**International Journal of Research in Pharmacy and Pharmaceutical Sciences**
**ISSN: 2455-698X**
**Impact Factor: RJIF 5.22**
**www.pharmacyjournal.in**
**Volume 3; Issue 2; March 2018; Page No. 30-37**

# Clinical profile and management of migraineurs in north India

**Ankit Gaur**
Department of Pharmacy Practice, ISF College of Pharmacy, Moga, Punjab, India

**Abstract**
This cross-sectional study was carried out six months period in Department of Neurology, Guru Gobind Singh Medical College and Hospital (GGSMCH), Faridkot. 300 Patients who were diagnosed with migraine of within the age of 18-75yrs were enrolled in our study after taking their written consent. Disability was assessed using Migraine Disability Assessment Score (MIDAS). Among the total study population 22.7% were male and 77.3% were female. Many patients were from the rural area 65.3%. By the occupation majority of the patients were housewife 61.3%. Location of the headache in majority of the patients was Unilateral changing sides, constricting and pulsatile i.e. up to 21.3%. Significantly higher combined precipitating factors that are responsible for migraine are physical activity/humidity/dust/smell/lack of sleep and depression. The regimen for migraine treatment was constituted mostly of NSAIDS, antidepressants and proton pump inhibitors which was given to the 53.3% of the patients. In prophylaxis of migraine, monotherapy was used most commonly in 55.3% patients followed by dual therapy and poly therapy. In our study the occurrence of migraine was more in females as compared to their male counterparts apart from this the rural population and married individuals developed migraine often. More studies are needed for identification of associations between symptoms, signs, and pathology and treatment based strategies in the Indian population.

**Keywords:** headache disorders, migraine, drug utilization review, prescription pattern, clinical characteristics of migraine

## 1. Introduction

Drug utilization studies are great exploratory tools to ascertain the role of drugs in the society, they generate a sound socio-medical and health economics basis to make health care decision [1, 2]. Drug utilization research is a collection of descriptive and analytical methods for the quantification, understanding and evaluation of the processes of prescribing, dispensing, and consumption of medicines, and for the testing of interventions to improve the quality of these processes [3]. Drug utilization research was defined by World Health Organisation (WHO) in 1977 as the marketing, distribution, prescription and use of drugs in a society, with special importance on the resulting medical, social and economic consequences [4]. It also provides unique approach for insight into the efficacy of drug use i.e. whether a certain drug therapy provides value for money. Drug utilization research can therefore help to set priorities for the rational allocation of health care budgets.

Migraine is a common, complex, incapacitating malady. Migraine is the 3rd most prevalent and 7th leading cause of disability worldwide. According to the International Headache Society (IHS), Migraine is a throbbing or pulsating headache that is experienced on one side of head usually accompanied with nausea, vomiting and sensitivity to light, sound and smell. A migraine attack can very last anywhere from 4-72 hours during which the sufferer may want to rest in a silent and dark place [5]. Population- based studies have shown that approximately 6% of men and 18% of women suffer migraine attacks [6] and over 80% of these suffer some degree of headache-related disability [6-8]. Despite of the high prevalence, migraine is under-recognized and undertreated [8]. Long-term management of migraine is often a major challenge primarily because it is a chronic condition with frequent episodic attacks, with varying characteristics among patients and even within attacks in the same patient. Migraine attacks vary not only in severity but also in occurrence.

In case of Indian set-up migraine is highly prevalent in India, and associated with considerable disability, especially among women and rural populations. It's prevalence was reported in 2014 as 25.2% in South India and 14.12% in East India [9, 10]. From an urban headache clinic in India found that 47% of patients were found to have migraine without aura and only 4% had migraine with aura; Indian data for the incidence of migraine with aura appear to be lower when compared with data from other parts of the world. Most migraine patients get habituated to living with headache as an integral part of their day-to-day life. Unlike in many developed countries, figures for the economic burden due to unpredictable absenteeism, frequent consultations, extensive investigations, repeated prescriptions, and ineffective over-the-counter medications, are unfortunately not available for India. Although there is as yet no biological marker to confirm the diagnosis, there have been a number of advances in diagnosis and treatment of migraine. Effective treatments are now available which are changing the way migraine is managed. Yet most patients with migraine are never diagnosed by a physician or treated with prescription medications [11] and those who do receive care are treated in so many different ways that they are finally dissatisfied with the results and keep on to suffer [12].

### 1.1 Pathophysiology of Migraine

The pathophysiology of migraine has historically been

acknowledged to be a process of vasoconstriction resulting in ischemia of brain tissue, followed by vasodilation of the cerebral arteries. This theory was believed to be supported by the focal neurologic changes often seen in migraine [13]. Activation of trigeminal sensory nerves triggers the release of vasoactive neuropeptides, including calcitonin gene-related peptide, neurokinin A, and substance P from perivascular axons. Vasodilation of dural blood vessels may occur with extravasation of dural plasma resulting in inflammation [14]. These neurochemicals produce inflammation, extravasation of plasma and vasodilatory changes which lead to a pulsatile headache. Initial vasoconstriction of intracranial and extracranial arteries causes a transient ischemia that may lead to prodrome symptoms such as confusion, vertigo, and hemiparesthesias [15].

Serotonin (5-hydroxytryptamine or 5-HT) is believed to play a significant role in mediating cerebral dilatory changes and inflammation. Release of serotonin triggers the stimulation of pain fibers [16]. Manipulation of 5-HT levels impacts perceived pain, but does not influence vasoconstriction or dilation [17]. Menstrual and postpartum migraines are believed to be initiated by rapidly falling levels of estrogen which trigger a vasospasm. This theory may help explain the higher prevalence of migraine in the female population. Some theorists have proposed that a decrease in estradiol and estrone may be the trigger for perimenopausal headaches [18].

## 2. Materials & methods

This was a descriptive cross-sectional study approved by Institutional Human Ethical Committee of ISF College of Pharmacy Registration no: ISFCP/IEC/2017-17/P-06. All relevant details of the enrolled patients were obtain from various data sources and documented in data collection form. Our study was conducted on a patient pool of 300 from August 2017 to December 2017 period in Department of Neurology, Guru Gobind Singh Medical College and Hospital (GGSMCH), Faridkot. Patients who were diagnosed with migraine of within the age of 18-75yrs and who were willing to participate were enrolled in our study after taking their written consent. The patient who are not willing to participate in the study, Pregnant and lactating mothers and patients with major neurological disorders (e.g. epilepsy, space occupying lesions, neurodegenerative disorders) were excluded from the study. Diagnosis was made on the basis of medical history and physical examination, and, if necessary, tests to rule out other diseases or conditions causing the headache were done. Disability was assessed using Migraine Disability Assessment Score (MIDAS).

A diagnosis of migraine is usually made on the basis of repeated attacks (at least 5) that meet the following criteria [5]:

- Attacks of headache last for 4 - 72 hours.
- Headache having atleast 2 of the following characteristics: Location on one side of the head; throbbing pain; moderate or severe pain intensity; pain worsened by normal physical activity (such as walking or climbing stairs).
- During the headache, the patient has one or both of the following characteristics: Nausea or vomiting; extreme sensitivity to light or sound.
- The headache cannot be attributed to another disorder.
- The study was approved by the institutional ethics committee and informed consent was obtained from all the study subjects. Specially designed data collection form (was developed. It includes demographic details like name, age, gender, medical history, height, weight, clinical data such as diagnosis, therapeutic details such as dose, type of treatment given, outcome, and management.

## 3. Results

The study enrolled 300 patients. Among the total study population 22.7% of the patients were male and 77.3% of patients were female. The mean age (mean±S.D) of the patients was 40.07±12.61 years with range 10-80 years. Out of the 300 studied patients, most of them were from the rural area 65.3%. By the occupation majority of the patients were housewife 61.3%. From the point of education a large number of the patients were 37.3% of patients were 10th passed while the smallest number were post graduate, 1.3%. Most of the patients 86.7% were married. Many patients 84% were having no family history. Large number of the patients 88% were non addict [Table 1].

**Table 1:** Socio-Demographic characteristics of the study population (n=300)

| Variable | No. of Patients (n=300) | Percentage (%) |
|---|---|---|
| Age (Years) | | |
| 10-20 | 20 | 6.7 |
| 21-30 | 48 | 16.0 |
| 31-40 | 88 | 29.3 |
| 41-50 | 96 | 32.0 |
| 51-60 | 32 | 10.7 |
| 61-70 | 12 | 4.0 |
| 71-80 | 04 | 1.3 |
| Gender | | |
| Male | 68 | 22.7 |
| Female | 232 | 77.3 |
| Residence | | |
| Rural | 196 | 65.3 |
| Urban | 104 | 34.7 |
| Marital status | | |
| Married | 260 | 86.7 |
| Unmarried | 40 | 13.3 |

| | | |
|---|---|---|
| Occupation | | |
| Housewife | 184 | 61.3 |
| Agriculture | 32 | 10.7 |
| Teacher | 28 | 9.3 |
| Student | 24 | 8.0 |
| Armyman | 08 | 2.7 |
| Other | 24 | 8.0 |
| Education | | |
| Illiterate | 44 | 14.7 |
| 10th | 112 | 37.3 |
| 12th | 84 | 28.0 |
| Graduate | 56 | 18.7 |
| Post graduate | 04 | 1.3 |
| Family history | | |
| Yes | 48 | 16.0 |
| No | 252 | 84.0 |
| Addiction | | |
| Alcoholic | 20 | 6.7 |
| Smoker | 04 | 1.3 |
| Other | 12 | 4.0 |
| None | 264 | 88.0 |

On examining the characteristics of migraine headache in study population it was found that the location of the headache in majority of the patients was Unilateral changing sides, constricting and pulsatile that is up to 21.3%. The major Central nervous system (CNS) symptoms experienced by the patients were sensitivity to noise, photophobia and ringing in ears 18.7% however 30.7% of the patients were having no central nervous system symptoms.

In case of Gastrointestinal system (GIT) symptoms experienced by the patients up to 24% of the patients were having nausea while 52% of the patients were having no gastrointestinal system symptoms. The major symptom other than the CNS, GIT symptoms was weakness which was experienced by the 53.3% patients [Table 2].

**Table 2:** Characteristics of migraine headache in study population

| Parameter | Number (n=300) | Percentage (%) |
|---|---|---|
| Location: | | |
| Strictly unilateral | 12 | 4.0 |
| Unilateral changing sides | 20 | 6.7 |
| Bilateral | 28 | 9.3 |
| Constricting | 04 | 1.3 |
| Unilateral changing sides + constricting + Pulsatile | 64 | 21.3 |
| Strictly unilateral+ Pulsatile | 44 | 14.7 |
| Bilateral + Pulsatile | 56 | 18.7 |
| Bilateral + Constricting | 36 | 12.0 |
| Associated features | | |
| CNS Symptoms: | | |
| Sensitivity to noise + Photophobia+ Ringing in ears | 56 | 18.7 |
| Sensitivity to noise + Photophobia+ Numbness | 36 | 12.0 |
| Phonophobia | 08 | 2.7 |
| Ringing in the ears + Numbness + Weakness+ Sensitivity to noise | 48 | 16.0 |
| Blurred vision | 32 | 10.7 |
| Numbness | 28 | 9.3 |
| No CNS symptoms | 92 | 30.7 |
| Gastrointestinal system: | | |
| Nausea | 72 | 24.0 |
| Vomiting | 36 | 12.0 |
| Nausea+Vomiting | 156 | 52.0 |
| No GIT symptoms | 36 | 12.0 |
| Other symptoms: | | |
| Weakness | 160 | 53.3 |
| Sweating | 20 | 6.7 |
| Weakness+Sweating | 60 | 20.0 |
| No other symptoms | 60 | 20.0 |

On examining the distribution of precipitating factors for migraine in study population test of proportion showed most of the patients were significantly higher combined precipitating factors that are responsible for migraine are 14.7% i.e. (physical activity, humidity, dust, smell, lack of sleep and depression), (travel, physical activity, lack of sleep), (dust, travel, physical activity, humidity, crowd, smell, watching TV, lack of sleep and depression), 1.3% of the patients were having least precipitating factors lack of sleep, physical activity respectively as shown in [Table 3].

**Table 3:** Distribution of precipitating factors for migraine (n=300)

| Precipitating factors | No. of the patients (n=300) | Percentage (%) |
|---|---|---|
| Travel+Crowd+Smell+Lack of sleep +depression | 40 | 13.3 |
| Physical activity+Humidity +Dust+ Smell+ Lack of sleep+Depression | 44 | 14.7 |
| Travel+Dust+Crowd | 36 | 12.0 |
| Humidity+Physical activity +Crowd + Smell+Watching TV+Depression | 32 | 10.7 |
| Travel+Physical activity+Lack of sleep | 44 | 14.7 |
| Travel+Crowd+Smell | 24 | 8.0 |
| Dust+Travel+Physical activity+ Humidity + Crowd+ Smell+ WatchingTV +Lack of sleep +Depression | 44 | 14.7 |
| Travel +Physical activity + Chocolates + Crowd + Dust +Watching TV+Lack of Sleep | 24 | 8.0 |
| Physical activity | 04 | 1.3 |
| Lack of sleep | 08 | 2.7 |

On assessing Migraine Disability Assessment Score (MIDAS) of the study participants test of proportion showed most of the patients were having higher 42.7% mild disability, 2.7% of the patients were having severe disability, 13.3% of the patients were having little or no disability and 41.3% of the patients were having moderate disability. Headache was severe enough to hamper daily work only 8 cases (2.7%), while majority of the score was mild 42.7%. Migraine without aura was the commonest presentation 66.66 % while only 33.33% had migraine with aura [Table 4].

**Table 4:** Migraine Disability Assessment Score (MIDAS)

| Migraine Disability Assessment Score of the patients | No. of the patients (n=300) | Percentage (%) |
|---|---|---|
| I Little or No Disability(0-5) | 40 | 13.3 |
| II Mild Disability(6-10) | 128 | 42.7 |
| III Moderate Disability(11-20) | 124 | 41.3 |
| IV Severe Disability(21+) | 08 | 2.7 |

The regimen for migraine treatment was constituted mostly of NSAIDS, antidepressants and proton pump inhibitors which was given to the 53.3% of the patients. In prophylaxis of migraine, monotherapy was used most commonly in 55.3% patients followed by dual therapy and poly therapy. In our study polytherapy was used most commonly in 53.3% patients [Table 5].

**Table 5:** Regimen for Migraine

| Regimen for Migraine | No. of the patients (n=300) | Percentage (%) |
|---|---|---|
| NSAIDS+Antidepressants+PPI+Betahistime+Antipsychotic agents | 08 | 2.7 |
| NSAIDS+Antidepressants+PPI+ARB | 08 | 2.7 |
| NSAIDS+Antidepressants+PPI | 160 | 53.3 |
| NSAIDS+Antidepressants+PPI+Piperidine derivatives+Anticonvulsants | 24 | 8.0 |
| NSAIDS+PPI+Antidepressants+Anticholinergics | 24 | 8.0 |
| Antipsychotic agents+CCB+ARB+Antivertigo+Anticonvulsants | 04 | 1.3 |
| NSAIDS+Antipsychotic agents+Anticonvulsants | 12 | 4.0 |
| Anticonvulsants+NSAIDS+Beta Blockers+Antidepressants | 12 | 4.0 |
| Corticosteroids+Anticholinergics+NSAIDS+PPI+Antidepressants | 12 | 4.0 |
| NSAIDS+PPI+Antidepressants+Antipsychotic Drugs | 20 | 6.7 |
| NSAIDS | 16 | 5.3 |

**Abbreviations**

NSAIDS (Non Steroidal Anti-inflammatory Drugs), PPI (Proton pump inhibitor), CCB (Calcium Channel Blocker), ARB (Angiotensin II receptor blocker)

On examining the which drugs were most prescribed each drug classes. It was found that the Naproxen was mostly prescribed in 78.7% of the patients in NSAIDS class, Domperidone in 86.7% Selective Dopamine D2 receptor antagonist class, Escitalopram and Clonazepam were 58.7% prescribed together most often in Antidepressants class, While in Proton pump inhibitors class Pantoprazole Sodium was prescribed mostly in 73.3% of the study population. Details

are which types of drugs were prescribed are shown in [Table5].

**Table 5:** Types of drugs which were prescribed

| Drugs | No. of Patients (n=300) | Percentage (%) |
|---|---|---|
| Non Steroidal Anti-inflammatory Drugs | | |
| Naproxen | 236 | 78.7 |
| Aceclofenac + Paracetamol | 36 | 12.0 |
| Aspirin | 04 | 1.3 |
| Diclofenac | 08 | 2.7 |
| Mefanimic acid | 04 | 1.3 |
| Naproxen + Mefanimic acid | 04 | 1.3 |
| Not given | 08 | 2.7 |
| Selective dopamine d2 receptor antagonist | | |
| Domperidone | 260 | 86.7 |
| Not given | 40 | 13.3 |
| Antidepressants | | |
| Escitalopram | 36 | 12.0 |
| Clonazepam | 12 | 4.0 |
| Escitalopram+Clonazepam | 176 | 58.7 |
| Amitryptyline | 28 | 9.3 |
| Escitalopram+Clonazepam+Amitriptyline | 12 | 4.0 |
| Sertraline | 04 | 1.3 |
| Not given | 32 | 10.7 |
| Proton pump inhibitors | | |
| Pantoprazole sodium | 220 | 73.3 |
| Rabeprazole sodium | 40 | 13.3 |
| Not given | 40 | 13.3 |
| Antivertigo | | |
| Betahistimine | 16 | 5.3 |
| Not given | 284 | 94.7 |
| Antipsychotic agents | | |
| Prochlorperazine Maleate | 24 | 8.0 |
| Olanzapine | 08 | 2.7 |
| Levosulpride | 08 | 2.7 |
| Not given | 260 | 86.7 |
| Piperidine derivative | | |
| Tolperisone | 24 | 8.0 |
| Not given | 276 | 92.0 |
| Anticonvulsants | | |
| Pregabalin | 16 | 5.3 |
| Topiramate | 28 | 9.3 |
| Divalproex | 08 | 2.7 |
| Not given | 248 | 82.7 |
| Corticosteroids | | |
| Dexamethasone | 12 | 4.0 |
| Not given | 288 | 96.0 |
| Anticholinergics | | |
| Dicyclomine | 36 | 12.0 |
| Not given | 264 | 88.0 |
| Beta Blockers | | |
| Propanolol | 08 | 2.7 |
| Not given | 292 | 97.3 |
| Calcium Channel blockers | | |
| Amlodipine | 08 | 2.7 |
| Not given | 292 | 97.3 |

## 4. Discussion

In our set up, the commonest complaint with which patient comes to the neurology OPD was headache. The study population had female preponderance (77.3%) more than the male patients. The Female to male ratio is 3.1:1 in this study which is similar to previous study. The literature from various studies also suggests migraine is more frequent in the female population [9-11, 19]. Housewives were more likely to suffer from migraine than the other professionals. Test of proportion showed most of the patients 32% were significantly higher in the age group 41-50 years which was also reported in other studies [20, 21]. The majority of the patients in this study

suffered from migraine without aura with a prevalence of 66.66 %. Migraine without aura is the common presentation reported in Indian studies [22, 23]. The prevalence of migraine was higher in rural patients than the urban patients which is quite the opposite as reported in another studies conducted in India and western countries [24], however lifestyle and ethnicity can be a major factor in this difference. The married patients were more likely to suffer from migraine than the unmarried patients similar finding was reported in a study conducted in Finland [25].

Trigger factors are important for migraine as these may be helpful as indicators to treat the cause & severity of migraine attack. The most common precipitants can be tension, hunger/ skipped meal/ fasting, insomnia, depression etc. Some interesting but unrelated stress factors also were observed during other studies such as fish, vegetables, fast foods etc. and changing weather (even taking a bath). Certain other factors associated with migraine include frequent & more television, strong light, computer, eating citrus fruits [26-28]. In current study common precipitate factors that are responsible for migraine were (14.7%) Dust/ Travel/Physical activity/ Humidity / Crowd / Smell / Watching TV / Lack of sleep /Depression. Association of migraine with allergic and psychiatric disorders was seen in our study population, such as migraineurs with significantly more asthma and chronic musculoskeletal pain compared to non- migraineurs (5% versus 3.2% and 39% versus 25%, respectively) [29].

Unilateral type of headache (59.8%) was much more common than bilateral type (40.2%). Headache was throbbing (71.5%) in nature in a majority of migraneurs which was consistent with various previous studies [30, 31]. Some other studies from India showed strictly unilateral pain in 40.5% patients [32]. Our study showed photophobia, phonophobia, nausea, and vomiting as the most common accompanying symptoms as the previous reports [33]. Other reported symptoms were dizziness, allodynia, and neck stiffness. In current study unilateral changing sidetype of headache (21.3%) was more common than bilateral type (9.3%). Headache was constricting and pulsatile in nature. Sensitivity to noise, photophobia, ringing in ears, blurred vision, numbness, nausea, vomiting, weakness are the most common symptoms in migraine patients. Migraine is more commonly associated with anxiety disorder than with depression [34]. It was observed that migraine was under diagnosed & management was insufficient affecting quality of life. Avoidance of trigger factors is important in management of migraine. In our study, for acute attack, NSAIDs alone were prescribed in 44.6% of cases and in combination with ergots and triptans 33.8% cases. For acute therapy ergotamine and sumatriptan alone were used in 9.8% and 11.1% cases, respectively. NSAIDs are a usual first-line therapy for mild to moderate migraine. A 2007 meta-analysis of ibuprofen for moderate to severe migraine showed that 200mg and 400mg doses were effective for short-term pain relief [35]. In our current study about 78.7% of the patients were received NSAIDS, 58.7% of the patients were received antidepressants, 73.3% of the patients were received proton pump inhibitors. Higher use of NSAIDs in this study could be due to easy availability and less cost. Triptans are considered first-line therapy for moderate to severe migraine or mild to moderate attacks unresponsive [19, 36]. In prophylaxis of migraine, monotherapy was used most commonly in 55.3% patients followed by dual therapy and poly therapy. Beta-blockers were most common dugs (57.1%) followed by, antidepressants and calcium channel blockers. Studies have shown Beta blocker (60-80%) were effective in reducing attack frequency by more than 50% [37-40]. In our study polytherapy was used most commonly in 53.3% patients.

## 5. Conclusion

In our study the occurrence of migraine was more in females as compared to their male counterparts apart from this the rural population and married individuals developed migraine than urban population and unmarried individuals. The occurrence of migraine was more in the least literates but it was low in patients with higher education. The familial history shown no significance in connection with disorder. Surprisingly people who were non addict was higher in numbers as compared to non addict. NSAIDS, antidepressants and proton pump inhibitors were more prescribed to the patients than the other class of drugs. More studies are needed for identification of associations between symptoms, signs, and pathology and treatment based strategies in the Indian population.

## 6. References


1. Bergman U. The history of the Drug Utilization Research Group in Europe. Pharmacoepidemiol Drug Saf. 2006; 15(2):95-8.
2. Sharma P, Sharma A, Gaur A, Chhabra M, Kaur R. A Cross-Sectional Study on Diabetes Mellitus Type-2 at a Tertiary Care Hospital. Adv Res Gastroentero Hepatol. 2017; 8(1):001-6.
3. Sutharson L, Hariharan RS, Vamsadhara C. Drug Utilization in Diabetology Opd Drug Utilization Study in Diabetology Outpatient Setting of a Tertiary Hospital. Indian J Pharmacol [Internet]. Available from: http://medind.nic.in/ibi/t03/i4/ibit03i4p237.pdf, 2003; (35):237-40.
4. Biswas NR, Jindal S, Mairaj Siddiquei M, Maini R. Patterns of prescription and drug use in ophthalmology in a tertiary hospital in Delhi. Br J Clin Pharmacol. 2001; 51(3):267-9.
5. Torelli P, Jensen R. Headache diaries and calendars. Handb Clin Neurol [Internet]. Available from: http://doi.wiley.com/10.1111/head.12190, 2010; 97(8):137-46.
6. Stewart WF, Shechter A, Rasmussen BK. Migraine prevalence. A review of population-based studies. Neurology [Internet]. Available from: http://europepmc.org/abstract/med/8008222, 1994; 44(6Suppl4):S17-23.
7. Stewart WF, Lipton RB. Migraine headache: epidemiology and health care utilization. Cephalalgia [Internet]. Available from: http://www.ncbi.nlm.nih.gov/pubmed/8500146, 1993; 13Suppl1(19):41-6.
8. Celentano DD, Stewart WF, Lipton RB, Reed ML. Medication Use and Disability Among Migraineurs: A National Probability Sample Survey. Headache J Head Face Pain. 1992; 32(5):223-8.

9. Ray B, Paul N, Hazra A, Das S, Das S, Ghosal M, *et al*. Prevalence, burden, and risk factors of migraine: A community-based study from Eastern India. Neurol India [Internet]. Available from: http://www.neurologyindia.com/text.asp?2017/65/6/1280/217979, 2017; 65(6):1280.
10. Kulkarni G, Rao G, Gururaj G, Subbakrishna D, Steiner T, Stovner L, *et al*. EHMTI-0333. The prevalence and burden of migraine in India: results of a population-based study in Karnataka state. J Headache Pain [Internet]. Available from: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4180629, 2014; 15(S1):B18.
11. Linet MS, Celentano DD, Stewart WF. Headache characteristics associated with physician consultation: a population-based survey. Am J PrevMed. 1991; 7(1):40-6.
12. Ravishankar K. Medication overuse headache in India. Cephalalgia. 2008; 28(11):1223-6.
13. Boegner F. [Headaches and facial pain]. Ther Umsch [Internet]. Available from: http://www.ncbi.nlm.nih.gov/pubmed/22540201, 1999; 56(8):450-4.
14. Joseph T DiPiro, Robert L Talbert, Gary C Yee, Gary R Matzke, Barbara G Wells LMP. Pharmacotherapy: A Pathophysiologic Approach 7th Edition. Igarss 2014-2011, 1-5.
15. Goadsby PJ. Migraine: diagnosis and management. Intern Med J [Internet]. Available from: https://pdfs.semanticscholar.org/e08b/350e8b9c1235ff5968022af2d1f404472828.pdf, 2003; 33:436-42.
16. Cunningham SM. Migraine: helping clients choose treatment and identify triggers. Br J Nurs. 1999; 8(22):1515-23.
17. Ferrari MD. Migraine. Lancet [Internet]. Available from: http://linkinghub.elsevier.com/retrieve/pii/S0140673697113708, 1998; 351(9108):1043-51.
18. Moloney MF, Matthews KB, Scharbo-Dehaan M, Strickland OL. Caring for the woman with migraine headaches. Dimens Crit Care Nurs. 2001; 20(4):17-25.
19. Jena SS, Jena M, Dash M, Mishra S, Behera IC. Migraine: Pattern of prescription & adverse drug reaction profile in a tertiary care teaching hospital. J Pharm Sci. Res. 2015; 7(3):111-6.
20. Westergaard ML, Hansen EH, Glümer C, Jensen RH. Prescription pain medications and chronic headache in Denmark: Implications for preventing medication overuse. Eur J Clin Pharmacol. 2015; 71(7):851-60.
21. Qazi F, Bano N, Zafar S, Ahmed K, Jabeen A. Drug utilization pattern for the management of pain - A community based survey in Karachi, Pakistan. Int J Pharm Sci. Rev Res. 2012; 17(1):22-6.
22. Ravishankar K. Management of Migraine. J Headache Pain [Internet]. Available from: http://link.springer.de/link/service/journals/10194/bibs/1002003/10020117.htm, 2001; 2(3):117-9.
23. Panda S, Tripathi M. Clinical Profile of Migraineurs in a Referral Centre in.
24. Nikiforow R, Hokkanen E. An Epidemiological Study of Headache in an Urban and a Rural Population in Northern Finland. Available from: http://doi.wiley.com/10.1111/j.1526-4610.1983.hed2301002.x, 1978; 18(3):137-45.
25. Granella F, Sances G, Zanferrari C, Costa A, Martignoni E, Manzoni GC, *et al*. Migraine Without Aura and Reproductive Life Events: A Clinical Epidemiological Study in 1300 Women. Headache J Head Face Pain [Internet]. Available from: http://dx.doi.org/10.1111/j.1526-4610.1993.hed3307385.x, 1993; 33(7):385-9.
26. Lipton RB, Stewart WF, Celentano DD, Reed ML. Undiagnosed Migraine Headaches: A Comparison of Symptom-Based and Reported Physician Diagnosis. Arch Intern Med. 1992; 152(6):1273-8.
27. Lipton RB, Diamond S, Reed M, Diamond ML, Stewart WF. Migraine diagnosis and treatment: Results from the American migraine study II. Headache. 2001; 41(7):638-45.
28. Bener a, Uduman S a, Qassimi EM, Khalaily G, Sztriha L, Kilpelainen H, *et al*. Genetic and environmental factors associated with migraine in schoolchildren. Headache. 2000; 40:152-7.
29. Terwindt GM, Ferrari MD, Tijhuis M, Groenen SMA, Picavet HSJ, Launer LJ, *et al*. The impact of migraine on quality of life in the general population: The GEM study. Neurology. 2000; 55(5):624-9.
30. Merikangas KR, Risch NJ, Merikangas JR, Weissman MM, Kidd KK. Migraine and depression: Association and familial transmission. J Psychiatr Res. 1988; 22(2):119-29.
31. Kudrow L. Current aspects of migraine headache. Psychosomatics. 1978; 19(1):55-7.
32. Chakravarty A, Mukherjee A, Roy D. Migraine pain location in adult patients from eastern India. Ann Indian Acad Neurol [Internet]. Available from: http://www.annalsofian.org/text.asp?2008/11/2/98/41876, 2008; 11(2):98.
33. Bokhari FA, Sami W, Shakoori TA, Ali SA, Qureshi GA. Clinical characteristics of 226 college-going female migraineurs in Lahore, Pakistan - putting ICHD-2 to the road test. Neuro Endocrinol Lett [Internet]. Available from: http://www.ncbi.nlm.nih.gov/pubmed/19112417, 2008; 29(6):965-70.
34. Breslau N, Davis GC, Andreski P. Migraine, psychiatric disorders, and suicide attempts: an epidemiologic study of young adults. Psychiatry Res. 1991; 37(1):11-23.
35. Suthisisang C, Poolsup N, Kittikulsuth W, Pudchakan P, Wiwatpanich P. Efficacy of low-dose ibuprofen in acute migraine treatment: systematic review and meta-analysis. Ann Pharmacother [Internet]. Available from: https://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0024379/, 2007; 41(11):1782-91.
36. Gilmore B, Michael M. Treatment of acute migraine headache. Am Fam Physician. 2011; 83(3):271-80.
37. Bigal ME, Ferrari M, Silberstein SD, Lipton RB, Goadsby PJ. Migraine in the triptan era: Lessons from epidemiology, pathophysiology, and clinical science. Headache, 2009, 49.
38. Lipton RB, Goadsby P, Silberstein SD. Classification and epidemiology of headache. Clin Cornerstone. 1999; 1(6):1-7.

39. May A, Geweke L, D'Amico D, Rigamonti A, Solari A, Al E, *et al*. Cluster headache: pathogenesis, diagnosis, and management. Lancet (London, England) [Internet]. Available from: http://www.ncbi.nlm.nih.gov/pubmed/16139660, 2002; 366(9488):843-55.
40. Silberstein SD, Olesen J, Bousser MG, Diener HC, Dodick D, First M, *et al*. The International Classification of Headache Disorders, 2nd Edition (ICHD-II)-revision of criteria for 8.2 Medication-overuse headache. Cephalalgia [Internet]. Available from: http://search.ebscohost.com/login.aspx?direct=true&db=aph&AN=17065475&loginpage=Login.asp&site=ehost-live&scope=site, 2005; 25(6):460-5.