



## CLINICAL PROFILE OF CHILDREN WITH HEADACHE

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### Abstract

**Background:** This study was done to study the clinical profile of children with headache.

**Methodology:** The present study was conducted in the Dr. D. Y. Patil medical college, hospital and research Centre, Pimpri, Pune and study was carried out over a period of 2 years from July 2020 to July 2022. A total 100 children were enrolled who had complaints of headache. Ethical committee approval was taken before the start of the study.

**Results:** Majority of the patients were in the age group of 8-10 years (56%). In the study, 53% of the subjects were females and 47% of the subjects were males. 60% of the children had more than one episode of headache per week and 40% of the children had more than two episodes in a year. 75% of children complained of having bilateral headache and 25% had unilateral headache. In our study group, 72% of children had primary headache and 28% had secondary headache. 86% patients had duration of symptoms lasting for more than 15 minutes. Nausea, photophobia, phonophobia, and dizziness were the commonest symptoms in all headache subtypes.

Children with headache were graded on quality of life with help of pedMIDAS severity grading scale, 48% children were in grade 2 followed by grade 1 (23%) and grade 3 (22%). Majority of the children had mild pedMIDAS disability (44%) followed by moderate (25%) and little to none (24%). In the present study, 17 patients underwent neuroimaging. Out of those, seven children had normal MRI findings, just had features of sinusitis without any neuro parenchymal abnormalities, only two children were found to have had obstructive hydrocephalus and other children showed various other neuro parenchymal abnormalities.

**Conclusion:** Headache is a common neurological disorder presenting in pediatric OPD. In this study, 72% were primary headache and 28% were secondary headache. The proportion of children with primary headache was much more than secondary headache. Early diagnosis and treatment significantly affect the outcome of headache disorders in children and can improve quality of life in day-to-day activities and scholastic performance

**Keywords:** headache, clinical profile, children, migraine, migraine prophylaxis, tension-type headache

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## 1. INTRODUCTION

Headache is a common complaint in children and adolescents. Headaches in children are frequently under recognized and under treated. It is estimated that worldwide about 60% of children and adolescents are prone to headache and migraine accounts for about 8%.<sup>1</sup> The prevalence is estimated to be 10-20% in the school-age population, increasing with age to around 27-32% at 13-14 years of age.<sup>2</sup> Primary headaches are unaccompanied by any structural, metabolic or any other lesion in the body in general and brain in particular, whereas secondary headaches are caused by exogenous disorders. Migraine has been ranked one of the most debilitating diseases with a disability score of 0.7 by World Health Organization (WHO).

Headaches which are more frequent can have an extensive impact on quality of life of the child and adolescent as reflected in poor scholastic performance, suboptimal participation in regular activities, loss of productivity, social withdrawal and changes in family interactions. Headache can cause a negative effect on quality of life, as well as physical and mental health. Certain factors like lifestyle, environment and psychological aspects can act as trigger and influence headache prevalence and frequency. Also, behavioral problems, mood disorders, allergies, chronic diseases such as asthma and obesity, and sleep disorders can also play a role in the causation of headache in childhood.<sup>3</sup>

There has been reported increase in headache prevalence when children go from preschool to elementary school during transition phase.<sup>4</sup> Studies have depicted the characteristic higher female-male ratio after adolescent period.<sup>5</sup> A Poor outcome was noted with a longer time between headache onset and first medical consultation, stressing the importance on adequate diagnosis and management in pediatric patients.<sup>6</sup>

Neuroimaging is not always necessary to confirm a distinct headache diagnosis. In order to make a responsible clinical and economically affordable decision to the patient, it is important to differentiate between a primary headache and secondary headache disorders, which are often associated with brain pathology. However, in most cases when neuroimaging is performed in headache patients, without associated neurological symptoms, the results may be negative.

The objective of the present study was to evaluate the prevalence and clinical profile of children with headache aged 8 to 15 years of age.

## 2. MATERIALS AND METHODS

The present study was conducted in the Dr. D. Y. Patil medical college, hospital and research Centre, Pimpri, Pune and study was carried out over a period of 2 years from JULY 2020 to JULY 2022. A total 100 children with complaints of headache were enrolled and clinical profile was studied. Before the start of study, a clearance from Institute ethics committee was obtained.

### Inclusion Criteria:

- All children aged 8 years to 15 years of both gender with history of headache, acute or chronic, primary or secondary headache, attending Paediatric Neurology OPD or Paediatric OPD or admitted in Paediatric ward of Dr. D.Y. Patil medical college, Pimpri, Pune.
- Secondary headache is defined as headaches which occur due to an underlying etiology, such as infectious etiology, trauma, sinusitis, brain tumors and refractive errors.

### Exclusion Criteria:

- All children below 8 years and above 15 years of age.

### Methodology

A cross sectional observational study was conducted at department of pediatrics at Dr. D. Y Patil Vidyapeeth Pune, over a period of 2 years from July 2020 to July 2022. This center is a tertiary care teaching institute with a well-functioning pediatric neurology OPD and IPD. The study population included children above 8 years and under 15 years of both genders with history of headache of any duration, etiology, including acute, recurrent headaches, who attended pediatric neurology OPD or Pediatric OPD or were admitted in ward of Dr. D.Y. Patil medical college, hospital and research center, fulfilling inclusion criteria were enrolled in the study after getting informed consent from the parents. Recurrent headache is defined as 2 episodes of headache in the last 6 months. Children with recurrent headache were enrolled in this study. All clinical details and examination findings were documented after

questioning all patients and parents using a structured format clinical proforma were given a written questionnaire to fill which included questions related to socio-demographic profile, age of onset of headache, course, location and laterality, frequency, duration of episodes and associated symptoms, detailed medical, family and developmental history which was documented during their OPD visit. Severity scoring was done using pedMIDAS scoring system for cases with Headache. Each child was evaluated by a single pediatric neurologist and final diagnosis of headache was made according to ICHD 3 criteria. Necessary investigations were done including Neuro-imaging, EEG, Xray paranasal sinuses, Dental, ENT and ophthalmic evaluation, wherever indicated.

### 3. RESULTS

Table 1: Patient characteristics

Age groups (years)	Number	Percentage
8-10	56	56.0
10-12 years	38	38.0
12-15 years	6	6.0
<b>Gender</b>		
Male	47	47.0
Female	53	53.0
<b>Frequency of headache</b>		
More than 1 episode a week	60	60.0
More than 2 episodes in a year	40	40.0
<b>Laterality</b>		
Unilateral	16	24.2
Bilateral	50	75.7

<b>Headache Type</b>		
Primary headache	72	72.0
Secondary headache	28	28.0
<b>Duration of symptoms</b>		
Less than 15 minutes	14	14.0
Between 15-30 minutes	40	40.0
More than one hour	46	46.0
<b>Prophylaxis required</b>		
Yes	9	9.0
No	91	91.0

Majority of the patients were in 8-10 years of age group 56% followed by 10-12 age group 38% and 12-15 age group 6%. In the study, 53% were females and 47% were males. 60% children had headache more than one episode a week and 40% had more than two episodes

in a year. 75% had bilateral headache and 25% had unilateral headache. 72% had primary headache and 28% had secondary headache. 86% patients had duration of symptoms more than 15 minutes. 9 patients required prophylaxis.

Table 2: Pain scale

<b>Pain scale</b>	<b>Number</b>	<b>Percentage</b>
Very mild	15	15.0
Discomforting	31	31.0
Tolerable	20	20.0
Distressing	15	15.0
Intense	16	16.0
Very Intense	3	3.0
Excruciating	0	0
Total	100	100.0

In the study, most of the patients had discomfort on the rate of pain scale followed by tolerable.

Table 3: PedMIDAS Grade

<b>PedMIDAS Grade</b>	<b>Number</b>	<b>Percentage</b>
0	1	1.0
1	23	23.0
2	48	48.0
3	22	22.0
4	5	5.0
6	1	1.0
Total	100	100.0

48% children were in grade 2 followed by grade 1 (23%) and grade 3 (22%).

Table 4: PedMidas disability

<b>PedMidas disability</b>	<b>Number</b>	<b>Percentage</b>
Little to none	24	24.0
Little	2	2.0
Mild	44	44.0
Moderate	25	25.0
Severe	5	5.0
Total	100	100.0

Majority of the children had mild PedMidas disability 44% followed by moderate 25% and little to none 24%.

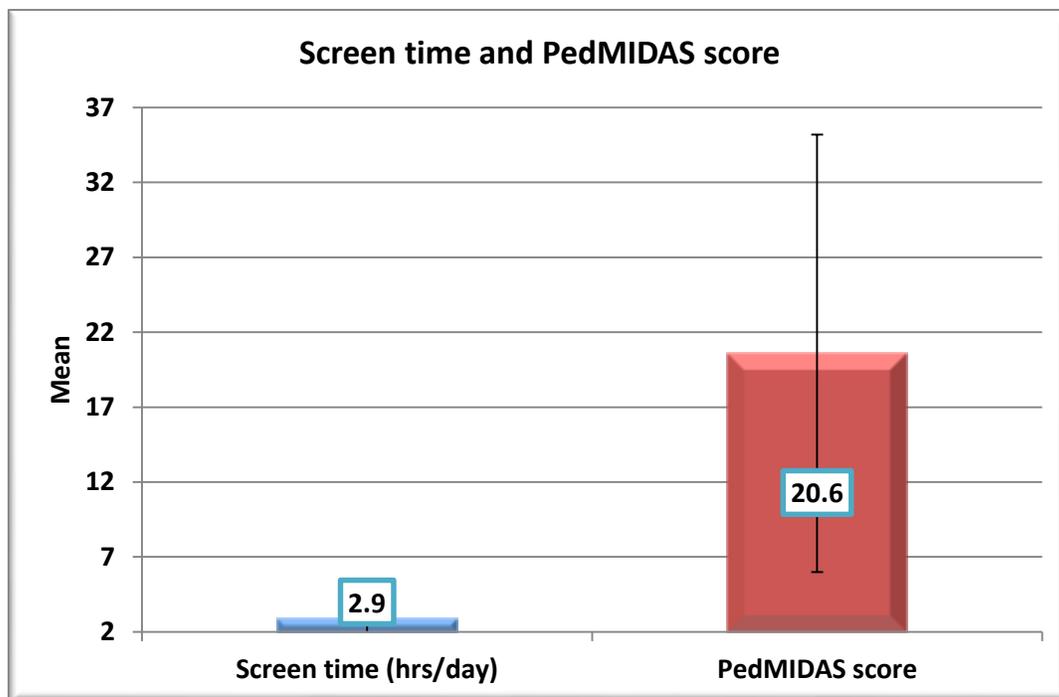


Table 5: Relation of screen time with PedMidas score.

Table 6: Underlying causes for headache

Underlying cause	Number	Percentage
Migraine	46	46.0
Tension Headache	27	27.0
Refractory error	6	6.0
Encephalitis	6	6.0
Posterior Fossa Brain Tumour	2	2.0
Sinusitis	2	2.0
Head Trauma	2	2.0
Obstructive hydrocephalus	2	2.0
Hypertension	1	1.0
Neurofibromatosis	1	1.0
Pyogenic Meningitis	1	1.0
Tuberous Sclerosis	1	1.0
Space occupying lesion	4	1.0

Arteriopathy	1	1.0
Total	100	100.0

Table 7: Neuroimaging (n=17)

Neuroimaging	Number	Percentage
Normal MRI	7	7%
Extensive mucosal thickening s/o sinusitis	3	3%
Findings s/o likely sequelae previous old haemorrhagic leucoencephalitis	1	1%
Findings s/o neurofibromatosis type 1	1	1%
Findings s/o obstructive hydrocephalus	2	1%
Findings suggestive of tuberous sclerosis	1	1%
Multiple ill-defined foci of cystic encephalomalacia with surrounding gliosis s/o previous hypoglycaemic insult	1	1%
Small vessel ischaemic changes can be migraine related	1	1%
Total	17	100%

In the present study, 17 patients underwent neuroimaging. Out of 17 patients, 7 had normal MRI followed by 3 with Extensive mucosal thickening s/o sinusitis and 2 patients with obstructive hydrocephalus.

#### 4. DISCUSSION

Headache is one of the most common reasons for visit to the pediatric outpatient department. Chronic daily headache (CDH) is defined as headache for at least 15 days a month for three or more months.<sup>7</sup>

The prevalence of headache in our study was found to be 72% of primary and 28% in secondary headache. A study in Taiwan reported the lifetime prevalence of migraine to be 6.8%.<sup>8</sup> Headache was observed to be prevalent in 29.1% (1465/5039) school going children in South Korea.<sup>9</sup> A Brazilian study the prevalence of headache was found to be

80.6%.<sup>10</sup> In this study, maximum children (56%) belonged to the age group 8-10 years, followed by 38 % falling in 10-12 years age group and 6 % in 13-15 years age group. A study by Agarwal et al. reported that 90 % children were 10 years or older in their study. In a study of 3–18-year-olds by Mishra et al (29), the median age was 10 years. In a Korean study<sup>11</sup> of 3–18-year-olds, the mean age was 10.9 years. A Taiwanese study<sup>8</sup> reported that migraine increased with age in both the sexes. The mean age of students with headaches ( $14.02 \pm 3.03$ ) was significantly high than students without headaches ( $12.73 \pm 3.36$ ) ( $P < 0.001$ ) in their study. Malik et al.<sup>12</sup> also reported that the prevalence of headache revealed an upward trend with increasing age. However, an Italian study<sup>3</sup> reported no as such difference in age distribution when compared to prevalence, frequency or pain intensity of headache. The

decreasing trend of headache with age observed in our study is in contrast to several aforementioned studies. Presentation of Chronic Daily Headache was different between adolescents and adults; chronic Tension type headache and daily persistent headaches are relatively more common in adolescents, while chronic migraine is more prevalent in adults.<sup>13</sup>

In this study, headache was commoner in females (53%), similar to several other studies. Pan et al.<sup>14</sup> have observed that among headache cases, gender ratio is boys > girls for age group (3-7 years), boys = girls for age group (7-11 years), and girls > boys for age group 15 years. An Italian study<sup>3</sup> observed that female adolescents experienced headaches more frequently and more intensely than their male peers.

In this study, 60 % children experienced more than 1 episode of headache in a week (i.e., more than 4 episodes/month) and 40 % had more than 2 episodes in a year. A similar result was reported by Straube et al<sup>15</sup> who observed that 33% to 40% children had at least one headache per week (i.e at least 4 episodes per week) and 66% to 71% of age group 12-15 had at least one headache every three months. Malik et al.<sup>12</sup> reported that the frequency of headaches was 2.6 episodes/month in their study which was lower than in our study. In this study, maximum number of children had generalized pain (31 %), followed by 28 % children who had pain in the frontal area (28%), 18 % children who had pain in the temporal region, 14 % children who had pain in the occipital region.

In the Children's National Hospital study<sup>16</sup>, headache was most commonly located at frontal region in 66%, followed by occipital (26%), and temporal (22%). In this study, 75.7 % children reported bilateral pain and 24.2 % children reported unilateral pain. Bingol et al.<sup>17</sup> reported that bilateral pain in tension-type headache was more in

adolescents. In this study, 46% children had headache lasting for more than one hour, 40% had symptoms lasting for 15 to 30 minutes and 14 % children had headache lasting for less than 15 minutes. A study by Malik et al.<sup>12</sup> reported that the average observed duration of primary headache disorders was 6.3 hrs.

A migraine is not just a headache—it is a complex neurological condition. More than 60% of children with migraine experience a premonitory phase prior to the migraine attack which is characterized by various symptoms, such as pallor or shadows under the eyes, fatigue, anxiety, irritability, phonophobia, photophobia, yawning, nausea, and, less commonly, concentration problems, cacosmia, food craving, hyperactivity, neck pain, stiff neck, sleep problems, and sadness.<sup>18</sup>

In this study, a majority of children (31 %) reported discomforting pain, while 20 % reported tolerable pain and 16 % reported intense pain. Very mild pain and distressing pain was reported by 15 % each. 3 % reported very intense pain. None of the children reported excruciating pain. The average PedMidas score was  $20.6 \pm 14.6$ , with the range being from 1 to 93. In this study, the majority of the children (48 %) reported Ped MIDAS Grade 2 headache, followed by 23 % who reported Grade 1 headache and 22 % who reported Grade 3 headache. 5 % reported Grade 4 headache and 1 % reported Grade 6 headache. Fuh et al<sup>19</sup> observed that students suffering from migraine had the highest Pediatric Migraine Disability Assessment scores ( $10.7 \pm 20.0$ ); whereas, the students with tension-type headaches were found to have the lowest scores ( $2.0 \pm 4.4$ ) In a Logistic regression analyses it was indicated that Ped MIDAS score  $\geq 31$  was an independent predictor for a migraine or probable migraine diagnosis, a higher depression score, severe headache intensity, and frequent headaches. A study by Brna et

al.<sup>20</sup> reported that headache severity at the time of diagnosis was predictive of long-term prognosis of headaches and outcome after 20 years. In this study, 72 % children had primary headache and 28 % had secondary headache.

In our study, of the 45 % children who had migraine, 20 % needed prophylaxis, while 80 % children did not need any prophylaxis. Medication use increased in the 10 years during since last follow-up. Selective serotonin receptor agonists (triptans) were not used by any patient. In the Children's National Hospital Study<sup>16</sup>, 80% of study participants reported the used of abortive medications, with use of ibuprofen (51%) and acetaminophen (29%) noted to be most common. In this study no patients with symptoms of trigeminal neuralgia were seen. Neuroimaging was arranged for wherever indicated and total 17 patients underwent MRI Brain out of which 7% had normal MRI findings, 3 had findings of sinusitis, 2% had

findings suggestive of obstructive hydrocephalus Findings suggestive of old hemorrhagic leucoencephalitis, tuberculous sclerosis, cystic encephalomalacia and small vessel ischemic changes were noted in 1%.

The main limitation of the study was that due to the sample bias this data could not be used to represent the general population. This needs to be done in a multicentric way.

A study done at a medical college at solan in Himachal Pradesh, India, clinical profile of headache in 100 children between age 8-18 years was studied and severity was graded using Numerical rating scale (NRS), while in our study we have used pedMIDAS scale<sup>21</sup>. Their study found migraine to be the commonest type of headache, as we found in our study too.

In our study we have studied relation of screen time with severity of headache, the mean screen time usage was 2.9 hours for children, with an increase after the lockdown.

Following table compares the underlying causes of headache in several studies.

Table 8: summary of underlying cause of headaches reported in several studies in comparison to our study is given in the above table.

Study	country	Migraine %	TTH %	RE %	Other %
Our study	Pune, India	45	27	6	-Encephalitis-6% -Brain tumour -2% -Sinusitis 2% -Head trauma and Obstructive hydrocephalus 2% each -Focal seizure, HTN, Neurofibrotosis, pyogenic meningitis- 1 % each
Mishra et al.	North India	60.5	25.6	0	-nonspecific headache 9.3 %
Malik et al.	Srinagar, India	27	51	NR	NR
Agarwal et al.	Gaziabad, India	28.3	29.2	12.3	-recurrent rhino sinusitis 13.2 % -unspecified 16.9 %

Turkdogan et al.		47	32	NR	NR
Fuh et al.	China	12.2 11.2 probable	27.6	NR	NR
Rho et al.	Korea	8.7	13.7	NR	6.7
Xavier et al.	Brazil	19.3	17.9	NR	43.4 % other
Goto et al.	Japan	8.5	16.6	NR	NR
Bharadwaj et al	Solan India	52%	23%	13%	Sinusitis (4%) Otitis media (1%) Dental caries (1%) Psychiatric disorder (1%)

## 5. CONCLUSION

Headache is a common neurological disorder presenting in pediatric OPD. In this study, 72% were primary headache and 28% were secondary headache. Percentage of primary headache was more than secondary headache. This study has provided an insight into the pattern of childhood headache, and its presenting features, triggers, level of disability and its relation with screen-time. Early diagnosis and treatment significantly affect the outcome of headache disorders in children and can improve quality of life in day-to-day activities and scholastic performance.

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