

## RESEARCH ARTICLE

### Prevalence of migraine among medical students of a tertiary care teaching medical college and hospital in South India - A cross-sectional study

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#### ABSTRACT

**Background:** Migraine is a common neurological disorder which affects the quality of life. In students, migraines cause absenteeism from classes and affect academic performance. They adversely affect the daily activities of sufferers and disrupt their lives. **Aims and Objectives:** This study was conducted to determine the prevalence of migraine among medical students in a tertiary care medical college and hospital in South India and also to assess the impact on migraine on their daily lives, intensity of migraine, and their therapeutic options seeking behavior, so adequate steps may be taken to prevent as well as adequately treat this ailment. **Materials and Methods:** A structured questionnaire was administered to the medical students of a tertiary care medical teaching hospital in South India, and data collected were analyzed to assess the location of headache (unilateral/bilateral/frontal), character, severity, duration, triggers, and family history of migraine. Migraine was diagnosed using ID migraine questionnaire (identification of migraine questionnaire). Migraine Disability Assessment was used to assess disability associated with migraine. Headache severity was assessed using the scale recommended by the international headache society. Results are expressed in  $n$  = numbers and percentage. **Results:** In our study ( $n = 366$ ), the prevalence of headache was 60% ( $n = 219$ ). Prevalence of migraine among medical students was 30% ( $n = 110$ ). Migraineurs ( $n = 110$ ) constituted 50% of the headache group. Triggers were identified in 94% migraineurs ( $n = 103$ ), predominantly emotional stress and anxiety. 49% of students ( $n = 54$ ) reported a family history of migraine. 65% of students ( $n = 71$ ) sought medications for migraine; 62% of migraineurs ( $n = 44$ ) used medicines prescribed by a doctor. Paracetamol was the most common analgesic used by 54% of students ( $n = 38$ ). Only 8% of migraineurs ( $n = 6$ ) used specific medication for migraine relief. **Conclusion:** Our study found a high prevalence of migraine among medical students with half of them suffering minimal disability due to migraine. Majority migraineurs had identifiable triggers. There is inadequate management of migraine among migraineurs as majority use non-specific drugs for headache relief.

**KEY WORDS:** Migraine; Migraine Disability Assessment; Identification of Migraine Questionnaire; Triggers; Medical Students

#### INTRODUCTION

Headaches are one of the most common neurological disorders. Primary headache disorders include tension-type headache, migraine, and cluster headache.<sup>[1]</sup> Headache is prevalent worldwide and affects people of all age groups, irrespective of their gender, educational level, socioeconomic status, and occupation.

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Migraine is a complex brain event that produces a wide range of neurological, autonomic, and systemic symptoms, of which headache is most prominent.<sup>[1]</sup>

A meta-analysis study on the prevalence of migraine has shown the global prevalence of migraine among adults to be 10%.<sup>[2]</sup> A population-based study from Karnataka, South India, reported the age-standardized 1-year prevalence of migraine as 25.2%.<sup>[3]</sup>

Migraines cause a great deal of suffering and adversely affect the quality of life. Repeated attacks can negatively affect family and social life, academic performance among students, and their choice of future employment.<sup>[4,5]</sup> Studies report migraine association with increased risk of depression.<sup>[6,7]</sup> The global burden of disease study, updated in 2013, found migraine by itself to be the sixth highest cause worldwide, of years lost due to disability.<sup>[1]</sup>

The undergraduate medical course - MBBS in India lasts for 5 and 1/2 years<sup>[8]</sup> with a rigorous and demanding curriculum. The students have to assimilate vast amounts of information and perform well in classes and examinations all through the long years of training. Frequent migraines can be disruptive and adversely affect the academic, social, and personal lives of students and can have life-altering consequences. The frequency of migraine attacks may even have a bearing on the choice of their further specialization and jobs.

A study published in the Indian Journal of Public Health reports that there were only 4.8 practicing doctors per 10,000 population available in India in 2014. The study also estimates to achieve a modest doctor-to-population ratio of 1:1000, and India will need 2.07 million more doctors by 2030.<sup>[9]</sup> In view of this scenario, it becomes all the more imperative that the health issues of the young doctors, who form the pillars of the scientific, economic, social, and healthcare community of the country, must be addressed and treated so that they can render valuable service to the community.

Several studies have been conducted both in India and abroad on prevalence and character of headaches. Study subjects for most of these studies are general population or patients visiting hospitals. There is a paucity of information on prevalence, pattern, and therapy-seeking behavior among medical student population in India. Studies on the prevalence of migraine among medical students, who form a niche group of the general population, will help in identifying high-risk groups among the study population, identifying triggers and knowing the impact of migraine on their quality of life.

To the best of our knowledge, the prevalence of headache among medical students of our college has not been investigated. There are no data available on the prevalence and intensity of migraine, triggering factors and the impact of migraine on daily lives of the migraineurs, and their

treatment-seeking behavior. Hence, this study was conducted to determine the prevalence of migraine among medical students in a tertiary care medical college and hospital in South India and also to assess the impact on migraine on their daily lives, intensity of migraine, and their therapeutic options seeking behavior, so adequate steps may be taken to prevent as well as adequately treat this ailment.

## MATERIALS AND METHODS

The study was conducted in a medical college, attached to a tertiary care hospital in South India. It was a descriptive, cross-sectional, questionnaire-based study. The target population was medical students.

After obtaining the ethical clearance from the institutional ethics committee, study questionnaire was distributed to students during working hours. Before distribution of the questionnaire, students were informed that their participation in the study was purely voluntary, and they were assured that any information provided by them in the questionnaire would be kept confidential. The questionnaire was distributed to all the students of first, second, third, and fourth year of medical college. The purpose of the study was informed, and a written consent was obtained from them before distribution of the questionnaire. Completed responses were collected on the spot. Inclusion criteria were all the medical students who volunteered for the study. Students with headaches due to secondary causes such as refractory errors, hypertension, head injuries, and sinusitis were excluded from the study.

First part of the questionnaire sought information regarding demographics (age, gender, diet, and levels of physical activity). Second part contained questions related to diagnosis of migraine using ID Migraine questionnaire,<sup>[10]</sup> assessment of impact of migraine on their daily lives using Migraine Disability Assessment (MIDAS) score questionnaire,<sup>[11]</sup> rating of the intensity of headache using 4-point headache severity scale,<sup>[12]</sup> characteristics of headache - location, quality, and duration of the ache, family history, triggers for migraine and medications used by participants for the treatment of migraine, and if the medications were self-prescribed or not.

Identification of Migraine (ID Migraine™) questionnaire has demonstrated good validity.<sup>[13]</sup>

Sensitivity, specificity, and positive predictive value of this test in primary care have been defined as 81%, 75%, and 93%, respectively.<sup>[13]</sup>

MIDAS score questionnaire helps to measure the impact of migraine on the life of migraineurs. It contains five questions regarding a number of days of regular activities missed by the participant due to headaches suffered, over the past 3 months. After filling the questionnaire, the total number of days from questions 1–5 is totaled to arrive at a score. Disability can

be graded from the scores as Grade I (0–5 score) little or no disability, Grade II (6–10 score) mild disability, Grade III (11–20 score) moderate disability, and Grade IV (21 and above score) severe disability.

Headache severity scale is recommended for use in migraine research by the International Headache Society. Respondents rate the severity of their pain on a four-point scale where 0 = no headache, 1 = mild headache, 2 = moderate headache, and 3 = severe headache.

Participants were asked to indicate triggers for their headaches from a list of common triggers provided in the questionnaire. The list included hair wash,<sup>[14]</sup> hot water bath,<sup>[15]</sup> exposure to noise, exertion, weather/climate change, alcohol consumption, smoking, caffeinated beverages, menstruation, emotional stress or anxiety, irregular sleep, missing a meal, exposure to sun, prolonged computer use, and others.

Each completed questionnaire was duly studied, and diagnosis of migraine was made according to response to ID migraine questionnaire. Data were tabulated and analyzed to assess prevalence, severity, location, quality, duration, and triggers of headache along with the grade of disability suffered by the migraineurs. They were also analyzed for medications taken for pain relief.

Collected data were analyzed to assess the prevalence, frequency, severity, and triggers of migraine. Statistical Package for the Social Sciences for Windows version 22 was used. Simple descriptive statistical methods (mean and standard deviation) were used to describe numerical data of the sample. Frequency and percentage were used to present categorical values.

A comparison of variables between males and females was performed using the independent *t*-test for quantitative variables and the Chi-square test for categorical variables.  $P < 0.05$  was considered as statistically significant.

## RESULTS

A total of 600 structured questionnaires were distributed to first, second, third, and fourth years of undergraduate medical students with 150 students per batch. Only 400 students returned the completed questionnaires which were scrutinized for completion. Of the returned questionnaires, 34 questionnaires were found to be incompletely answered and hence excluded from the study. The remaining 366 completely filled questionnaires were included in the study. Final analysis was performed on information provided by the 366 respondents (156 males and 210 females). The mean age of the respondents was  $19.5 \pm 1.94$  years. Gender difference was not statistically significant ( $P = 0.54$ ). Among the included respondents, 59.8% ( $n = 219$ ) had headache and 62.5% ( $n = 137$ ) of the subjects with headache were

females. Among those with headaches, 50% of students ( $n = 110$ ) fulfilled the criteria for migraine according to ID Migraine™ questionnaire. Among the migraineurs, 63% ( $n = 69$ ) were females. Migraineurs constituted 30% ( $n = 110$ ) of the medical student study population. In the subgroup of students having headache, migraineurs constituted 50% ( $n = 110$ ). Gender difference between subjects without migraine ( $n = 256$ ) and migraineurs ( $n = 110$ ) was not statistically different ( $P = 0.75$ ). Prevalence of migraine among females was 32.8%, and among males, it was 26.2%.

Demographic data showed that 78% ( $n = 86$ ) of migraineurs were non-vegetarians and only 40% ( $n = 47$ ) of students engaged in a moderate intensity activity, for example, a brisk walk (i.e., the fastest pace that one can maintain) for at least 30 min every day for at least 5 days a week.

Majority of the migraineurs experienced bilateral headache 41% ( $n = 45$ ) of dull throbbing nature 36% ( $n = 40$ ) and of moderate intensity 45% ( $n = 50$ ). 38% ( $n = 42$ ) of migraineurs reported that their headache lasted for more than 4 h [Table 1].

The headache severity scale recommended by the International Headache Society was used to assess the severity of migraine headache among the participants. Majority of the migraineurs 45% ( $n = 50$ ) reported of suffering from moderately severe headache.

MIDAS score was used to determine the effect of migraine on the lives of the migraineurs.

**Table 1:** Characteristics of headache among migraineurs ( $n=110$ )

Characteristics	Number of students (%)
Headache location	
Unilateral	33 (30)
Bilateral	45 (42)
Frontal	32 (29)
Headache quality	
Pulsatile	35 (32)
Dull throbbing	40 (36)
Sharp stabbing	35 (32)
Duration	
<4 h	68 (62)
>4 h	42 (38)
Family history	
Yes	54 (49)
No	56 (51)
Headache severity	
Mild	38 (35)
Moderate	50 (45)
Severe	22 (20)

It showed that 52.7% ( $n = 58$ ) of students had minimal disability Grade I with a mean score of 2.1, 17.2% ( $n = 19$ ) of students had mild disability Grade II with a mean score of 7.8, 13.6% ( $n = 15$ ) of students had moderate disability Grade III with a mean score of 16.2, and 16.3% of students ( $n = 18$ ) had severe disability Grade IV with a mean score of 38.1. No difference was found between males and females with regard to their MIDAS scores [Table 2].

A majority of students 94% ( $n=47$ ) were able to identify triggers for their migraine and 43% ( $n =$ ) of them had more than one trigger. Major trigger was emotional stress reported by 9% ( $n = 10$ ) of students, followed by hair wash and exposure to sun by 7% ( $n = 8$ ) of students for each and irregular sleep reported by 6% ( $n = 7$ ) of students. Of the 69 female migraineurs, 6% ( $n = 4$ ) reported menstruation as a trigger [Figure 1].

In response to the query regarding the drugs used for relief from migraine, 65% ( $n = 71$ ) migraineurs reported using medications. Of the migraineurs using drugs, 62% ( $n = 44$ ) used drugs prescribed by a doctor.

Paracetamol was the most common analgesic used by 54% of students ( $n = 38$ ) followed by a combination of paracetamol and ibuprofen used by 18% ( $n = 13$ ) of students. Specific antimigraine drug - Migranal (ergotamine) was used by only 8% ( $n = 6$ ) of students [Table 3].

Among migraineurs who consulted doctors for migraine relief, 36 students (82%) consulted general physicians, 1 (2%) consulted an ophthalmologist, and 7 (16%) consulted a neurologist.

## DISCUSSION

Our study showed the prevalence of migraine was 30% (32.8% in women and 26.2% in men) among medical student study population. Half the percentage of students with headache in our study group conformed to the diagnosis of migraine. There were more number of female migraineurs 69 (63%), but migraine prevalence was not associated with gender.

According to a population-based study conducted in Karnataka, age-standardized 1-year prevalence of migraine was found to be 25.2%.<sup>[3]</sup> Higher migraine prevalence of 30% in our study can be explained by the study population which is under considerable stress as compared to general population. This is in agreement with the meta-analysis study on the global epidemiology of migraine at community level which concluded that there is a higher prevalence among school/college students and urban residents.<sup>[16]</sup>

In a study conducted among medical students in a medical college in Andhra Pradesh, India, migraine prevalence was found to be 28%.<sup>[17]</sup> This is almost similar to our study results.

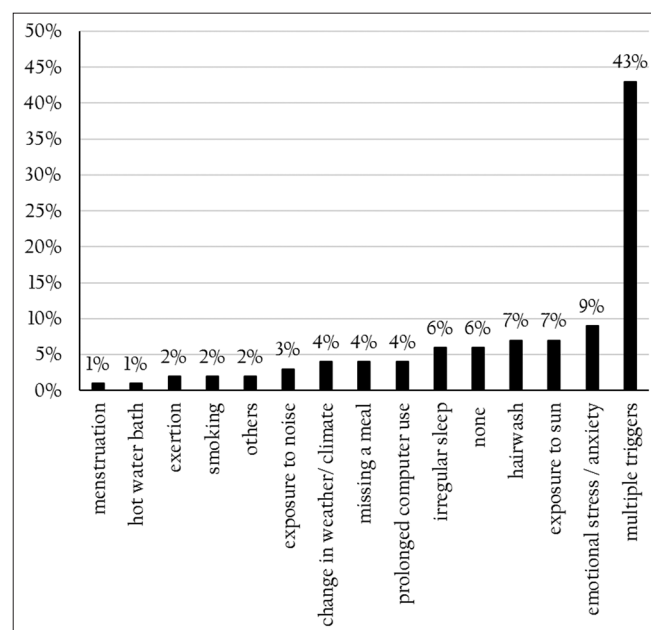
**Table 2: MIDAS grading of migraineurs**

MIDAS grade	Male (%)	Female (%)	Total (%)
I	25 (22.7)	33 (30)	58 (52.7)
II	6 (5.45)	13 (11.8)	19 (17.2)
III	4 (3.6)	11 (10)	15 (13.6)
IV	6 (5.45)	12 (10.9)	18 (16.3)

MIDAS: Migraine Disability Assessment

**Table 3: Medications used by the migraineurs ( $n=71$ )**

Drug used	Number of students (%)
Paracetamol	38 (54)
Paracetamol+ibuprofen	13 (18)
Migranal (ergotamine)	6 (8)
Paracetamol+domperidone	4 (6)
Aspirin	1 (1)
Others	9 (13)



**Figure 1: Triggers for migraine**

Prevalence of migraine among our students is higher than 13.44% prevalence reported from a study conducted among dental students in a tertiary care dental hospital in Northern India.<sup>[18]</sup>

Worldwide, migraine prevalence among medical students is variable. It was found to be comparatively less in studies conducted among university students in Greece 2.4%,<sup>[19]</sup> Turkey 12.6%,<sup>[20]</sup> Oman 12.2%,<sup>[21]</sup> and Spain 16%.<sup>[22]</sup> In a study conducted among students belonging to a National Hospital in Nairobi, migraine prevalence was found to be 33.8%.<sup>[23]</sup>

The prevalence of migraine in our study is higher compared to results of studies in other countries but lesser than the Nairobi study results.

Worldwide variance in the prevalence of migraine among medical students could be as a result of different stressors in different universities and the method used to diagnose migraine headaches. It could also be due to different geographical location, socioeconomic and nutritional status, racial, psychological and climatic factors, and personal habits of subjects in various studies contributing to headache.

Among the migraineurs in our study, almost half of them, (52.7%) had Grade I disability. In an epidemiological study conducted in France, majority of the subjects (74.7%) had Grade I disability.<sup>[24]</sup> Our study scores reflect similar results.

A family history of headache was seen in 49% of students in our study. This is higher than 31% reported in the study conducted among medical students in Rajahmundry, Andhra Pradesh,<sup>[17]</sup> and 20% from a study conducted among dental students in North India.<sup>[18]</sup> Our result falls within the reported range from 20% to 80% in other studies, worldwide.<sup>[25,26]</sup> The high rate of family history in our study suggests a genetic factor as a cause for migraine.

A majority of the study subjects (60%,  $n = 66$ ) did not engage in any form of moderate physical activity on a regular basis. These results reflect the results of a study conducted among the medical students in a Rajahmundry Medical College, Andhra Pradesh, where only 4% of students exercised daily and 33% did not engage in any form of exercise. The remaining students indulged in mild-to-moderate form of exercise, infrequently.<sup>[17]</sup> A study has shown that students who do not indulge in regular physical activity are at a risk of developing recurrent headaches.<sup>[27]</sup> Another study concluded that exercise is an alternative to prophylactic treatment among migraineurs.<sup>[28]</sup> A study conducted in the National Institute of Mental Health and Neurosciences, Karnataka, India, on patients with migraine, was found that patients who practiced yoga along with conventional therapy showed statistically significant reduction of headache impact test score. These patients also reported better improvement in their headaches as compared to those who used only conventional care.<sup>[29]</sup>

Similar findings have been reported by the investigators of a randomized controlled trial conducted in NMP Medical research Institute, Rajasthan, India. They studied the effectiveness of yoga intervention on migraine headache among the patients from their headache clinic and from the general population and found that the practice of yoga had a beneficial effect on the frequency, intensity, duration of attack of migraine, the medication score, nature of pain, anxiety, and depression of the patients.<sup>[30]</sup>

In our college, the 1<sup>st</sup> year MBBS Physiology curriculum incorporates 16 h of yoga classes including theory and practical classes. Students are taught various asanas during the practical sessions. However, not many students continue to practice yoga after the completion of these

yoga classes. Hence, students should be encouraged to engage in physical activities, more often, to continue the practice of yoga even after the completion of yoga classes, to maintain their general well-being, to reduce the frequency and intensity of migraine attacks, and to improve their quality of life.

Triggers are common in migraineurs and they experience various triggers. Our study population is exposed to a variety of stress throughout the long duration of their study and reported a variety of triggers. Trigger factors in our study were poor sleep habits, emotional stress, weather changes, hair wash, hot water bath, and lack of sleep. This is similar to other studies which have reported sleep disturbance and emotional stress as triggers for migraine.<sup>[2,6,24,27,31]</sup> 7% of migraineurs also reported hair wash as a trigger. Hair wash or head bath is an unusual trigger found in Indians which has been previously documented.<sup>[14]</sup>

There was a 6% prevalence of menstrual migraine in our study, which is similar to the findings of 6.2% menstrual migraine prevalence in a study conducted at a medical college in Rajahmundry, Andhra Pradesh.<sup>[17]</sup>

Some triggers such as sleep pattern, emotional stress, and hair wash are modifiable, and their identification can help to avoid them and thereby prevent migraines. Migraine due to non-modifiable triggers such as weather changes and menstrual cycles can be prevented by taking prophylactic medications.

In our study, a majority of the migraineurs 65% ( $n = 71$ ) gave a positive history of drug intake for the relief of migraine. More than half the percentage - 62% ( $n = 44$ ) of those who took medications - did so after consulting a doctor. Non-prescription drugs were consumed by most of the migraineurs for relief from headache with paracetamol being the most common drug consumed by 54% ( $n = 38$ ) migraineurs. Although triptans and ergot preparations are a specific class of drugs to treat pain and associated symptoms of migraine, only 6 subjects (8%) in our study consumed Migranal. In a study conducted in Turkey,<sup>[32]</sup> it was found that only a minimal number of 5 (3.9%) subjects used drugs from the triptan group and ergot preparations were not used at all. A study conducted among dental students in North India reports 75% migraineurs having positive drug history with only 4 (25%) subjects taking specific drugs for migraine, and paracetamol was the most common analgesic used in 25 (36.76%) students.<sup>[18]</sup> Results of our study show inadequate management of migraine. Hence, the physicians must be made aware of the extent of migraine among medical students and the need for prescription of specific drugs for headache relief for effective treatment of migraine attacks.

## LIMITATIONS

The migraine diagnosis was not confirmed by a neurologist. We did not subclassify the migraine headaches. There is a risk of subjectivity in answering some of the questions in the self-administered questionnaire.

## CONCLUSION

Results of our study showed a high prevalence of migraine among medical undergraduates with half the migraineurs suffering from minimal disability due to migraine. Majority of the migraineurs had identifiable triggers, some of which were modifiable. Knowledge of triggers can help personalize their treatment. Many students continue to treat their migraines with simple analgesics. Hence, educational programs may be needed for the subjects to recognize the importance of effective migraine treatment and to tailor their treatment accordingly. Early detection of migraine and its effective treatment will help to reduce the disability suffered from migraine and to improve the quality of life of the migraineurs.

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