**Original Research Article**

# Clinico-demographic profile of Primary Pediatric headache

Authors

## Arpita Adhikari[1], Abhilash Chavan[2], Swarali Joshi[2], Mona Gajre[3]

[1]Associate Professor , Department of Pediatrics, Division of Neurology & Developmental Pediatrics, Lokmanya Tilak Municipal Medical college & Hospital , Mumbai , India

[2]Junior Resident, Department of Pediatrics, Lokmanya Tilak Municipal Medical college & Hospital , Mumbai , India

[2]Fellow-Pediatric Neurology , Department of Pediatrics, LokmanyaTilak Municipal Medical college & Hospital , Mumbai , India

[3]Professor, Department of Pediatrics, Lokmanya Tilak Municipal Medical college & Hospital, Mumbai, India

*Corresponding Author

**Arpita Adhikari**

Department of Pediatrics, Lokmanya Tilak Municipal Medical College & Hospital, Mumbai, India

**Abstract**

**Background:** *Headache is one of the most common neurological symptoms and the source of frequent referrals to neurology and is increasingly being recognized as a major source of morbidity in youth related to missed school days and activities. It is therefore essential for clinicians to have a thorough and systematic approach to the evaluation of headaches, because proper diagnosis and management can lead to improved outcomes and quality of life.*

**Methods:** *280 children diagnosed with primary pediatric headache at a tertiary care hospital in Mumbai were enrolled. The study was conducted between January 2019 to June 2020. Demographic data and clinical profile were collected and analysed.*

**Results:** *Of 280 study subjects, there were 164 females (58.6%) and majority (48.2%) were aged between 11-15 years. As per the International Classification of Headache Disorders - ICHD (3) beta version classification, Migraine without aura (16.4%) was the most common diagnosis and Probable Tension type headache (TTH) and Migraine with aura were the least common (3.6% each). Duration of screen exposure and sleep have shown significant association with primary pediatric headache. Migraine headaches showed the maximum impact on limitation of physical activity (52.4%) and school absentism (67.1%) along with worsening school performance (46.3%).*

**Conclusions:** *Pediatric primary headaches are most common in early adolescents and have a negative impact on school attendance, day to day activity and academic performance .Hence early diagnosis, referral and management can help improve the quality of life of these children.*

**Keywords:** *Primary headache, Migraine, Tension type headache, ICHD.*

## Introduction

Headache is one of the most common neurological symptom and the source of frequent referral to neurology. About 60% of children worldwide report at least 3 attacks of headache per year [1]

The International Headache Society proposed International Classification of Headache Disorders 3rd edition (ICHD) 3-beta in 2013.Headache disorders are classified on the basis of etiology into primary (no other underlying cause), secondary (when headache is a manifestation of another disorder) and undetermined etiology[1] The reported prevalence of primary headache in Indian population is 10-20% in school-aged children and >50% in those under-20years [2]

Primary headache can progress to very frequent or even daily headaches. Among primary headache, migraine and tension-type headache are being increasingly identified as a problem for children and adolescents. These more frequent headaches can have an enormous impact on the life of the child as reflected in school absentism, poor school performance, social withdrawal, and changes in family interactions[3]

Despite the high prevalence of headache in children, it continues to be under-diagnosed and undertreated. It is therefore essential for clinicians to have a thorough and systematic approach to the evaluation of headache and provide proper diagnosis and management which can lead to improved outcomes and quality of life [4],[5]

## Need for the study

A systematic review and meta-analysis of primary headache in children and adolescents [6] revealed a remarkable underrepresentation of studies from Asian countries, our study contributes to filling these lacunae.

## Methods

Study Design: Cross-sectional, Observational study.

**Study Place**: Outpatient department of Paediatrics, Lokmanya Tilak Municipal medical college & hospital, Mumbai.

**Duration of Study:** January 2019 to June 2020.

**Sample Size**: A total of 280 patients were enrolled in the study based on the sample size calculation by SAS 9.2 package. The sampling method used was convenience-based sampling for the study.

### Recruitment Procedure

### Inclusion Criteria

1. Children aged between 7 to 18 years attending pediatric and neurology outpatient services with chief compliant of headache.
2. Headache diagnosis made by using International Classification of Headache Disorders 3(beta version).

### Exclusion Criteria

1. Patients who were suspected to have headache due to any known systemic or secondary cause (due to meningitis, encephalitis, seizures or with intracranial space occupying lesion or CNS trauma cases).
2. Patients/Parents not giving consent for the participation in the study.

**Methodology:** Prospective cases data was obtained from patients in Pediatric Care services from January 2019 to June 2020 .Total 280 cases were identified of primary pediatric headache and studied in detail.

•The study was initiated only after institutional ethics committee permission was obtained. The study was performed in accordance with the ethical principles specified in the Declaration of Helsinki and as per the guidelines of Good Clinical Practice.

After enrollment, demographic details such as age, sex, detailed clinical history, complete physical & neurological examination were noted in the predesigned proforma, thereafter classified according to ICHD 3 beta version. Data of the impact on limitation of physical activity and school performance were also noted.

**Statistical Analysis:** After data collection, data entry was done in a Microsoft Excel sheet.Data analysis was done with the help of statistical software Statistical Package for Social Sciences

software, Version 25.0 (SPSS).Data were presented in tables as well as figures, wherever needed descriptive statistics were used to note down the distribution of patients based on age, gender, patient history details, and other findings. A P-value of less than 0.05 was considered significant wherever applicable.

**Results**

280 pediatric primary headache cases age group 7 to 18 years old , were analyzed.

The mean age of presentation was 14.4 years (range: 7–18 years).

Of 280cases, 116 (41.4%) were male and 164 (58.6%) female with male/female ratio of 0.7:1.

**Table 1:** Distribution of Study Subjects according to the Age Group and Gender (N = 280)

| Parameters | 7-10years | 11-15years | 16-18years | Male | Female |
|---|---|---|---|---|---|
| Numbers | 29 | 135 | 116 | 116 | 164 |
| Percentage | 10.4 | 48.2 | 41.4 | 41.4 | 58.6 |
| **Mean age (SD)** | 14.44 ±2.58 years | | | | |

**Table 2:** Distribution of Study Subjects according to the Diagnosis (N=280)
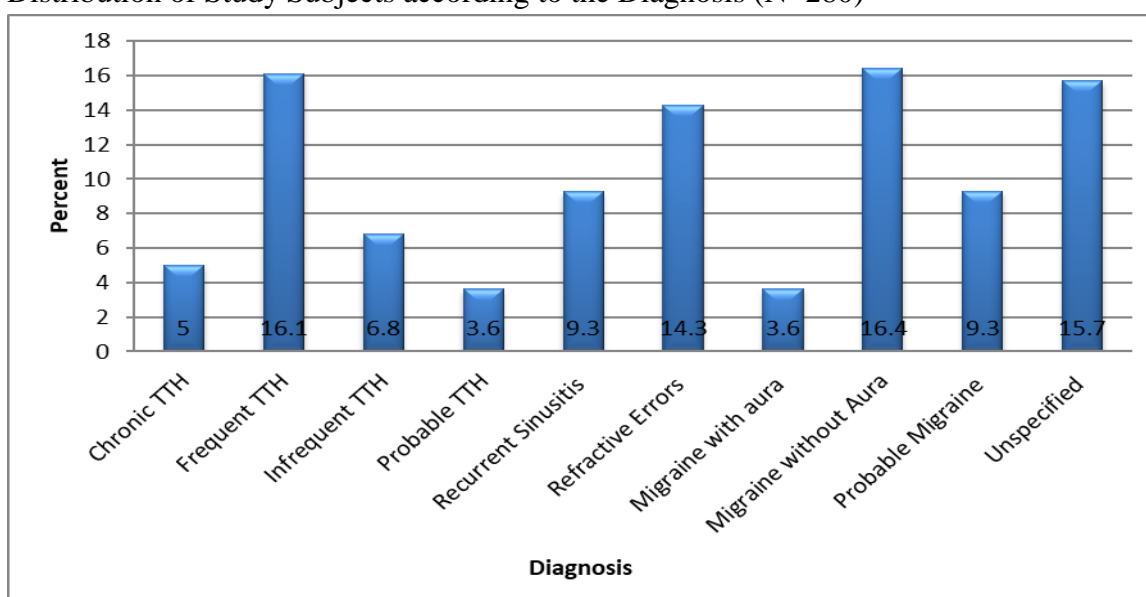


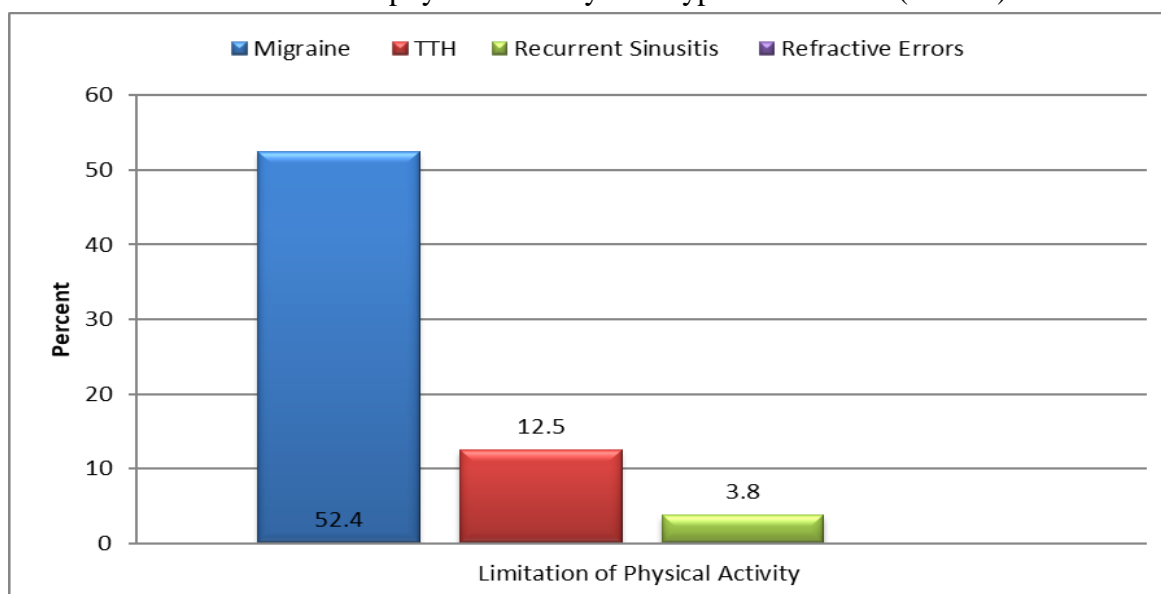**Table 3:** Distribution of Limitation of physical activity with type of headache (N=280)

**Table 4:** Distribution of Impact of Headache on School Absentism and school performance (N=280)

| Parameter | Migraine (n=82) | TTH (n=88) | Recurrent Sinusitis (n=26) | Refractive Errors (n=40) |
|---|---|---|---|---|
| School Absentism | 55 (67.1) | 11 (12.5) | 1 (3.8) | 2 (5.0) |
| Worsened School Performance | 38 (46.3) | 17 (19.3) | 1 (3.8) | 13 (32.5) |
| P Value **<0.001**, Significant | | | | |

**Table 5:** Distribution of Sleep pattern with type of headache

| Sleep hours | Migraine (n=82) | TTH (n=88) | Recurrent sinusitis (n=26) | Refractive errors (n=40) |
|---|---|---|---|---|
| <8hrs | 20(24.4) | 54 (63.4) | 00 | 5 (12.5) |
| 8 or > 8 hrs | 62(75.6) | 34 (38.6) | 26 (100.0) | 35 (87.5) |
| P Value **<0.001**, Significant | | | | |

**Table 6 :** Distribution of screen exposure in type of headache

| Screen exposure (hours/day) | Migraine (n=82) | TTH (n=88) | Recurrent Sinusitis (n=26) | Refractive Errors (n=40) |
|---|---|---|---|---|
| <1 | 1 (1.2) | | | |
| 1-2 | 55 (67.1) | 50 (56.8) | 1 (3.8) | 14 (35.0) |
| 2-4 | 6 (7.3) | 13 (14.8) | 24 (92.3) | 7 (17.5) |
| >4 | 20 (24.4) | 25 (28.4) | 1 (3.8) | 19 (47.5) |
| P Value **<0.001**, Significant | | | | |

In our study out of 280 cases, children in age group 11-15 years had maximum prevalence of headache with mean age of presentation 14.44 ± 2.58 years. M : F ratio was 0.7:1.

All cases were classified on the basis of ICHD (3) beta version. 10 (3.6%) cases of migraine with aura, 46 (16.4%) migraine without aura and 26 (9.3%) as probable migraine. 45 (16.1%) cases of Frequent TTH, 19 (6.8%) Infrequent TTH, 14 (5%) chronic TTH and 10 (3.6%) as probable TTH. Headache due to refractive error in 40 (14.3%) cases and 26 (9.3%) due to recurrent sinusitis. 44 (15.7%) children were labelled as headache unspecified as enough history was not available to classify the headache.

PedMIDAS scoring was used for assessing the limitation of physical activity in the different types of headaches. The score of more than 10 implied limitation of physical activity. In our study, it was observed to be maximum with migraine, 43 (52.4%) while in TTH it was found in 12.5%. One case (3.85%) with headache due to recurrent sinusitis also experienced limitation in activities.

Headache causing school absentism was found to be highest with Migraine in 55 cases (67.1%), followed by TTH in 11(12.5%). School absentism due to headache was also found in 2 (5%) cases affected with refractive error and one (3.8%) with recurrent sinusitis. School performance was affected in 38 (46.3%) cases of migraine and 17 (19.3%) cases of TTH.

In our study, we had divided sleep duration as <8hours, 8, > 8hours. <8hrs was considered to be inadequate sleep and 8 or>8hrs sleep as adequate sleep. TTH had maximum affliction on sleep in 54 (63.4%) cases in comparison to 20 migrainers (24.4%).

In our study, duration of screen exposure was divided into < 60mins as very low, 1-2hours as low, 2-4 hours as moderate and >4hours as high per 24 hours. It was found that Screen exposure was high in around one quarter cases of Migraine and TTH (24.4% and 28.4% respectively) and maximum with cases of refractive errors (47.5%).

## Discussion

This study describes the clinic-demographic features of children aged 7-18 years with primary headache as diagnosed using the ICHD- 3 classification.

The mean age of our study population was 14.4 years with SD value of 2.28.Malik et al study revealed an increasing trend in prevalence of primary headache disorders in adolescent age group 16-18 years, which was slightly higher than our study.Female preponderance in our study was similar to studies conducted by V Agarwal et al[4] and Malik et al[7]

International headache of classification (3) beta version helps not only in categorizing all types of headache but also provides subtype. In our study, Migraine without aura was the most common headache type diagnosed in children with prevalence of 16.4% followed by Frequent TTH with prevalence of 16.1%. Similarly V Agrawal et al and Malik et al used ICHD (3) beta version for diagnosis, they found TTH as most common headache type in children with prevalence of 29.2% followed by Migraine with 28.3% [4]

PedMIDAS score was used to classify the limitation of physical activity. Mishra et al reported Migraine (92%) to be associated with highest limitation of physical activity followed by TTH(72%), which was similar to our study.

School absentism and school performance were correlated with the type of headache. We found that 67.1% had school absentism in migrainers, while it was 12.5% children in TTH .In our study, the school performance was also seen to be worsened in primary headache disorders mostly affecting migraine children. 46.3% children in migraine had worsened their grades which can be explained by school absentism and associated symptoms of headache. School performance was also affected in TTH (19.3%) which may be attributed to chronic and frequent headaches in TTH. In headache due to refractive errors worsening of school performance was seen in only 13% children, probably because the refractory correction was done earlier.

As per international studies by Ferini-Strambi L et al and Bertisch SM et al, sleep is significantly affected in primary disorders [8][9]. In our study we had divided sleep duration in <8hours as inadequate sleep and 8 hours or more as adequate sleep as per the American Academy of Sleep Medicine (AASM) guidelines[10] The mean duration of sleep was 7.8 hours. Sleep duration was mainly affected in migraine and TTH. Sleep duration and pattern in primary headache disorders has not been well studied in India.

Electronic screens are becoming increasingly important in the lives of preteens and teens. In our study, duration of screen exposure was maximum with refractive errors (47.5%) followed by TTH & Migraine . Time spent on screen-based activities contributes to the chance of reporting general physical complaints, in particular, headache during early adolescence, therefore it is suggested that all children with primary headache should be evaluated for abuse of electronic screens in neurology practice[11]

## Limitations of the study

This is a single centre, non population-based study.

## Conclusion

The impact of headache disorders on individuals and society is extensive and provides an important target for public health interventions. Hence early diagnosis, referral and management can help improve the daily functioning, quality of life, school attendance and school performance of these children.

## References

1. Ishaq Abu-Arafeh,1 Massimiliano Valeriani, 2 Prab Prabhakar3. Indian Pediatr 2021;58:757-764
2. Mishra D, Sharma A, Juneja M, Singh K. Recurrent headache in pediatric outpatients at a public hospital in Delhi. Indian Pediatr. 2013
3. Hoskins NM. Nelson Textbook of Pediatrics. Am J Heal Pharm. 1976;33 (1):79–80.
4. Agarwal V, Rawat M, Chugh R. To identify the clinical profile of children (7-18 Years) presenting in General Pediatrics O . P . D with recurrent headache using international classification of headache disorders 3rd Edition (Beta Version). 2016;2(June):112–6.
5. Goryunova A V., Maslova OI, Dybunov AG. Primary headache in children. Zhurnal Nevrol i PsihiatrIm SS Korsakova. 2004;104(5):69–76.
6. Ann Indian Acad Neurol. 2021 Jan-Feb; 24(1): 8–10.doi: 10.4103/aian.AIAN_972_20
7. Onofri, A., Pensato, U., Rosignoli, C. et al. Primary headache epidemiology in children and adolescents: a systematic review and meta-analysis. J Headache Pain 24, 8 (2023). https://doi.org/10.1186/s10194-023-01541
8. Malik AH, Shah PA, Yaseen Y. Prevalence of primary headache disorders in school-going children in Kashmir Valley (North-west India). Ann Indian Acad Neurol. 2012;15(SUPPL.):100–3.
9. Ferini-Strambi L, Galbiati A, Combi R. Sleep disorder-related headaches. Neurological Sciences. 2019.
10. Bertisch SM, Li W, Buettner C, Mostofsky E, Rueschman M, Kaplan ER, et al. Nightly sleep duration, fragmentation, and quality and daily risk of migraine. Neurology. 2020;
11. Paruthi S, Brooks LJ, D'Ambrosio C, Hall WA, Kotagal S, Lloyd RM, et al. Consensus Statement of the American Academy of Sleep Medicine on the Recommended Amount of Sleep for Healthy Children: Methodology and Discussion.J Clin Sleep Med. 2016;
12. Hüseyin Çaksen. Ann Indian Acad Neurol. 2021 Jan-Feb; 24(1): 8-10.doi:10.4103/aian.AIAN_972_20