

Headache among Students of the Paramedical Schools of Dapaong, Northern Togo: Prevalence, Clinical Features, and Associated Factors

Lehleng Agba^{1*}, Kokou Mensah Guinhouya², Paulin Soglo³, Komla Nyinèvi Anayo⁴, Mawulikplimi Ephoevi-Ga⁴, Kossivi Apetse⁵, Vinyo Kumako¹, Komi Assogba², Mofou Belo³

¹Department of Neurology, Kara University Teaching Hospital (CHU Kara), Kara, Togo

²Department of Neurology, Sylvanus Olympio University Teaching Hospital (CHU Sylvanus Olympio), Lomé, Togo

³Faculty of Health Sciences, University of Kara, Kara, Togo

⁴Department of Neurology, Campus University Teaching Hospital (CHU Campus), Lomé, Togo

⁵Department of Neurology, Atakpamé Regional Hospital (CHR Atakpamé), Atakpamé, Togo

Email: *thierrielle@gmail.com

How to cite this paper: Agba, L., Guinhouya, K.M., Soglo, P., Anayo, K.N., Ephoevi-Ga, M., Apetse, K., Kumako, V., Assogba, K. and Belo, M. (2026) Headache among Students of the Paramedical Schools of Dapaong, Northern Togo: Prevalence, Clinical Features, and Associated Factors. *Neuroscience and Medicine*, 17, 225-244. <https://doi.org/10.4236/nm.2026.174016>

Received: August 31, 2026

Accepted: October 24, 2026

Published: October 27, 2026

Copyright © 2026 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

Introduction: Headache is a common problem among young adults and a major source of disability. Students in health-related programs are particularly exposed to academic and psychosocial demands that may promote its occurrence and impact. **Objective:** To determine the prevalence and characteristics of headache among students of the paramedical schools of Dapaong and to identify factors associated with its presence and its substantial impact. **Methods:** A descriptive and analytical cross-sectional study was conducted from January 22 to March 6, 2026, among students of the paramedical schools of Dapaong (Northern Togo). Data were collected through a self-administered electronic questionnaire on KoboToolbox after informed consent. Headache was defined by its presence during the six months preceding the survey, and its typology was assigned algorithmically from self-reported features using operational criteria based on the ICHD-3. Impact was assessed with the HIT-6. Factors associated with the presence of headache and then with its substantial impact were examined using bivariate and multivariate analyses. Analyses were performed with R version 4.5.3. **Results:** Of the 192 students invited, 118 questionnaires were collected and 117 analyzed. Headache affected 82/117 (70.1%) participants. Among those with headache, tension-type headache was the most frequent category (32/82; 39.0%, 95% CI 28.4 to 50.4); migraine affected 19/82 (23.2%, 95% CI 14.6 to 33.8), corresponding to a prevalence of 16.2% (95% CI 10.1 to 24.2) in the overall sample. Anxiety was independently associated with the presence of headache (aOR 1.66; 95% CI 1.20 - 2.30; p =

0.002). Substantial impact (HIT-6 $\geq$ 56) affected 40/82 (48.8%, 95% CI 37.6 to 60.1) of participants with headache and was independently associated with pain intensity (aOR 1.53; 95% CI 1.21 - 2.02; $p < 0.001$) and perceived stress (aOR 1.19; 95% CI 1.06 - 1.37; $p = 0.006$). **Conclusion:** Headache is very common among students of the paramedical schools of Dapaong. Its presence is independently associated with anxiety symptoms, whereas its substantial impact is associated with pain intensity and perceived stress.

Keywords

Headache Disorders, Students, Health Occupations, Anxiety, Stress, HIT-6, Togo

1. Introduction

Headache is among the most frequent neurological disorders and a major cause of disability in the general population. Migraine, in particular, is a common neurological disorder with an estimated worldwide prevalence of about 12%, more frequent in women and in students [1] [2]. It remains the second leading cause of disability worldwide and the first among young women [3].

Student populations therefore constitute a particularly vulnerable group. A meta-analysis of 56 studies involving 34,904 university students estimated the pooled prevalence of migraine at 16.1%, strongly influenced by diagnostic criteria and sex composition [4]. A more recent systematic review of 92 studies estimated this prevalence at 19% (95% CI 16 - 22), while emphasizing substantial heterogeneity across geographic regions, migraine types, and prevalence periods [5].

Medical students appear to be particularly affected. A meta-analysis of 79 studies estimated the prevalence of headache at 70.4%, that of migraine at 18.9%, and that of tension-type headache at 39.5%. The authors highlighted the possible role of stress and workload in this vulnerability [6]. This vulnerability is part of a broader context of psychological and behavioral difficulties among health-profession students. An umbrella review of meta-analyses reported high prevalences of sleep disturbance, stress, and anxiety among medical students [7]. Sleep is also a major issue: a meta-analysis of 109 studies including nearly 60,000 medical students estimated the mean sleep duration at 6.5 hours per night and the prevalence of poor sleep at 55.6% [8].

In Africa, data remain more limited. According to a systematic review spanning 43 years of data, migraine prevalence is 5.6% in the general African population and 14.9% in student cohorts [9]. Another global meta-analysis reported a migraine prevalence of 10.4% in Africa and 12.4% among students and secondary-school pupils [2]. Beyond their frequency, headaches can have a substantial functional impact. The Headache Impact Test-6 (HIT-6) was developed to measure the impact of headache on functioning and daily life and shows good reliability and validity [10] [11]. Migraine-specific disability can be assessed with the Migraine

Disability Assessment (MIDAS) [12].

In Togo, data on headache among students in paramedical programs remain scarce. Yet this population is exposed to a combination of academic demands, clinical placements, on-call duties, sleep disruption, and psychosocial factors that may influence the occurrence and impact of headache. These considerations prompted the present study, whose dual objective was to determine the prevalence and characteristics of headache among students of the paramedical schools of Dapaong and to identify factors associated with its presence and its substantial impact.

2. Methods

2.1. Study Design and Period

This was a descriptive and analytical cross-sectional study conducted from January 22 to March 6, 2026, among students of the paramedical schools of Dapaong, in northern Togo. The manuscript was prepared in accordance with the STROBE guidelines for cross-sectional studies [13].

2.2. Source Population

The source population comprised all 192 students enrolled in the two participating paramedical schools of Dapaong during the study period: the “École Nationale des Auxiliaires Médicaux de Dapaong” (ENAM-Dapaong; 105 nursing students) and the “École Nationale des Sages-Femmes de Dapaong” (ENSF-Dapaong; 87 midwifery students).

2.3. Sampling and Recruitment

Census sampling was used: all students in the source population were invited to participate. The project was presented and explained to students during classroom visits, and a link to the electronic questionnaire was then made available to them. In total, 118 questionnaires were collected. One questionnaire was excluded for absence of consent, yielding 117 analyzed participants. The completion rate was 118/192 (61.5%), and the analyzed proportion was 117/192 (60.9%). Of the 117 analyzed participants, 74 (63.2%) were enrolled at ENAM-Dapaong and 43 (36.8%) at ENSF-Dapaong, corresponding to participation of 74/105 (70.5%) among nursing students and 43/87 (49.4%) among midwifery students.

2.4. Data Collection

Data were collected using a self-administered electronic questionnaire developed on KoboToolbox. Information about the study and an informed-consent form were presented before access to the questions, with access conditional on prior consent. The questionnaire captured sociodemographic and academic characteristics, lifestyle habits, selected medical history, headache characteristics, triggers, self-medication, psychological symptoms, and headache impact.

2.5. Eligibility Criteria

Included were students enrolled in the participating schools during the study period who agreed to participate after being informed. Students in the source population who did not take part in data collection were not included. Any questionnaire without informed consent was excluded.

2.6. Study Variables

Sociodemographic and academic characteristics: age; sex; program; year of study; years since baccalaureate; distance of residence; academic status; on-call duty during placement.

Lifestyle and environmental factors: daily sleep duration; sleep regularity; daily screen time; nighttime screen exposure; coffee consumption; energy-drink consumption; frequency of fasting.

Medical history and clinical characteristics: family history of migraine; chronic illness; head trauma; corrective lenses.

Headache characteristics: attack frequency; pain intensity; attack duration; topography; pain quality; triggers; self-medication; medications used. Participants were instructed to report the characteristics of their usual headache attacks, reflecting the most frequent pattern of their headaches rather than a single isolated episode. Attack duration was recorded as a categorical item (<4 h; 4 to 72 h; >72 h; highly variable or undetermined) and was used descriptively only; it did not enter the classification algorithm.

Psychological dimensions and impact: perceived stress, assessed with the PSS-10 [14]; anxiety symptoms, assessed with the GAD-2 [15]; depressive symptoms, assessed with the PHQ-2 [16]; headache impact, assessed with the HIT-6 [10]; migraine-related disability, assessed with the MIDAS [12], an instrument with established reliability [17].

2.7. Operational Definitions

Headache was defined as the report of at least one headache episode during the six months preceding the survey. Headache types were not assigned by clinical examination but were derived algorithmically from self-reported attack features, using operational criteria based on the ICHD-3 [18]. Algorithmic assignment of headache type from a structured diagnostic question set, rather than clinician interview, is the established method for headache classification in large-sample and population-based surveys, in which individual clinical assessment is not feasible [19]. Throughout this article, the terms “migraine” and “tension-type headache” denote these questionnaire-based, algorithm-derived categories, not clinician-confirmed ICHD-3 diagnoses. Types were assigned in a fixed precedence order, migraine being evaluated before tension-type headache.

Migraine. Classification required at least two of the following four features: unilateral location, pulsating quality, intensity $\geq 4/10$, and aggravation by physical activity; together with either nausea or vomiting, or the combination of photo-

phobia and phonophobia. Attacks meeting these criteria were classified as migraine irrespective of reported duration.

Tension-type headache. In participants not meeting the migraine criteria: bilateral location, pressing or tightening quality, intensity $\leq 6/10$, no aggravation by physical activity, absence of nausea, and no more than one of photophobia or phonophobia.

Other or undifferentiated headache. Headache meeting neither operational set. A residual, undifferentiated category is an expected and recognized feature of questionnaire-based headache classification [19].

2.8. Statistical Analysis

Categorical variables were described as counts and percentages. Continuous variables were presented as mean $\pm$ standard deviation, median [Q1 - Q3], and range; the median was preferred for skewed distributions. Normality was assessed with the Shapiro-Wilk test [20], supplemented by inspection of skewness and kurtosis.

Prevalences were reported with exact binomial 95% confidence intervals using the Clopper-Pearson method [21]. Bivariate comparisons used Pearson's χ^2 test or Fisher's exact test for categorical variables, and Student's *t* test or the Mann-Whitney *U* test for continuous variables, depending on distribution.

Factors associated with the presence of headache (among the 117 participants) and then with substantial impact (among the 82 participants with headache, HIT-6 ≥ 56) were examined by logistic regression. Variables associated at $p < 0.20$ in bivariate analysis were candidates for the multivariate model. The number of variables was limited according to the rule of at least ten events per variable [22]. Final selection relied on backward elimination guided by the Akaike information criterion (AIC) and the likelihood-ratio test; results were expressed as adjusted odds ratios (aOR) with 95% CIs. Collinearity was assessed with the variance inflation factor (VIF), calibration with the Hosmer-Lemeshow test [23], and discrimination with the area under the ROC curve (AUC). Among participants with migraine, disability (MIDAS) was described only descriptively given the small sample size. The significance threshold was set at $p < 0.05$ (two-sided).

2.9. Ethical Considerations

The study protocol was not reviewed by a formal research ethics committee, as no such committee was available to the investigators for this survey; the study was nonetheless conducted in accordance with the principles of the Declaration of Helsinki. Administrative authorization to conduct the survey was obtained from the directors of the two participating schools. Participation was voluntary; all students received information about the study and provided electronic informed consent before accessing the questionnaire.

3. Results

3.1. Study Population

Of the 192 students invited, 118 questionnaires were collected and 117 analyzed

after exclusion of one questionnaire for absence of consent (**Figure 1**). The analyzed population comprised 68/117 (58.1%) men, for a male-to-female sex ratio of 1.4. Nursing students accounted for 74 (63.2%) participants. The median age was 21 years [20 - 22]. Details are provided in **Table 1**.

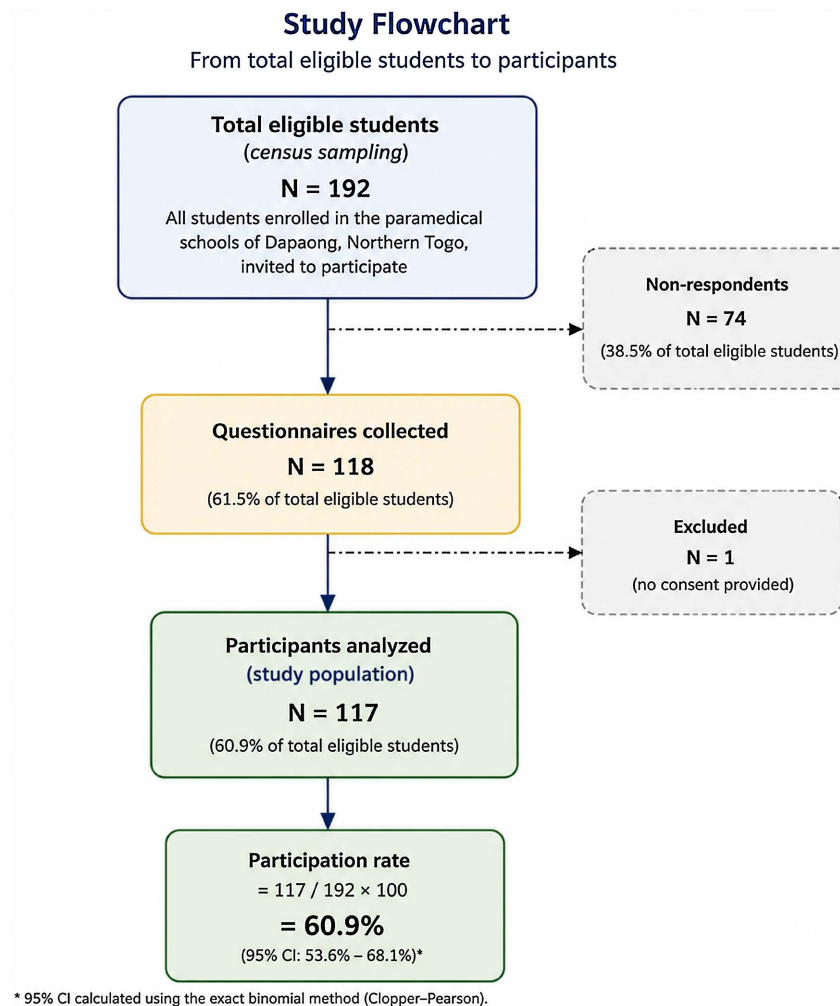


Figure 1. Study flow chart.

3.2. Psychological Profile

The median PSS-10 score was 18 [15 - 21]. A positive screen was found in 34/117 (29.1%) participants for anxiety ($GAD-2 \geq 3$) and 38/117 (32.5%) for depressive symptoms ($PHQ-2 \geq 3$) (**Table 1**).

3.3. Prevalence and Typology of Headache

The prevalence of headache during the previous six months was 82/117 (70.1%; 95% CI 60.9 - 78.2). Tension-type headache was the most frequent category, affecting 32/82 (39.0%; 95% CI 28.4 to 50.4) of participants with headache (**Table 2**). Migraine affected 19/82 (23.2%; 95% CI 14.6 to 33.8) of participants with headache, corresponding to 16.2% (95% CI 10.1 to 24.2) of the overall sample.

Table 1. Characteristics of the study population (n = 117).

Characteristic	Value
Sociodemographic and academic	
Age (years)	21.5 ± 2.8; 21 (IQR: 20 - 22); 17 - 31
Sex	
Male	68 (58.1)
Female	49 (41.9)
Program	
Nursing	74 (63.2)
Midwifery	43 (36.8)
Year of study	
1 st	35 (29.9)
2 nd	40 (34.2)
3 rd	42 (35.9)
Years since baccalaureate	3.2 ± 2.0; 3 (IQR: 2 - 4); 1 - 11
Distance of residence	
<5 km	62 (53.0)
6 - 10 km	36 (30.8)
>10 km	19 (16.2)
Academic status	
Placement	79 (67.5)
Coursework	38 (32.5)
On-call duty during placement	
Yes	68 (58.1)
No	49 (41.9)
On-call duties per week (n = 68)	2.3 ± 0.7; 2 (IQR: 2 - 3); 1 - 5
Weekly workload (h)	52.2 ± 21.8; 48 (IQR: 40 - 64); 17 - 120
Lifestyle and environmental	
Sleep duration (h)	5.4 ± 1.3; 5 (IQR: 5 - 6); 3 - 8
Sleep quality	
Very regular	2 (1.7)
Fairly regular	39 (33.3)
Rather irregular	41 (35.0)
Very irregular	35 (29.9)
Daily screen time (h)	4.1 ± 3.5; 3 (IQR: 2 - 5); 1 - 20

Continued**Nighttime screen use**

Yes	68 (58.1)
No	49 (41.9)

Coffee consumption

Yes	5 (4.3)
No	112 (95.7)

Energy drinks

Yes	32 (27.4)
No	85 (72.6)

Fasting

Never	27 (23.1)
Sometimes	65 (55.6)
Often	25 (21.4)

Medical history**Family history of migraine**

Yes	19 (16.2)
No	98 (83.8)

Corrective lenses

Yes	15 (12.8)
No	102 (87.2)

Chronic illness

Yes	10 (8.5)
No	107 (91.5)

Head trauma

Yes	4 (3.4)
No	113 (96.6)

Psychological profile

PSS-10	17.7 ± 4.9; 18 (IQR: 15 - 21); 4 - 33
GAD-2	2.0 ± 1.6; 2 (IQR: 1 - 3); 0 - 6
GAD-2 positive (≥3)	34 (29.1)
PHQ-2	2.1 ± 1.5; 2 (IQR: 1 - 3); 0 - 6
PHQ-2 positive (≥3)	38 (32.5)

Continuous variables: mean ± SD; median (IQR: Q1 - Q3); range. Categorical variables: n (%).

3.4. Clinical Characteristics of Headache

Among the 82 participants with headache, the median frequency was 5 attacks per month [3 - 8], the median intensity 5 [4 - 7], and the median HIT-6 score 55 [48 - 60]. Other characteristics are presented in **Table 2**.

Table 2. Clinical characteristics of headache in participants with headache (n = 82).

Characteristic	Value
Headache type	
Migraine	19 (23.2; 95% CI 14.6 to 33.8)
Tension-type	32 (39.0; 95% CI 28.4 to 50.4)
Other/unclassifiable	31 (37.8; 95% CI 27.3 to 49.2)
Attack frequency (per month)	6.5 ± 5.7; 5 (IQR: 3 - 8); 1 - 30
Pain intensity (0 - 10)	5.4 ± 2.3; 5 (IQR: 4 - 7); 1 - 10
Attack duration	
<4 hours	39 (47.6)
4 - 72 hours	20 (24.4)
>72 hours	2 (2.4)
Highly variable/undetermined	21 (25.6)
Topography	
Frontal	32 (39.0)
Diffuse	19 (23.2)
Temporal	9 (11.0)
Bilateral	9 (11.0)
Unilateral alternating	8 (9.8)
Occipital	4 (4.9)
Unilateral fixed	1 (1.2)
Pain quality	
Pulsating/throbbing	51 (62.2)
Pressing/tightening	11 (13.4)
Burning	10 (12.2)
Other	10 (12.2)
HIT-6 score	53.9 ± 8.7; 55 (IQR: 48 - 60); 36 - 78
HIT-6 impact grade	
None/little (≤49)	28 (34.1)
Moderate (50 - 55)	14 (17.1)
Substantial (56 - 59)	18 (22.0)

Continued

Severe (≥ 60)	22 (26.8)
Migraine-related disability—migraine subgroup (n = 19)	
MIDAS score	17 (IQR: 10 - 58); range 0 - 80
MIDAS grade	
I — minimal (0 - 5)	3 (15.8)
II — mild (6 - 10)	2 (10.5)
III — moderate (11 - 20)	6 (31.6)
IV — severe (≥ 21)	8 (42.1)

Continuous variables: mean $\pm$ SD; median (IQR: Q1-Q3); range (MIDAS: median (IQR: Q1-Q3); range). Categorical variables: n (%). MIDAS rows refer to the migraine subgroup (n = 19). Headache-type prevalences are shown with exact (Clopper-Pearson) 95% CIs. Substantial or severe impact (HIT-6 ≥ 56): 40/82 (48.8%; 95% CI 37.6 to 60.1).

3.5. Impact, Self-Medication, and Triggers

Substantial or severe impact (HIT-6 ≥ 56) affected 40/82 (48.8%; 95% CI 37.6 to 60.1) of participants with headache (**Table 2**). Self-medication was reported by 44/82 (53.7%) participants (**Table 3**). The most frequently reported triggers were lack of sleep (64/82; 78.0%) and study-related stress (46/82; 56.1%) (**Table 3**).

Table 3. Self-medication and reported triggers in participants with headache (n = 82).

Characteristic	Value
Self-medication	
Yes	44 (53.7)
No	38 (46.3)
Medications used—among those who self-medicated (n = 44)	
Medication (multiple responses)	
Paracetamol and combinations	34 (77.3)
Ibuprofen/NSAIDs	8 (18.2)
Weak opioid analgesics	4 (9.1)
Other	4 (9.1)
Reported triggers (n = 82)	
Trigger (multiple responses)	
Lack of sleep	64 (78.0)
Study-related stress	46 (56.1)
Bright light or screens	23 (28.0)
Intense physical activity	19 (23.2)
Fasting or prolonged hunger	15 (18.3)

Continued

Menstrual period	11 (13.4)
Excess sleep	6 (7.3)
Strong odors	5 (6.1)
Other	4 (4.9)

Multiple-response items: percentages are based on the relevant denominator (medications, n = 44; triggers, n = 82) and do not sum to 100%.

3.6. Migraine-Related Disability

Among the 19 participants with migraine, the median MIDAS score was 17 [10 - 58], with values ranging from 0 to 80. Severe disability was observed in 8/19 (42.1%; 95% CI 20.3 to 66.5) (**Table 2**).

3.7. Factors Associated with the Presence of Headache**3.7.1. Bivariate Analysis**

In bivariate analysis, variables associated with the presence of headache at the $p < 0.20$ threshold were years since baccalaureate ($p = 0.040$), sleep duration ($p = 0.130$), screen time ($p = 0.081$), GAD-2 ($p = 0.001$), PHQ-2 ($p = 0.036$), and family history of migraine ($p = 0.081$) (**Table 4**).

Table 4. Bivariate analysis of factors associated with the presence of headache (n = 117).

Characteristic	Without headache (n = 35)	With headache (n = 82)	Test	p
Age (years)	21 (IQR: 20 - 22)	21 (IQR: 20 - 22)	Mann-Whitney	0.329
Years since baccalaureate	2 (IQR: 2 - 3)	3 (IQR: 2 - 4)	Mann-Whitney	0.040
Weekly workload (h)	48 (IQR: 35 - 60)	48 (IQR: 40 - 68)	Mann-Whitney	0.573
Sleep duration (h)	6 (IQR: 5 - 7)	5 (IQR: 4 - 6)	Mann-Whitney	0.130
Screen time (h)	2 (IQR: 2 - 4)	3 (IQR: 2 - 5)	Mann-Whitney	0.081
PSS-10	17 (IQR: 14 - 20)	18 (IQR: 15 - 21)	Student	0.438
GAD-2	1 (IQR: 0 - 2)	2 (IQR: 1 - 3)	Mann-Whitney	0.001
PHQ-2	2 (IQR: 0 - 2)	2 (IQR: 1 - 3)	Mann-Whitney	0.036
Sex			χ^2	0.730
Female	16 (32.7)	33 (67.3)		
Male	19 (27.9)	49 (72.1)		
Program			χ^2	0.493
Nursing	20 (27.0)	54 (73.0)		
Midwifery	15 (34.9)	28 (65.1)		
Year of study			χ^2	0.532
1 st	13 (37.1)	22 (62.9)		
2 nd	11 (27.5)	29 (72.5)		

Continued

3 rd	11 (26.2)	31 (73.8)		
Distance of residence			χ^2	0.836
<5 km	20 (32.3)	42 (67.7)		
6 - 10 km	10 (27.8)	26 (72.2)		
>10 km	5 (26.3)	14 (73.7)		
Academic status			χ^2	0.625
Coursework	13 (34.2)	25 (65.8)		
Placement	22 (27.8)	57 (72.2)		
On-call duty			χ^2	1.000
No	15 (30.6)	34 (69.4)		
Yes	20 (29.4)	48 (70.6)		
Sleep quality			Fisher	0.727
Very regular	0 (0.0)	2 (100.0)		
Fairly regular	14 (35.9)	25 (64.1)		
Rather irregular	11 (26.8)	30 (73.2)		
Very irregular	10 (28.6)	25 (71.4)		
Nighttime screen use			χ^2	1.000
No	15 (30.6)	34 (69.4)		
Yes	20 (29.4)	48 (70.6)		
Coffee consumption			Fisher	1.000
No	34 (30.4)	78 (69.6)		
Yes	1 (20.0)	4 (80.0)		
Energy drinks			χ^2	0.627
No	27 (31.8)	58 (68.2)		
Yes	8 (25.0)	24 (75.0)		
Fasting			χ^2	0.597
Never	9 (33.3)	18 (66.7)		
Sometimes	17 (26.2)	48 (73.8)		
Often	9 (36.0)	16 (64.0)		
Family history of migraine			χ^2	0.081
No	33 (33.7)	65 (66.3)		
Yes	2 (10.5)	17 (89.5)		
Head trauma			Fisher	1.000
No	34 (30.1)	79 (69.9)		
Yes	1 (25.0)	3 (75.0)		

Continued

Corrective lenses			Fisher	0.226
No	33 (32.4)	69 (67.6)		
Yes	2 (13.3)	13 (86.7)		
Chronic illness			Fisher	0.278
No	34 (31.8)	73 (68.2)		
Yes	1 (10.0)	9 (90.0)		

Continuous variables: median (IQR: Q1 - Q3). Categorical variables: n (row %). Candidates for the multivariate model: $p < 0.20$.

3.7.2. Multivariate Analysis

After adjustment, only the GAD-2 score was independently associated with the presence of headache (aOR 1.66; 95% CI 1.20 - 2.30; $p = 0.002$). Years since baccalaureate and sleep duration did not retain a statistically significant association. The model showed satisfactory calibration (Hosmer-Lemeshow $p = 0.93$), an AUC of 0.73, and a VIF close to 1.0 (**Table 5**).

Table 5. Factors associated with the presence of headache: multivariate model ($n = 117$).

Variable	aOR	95% CI	p
GAD-2	1.66	1.20 - 2.30	0.002
Years since baccalaureate	1.22	0.97 - 1.55	0.095
Sleep duration	0.78	0.56 - 1.10	0.156

Hosmer-Lemeshow $p = 0.93$; AUC = 0.73; VIF ≈ 1.0 .

3.8. Factors Associated with Substantial Impact

3.8.1. Bivariate Analysis

Among the 82 participants with headache, 42/82 (51.2%) had a HIT-6 < 56 and 40/82 (48.8%) a HIT-6 ≥ 56 . Pain intensity ($p < 0.001$) and perceived stress ($p = 0.002$) were associated with impact; attack frequency ($p = 0.052$), GAD-2 ($p = 0.053$), PHQ-2 ($p = 0.141$), on-call duty ($p = 0.191$), and headache type ($p = 0.139$) also met the preselection threshold (**Table 6**).

Table 6. Bivariate analysis of factors associated with substantial impact (HIT-6 ≥ 56 ; $n = 82$).

Characteristic	HIT-6 < 56 ($n = 42$)	HIT-6 ≥ 56 ($n = 40$)	Test	p
Age (years)	22 (IQR: 20 - 23)	20 (IQR: 20 - 22)	Mann-Whitney	0.421
Attack frequency (per month)	4 (IQR: 2 - 6)	5 (IQR: 3 - 12)	Mann-Whitney	0.052
Pain intensity (0 - 10)	4 (IQR: 3 - 5)	6 (IQR: 5 - 7)	Mann-Whitney	< 0.001
Sleep duration (h)	5 (IQR: 5 - 6)	5 (IQR: 4 - 6)	Mann-Whitney	0.939
Screen time (h)	3 (IQR: 2 - 4)	4 (IQR: 2 - 6)	Mann-Whitney	0.271

Continued

PSS-10	16 (IQR: 14 - 20)	20 (IQR: 16 - 22)	Student	0.002
GAD-2	2 (IQR: 1 - 3)	2 (IQR: 2 - 4)	Mann-Whitney	0.053
PHQ-2	2 (IQR: 1 - 3)	2 (IQR: 2 - 3)	Mann-Whitney	0.141
Sex			χ^2	0.528
Female	15 (45.5)	18 (54.5)		
Male	27 (55.1)	22 (44.9)		
Program			χ^2	0.391
Nursing	30 (55.6)	24 (44.4)		
Midwifery	12 (42.9)	16 (57.1)		
Academic status			χ^2	0.884
Coursework	12 (48.0)	13 (52.0)		
Placement	30 (52.6)	27 (47.4)		
On-call duty			χ^2	0.191
No	14 (41.2)	20 (58.8)		
Yes	28 (58.3)	20 (41.7)		
Sleep quality			Fisher	0.267
Very regular	2 (100.0)	0 (0.0)		
Fairly regular	15 (60.0)	10 (40.0)		
Rather irregular	15 (50.0)	15 (50.0)		
Very irregular	10 (40.0)	15 (60.0)		
Nighttime screen use			χ^2	0.391
No	15 (44.1)	19 (55.9)		
Yes	27 (56.2)	21 (43.8)		
Energy drinks			χ^2	0.284
No	27 (46.6)	31 (53.4)		
Yes	15 (62.5)	9 (37.5)		
Fasting			χ^2	0.776
Never	10 (55.6)	8 (44.4)		
Sometimes	23 (47.9)	25 (52.1)		
Often	9 (56.2)	7 (43.8)		
Family history of migraine			χ^2	0.511
No	35 (53.8)	30 (46.2)		
Yes	7 (41.2)	10 (58.8)		
Corrective lenses			χ^2	0.924
No	36 (52.2)	33 (47.8)		

Continued

Yes	6 (46.2)	7 (53.8)		
Self-medication			χ^2	0.987
No	20 (52.6)	18 (47.4)		
Yes	22 (50.0)	22 (50.0)		
Headache type			χ^2	0.139
Migraine	6 (31.6)	13 (68.4)		
Tension-type	19 (59.4)	13 (40.6)		
Other	17 (54.8)	14 (45.2)		

Continuous variables: median (IQR: Q1 - Q3). Categorical variables: n (row %). Candidates for the multivariate model: $p < 0.20$.

3.8.2. Multivariate Analysis

In the final model, two factors were independently associated with substantial impact: pain intensity (aOR 1.53; 95% CI 1.21 - 2.02; $p < 0.001$) and perceived stress (aOR 1.19; 95% CI 1.06 - 1.37; $p = 0.006$). The model showed satisfactory calibration (Hosmer-Lemeshow $p = 0.43$), an AUC of 0.79, and a VIF close to 1.1 (Table 7).

Table 7. Factors associated with substantial impact: multivariate model ($n = 82$).

Variable	aOR	95% CI	p
Pain intensity	1.53	1.21 - 2.02	< 0.001
PSS-10	1.19	1.06 - 1.37	0.006

Hosmer-Lemeshow $p = 0.43$; AUC = 0.79; VIF ≈ 1.1 .

4. Discussion

4.1. Study Population

Of the 192 students invited, 118 completed the questionnaire (completion rate 61.5%) and 117 were analyzed (60.9%). The population was predominantly male (58.1%) and enrolled in nursing (63.2%), with a median age of 21 years. The median sleep duration was 5 hours per night and the median daily screen time 3 hours. These characteristics describe a young population in paramedical training, exposed to academic demands and to a relatively short sleep duration.

4.2. Psychological Profile

A positive screen for anxiety symptoms was found in 29.1% of participants and for depressive symptoms in 32.5%. These findings are consistent with data reported among health-science students, in whom anxiety, depressive symptoms, and sleep disturbances are common [7,8], and underscore the importance of considering psychological dimensions in the study of headache.

4.3. Prevalence and Typology of Headache

The prevalence of headache during the previous six months was 70.1%, close to the estimate of 70.4% reported among medical students [6]. It should be noted that differences in prevalence periods, diagnostic criteria, and recruitment methods may bias this comparison. Migraine affected 23.2% of participants with headache; relative to the whole sample, its prevalence was 16.2% (19/117). The questionnaire-based migraine estimate (16.2% of the sample) is of the same order as figures reported among university students, 16.1% [4] and 19% [5], and the 14.9% reported in African student cohorts [9]. These estimates are not directly comparable, however, because they rest on differing case definitions, ascertainment methods, and prevalence periods; the present figure should be read as an approximation derived from a self-administered algorithm rather than as an ICHD-3-equivalent prevalence.

4.4. Clinical Characteristics of Headache

Among participants with headache, the median frequency was five attacks per month and the median intensity 5/10, with pain most often pulsating and a predominantly frontal topography. These features indicate potentially recurrent headaches liable to limit academic and daily activities. Because classification relied on a self-administered questionnaire rather than a neurological examination, generalization and firm conclusions may be limited.

4.5. Impact, Self-Medication, and Triggers

Substantial or severe impact ($\text{HIT-6} \geq 56$) affected 48.8% of participants with headache, despite a moderate median frequency (5 attacks per month). The functional burden of headache is therefore not captured by frequency alone, which the HIT-6 is specifically designed to quantify [10]. Self-medication was reported by 53.7% of participants with headache, with paracetamol largely predominant; this frequent use, in a population expected to enter the health professions, underscores the value of education on the rational use of analgesics. Lack of sleep and study-related stress were the triggers most frequently reported by participants. This predominance is consistent with the high level of exposure to stress and sleep disturbance documented among health-science students [7] [8], although these merely self-reported factors cannot be regarded as established risk factors.

4.6. Migraine-Related Disability

Among the 19 participants with migraine, the median MIDAS score was 17 and severe disability affected 42.1%, indicating potentially substantial disability in a considerable proportion of those affected. The small subgroup size warrants a descriptive interpretation, a specific multivariate analysis not being feasible.

4.7. Factors Associated with the Presence of Headache

After adjustment, only the GAD-2 remained independently associated with the

presence of headache, each additional point increasing the odds (aOR 1.66; 95% CI 1.20 - 2.30). This association is consistent with the high frequency of anxiety symptoms among health-science students [7] and with the recognized role of psychological factors in headache [24]. Several mechanisms may be involved: stress-related physiological arousal, sleep disruption, hypervigilance to painful symptoms, and bidirectional interactions between anxiety and pain. However, the cross-sectional design does not allow the temporality of this association to be determined.

4.8. Factors Associated with Substantial Impact

In the final model, pain intensity (aOR 1.53) and perceived stress (aOR 1.19) remained independently associated with impact. The association between pain intensity and impact is consistent with the very design of the HIT-6, an instrument developed to capture the functional impact of headache pain [10]. The association with perceived stress complements the finding for anxiety: anxiety was associated with the presence of headache, whereas perceived stress was associated with its impact. This twofold observation aligns with the recognized role of psychological factors, which may operate at different levels of the headache phenomenon—occurrence, frequency, and disability [24]. These associations, measured concurrently, do not, however, allow any direction of causality to be established.

5. Strengths and Limitations

This study addresses an underdocumented African paramedical population, relies on census sampling, and uses structured instruments (PSS-10, GAD-2, PHQ-2, HIT-6, MIDAS). Its main limitations are the participation rate of 61.5%, exposing it to non-response bias; the cross-sectional design, which precludes causal inference; and the use of a self-administered questionnaire, liable to recall and reporting biases. Participation also differed across programs (nursing $\approx$ 70%; midwifery $\approx$ 49%), and the underrepresentation of midwifery students may introduce selection bias. The limited sample size, particularly among participants with migraine ($n = 19$), reduces the precision of estimates. The initial candidate sets for the multivariable models were larger than the models finally retained (Table 4 and Table 6); although the final models, comprising three and two variables respectively, satisfied the ten-events-per-variable rule, the multivariable analyses should be regarded as exploratory. The protocol was not reviewed by a formal research ethics committee. Finally, headache types were derived from a self-administered questionnaire algorithm and were not confirmed by neurological examination; as with all questionnaire-based classifications, sensitivity is limited and a residual undifferentiated category is unavoidable [19].

6. Conclusion

Headache is very common among students of the paramedical schools of Dapaong, affecting 82/117 (70.1%) of participants. Tension-type headache was the

most frequent phenotype, with migraine affecting 16.2% of the sample. Nearly half of participants with headache had substantial impact, and more than half used self-medication. Anxiety was independently associated with the presence of headache; pain intensity and perceived stress were associated with its substantial impact. The management of headache in paramedical training programs should therefore address clinical characteristics, functional impact, and the associated psychological dimensions together. Longitudinal and multicenter studies are needed to clarify the temporality of the associations observed.

Declarations

Informed Consent

Obtained electronically before access to the questionnaire.

Consent for Publication

Not applicable.

Funding

This study received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Author Contributions

A.L. conceived and designed the study, developed the data collection instrument, performed data curation and statistical analysis, produced the figures and tables, and wrote the original draft of the manuscript. S.P. carried out field data collection among the students of the paramedical schools of Dapaong. G.K.M. and A.K. contributed to the methodological design and critically revised the manuscript. K.N.A., M.E.-G. and K.A. validated the clinical and methodological content and critically revised the manuscript. V.K. contributed resources and critically revised the manuscript. M.B. supervised the project and critically revised the manuscript. All authors read and approved the final version of the manuscript.

Conflicts of Interest

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

References

- [1] GBD 2016 Headache Collaborators (2018) Global, Regional, and National Burden of Migraine and Tension-Type Headache, 1990-2016. *The Lancet Neurology*, **17**, 954-976.
- [2] Woldeamanuel, Y.W. and Cowan, R.P. (2017) Migraine Affects 1 in 10 People Worldwide Featuring Recent Rise: A Systematic Review and Meta-Analysis of Community-Based Studies Involving 6 Million Participants. *Journal of the Neurological Sciences*, **372**, 307-315. <https://doi.org/10.1016/j.jns.2016.11.071>
- [3] Steiner, T.J., Stovner, L.J., Jensen, R., Uluduz, D. and Katsarava, Z. (2020) Migraine

- Remains Second among the World's Causes of Disability, and First among Young Women: Findings from GBD2019. *The Journal of Headache and Pain*, **21**, Article No. 137. <https://doi.org/10.1186/s10194-020-01208-0>
- [4] Wang, X., Zhou, H.B., Sun, J.M., Xing, Y.H., Zhu, Y.L. and Zhao, Y.S. (2015) The Prevalence of Migraine in University Students: A Systematic Review and Meta-Analysis. *European Journal of Neurology*, **23**, 464-475. <https://doi.org/10.1111/ene.12784>
 - [5] Flynn, O., Fullen, B.M. and Blake, C. (2022) Migraine in University Students: A Systematic Review and Meta-Analysis. *European Journal of Pain*, **27**, 14-43. <https://doi.org/10.1002/ejp.2047>
 - [6] Abtahi, S., Esfahanian, F., Akbari, M., Roomizadeh, P. and Neshat, S. (2023) Headache—A Challenge across Medical Students' Life: A Systematic Review and Meta-Analysis. *Acta Neurologica Belgica*, **123**, 785-801. <https://doi.org/10.1007/s13760-023-02274-2>
 - [7] Jahrami, H., AlKaabi, J., Trabelsi, K., Pandi-Perumal, S.R., Saif, Z., Seeman, M.V., *et al.* (2023) The Worldwide Prevalence of Self-Reported Psychological and Behavioral Symptoms in Medical Students: An Umbrella Review and Meta-Analysis of Meta-Analyses. *Journal of Psychosomatic Research*, **173**, Article ID: 111479. <https://doi.org/10.1016/j.jpsychores.2023.111479>
 - [8] Binjabr, M.A., Alalawi, I.S., Alzahrani, R.A., Albalawi, O.S., Hamzah, R.H., Ibrahim, Y.S., *et al.* (2023) The Worldwide Prevalence of Sleep Problems among Medical Students by Problem, Country, and COVID-19 Status: A Systematic Review, Meta-Analysis, and Meta-Regression of 109 Studies Involving 59427 Participants. *Current Sleep Medicine Reports*, **9**, 161-179. <https://doi.org/10.1007/s40675-023-00258-5>
 - [9] Woldeamanuel, Y.W., Andreou, A.P. and Cowan, R.P. (2014) Prevalence of Migraine Headache and Its Weight on Neurological Burden in Africa: A 43-Year Systematic Review and Meta-Analysis of Community-Based Studies. *Journal of the Neurological Sciences*, **342**, 1-15. <https://doi.org/10.1016/j.jns.2014.04.019>
 - [10] Kosinski, M., Bayliss, M.S., Bjorner, J.B., Ware, J.E., Garber, W.H., Batenhorst, A., *et al.* (2003) A Six-Item Short-Form Survey for Measuring Headache Impact: The HIT-6™. *Quality of Life Research*, **12**, 963-974. <https://doi.org/10.1023/a:1026119331193>
 - [11] Yang, M., Rendas-Baum, R., Varon, S.F. and Kosinski, M. (2010) Validation of the Headache Impact Test (HIT-6™) across Episodic and Chronic Migraine. *Cephalalgia*, **31**, 357-367. <https://doi.org/10.1177/0333102410379890>
 - [12] Stewart, W.F., Lipton, R.B., Dowson, A.J. and Sawyer, J. (2001) Development and Testing of the Migraine Disability Assessment (MIDAS) Questionnaire to Assess Headache-Related Disability. *Neurology*, **56**, S20-S28. https://doi.org/10.1212/wnl.56.suppl_1.s20
 - [13] von Elm, E., Altman, D.G., Egger, M., Pocock, S.J., Gøtzsche, P.C. and Vandenbroucke, J.P. (2007) The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement: Guidelines for Reporting Observational Studies. *The Lancet*, **370**, 1453-1457. [https://doi.org/10.1016/s0140-6736\(07\)61602-x](https://doi.org/10.1016/s0140-6736(07)61602-x)
 - [14] Cohen, S., Kamarck, T. and Mermelstein, R. (1983) A Global Measure of Perceived Stress. *Journal of Health and Social Behavior*, **24**, 385-396. <https://doi.org/10.2307/2136404>
 - [15] Kroenke, K., Spitzer, R.L., Williams, J.B.W., Monahan, P.O. and Löwe, B. (2007) Anxiety Disorders in Primary Care: Prevalence, Impairment, Comorbidity, and Detection. *Annals of Internal Medicine*, **146**, 317-325. <https://doi.org/10.7326/0003-4819-146-5-200703060-00004>
 - [16] Kroenke, K., Spitzer, R.L. and Williams, J.B.W. (2003) The Patient Health Question-

- naire-2. *Medical Care*, **41**, 1284-1292.
<https://doi.org/10.1097/01.mlr.0000093487.78664.3c>
- [17] Stewart, W., Lipton, R., Kolodner, K., Liberman, J. and Sawyer, J. (1999) Reliability of the Migraine Disability Assessment Score in a Population-Based Sample of Headache Sufferers. *Cephalalgia*, **19**, 107-114.
<https://doi.org/10.1046/j.1468-2982.1999.019002107.x>
 - [18] Headache Classification Committee of the International Headache Society (2018) The International Classification of Headache Disorders, 3rd Edition. *Cephalalgia*, **38**, 1-211.
 - [19] Steiner, T.J., Gururaj, G., Andrée, C., Katsarava, Z., Ayzenberg, I., Yu, S., et al. (2014) Diagnosis, Prevalence Estimation and Burden Measurement in Population Surveys of Headache: Presenting the HARSHIP Questionnaire. *The Journal of Headache and Pain*, **15**, Article No. 3. <https://doi.org/10.1186/1129-2377-15-3>
 - [20] Shapiro, S.S. and Wilk, M.B. (1965) An Analysis of Variance Test for Normality (Complete Samples). *Biometrika*, **52**, 591-611.
<https://doi.org/10.1093/biomet/52.3-4.591>
 - [21] Clopper, C.J. and Pearson, E.S. (1934) The Use of Confidence or Fiducial Limits Illustrated in the Case of the Binomial. *Biometrika*, **26**, 404-413.
<https://doi.org/10.1093/biomet/26.4.404>
 - [22] Peduzzi, P., Concato, J., Kemper, E., Holford, T.R. and Feinstein, A.R. (1996) A Simulation Study of the Number of Events per Variable in Logistic Regression Analysis. *Journal of Clinical Epidemiology*, **49**, 1373-1379.
[https://doi.org/10.1016/s0895-4356\(96\)00236-3](https://doi.org/10.1016/s0895-4356(96)00236-3)
 - [23] Hosmer, D.W., Lemeshow, S. and Sturdivant, R.X. (2013) Applied Logistic Regression. 3rd Edition, Wiley. <https://doi.org/10.1002/9781118548387>
 - [24] Nicholson, R.A., Houle, T.T., Rhudy, J.L. and Norton, P.J. (2007) Psychological Risk Factors in Headache. *Headache: The Journal of Head and Face Pain*, **47**, 413-426.
<https://doi.org/10.1111/j.1526-4610.2006.00716.x>