in this study was higher than the WHO reported prevalence of TTH in SSA of 1.7% [34].

Migraine often co-exists with TTH [35]. TTH in migraineurs may be different from episodic tension-type headache [35] [36] [37] and has been reported to be similar in people with migraine and in non migraineurs [38]. The rate of migraine co-existing with TTH in this study is 5.8% higher than 0.8% reported by Schramm *et al.* [38]. The reason for this is not known. Whether migraine and TTH are separate entities or a continuum remains controversial. As headache frequency increases, the phenotypic spectrum of individual headache episodes broadens, and the clinical distinction between migraine and TTH may become less obvious. Migraine and TTH may also aggravate and precipitate each other possibly due to overlapping trigger factors. Furthermore, both disorders may share common pain characteristics hence making misdiagnosis very likely [32] [39].

CDH represents a heterogeneous group of headache disorders with a global prevalence of 3% - 5% [32] [39]. The epidemiology of CDH varied from study to study just like other primary headaches. Few studies have reported on the prevalence of CDH in SSA. Hainamot *et al.* [16] reported a prevalence of 1.7% in Ethiopia while Mbewe *et al.* [17] from Zambia reported a 1-year prevalence of 11.5% [12]. In Nigeria, a prevalence of 17% has been reported among medical students [1]. Outside the continent, relatively higher prevalence has been found in Georgia [23] and Brazil [24]. The relatively high prevalence in this study is difficult to explain but high rate of caffeine consumption and use of over the counter analgesic may be contributory [32] [35] [39].

CM and CTTH may account for more than 60% of the CDH population [18]-[24] and may evolve from episodic forms [32]. Furthermore, medication overuse may be implicated in some patients. Therefore, it is theoretically possible for a patient to have both these diagnoses. The prevalence and sex distribution of CDH in the present study is different from previous studies [18]-[24].

Headaches represent one of the most challenging neurological disorders in SSA considering the numerous differential diagnosis and its variable intensity. It takes a lot of toll on the sufferers, family and coworkers and employers and is fraught with personal and societal consequences. In SSA, where there are few headache specialists and exposure to the discipline is not adequate during medical training [27] primary headaches remain under diagnosed. Overall, the rate of medical consultation was 54.8%. It was more than 80% for all headache subtypes



studies; reaching almost 93% for CTTH. Though the prevalence of CDH in the community is about 3% - 5% of the population, [15] it accounts for the bulk of out-patient visits for headache [32]. The high proportion of medical consultation in this study may be attributed to quick and cheap access to care in a teaching hospital setting. Students may seek care from their senior colleagues, junior doctors or from the school health center which is usually free. Furthermore, they may buy medication based on past experiences instead of seeking proper care. Though this study was conducted in a hospital setting the possibility of using alternative medicine could not be totally ruled out. In Lagos, South West Nigeria only 19.6% of all primary headache sufferers, 67.7% of migraineurs and 16.1% of TTH sufferers sought orthodox medical attention respectively.

The main strength of this study is in determining the prevalence of subtypes of primary headaches among medical and nursing students in SSA. To the best of our knowledge this is the first time the prevalence of CM, CTTH and migraine co-existing with TTH was studied in Nigeria. Though this study was limited to medical and nursing students; it is representative of undergraduate students' population in Nigeria and youths in the community. Mental stress and other factors such as poor feeding habits, excessive use of caffeine and other stimulants that may precipitate and sustain primary headaches are common among students and youths.

## 5. Limitations

The current study was subject to some limitations. Although clinical examinations were not done, the use of ICDH-II criteria mitigated the effect of these to the barest minimum. Students with medication overuse headache, hemicrania continua and other forms of CDH were not included in the present study. The knowledge of over-the-counter-drugs may increase the likelihood of medication overuse headache especially in those with CDH. The study could have been influenced by recall bias because it is possible that some of the participants did not readily recall the characteristics of the headaches they had in the past. All the data were self-reported and there was no supporting medical records or data accessed. The strict use of ICDH II may underestimate mild forms of primary headaches. The most recent version of headache classification (ICHD-3beta) was not used; however, there are no significant changes between ICHD-II and ICHD-3beta in the criterion for the main headache subtypes discussed in this manuscript.

## 6. Conclusion

Headache is a common health problem among medical and nursing students in Enugu South East Nigeria where 89.8% of respondents have had primary headaches. The prevalence of migraine, TTH and chronic daily headache was 8.9%, 22.9% and 8.5% respectively. Headaches therefore, represent one of the most challenging neurological disorders in Sub-Saharan Africa where most sufferers



do not have access to specialist care.

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## Conflicts of Interest

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

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