

## Clinical profile of recurrent headache in rural children of Rajasthan: A cross-sectional study

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### ABSTRACT

**Context:** Recurrent headache is a commonly encountered clinical entity in rural children. **Aims:** This study aims to record the clinical profile of recurrent headache in rural children of Rajasthan. **Settings and Design:** A cross-sectional, observational study in a pediatric outpatient department of a tertiary care teaching hospital. **Methods and Materials:** A total of 164 children of either sex, between 5 and 17 years of age, presenting with complaints of a recurrent headache were included in the study. All relevant clinical details collected from patients and their relatives were recorded in a structured pro forma. A detailed examination was performed to rule out underlying problems associated with a headache. Headache subtypes were classified according to the International Classification of Headache Disorders, 3<sup>rd</sup> edition beta, 2013. Pediatric migraine disability assessment test score and Faces pain rating scale were utilized to assess the disability and severity, respectively. Statistical analysis involved summarizing the continuous variables as mean and standard deviation while nominal/categorical variables were expressed as percentages. **Results:** The mean age was 11.5 years and the M:F ratio was 1:1.1. Adolescents in 13–17 years age group constituted 61.5% (n=101) of the study sample with 58.4% (n=59) female subjects. Primary headaches - tension-type headache (n=77, 46.9%), migraine (n=43, 26.2%), and new daily persistent headache (n=5, 3%) were observed in 125 (76.1%) cases. Common causes of secondary headache were somatization disorder (n=27, 16.5%), ophthalmic problems (n=7, 4.3%), medication overuse (n=3, 1.9%), intracranial tumor (n=1, 0.6), and postictal (n=1, 0.6). **Conclusions:** Recurrent headache in rural children has distinct etiological profile which mandates a meticulous evaluation for initiating appropriate management.

**Key words:** *Recurrent, Headache, Rural, Children*

Headache is a common problem in children and adolescents worldwide and ranks third among illness-related causes of school absenteeism [1]. Prevalence estimates vary according to age, the definition of headache, and the method of data collection used, but as many as 60% of school-age children may experience headache infrequently at some point of time [2], while around 10% have recurring headaches [3]. Studies have found prevalence rates of 10–20% in school-age children [4,5] and >50% in those below the age of 20 years [2].

There is a paucity of available data on the clinical profile of recurrent headache in Indian children with studies in rural settings [6] being a rarity. The majority of studies have been school-based questionnaire surveys [4-5,7-18] in urban settings. This study was designed to record the clinical profile of recurrent headache in rural children in a hospital-based setting.

### METHODS AND MATERIALS

This cross-sectional, observational study was carried out in the pediatric outpatient department of a tertiary care hospital from April 2015 till October 2017. This teaching hospital is situated 50 km from Jaipur city amidst rural surroundings. Apart from Jaipur district, it

also caters to a significant chunk of rural population from adjoining Alwar, Dausa, Bharatpur, Karauli, Kota, Churu, Sikar, and Jhunjhunu districts of eastern Rajasthan and bordering districts of Haryana.

Children of either sex, between 5 and 17 years of age, presenting with complaints of a recurrent headache were included in the study after obtaining written informed consent from their parents or guardians.

For this study, a recurrent headache was defined as more than three headache episodes in past 12 months [19]. Children presenting with <3 headache episodes, headache due to fever, acute trauma, intracranial infections, dental or sinus infection, and chronic medical illnesses were excluded from the study.

The sample size of 160 subjects was calculated by considering an 11% prevalence of childhood migraine with a 5% margin of error and 95% confidence level.

A structured pro forma was prepared to collect relevant details from parents and record clinical examination data in relation to recurrent headache in the study subjects. All patients were evaluated as per recommendations [18]. A detailed ophthalmological, ear, nose, throat and dental examinations were performed by the respective consultants to rule out underlying problems associated with a headache. Spectacles for correction

of vision were prescribed wherever indicated and its impact on occurrence and severity of a headache was assessed on follow-up. Magnetic resonance imaging brain and fundus examination were performed in those patients presenting with a history or examination suggestive of an intracranial neoplasm, seizures, refractory error, or strabismus. A psychiatric evaluation was carried out by a consultant psychiatrist in study subjects with suggestive clinical history and where other common causes of headache were ruled out by history, examination, or by investigations.

Headache subtypes were classified according to diagnostic criteria laid down in the International Classification of Headache Disorders, 3<sup>rd</sup> edition beta (ICHD-3b) ©International headache society [20], 2013 and which are mentioned as follows (Table 1):

Pediatric migraine disability assessment test score was utilized to assess the disability arising due to a headache in past 3 months

[21]. For this, the parents were advised to keep a written record of the headache episodes and the resultant disability in the child, in their own language. The utility of a Faces pain rating scale [22] (score=0–5) was demonstrated before the parents so that the severity of an acute headache episode can be assessed at home and reviewed on a follow-up visit which was scheduled every 4 weeks. All parents were adequately counseled at the time of diagnosis and on follow-up. They were personally contacted if they failed to follow-up.

Statistical analysis involved summarizing the continuous variables as mean and standard deviation (SD) while nominal/categorical variables were expressed as percentages. All the above analysis was performed using SPSS version 17 software. The study was approved by the ethics committee of the institution.

**Table 1: Classification of headache according to ICHD-3b criteria**

1	Migraine without aura	At least five attacks of headache with each attack lasting 4–72 h and bearing typical characteristics – bilateral (in children)/unilateral (in adolescents) location, pulsating quality, moderate or severe intensity, aggravation by routine physical activity and association with nausea and/or vomiting, photophobia, and phonophobia
2	Probable migraine without aura	Headache satisfying all but one of the features required to fulfill all the criteria for migraine without aura and which is not explained by other headache disorder
3	Migraine with aura	At least two attacks with each attack lasting 5–60 min, of unilateral, fully reversible visual, sensory, speech/language, or other central nervous system symptoms (aura) that usually develop gradually and are usually followed by headache and associated migraine symptoms
4	Infrequent tension-type headache	Infrequent episodes of headache (on<1 day/month), typically bilateral, pressing or tightening in quality and of mild to moderate intensity, lasting from 30 min to 7 days. The pain does not worsen with routine physical activity and is not associated with nausea, pericranial tenderness but photophobia or phonophobia may be present
5	Frequent tension-type headache	Frequent episodes of headache (at least 10 episodes occurring on 1–14 days/month on average for>3 months) with similar characteristics as infrequent tension-type headache
6	Probable tension-type headache	Tension-type like headache missing one of the features required to fulfill all the criteria for tension-type headache as above and not fulfilling criteria for another headache disorder
7	NDPH	A headache evolving from frequent ( $\geq 15$ days/month on average for>3 months) episodic tension-type headache with similar pain characteristics and not fulfilling criteria for another headache disorder
8	Headache associated with somatization disorder	Headache evolves, significantly worsens, fluctuates, or remits in parallel with other somatic symptoms such as chest pain, backache, nausea, vomiting, bloating, menstrual dysfunction, and dysphagia and which cannot be better accounted by another ICHD-3 diagnosis
9	Headache attributed to refractive errors	Headache associated with uncorrected or miscorrected refractive error (s) in one or both eyes and which develops, worsens, and remits subsequently with correction of refractive error (s)
10	Headache attributed to squint	Headache associated with latent or persistent squint and which develops, worsens, and remits subsequently with correction of underlying squint
11	Headache associated with overuse of acetylsalicylic acid	Headache associated with regular intake of acetylsalicylic acid for 15 days/month for more than 3 months and which usually, not invariably, resolves after the overuse has stopped
12	Headache attributed to intracranial neoplasia	Headache has developed in temporal relation to intracranial neoplasia or led to its discovery or the headache significantly worsens or improves with worsening or treatment of lesion, respectively
13	Postictal headache	Headache caused by or occurring within 3 h after a partial or generalized epileptic seizure and remitting spontaneously within 72 h after seizure termination

ICHD-3b: International classification of headache disorders, 3<sup>rd</sup> ed.ition beta, NDPH: New daily persistent headache

## RESULTS

Of the 247 patients presenting with a headache during the study period, 25 patients were excluded as per stated criteria, 21 refused to participate, and 37 patients failed to follow-up. Finally, 164 patients (78 boys) were included in the study. The mean age (SD, range) of these study subjects was 11.5 years (2.43, 5–17) and the M:F ratio was 1:1.1. The etiology of recurrent headache in the study subjects is shown in Table 2.

Among primary headaches - tension-type headache, migraine, and new daily persistent headache were observed in 76.1% cases. Migraine without aura constituted 88.3% (n=38) of patients with migraine (n=43). A headache due to underlying psychiatric problems was the most common cause of a secondary headache followed by a headache attributed to ophthalmic disorders.

Myopia was newly diagnosed in five patients and was corrected with appropriate spectacles. An increase in occurrence of recurrent headache was observed with increase in age (Table 3).

Adolescents in 13–17 years age group constituted 61.5% (n=101) of the study sample with 58.4% (n=59) female subjects. Recurrent headache due to migraine and psychiatric disorders was commonly observed in adolescent females. The clinical profile of the study subjects is shown in Table 4.

The average duration of headache illness was  $1.63 \pm 0.9$  years. Mean duration of headache episodes was 3.57 h. A headache was characteristically reported as “throbbing” and “band-like” tightening sensation by migraine (n=32, 78%) and TTH (n=57, 74%) patients, respectively. A family history of migraine could be elicited in only 12 patients (27.9%), whereas triggers inciting a migraine episode could be identified in

**Table 2: Etiology of recurrent headache in study subjects (n=164)**

Type of headache	ICHD-3 code	Number of cases (n)	% age of total cases (n=164)
Primary headache			
1. Tension-type headache	2	77	46.9
a). Infrequent episodic	2.1.2	55	
b). Frequent episodic	2.2.2	17	
c). Probable freq. episodic	2.4.2	05	
2. Migraine	1	43	26.2
a). Without aura	1.1	38	
b). With aura	1.2.1.1	03	
c). Probable without aura	1.5.1	02	
3. NDPH	4.10	05	3.0
Total	-	125	76.1
Secondary headache			
1. Headache attributed somatization disorder	12.1	27	16.5
2. Headache attributed to disorder of the eyes	11.3	07	4.3
a). Attributed to refractory error	11.3.2	05	
b). Attributed to squint	11.3.3	02	
3. Acetylsalicylic acid overuse headache	8.2.3.3	03	1.9
4. Headache attributed to intracranial neoplasm	7.4.1	01	0.6
5. Postictal headache	7.6.2	01	0.6
Total		39	23.9

ICHD-3b: International classification of headache disorders, 3<sup>rd</sup> edition beta, NDPH: New daily persistent headache

**Table 3: Etiology of recurrent headache according to age and gender**

Etiology of headache	Gender		Age group (in years)/gender-wise distribution					
	M	F	5–<9		9–<13		13–17	
			M	F	M	F	M	F
Tension-type headache (n=77)	51	26	02	00	20	10	29	16
Migraine (n=43)	13	30	01	01	04	09	08	20
New daily persistent headache (n=5)	03	02	00	00	00	00	03	02
Headache attributed to somatization disorder (n=27)	05	22	00	00	02	05	03	17
Headache attributed to disorder of the eyes (n=7)	03	04	00	00	01	02	02	02
Acetylsalicylic acid overuse headache (n=3)	01	02	00	00	00	00	01	02
Headache attributed to intracranial neoplasm (n=1)	01	00	01	00	00	00	00	00
Postictal headache (n=1)	01	00	00	00	00	00	01	00
Total (n=164)	78	86	04	01	27	26	47	59

**Table 4: Clinical profile of study subjects with recurrent headache (n=164)**

Characteristics	TTH* n=77	Migraine n=43	NDPH** n=5	Others*** n=39
Age at presentation (years)				
5-<9	02	01	00	01
9-<13	32	13	00	10
13-17	43	29	05	28
Sex				
Male (n=78)	50	13	03	11
Female (n=86)	27	30	02	28
Location				
Frontal	21	12	02	07
Temporal	02	25	02	01
Occipital	01	01	00	01
Diffuse	53	05	01	30
Character				
Throbbing	04	38	02	01
Bandlike/tightening	66	04	02	01
Sharp	03	00	00	02
Dull/undefined	04	01	01	35
Duration of typical episode (hours)				
<1	07	01	00	31
1-3	49	12	03	08
>3	21	30	02	00
Frequency				
Daily	06	00	05	29
Weekly	21	20	00	03
Monthly	43	12	00	07
2-3 monthly	07	11	00	00
Disability (n=125)	n=63	n=30	n=2	n=30
No (score=0-10)	06	00	00	04
Mild (score=11-30)	42	12	01	24
Moderate (score=31-50)	15	18	01	02
Severe (score≥50)	00	00	00	00
Severity (n=125)	n=63	n=30	n=2	n=30
<2	03	00	00	03
2-3	55	25	01	27
4-5	05	05	01	00

Tension-type headache, \*\*new daily persistent headache, \*\*\*cases of secondary headache

15 (34.8%) cases only. The majority of patients with migraine (n=31, 72%) or tension-type headache (n=59, 76.5%) had symptoms of chronic duration (>1 year). The severity of a headache and the resultant disability could be assessed in only 125 patients (76.2%) appearing for follow-up (Table 4). Of 95 patients of primary headache, remission from headache and associated symptoms was observed in 84 (88.4%) along with poor compliance (n=8, 8.4%) and partial response (n=3, 3.2%) to treatment in the remaining patients. All patients (n=27) with headache secondary to somatization disorder were provided appropriate therapy and counseling at the time

of diagnosis by the psychiatrist. A remission in headache with concomitant disappearance of associated somatic symptoms was observed in 21 patients (77.7%) on follow-up. Regular use of spectacles with appropriate lenses resulted in correction of myopia and strabismus and relief from headache in 7 (100%) cases. Two patients reported remission from headache for few days on withdrawal of acetylsalicylic acid that was being overused earlier, only to follow-up with features of tension-type headache episodes presently. One patient diagnosed as a case of astrocytoma with recurrent headache was operated in the department of neurosurgery of this institution.

## DISCUSSION

Recurrent headaches may have a considerable impact on the quality of life as it may affect productivity at school, general work capacity, and leisure time activities of the affected child. This hospital-based cross-sectional study aimed to record the clinical profile of recurrent headache in children of rural background.

Among children with primary headache, tension-type headache was diagnosed in 77 (46.9%) as compared to migraine in 43 (26.2%) children. Malik *et al.* [16] reported the prevalence of tension-type headache and migraine to be 50.99% and 26.98%, respectively, in their school-based study. Similarly, Bugdayci *et al.* [10] have reported it as 24.7% and 10.4%, respectively. Mishra *et al.* [19] have reported 21 (48.8%) children with migraine and 11 (25.6%) with tension-type headache in their hospital-based study. However, no hospital-based Indian study reporting a higher occurrence of tension-type headache could be identified. Recent reviews indicate a higher prevalence and disability attributed to tension-type headache than migraine [23,24]. A significant observation during follow-ups in all the study subjects with tension-type headache was the absence of pericranial tenderness as has been classically described in ICHD-3b classification [20].

Age was observed to affect occurrence of headache. Both tension-type headache and migraine increased with increase in age (Table 3) in male and female subjects, respectively. A Swedish study [25] observed similarly, especially in girls. Other studies [26,27] have described a similar escalating trend of headache frequency, duration, severity, and resultant disability with age in adolescents. A family history of migraine could be elicited in 12 (29.2%) patients only in comparison to that of Mishra *et al.* [19] (23%). However, other studies [28,29] have observed a significant proportion of study subjects with positive family history in the first degree relatives.

In this study, new daily persistent headache was observed in five adolescent patients with some having overlapping features suggestive of a tension-type-like headache or a migraine-like headache (Table 4). Abu-arafteh [30] observed similar headache presentation in 81% cases. Chakravarty [31] had described patients with a “baseline” chronic daily headache of more than 3 months duration among 8–15-year-old children with superimposed episodic spells of a migraine-like headache.

A significant number of patients presented with secondary headache (n=39, 23.9%) in comparison with other studies [19,32]. This may be due to the fact that the study subjects belonged from far-flung rural areas where medical facilities are inadequate, leading to chronic untreated underlying health problems associated with headache. In this study, the most common cause of secondary headache was due to psychiatric problems (16.5%). The majority (81.4%) of patients were school-going adolescent females who reported headache in association with multiple unexplainable symptoms such as bloating, chest pain, back pain, difficulty in swallowing, and irregular menses in varying combinations.

Psychiatric evaluation revealed gender discrimination, family conflicts, social pressure for early marriage, and discontinuation in studies as underlying issues rampant in any rural society. The frequency of somatization in the population of children and adolescents is estimated at 10–25% [33]. In diagnostically difficult cases of headache, it is recommended that a detailed psychiatric history of the patients and their family members should also be taken [34]. Anxiety arising out of poor academic performance was noted in study subjects with chronic tension-type headache [35] and chronic daily headache [31]. In comparison to other studies [19], headache due to refractory errors and strabismus was observed in seven patients. Coexistence of errors of refraction and headache is not unusual [36]. This is in contrast to the earlier studies [37,38] which failed to show any conclusive evidence for a relationship between headache and refractory errors.

A headache attributed to chronic analgesic overuse was observed in three patients who had primarily experienced episodic tension-type headache but over a period of time complained of increased recurrence of headache after frequent ingestion of acetylsalicylic acid. A remission in headache on withdrawal of the drug was documented during follow-ups. Such cases were similarly observed in other studies [39,40].

Majority of patients consulted after 1–2 years of onset of their recurrent headache episodes due to inability to access medical facilities from remotely located rural areas. Reliance on alternative therapies - Homeopathy, Unani, and Ayurveda over a chronic period with limited or no relief was cited as the reason. Moreover, the local unqualified practitioner or a quack’s “help” was sought at times to relieve acute episodes.

The strengths of this study are that it is the first hospital-based study which attempted to shed light on the prevalent causes and clinical profile of recurrent headache in children from rural background. The sample size was adequate to lend sufficient power to this study. Due to the availability of a well-defined headache subtypes in ICHD-3b classification [20], all cases could be recognized and specified. At the same time, it could not calculate the prevalence due to difficulty in defining the exact catchment area for this tertiary level hospital. An assessment of severity and disability arising due to recurrent headache could not be performed in all the study subjects as 39 (23.7%) patients failed to appear on follow-ups despite several telephonic reminders. As this hospital also has a department of general medicine and neurology as a superspecialty, other relatively rarer types of primary or secondary headaches could not be included.

## CONCLUSION

Recurrent headache is a commonly encountered entity in children from rural background with significantly different etiological profile. Further, the currently available extensive classification has helped to recognize and treat various headache entities as evident in this study. However, a population-based community survey to know the exact prevalence of headache in vast stretches of hinterland is the need of the hour.



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