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Multidimensional Assessment of Chronic Headache Burden Using VAS, MIDAS, and HIT-6: A Cross-Sectional Study from a Tertiary Care Center in Bangladesh

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Abstract

Background: Headache disorders are one of the most common neurological disorders in the world and a significant but under-acknowledged burden to the population. **Objective:** The purpose of the present study was to perform the multidimensional assessment of chronic headache burden using VAS, MIDAS, and HIT-6 among the patients attended at a tertiary care center in Bangladesh. **Methodology:** This was a cross-sectional observational study that was carried out in a tertiary care hospital in Bangladesh during the month of May to July 2025. Consecutive enrolment of adult patients (patients aged 18 years and above) with chronic headache. The diagnosis of headaches has been laid down based on the ICHD, 3rd edition. Structured questionnaires and assessments that were conducted by physicians were used to gather sociodemographic, clinical, lifestyle, and headache-related variables. The VAS, MIDAS, and HIT-6 were used to assess the severity of headaches, disability, and impact. **Results:** A total number of 17 patients were included (mean age 42.9 ± 15.2 years; 53.8 per cent men), and the median BMI was 27.7 kg/m². The median VAS, MIDAS, and HIT-6 scores were 6 (4 to 8), 33 (17 to 47), and 58 (47 to 71), which reflects a high disease burden. Unilateral headache was present in 52.1%, visual aura happened in 50.4% and stress and sleep deprivation were some of the frequent inducers. It was common to find cardiometabolic comorbidities. The individual headache characteristics, lifestyle, and comorbidity did not have any significant negative relations with disability and impact (all $p > 0.05$). The only predictor of severe disability (MIDAS ≥ 21) was the risk of medication overuse, aOR is 0.20, 95% CI is 0.05-0.75; $p = 0.017$). The female scores of HIT-6 were higher than those of the males ($p = 0.044$). **Conclusion:** The prevalence of chronic headache is very high in adults taking tertiary care in Bangladesh and is linked to a significant personal and socioeconomic burden. *[Journal of National Institute of Neurosciences Bangladesh, July 2025;11(2):150-158]*

Keywords: Chronic headache; clinical characteristics; medication; Bangladesh

Introduction

Headache disorders, especially migraine and tension-type headache, are very common and debilitating neurological conditions that significantly limit day-to-day functioning, productivity and use of healthcare services[1-2]. The unseen character of the disability caused by headache has made it non-recognized as a burden on society. Healthcare planning requires epidemiological data in terms of prevalence, demographics, patterns of attacks, and disability, and the emergence of a uniform set of IHS criteria has facilitated credible research on populations[3].

The WHO and the Global Burden of Disease studies have indicated the importance of migraine in the world; through these studies, migraine has been consistently ranked as one of the top causes of years lived with disability in the world[4]. The impairment of functioning when acute migraine attacks occur is similar to that of

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major neurological and psychiatric disorders. Quality-of-life research shows that patients with migraine have significant impairments in their physical, social, and role functioning, as well as create severe levels of psychological distress and low energy[5].

Outside the personal distress, absenteeism, and presenteeism caused by headaches have a high socioeconomic cost. This is vital evidence that informs the formulation of contextual clinical guidelines on the management of headaches. in countries like Bangladesh, where the standardized care pathways in headache management are few and local surveillance and epidemiological statistics are still insufficient, it is especially significant to learn how to define a clinical and demographic portrait of a patient with chronic headache[6]. Thus, the current research will profile the demographic, clinical, and lifestyle characteristics of chronic headache patients in a tertiary care unit in Bangladesh and determine the determinants of disability and the impact of headache in patients with standardized evaluation instruments.

This study was aimed to provide region-specific evidence among an underrepresented group of people to further comprehend the chronic burden of headache, along with informing specific, context-sensitive approaches to enhancing the care burden of headache and minimizing disability.

Methodology

Study Settings and Population: This was a cross-sectional study that was conducted by the Department of Neurology and Radiology, Bangladesh Medical University, Dhaka, Bangladesh, between May and July 2025. This study selected adult patients (age over 18 years) presenting with chronic headache through a structured clinical questionnaire.

Study Procedure: The definition of chronic headache was based on the ICHD, 3rd edition, which specified chronic headache as occurring 15 days or more per month with a span of three months or longer and at least four days per month. Only patients who wanted to sign a written informed consent were cut. The study excluded patients with secondary headache (structural lesions of the brain), history of any significant psychiatric disorder, acute systemic infection or recent trauma, and any incomplete clinical information. The participant's age, gender, place of residence, level of education, occupation, status in marriage, and monthly income were the sociodemographic variables obtained. Clinical features of headache-related were collected by elaborate descriptive features such as the duration of the illness, the frequency of headaches a month, the time of each episode, the laterality, the location of the pain, and the quality of the pain.

Measurement of Pain: The severity of headache and headache impairment were measured by the validated measures, including Visual Analog Scale (VAS), Migraine Disability Assessment (MIDAS), and Headache Impact Test-6 (HIT-6). Data on the visual aura, type of aura, symptoms linked with the aura, aggravating and relieving factors was also recorded. Lifestyle and behavioral items, such as the duration of sleep and sleep quality, screen time (number of hours a day), perceived level of stress, caffeine consumption, painkiller usage, and substance overuse risk were measured. Patient history and clinical records provided the data on comorbid conditions such as dyslipidemia, diabetes mellitus, and hypertension, smoking status, and alcohol use. The anthropometric measurements were collected through the standardized procedures, and the BMI was calculated as the weight (kg/m^2). Trained physicians undertook all clinical assessments to achieve consistency and reliability.

Statistical Analysis: Python was used to conduct statistical tests. The aspect of the characteristics of the participants was summarized using the descriptive statistics. Categorical variables were evaluated using chi-square test or Fisher precise test, whereas comparison between groups of non-normally distributed variables was done by Mann Whitney U test or Kruskal Wallis test (6,7). The statistically significant p-value was taken to be less than 0.05.

Ethical Consideration: The IRB of Bangladesh Medical University gave an ethical approval. Privacy was strictly ensured, and before participating in the study, each person was informed about the study via written consent before joining it.

Results

The total count of patients analyzed was 117, who had chronic headache. The average age of the population was 42.9 ± 15.2 years, and the median age was 42 (30-54). The population of males was 53.8 percent of the study population, and 54.7 percent lived in rural regions. The median scores BMIwas 27.3 ± 4.5 kg/m^2 implies an overweight trend in general. The headache severity and disability had the median scores of VAS 6 (IQR: 4-8), MIDAS 33 (IQR: 17-47), and HIT-6 58 (IQR: 47-71). There were 57.3%, 59.0% and 56.4% patients who had hypertension, diabetes mellitus and dyslipidemia respectively. Almost 1/3 of the respondents were active smokers and 53.8% reported on

a casual basis of alcohol use (Table 1).

Table 1: Summarizes Baseline Sociodemographic and Clinical Characteristics (n=117)

Categorical Variable	Category	n (%)
Sex	Male	63 (53.8%)
	Female	54 (46.2%)
Residence	Rural	64 (54.7%)
	Urban	53 (45.3%)
Laterality	Unilateral	61 (52.1%)
	Bilateral	56 (47.9%)
Visual Aura	Yes	59 (50.4%)
	No	58 (49.6%)
Hypertension	Yes	67 (57.3%)
	No	50 (42.7%)
Diabetes	Yes	69 (59.0%)
	No	48 (41.0%)
Dyslipidemia	Yes	66 (56.4%)
	No	51 (43.6%)
Smoking Status	Never	41 (35.0%)
	Past	38 (32.5%)
	Current	38 (32.5%)
Alcohol Use	Occasional	63 (53.8%)
	Never	54 (46.2%)
Continuous Variable	**Mean ± SD**	**Median (IQR)**
Age	42.95 ± 15.23	42.00 (30.00-55.00)
BMI	27.25 ± 4.52	27.70 (23.20-31.00)
VAS Score	6.03 ± 2.04	6.00 (4.00-8.00)
MIDAS Score	32.33 ± 18.07	33.00 (17.00-47.00)
HIT6 Score	58.85 ± 12.36	58.00 (47.00-71.00)
Sleep Duration Hours	6.45 ± 1.56	6.00 (5.00-8.00)

As far as headache characteristics are concerned, 52.1% cases of the patients reported unilateral headache. Temporal 29.1% cases and frontal 26.5% cases were the most frequent regions of pain. The quality of pain was also mostly throbbing (34.2%) or sharp (34.2%), and 31.6% reported dull pain. The visual aura was experienced by 50.4 percent of the respondents and the most common type of aura was the zigzag lines. Among the related symptoms were nausea (23.9%), photophobia (19.7%), and vomiting (14.5%) which had a common association. The most common aggravating factors that were reported were stress and sleep deprivation, and the common relieving factors were rest and sleep (Table 2).

These results suggest that MIDAS and HIT-6 measure headache-related disability and impact, which were not significantly correlated with personal headache characteristics, sleep-related parameters, or comorbidity rates of cardiometabolism in this study cohort. The lack of statistically significant associations indicate that disability burden in chronic headache could be as a result of complex, multifactorial, and perhaps interacting processes rather than a consequence of single clinical or lifestyle factors (Table 3).

Table 2: Clinical Headache Characteristics among Patients with Chronic Headache (n = 117)

Clinical Feature	Category	n (%)
Laterality	Unilateral	61 (52.1%)
	Bilateral	56 (47.9%)
Pain Location	Temporal	34 (29.1%)
	Frontal	31 (26.5%)
	Holocranial	28 (23.9%)
	Occipital	24 (20.5%)
Nature of Pain	Throbbing	40 (34.2%)
	Sharp	40 (34.2%)
	Dull	37 (31.6%)
Visual Aura	Yes	59 (50.4%)
	No	58 (49.6%)
Aura Type	Zigzag lines	35 (29.9%)
	Scotoma	28 (23.9%)
	Flashing lights	27 (23.1%)
	None	27 (23.1%)
Associated Symptoms	Nausea	28 (23.9%)
	Multiple	26 (22.2%)
	None	23 (19.7%)
	Photophobia	23 (19.7%)
	Vomiting	17 (14.5%)
Aggravating Factors (Triggers)	Stress	33 (28.2%)
	Sleep loss	30 (25.6%)
	None	30 (25.6%)
	Bright light	24 (20.5%)
Relieving Factors	Rest	31 (26.5%)
	None	31 (26.5%)
	Sleep	30 (25.6%)
	Medication	25 (21.4%)

The Spearman correlation matrix demonstrates the correlation between the headache severity scores (VAS, MIDAS, HIT-6), headache attributes, sleep attributes, level of stress, and lifestyle variables. All in all, the correlations were small to moderate, which suggests the occurrence of weak linear relationships between independent variables. The measure of sleep quality was positively related to analgesic use ($r = 0.33$) and stress level ($r = 0.28$), and the measures of headache severity were weakly correlated with lifestyle-related factors. These results endorse the multifactorial arbitrariness of the burden of headaches (Figure I).

Table 3: Association between Headache-Related Disability (MIDAS and HIT-6) and Selected Clinical and Lifestyle Variables

Disability Stratification	Variable Compared	Statistical Test	P value
MIDAS Severity	Laterality	Chi-square	0.173
	Visual Aura	Chi-square	0.385
	Sleep Quality	Chi-square	0.691
	Smoking Status	Chi-square	0.45
	Hypertension	Chi-square	0.539
	Diabetes	Chi-square	0.719
	Sleep Duration Hours	Kruskal-Wallis	0.652
	VAS Score	Kruskal-Wallis	0.41
	Headache Frequency Per Month	Kruskal-Wallis	0.766
HIT-6 Group	Laterality	Chi-square	0.384
	Visual Aura	Chi-square	0.638
	Sleep Quality	Chi-square	0.874
	Smoking Status	Chi-square	0.277
	Hypertension	Chi-square	0.874
	Diabetes	Chi-square	0.533
	Sleep Duration Hours	Mann-Whitney U	0.465
	VAS Score	Mann-Whitney U	0.451
	Headache Frequency Per Month	Mann-Whitney U	0.726

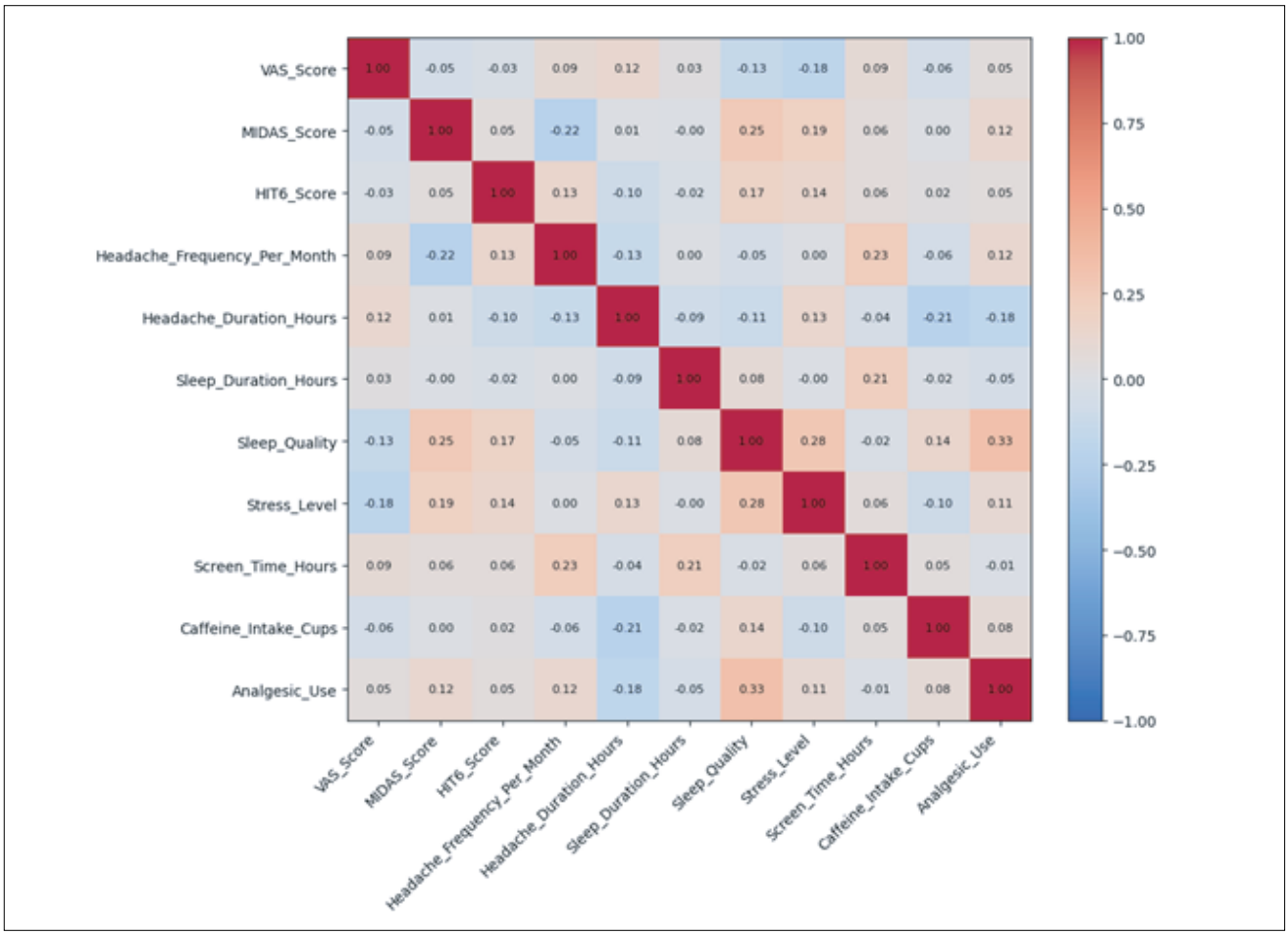

Figure I: Correlation Matrix of Headache Severity, Clinical, and Lifestyle Variables

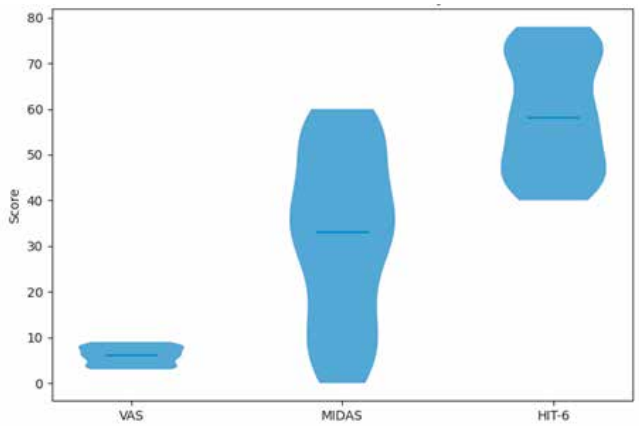

Figure II: Showing Headache Severity and Impact Scores Across VAS, MIDAS, and HIT-6 Scales

The violin plot demonstrates the distribution, density, and median values of the patient-reported scores of each assessment tool. The distribution of VAS scores is relatively limited in the middle of the pain intensity, and MIDAS scores are more spread with a high level of variation in disability due to headaches. The scores in HIT-6 depict a more dominant higher range of scores, meaning that the perceived effect of a headache on a day-in-day-out functioning is higher (Figure II).

A multivariate logistic regression analysis was conducted to reveal factors that were independently related to severe headache-related disability (MIDAS ≥ 21). Risk of medication overuse was discovered to be the only significant independent predictor of severe disability after demographic, clinical and lifestyle factors were adjusted aOR is 0.20, 95% CI in range 0.05 -0.75; p = 0.017). There were no statistically significant correlations with age, sex, frequency of headaches, headache laterality, whether they had a visual aura, sleep quality, perceived stress level, or analgesic use (all p > 0.05). The large confidence intervals experienced on most variables indicates the variability in the study population and possibility of sample size limitation (Table 4).

In adjusted model, which evaluated predictors of high headache impact (HIT-6 ≥ 60), no statistically significant relationship was found between the evaluated variables. High headache impact was not associated with age, sex, frequency of headache, laterality of headache, visual aura, quality of sleep, stress level, analgesic use and risk of medication

Table 4: Multivariable Logistic Regression Analysis Identifying Predictors Of Severe Headache-Related Disability (MIDAS ≥ 21)

Variable	aOR	Lower 95% CI	Upper 95% CI	P value
Age	0.979681845	0.941411629	1.019508	0.31265
Sex	1.650857758	0.516408726	5.27747	0.39787
Headache_Frequency_Per_Month	0.908113288	0.792932323	1.040025	0.163667
Laterality	0.502623454	0.148759241	1.69825	0.268116
Visual_Aura	1.230765249	0.361919095	4.185419	0.739518
Sleep_Quality	1.244849813	0.324313446	4.778251	0.749621
Stress_Level	1.826934866	0.506499615	6.589721	0.357202
Analgesic_Use	1.802686494	0.462148363	7.031678	0.396147
Medication_Overuse_Risk	0.200536215	0.053352892	0.753751	0.017387

Table 5: Multivariable Logistic Regression Analysis Determines Factors of d High Headache Impact (HIT-6 ≥ 60)

Variable	aOR	Lower 95% CI	Upper 95% CI	P value
Age	0.970866	0.935588	1.007476	0.117446
Sex	0.347737	0.11748	1.029287	0.056413
Headache_Frequency_Per_Month	1.078614	0.95254	1.221376	0.232763
Laterality	2.322299	0.714789	7.544981	0.161075
Visual_Aura	1.496694	0.474078	4.725155	0.491771
Sleep_Quality	1.080222	0.31851	3.663557	0.90144
Stress_Level	1.865536	0.570676	6.098421	0.302172
Analgesic_Use	0.543769	0.158523	1.865244	0.332683
Medication_Overuse_Risk	1.756632	0.538909	5.725929	0.350034

Table 6: Sex-Based Comparison Of Headache Severity, Disability, and Frequency among Patients with Chronic Headache

Variables	Male Median (IQR)	Female Median (IQR)	P value
VAS Score	6.0 (4.0–8.0)	6.0 (4.0–8.0)	0.7548
MIDAS Score	37.0 (22.0–48.0)	32.5 (15.5–46.0)	0.4074
HIT6_Score	55.0 (46.5–66.5)	63.5 (48.5–72.8)	0.0444
Headache Frequency Per Month	12.0 (7.0–15.0)	11.0 (8.0–16.0)	0.6063

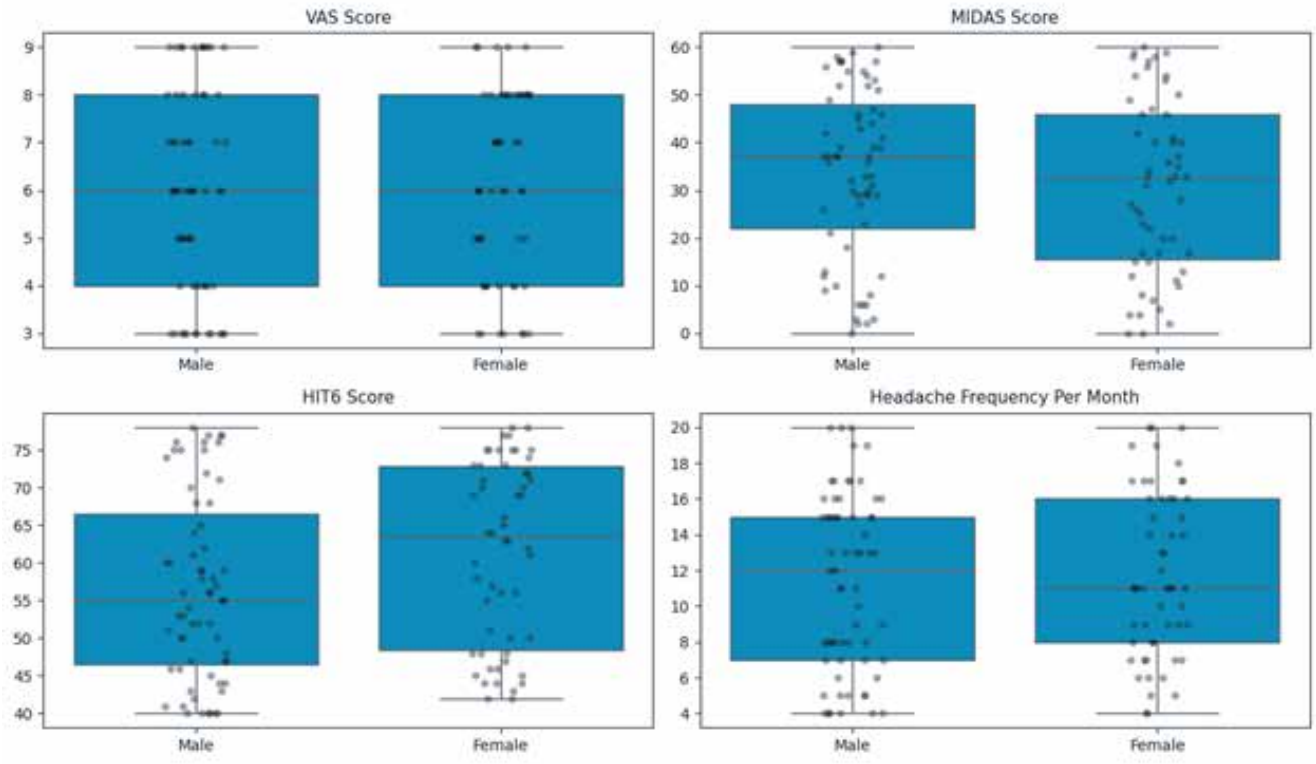

Figure III: Showing Gender-based Distribution of VAS, MIDAS, HIT-6 Scores, and Monthly Headache Frequency

overuse independently (all p > 0.05). There was a borderline relationship between female sex and reduced odds of high impact of headache (aOR = 0.35; 95% CI: 0.12-1.03; p = 0.056), though not statistically significant (Table 5).

Sex-based comparative analysis showed that there were no significant disparity in pain intensity evaluated through VAS (p = 0.755), headache-related disability measured using MIDAS (p = 0.407), or frequency of headaches in a month (p = 0.606) (Table 6).

Nevertheless, the headache impact of female patients in the group with respect to HIT-6 scores was much higher (median [IQR]: 63.5 [48.5 to 72.8] vs 55.0 [46.5 to 66.5]; p = 0.044) than in men patients, which means that perceived functional burden was higher in females (Figure III).

Discussion

This cross-sectional observational research paper describes in depth the study of the Clinical profiles of patients with chronic headache who are referred to a tertiary care unit in Bangladesh and identifies clinical, lifestyle, and demographic predictors of the disability and burden associated with headaches. Our results contribute region-specific evidence to the literature and uphold the idea that chronic headache burden is multifactorial and not based on clinical characteristics alone[8-9]. The middle-aged adults were dominant since the mean patient age of patients with chronic headache was 42.95 ± 15.23 years, with a median of 42 years of age (IQR: 30 to 55). This is in line with other past-hospital-based and population-based studies that have indicated mean ages of between mid-30s and early 40s[8,9,10]. Szabo et al[11]. mentioned the mean age of

36.4 ± 12.7 years, whereas Lebedeva et al[12] measured 34.9 ± 14.1 years, indicating a slightly younger age of Western cohorts.

Conversely, mean ages of hospital-based Asian studies have been found to be nearer to 40 years which is in close similarity to our results and reflects regional consistency in the burden of chronic headaches[12]. The study population was 53.8 percent male. This is unlike in population-based research, which indicated female predominance (60 to 70%) in chronic headache[13-14]. Nevertheless, they have documented male dominance in a number of South Asian tertiary-care studies, which probably represent health-seeking patterns, socio-cultural variables, and even trends in referrals rather than actual variation in prevalence[15]. The patients reported unilateral headache in 52.1% and bilateral pain in 47.9%, which indicates the presence of a mixed headache phenotype. Such a distribution is in line with the research findings which show the overlap characteristics of migraine and tension-type headache in chronic manifestations[16].

According to previous reports, tension-type headache is more characterized by bilateral pain (up to 70-75%), as compared to the characteristic of unilateral pain of migraine[17]. The most prevalent areas of pain included temporal (29.1%) and frontal (26.5%) regions which is in line with previous reports that found these areas to be the most prevalent sites of chronic headache pain[18]. The quality of pain was also heterogeneous throbbing, sharp and dull pain 34.2%, 34.2%, 31.6%, respectively, which is aligned with the existing literature describing the clinical heterogeneity of headache chronic syndromes[19]. Visual aura occurred in 50.4% of patients -which is more than population estimates 5 to 30% cases[20]. It is probably a manifestation of referral bias in tertiary-care environments as patients with more severe or complex symptoms are oversampled[21]. The most frequent types of aura were zigzag lines (29.9%), scotoma (23.9%), and flashing lights (23.1%), which were in line with the classical type of migraine aura[20].

Related symptoms like nausea (23.9%), photophobia (19.7%), and vomiting (14.5%), were not unusual, and are similar to other prior reports of such characteristics in about 20 to 30.0% of chronic headache patients[22]. The most common triggers were stress (28.2%) and sleep deprivation (25.6%), which is consistent with solid evidence indicating that psychosocial stress and sleep disturbances are linked to headache chronification[23,24]. Widespread relieving factors were rest (26.5%), and sleep (25.6%), which supports the value of non-pharmacological interventions in the treatment of headache[25]. The median scores provided a large burden: VAS 6 (IQR: 4 -8), MIDAS 33 (IQR: 17 -47), and HIT-6 58 (IQR: 47 -71). Notably, the laterality of a headache, the visual aura, the quality of sleep, smoking, hypertension, diabetes, and the frequency of a headache did not exhibit any statistically significant correlations with either the MIDAS or HIT-6 categories ($p > 0.05$). The same has also been observed in the recent reports which focus on the idea that headache-related disability cannot be attributed to single clinical variables[26,27].

Weak to moderate relationship between severity, lifestyle and clinical variables also corroborate the multifactorial model of chronic headache burden[28]. The only independent predictor of a severe headache-related disability (MIDAS ≥ 21) was the risk of medication overuse, aOR is 0.20; 95% CI in 0.05 -0.75; $p = 0.017$. This fact is in agreement with strong evidence of medication overuse related to headache chronification, central sensitization, and enhanced disability[29-31]. The lack of any meaningful relationship with HIT-6 makes it possible that disability and perceived impact are connected, but not mediated by various psychosocial and contextual factors[32].

There were no sex-related differences in VAS scores, MIDAS scores or frequency of headache. But females had much higher HIT-6 scores (63.5 vs. 55.0; $p = 0.044$), meaning the perceived functional impact was higher. This result is in line with other previous studies that propose sex-based variations in pain perception, emotional processing, and psychosocial burden during chronic headache[33-34]. In general, our results provide support to the idea that these biological, behavioral, and psychosocial factors interact in a complex manner to produce chronic headache disability. The control of medication excess with combined treatment of stress and sleep disorders can provide more disability improvements than treatments that emphasize headache features alone[31,35].

Strengths and Limitations

The advantages of the research are validated disability scales, full evaluation of lifestyle and clinical factors, and standardized physician-administered scales. Nonetheless, all the cross-sectional design restricts the capacity to determine cause-and-effect, and the fact that the study is single-centered serves to limit the generalizability. Also, the sample size used was relatively small and could have diminished the statistical strength of the research to identify smaller effect sizes.

Conclusion

This study has shown that the disability associated with chronic headaches and perceived impact in Bangladeshi patients cannot be sufficiently related to either clinical or lifestyle factors alone, and it is more appropriate to consider a multifactorial disease model. Medication overuse risk has become the main determinant of severe disability that can be changed, and the necessity to implement rational pharmacological therapy and patient education. The VAS, MIDAS, and HIT-6 can be effectively used to provide a comprehensive, multidimensional perspective on the burden of chronic headache by evaluating the uniq ue but complementary factors of patient experience. It offers a framework to future longitudinal and interventional studies centered on disability and impact outcomes but not symptom prevalence, and could justify the increased personalization and outcome-centered management of headache, especially in low-resource environments.

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Conflict of interest
All authors declare that they have no competing interest.

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Contribution to authors
Conception and design: Choudhury S, Ferdoucy SA, Islam T; Acquisition, analysis, and interpretation of data: Choudhury S, Ferdoucy SA; Data collection, consultation, and surgical team: Ghimire S, Shrestha S, Niraula L, Hossain S, Deepa ZS; Manuscript drafting and revising it critically: Begum M, Ghimire S, Shrestha S; Approval of the final version of the manuscript: Choudhury S. All authors read and approved the final manuscript.

Data Availability
The datasets generated and analyzed during this study are not publicly available due to patient confidentiality and institutional data protection policies. However, anonymized data may be made available from the corresponding author upon reasonable request, subject to approval by the institutional ethics committee.

Ethics Approval and Consent to Participate
Ethical approval for the study was obtained from the Institutional Review Board. As this was a prospective study the written informed consent was obtained from all study participants. All methods were performed in accordance with the relevant guidelines and regulations. The ethical approval was obtained from July 2024 to December 2024.

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