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CLINICAL SPECTRUM AND ICHD-3 CLASSIFICATION OF HEADACHE DISORDERS IN A TERTIARY CARE NEUROLOGY OUTPATIENT CLINIC:A ONE-YEAR PROSPECTIVE STUDY

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ABSTRACT

Background: Headache disorders represent a major burden in neurology outpatient clinics, yet comprehensive prospective datasets utilizing the International Classification of Headache Disorders, 3rd edition (ICHD-3) remain limited in Central India. Objective: To determine the demographic distribution and ICHD-3 clinical spectrum of headache disorders presenting to the Neurology Outpatient Department (OPD) of Gandhi Medical College, Bhopal. **Methods:** This one-year prospective observational study (January 1, 2025 to December 31, 2025) enrolled 481 consecutive headache patients. Diagnoses were established via structured clinical history, neurological examination, and targeted neuroimaging or laboratory investigations, including inpatient workup for patients admitted to wards or the intensive care unit (ICU). **Results:** Females predominated (326; 67.8%) over males (155; 32.2%; ratio 2.1:1), with peak clustering in the 21–40-year age group (62.4%). Primary headaches (Part 1) accounted for 368 cases (76.5%), led by migraine (185; 38.5%) and tension-type headache (147; 30.6%), alongside mixed migraine plus tension-type headache (16; 3.3%), other primary headaches (14; 2.9%), and trigeminal autonomic cephalalgias (6; 1.2%). Secondary headaches (Part 2) comprised 73 cases (15.2%), predominantly medication-overuse headache (19; 4.0%), cerebral venous sinus thrombosis (12; 2.5%), cervicogenic headache (12; 2.5%), and brain infections (9; 1.9%). Painful cranial neuropathies (Part 3, Section 13) accounted for 34 cases (7.1%), and headache not elsewhere classified (Section 14) for 6 cases (1.2%). **Conclusion:** While primary headaches dominate outpatient neurology consultations, nearly one-quarter of patients harbor secondary etiologies or cranial neuropathies requiring vigilant red-flag evaluation.

INTRODUCTION

Headache disorders rank among the most prevalent neurological conditions globally and represent a leading cause of disability among young and middle-aged adults [1]. Because headache spans benign primary neurovascular syndromes, analgesic overuse, cranial neuralgias, and life-threatening intracranial emergencies, accurate phenotyping at initial presentation is essential [2].

The International Classification of Headache Disorders, 3rd edition (ICHD-3) categorizes headache disorders into primary headaches (Part 1, Sections 1–4), secondary headaches (Part 2, Sections 5–12), and painful cranial neuropathies, other facial pains, and other headache disorders (Part 3, Sections 13–14) [3]. Although population-based studies in India report high prevalence rates of tension-type headache (TTH) and migraine [4], tertiary care neurology clinics encounter a distinct spectrum enriched with chronic, overlapping, and secondary etiologies [5,6]. Prospective hospital-based studies applying full ICHD-3 subtyping across Central India remain scarce. This study evaluated the demographic profile and complete ICHD-3 diagnostic distribution of patients presenting with headache to a tertiary neurology outpatient clinic in Bhopal.

MATERIAL AND METHODS

This prospective observational study was conducted in the Neurology Outpatient Department (OPD) of Gandhi Medical College, Bhopal, Madhya Pradesh, from January 1, 2025, to December 31, 2025, following written informed consent.

All 481 consecutive patients presenting with headache as a primary complaint were enrolled. Patients with incomplete records or declining evaluation were excluded. Each participant underwent structured clinical history taking (onset, frequency, location, pain quality, aura, autonomic features, analgesic usage, and red flags) and thorough neurological examination. Laboratory tests, ophthalmological/ENT evaluations, cerebrospinal fluid (CSF) analysis, and neuroimaging—computed tomography (CT), magnetic resonance imaging (MRI), or magnetic resonance venography (MRV)—were performed when clinically indicated. Patients exhibiting acute red flags requiring inpatient care were admitted to medical wards or the intensive care unit (ICU), and their definitive post-admission diagnoses were included in the final classification. All cases were categorized into one or more headache types strictly per ICHD-3 criteria [3]. Data were analyzed using descriptive statistics (frequencies and percentages).

RESULTS

Among 481 patients, females outnumbered males (326 [67.8%] vs. 155 [32.2%]; female-to-male ratio 2.1:1). Most patients were aged 21–30 years (159; 33.1%) or 31–40 years (141; 29.3%), together comprising 62.4% of the cohort, while only 4 patients (0.8%) were aged ≥61 years (Table 1).

Table 1: Demographic Distribution and Broad ICHD-3 Classification (N = 481)

Parameter / Diagnostic Category	Patients (n)	Percentage (%)
Age Group: 11–20 years	68	14.1%
Age Group: 21–30 years	159	33.1%
Age Group: 31–40 years	141	29.3%
Age Group: 41–50 years	69	14.3%
Age Group: 51–60 years	40	8.3%
Age Group: ≥61 years	4	0.8%
Sex: Female / Male	326/155	67.8%/32.2%
Part 1: Primary Headaches (Sections 1–4)	368	76.5%
Part 2: Secondary Headaches (Sections 5–12)	73	15.2%
Part 3: Painful Cranial Neuropathies & Facial Pains (Section 13)	34	7.1%
Part 3: Other Headache Disorders / NEC (Section 14)	6	1.2%
Total Cohort	481	100.0%

NEC: Not elsewhere classified. Age percentages sum to 99.9% due to rounding.

Primary headaches (Part 1) accounted for 368 cases (76.5%). Migraine was the commonest primary disorder (185; 38.5%), led by migraine without aura (112; 23.3%) and chronic migraine (37; 7.7%), followed by TTH (147; 30.6%). Coexisting mixed migraine plus TTH features occurred in 16 patients (3.3%), TACs in 6 (1.2%; 4 cluster headache, 2 paroxysmal hemicrania), and Section 4 primary headaches in 14 (2.9%), led by new daily persistent headache (4 cases) (Table 2).

Table 2: Subtype Distribution of Primary Headache Disorders (ICHD-3 Part 1, n = 368)

ICHD-3 Primary Headache Category & Subtype	n	% Primary	% Total
1. Migraine (Total)	185	50.3%	38.5%
Migraine without aura (1.1)	112	30.4%	23.3%
Chronic migraine (1.3)	37	10.1%	7.7%
Migraine with aura (1.2)	28	7.6%	5.8%
Probable migraine (1.5)	8	2.2%	1.7%
2. Tension-Type Headache [TTH] (2)	147	39.9%	30.6%
3. Mixed Headache (Migraine + TTH)	16	4.3%	3.3%
4. Trigeminal Autonomic Cephalalgias [TACs] (Total)	6	1.6%	1.2%
Cluster headache (3.1) / Paroxysmal hemicrania (3.2)	4/2	1.1% / 0.5%	0.8% / 0.4%
5. Other Primary Headache Disorders (Total)	14	3.8%	2.9%
New daily persistent headache [NDPH] (4.10)	4	1.1%	0.8%
Nummular (4.8) / Hypnic (4.9) / Sexual activity (4.3)	2/2 /2	0.5% each	0.4% each
Stabbing (4.7) / External-pressure (4.6) / Cough (4.1) / Thunderclap (4.4)	1 each	0.3% each	0.2% each
Total Primary Headaches	368	100.0%	76.5%

Secondary headaches (Part 2) comprised 73 cases (15.2%), led by medication-overuse headache (MOH; 19 cases, 4.0%), cerebral venous sinus thrombosis (CVST; 12, 2.5%), cervicogenic headache (12, 2.5%), and brain infections (9, 1.9%). Painful cranial neuropathies and facial pains (Part 3, Section 13) accounted for 34 cases (7.1%), predominantly optic neuritis (12; 2.5%) and trigeminal neuralgia (9; 1.9%), while 6 cases (1.2%) fell under Section 14 (Table 3).

Table 3: Secondary Headaches, Painful Cranial Neuropathies, and Other Headaches (ICHD-3 Parts 2 & 3, n = 113)

ICHD-3 Category & Etiology	n	% Subgroup	% Total
Part 2: Secondary Headaches (Sections 5–12)	73	100.0%	15.2%
Medication-overuse headache (8.2)	19	26.0%	4.0%
Cerebral venous sinus thrombosis [CVST] (6.6)	12	16.4%	2.5%
Cervicogenic / neck pain or muscle spasm (11.2)	12	16.4%	2.5%
Intracranial / brain infection (9.1)	9	12.3%	1.9%
Acute or chronic rhinosinusitis (11.5)	8	11.0%	1.7%
Headache attributed to head trauma (5.1/5.2)	7	9.6%	1.5%
Intracranial space-occupying lesion [SOL] (7.4)	2	2.7%	0.4%
Non-traumatic subarachnoid hemorrhage [SAH] (6.2)	2	2.7%	0.4%
Dental / temporomandibular disorder (11.6/11.7)	2	2.7%	0.4%
Part 3: Painful Cranial Neuropathies & Facial Pains (Section 13)	34	100.0%	7.1%
Pain attributed to optic neuritis (13.6)	12	35.3%	2.5%
Trigeminal neuralgia (13.1.1)	9	26.5%	1.9%
Painful trigeminal neuropathy [trauma / herpes zoster] (13.1.2)	5	14.7%	1.0%
Central neuropathic pain (13.12)	4	11.8%	0.8%
Occipital neuralgia (13.4)	2	5.9%	0.4%
Glossopharyngeal neuralgia (13.2.1) / Tolosa–Hunt syndrome (13.8)	1 / 1	2.9% each	0.2% each
Part 3: Other Headache Disorders / NEC (Section 14)	6	100.0%	1.2%
Total Non-Primary Headaches (Parts 2 & 3)	113	—	23.5%

DISCUSSION

This prospective one-year study characterizes 481 consecutive headache patients evaluated at a tertiary neurology clinic in Central India using ICHD-3 criteria. The strong female predominance (67.8%; ratio 2.1:1) and clustering in the 21–40-year age bracket (62.4%) mirror Indian epidemiological and clinic-based cohorts [4–6], reflecting hormonal influences, occupational stressors, and greater disability-driven consultation among young women.

Primary headaches comprised 76.5% of consultations, with migraine (38.5%) exceeding TTH (30.6%). Unlike community surveys where TTH is slightly more prevalent [4], tertiary neurology clinics routinely observe migraine predominance due to higher attack severity and disability [5,6]. Notably, 20.0% of migraine patients presented with chronic migraine (37/185) and 3.3% (16/481) displayed mixed migraine–TTH phenotypes, emphasizing headache chronification and symptom overlap in referral practice. Uncommon primary syndromes—including TACs (1.2%) and Section 4 disorders (2.9%, led by NDPH)—were systematically captured through structured ICHD-3 questioning.

Secondary headaches represented 15.2% (73/481) of cases, exceeding general-population rates. MOH was the leading secondary diagnosis (19 cases; 26.0% of secondary headaches), underscoring widespread unsupervised analgesic overuse among chronic headache sufferers [7]. Crucially, serious vascular, infectious, and structural emergencies initially presented to the outpatient clinic—specifically CVST (12 cases), intracranial infections (9 cases), intracranial SOL (2 cases), and non-traumatic SAH (2 cases)—many requiring urgent ward or ICU admission after red-flag detection [2,8]. Painful cranial neuropathies (7.1%), led by optic neuritis (12 cases) and trigeminal neuralgia (9 cases), further underscore the necessity of targeted neuroimaging and neuro-ophthalmological workup. Study limitations include single-center tertiary referral bias and absence of longitudinal inpatient outcome tracking.

CONCLUSION

Primary headaches—principally migraine and TTH in young adult females—account for 76.5% of neurology outpatient headache visits in Central India. However, 23.5% of patients harbor secondary headaches or painful cranial neuropathies, including preventable MOH and life-threatening emergencies such as CVST, intracranial infections, and SAH. Rigorous ICHD-3 phenotyping combined with systematic red-flag screening is vital for timely diagnosis and safe clinical triage.

Declarations

Ethical Approval and informed consent obtained from all participants.

Conflict of Interest: None declared. Funding: Nil.

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