



# African Journal of Biological Sciences



## Retrospective Observational study to assess clinical characteristics, prescription pattern and concurrent diagnosis in headache patients attending Tertiary Care Hospital

Naga Rajeswari Ambati<sup>1</sup>, Jaya Prakash M<sup>2</sup>, Priyanka KS<sup>3</sup>, Vandana Raj T<sup>1</sup>, Santh Rani Thakur<sup>1\*</sup>

<sup>1</sup>Division of Pharmacology, Institute of Pharmaceutical Technology, Sri Padmavati Mahila Visvavidyalayam, Tirupati, Andhra Pradesh, India.

<sup>2</sup>JP Super Speciality hospital and Neuro medical centre, Tirupati, Andhra Pradesh, India.

<sup>3</sup>Department of Pharmaceutics, Institute of Pharmaceutical Technology, Sri Padmavati Mahila Visvavidyalayam, Tirupati, Andhra Pradesh, India.

**Running Title:** A retrospective study on headache patients in a tertiary hospital

\*Corresponding author: Santh Rani Thakur, E-mail: drsanthrani@gmail.com, Institute of Pharmaceutical Technology, Sri Padmavati Mahila Visvavidyalayam, Tirupati- 517502, Andhra Pradesh, India.

### ABSTRACT:

**Background:** Headache is a common neurological disorder that affects millions of people worldwide. This study aimed to assess clinical characteristics, prescription pattern and concurrent diagnosis in headache patients attending Tertiary Care Hospital

**Key words:** Headache, Clinical characteristics, Prescription pattern, Concurrent diagnosis.

### INTRODUCTION:

Worldwide half of the adult's experience headaches at least once a year, according to a WHO study 33% of the people with headaches require bed rest and 90% has decreased function.<sup>1</sup> About 40% of tension-type headaches and 10% of migraines are actively prevalent worldwide.<sup>2</sup> Migraine is three times more prevalent in women than in men, and it most frequently affects people between the ages of 25 and 55.<sup>3</sup> Migraine is still under diagnosed and undertreated even though it significantly reduces daily functions.<sup>4</sup> Usually cervicogenic

headaches (CGH) are characterized by unilateral neck pain that is caused by bony structures or soft tissues. This is a common persistent headache that flares up intermittently after moving the neck.<sup>5-7</sup> It is often accompanied by restricted neck range of motion (ROM).<sup>8-9</sup> Either it may be a primary headache, migraine or a tension headache. In order to diagnose this condition the pain must be felt in the neck and be perceived in the head or face.<sup>10-13</sup>

A migraine is a disabling disorder that causes headache, nausea, vomiting, aura, and photophobia all of which disrupt the private and professional lives of those affected.<sup>14</sup> Clinical history and diagnosis should exclude secondary headache using International Classification of Headache Disorders (ICHD).<sup>15-17</sup> Migraines are also associated with comorbid conditions such as psychological disorders, allergies, insomnia, fatigue, heart complications and asthma.<sup>18</sup> By managing comorbidities and limiting attacks the treatment aims to improve quality of life and limit the severity of symptoms.<sup>19-21</sup>

Treatment includes both acute and preventive measures are several ways to treat acute conditions, including analgesics, anti-emetics and emergency treatments. When non-migraine-specific analgesics do not provide adequate relief such as triptans are usually recommended. An acute therapy strategy emphasizes opioids and ergotamines are often discouraged.<sup>22</sup> In preventive medicine the primary goal is to reduce the number of attacks.<sup>23-24</sup> The traditional preventative drugs include propranolol and metoprolol (beta-blockers), flunarizine (calcium channel blockers), topiramate (anticonvulsant), amitriptyline (antidepressant), and botulinum toxin A (muscle relaxant; for chronic migraine only).<sup>25</sup> This analysis did not include erenumab, galcanezumab, or fremanezumab, which were used most recently.<sup>26</sup>

#### **METHODOLOGY:**

The Data was collected retrospectively from JP SUPER SPECIALTY HOSPITAL NEURO MEDICAL CENTER, TIRUPATI-517502, Andhra Pradesh, India. The period from January 2023 to March 2023, 290 persons were examined. The report includes both inpatients and outpatients was diagnosed according to the edition of the International Classification of Diseases (ICD 10) and drug prescriptions. By analyzing groups of patients was defined traits instance suffering from headaches under gone medications. The JP SUPER SPECIALTY HOSPITAL NEURO MEDICAL CENTER provided access to analyse the patients. The information from the electronic databases under naturalistic conditions. Previously established processes were used to import and check the raw data.

The study was evaluated from 18 years or older patients suffering from headache. The information was collected from the hospital about demographics, medical history, headache characteristics, concomitant symptoms, and instrument evaluation results. A descriptive analysis of patient traits was conducted and transferred into an Excel sheet. Number and

percentages were used to brief categorical data, mean and standard deviations were used to brief continuous data.

### **Data analysis:**

The Analyses results was using SAS 9.4 and Excel (Microsoft) using appropriate statistical methods. Continuous variables were summarized due to mean and standard deviation (SD) regarding categorical variables, while categorical variables presented as number and percentage related to patients.

### **RESULTS:**

There were 290 participants in this survey among the study population, 179(62.0%) were females and 111(28.0%) were males. The 18-28 age group consisted of 85 patients.39-58-year-old women was the majority of patients. Mean (SD) age of females was  $35.8\pm 11.17$  and for males it is  $22.2\pm 11.17$  years. Male to female ratio was close to 1:1.6 (Figure1). In this study majority were females with different age groups viz., the tabular form of distribution according to age group is mentioned in (Table 1). Common medications prescribed for patients suffering from headache such as SSR agonist, GABA analogues, and neuropathic pain medications, steroids, anti-migraine, propranolol etc. was shown in (Figure2). Most of the patients suffered from chronic headache in (Table 2). Among chronic headache patients most of them are age group of 39-48 years (38 patients) with female dominance 5n (Table 3). The mean age of migraine patients was  $23\pm 5.6$ . The Patients was 18-28 years (34 patients) were the major sufferers of chronic headache migraine without aura(Table 4).Cervicogenic headache was dominantly seen in 10 patients 39-48 years (Table 5).Simple headache was mostly seen in the age group of 18-28 years (Table 6).Vestibular migraine commonly seen in the age group of 39-48 years in female patients(Table 7).Migraine overlap with TTH was seen in only one female with age group of 39-48. New onset headaches Vertiginous headaches, Acute status migraine were seen in only one female patient except acute status migraine is seen in male with the agegroup of 18-28 years(Table 8). In (Table 9) shows the number of tests conducted to confirm headache and the most common concurrent diseases such as RBS, CRP, CBC, ESR, serum creatinine, urine routine by microscopy, MRI, CT scan, EEG, serum electrolytes, CT brain plain, MRI brain plain, and serum PSA. Among 290 Migraine saw in 73 members out Complaints in 16 members. Monotherapy was given for 118(40.69%) patients include NSAIDS for 111(94.06%) patients and anti-migraine drugs for 6(5.08%) patients. Dual therapy for 134(46.20%) patients includes NSAID along with anti-migraine for 87(64.92%) patients, NSAID along with anti-depressant for 26(19.40%) patients NSAID along with anticonvulsants for 13(9.70%) patients and Poly therapy for 38(13.10%) patients as mentioned in (Table 10). The medications prescribed for

different types of headaches such as chronic headache, new onset headache, migraine, cervicogenic headache, and vertiginous headache etc., shown in (Table 11). The complaints symptoms and signs related to headache reported by the patients along with their frequency listed in (Table12).The most common complaint was headache associated with periorbital pain holocranial throbbing type, followed by headache and neck pain radiating to nape of neck. The least common complaints included heaviness of head, vertigo, cough, and ear pain, among others. The distribution of concurrent diseases according to gender among the patients with headache observed in (Table 13) the lists of 87 different diseases along with the number of females, males, and total patients affected by each disease. The most prevalent concurrent disease was fibromyalgia, followed by cervical disc disease with radiculopathy and hypertension. The least prevalent diseases included ear pain, tinnitus in left ear, and vitamin D and vitamin B12 deficiency, among others.

## **DISCUSSION**

In our study, the male-female (M: F) proportion was 1:1.6, which was close to the studies done by Benbir G et al., (2012), and Baykan B et al., (2007) where the male-female (M: F) proportion was 1:2.9.<sup>27-28</sup>In the study population, most of them were females (61.7%). The prevalence, frequency and severity of primary headache problems were assumed to be significantly influenced by sex hormones with oestrogen in particular being thought to be a key initiator.<sup>29</sup> Sader et al., (2018) reported that hormonal changes which are typically seen from adolescence through pregnancy to menopause and post-menopause were implicated in the development of the headache by examining the normal progression throughout the lifespan of female patients.<sup>30</sup>Online Ramasamy B et al., (2019) confirmed, females were more likely to suffer from migraines (%) than males.<sup>31</sup>In the present study vestibular migraine was mostly found in the age group of 39-48, Felipe Barbosa et al., (2016) found that vestibular migraine can occur at any age, but the average age of onset of this migraine is about 40.<sup>32</sup>where as Yasir Al Khalili et al., (2022) found cervicogenic headaches are chronic headache most often seen in 30-44-year-olds.<sup>19</sup>

In the present study NSAIDs and Anti-migraine drugs were prescribed to 111 and 6 patients respectively and NSAIDs along with Anti-migraine drugs for 87 patients indicating adherence to the guidelines of European Federation of Neurological Societies.<sup>33</sup>Among the best treatments for migraines are triptans, NSAIDs ergotamine derivatives, opioids and other combination drugs according to research by the American Headache Society (AHS).<sup>34</sup> In an acute attack, Sumatriptan, ergotamine derivatives are more effective than NSAIDs according to the American Association of Neurology.<sup>35</sup>Anti-

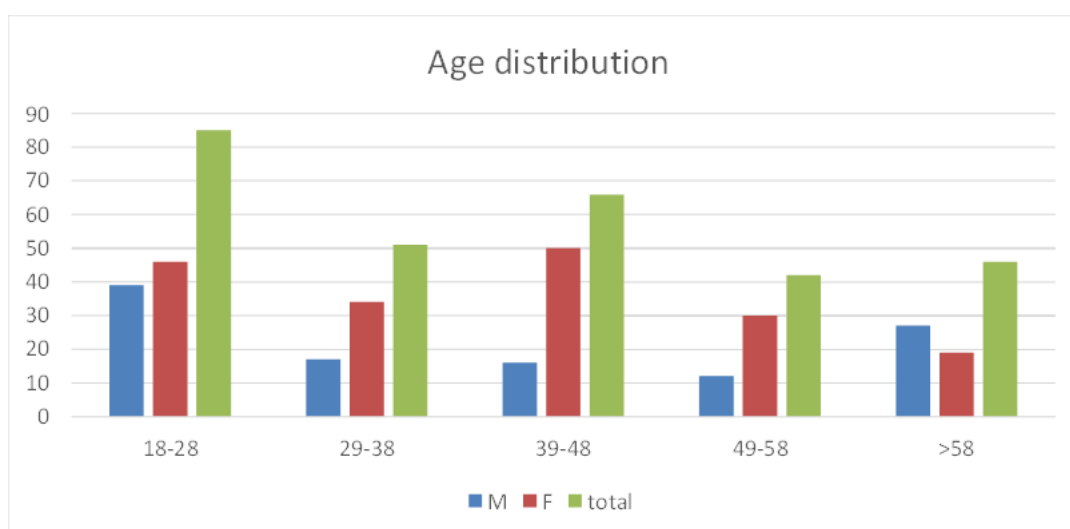
depressants, propranolol, Anti-migraine drugs, Steroids, anticonvulsants, flunarizine, anti-emetics, anti-anxiety drugs, GABA analogues and SSR agonists were used in our study population. Beta blockers effectively cut the incidence of attacks by about 50%. Antidepressants may be equally effective as propranolol for reducing headache frequency.<sup>36</sup> In our study monotherapy was given to dual therapy and polytherapy. It was carried out by Jena S.S et al., (2015) monotherapy was used most commonly in 55.3% patients followed by dual therapy and poly therapy.<sup>37</sup> Fibromyalgia was the major concurrent disease observed in our study population. In contrary the other study commonest comorbidity was depression followed by fibromyalgia.<sup>38</sup> Compared to other investigations there was few drawbacks in the current study.

The ICHD-3 was used in our study for the definition and diagnosis of general headache disorders but there is a significant source of potential bias for this study as the definition and diagnostic criteria may be continuously updated and modified with a deeper understanding of the disease.<sup>39</sup> Drawback of the study is that while migraine, TTH, and simple headache disorders were taken into account and, certain other rare headache such as cervicogenic headache<sup>40</sup> and vertiginous headache were not giving more research topic.

### CONCLUSION:

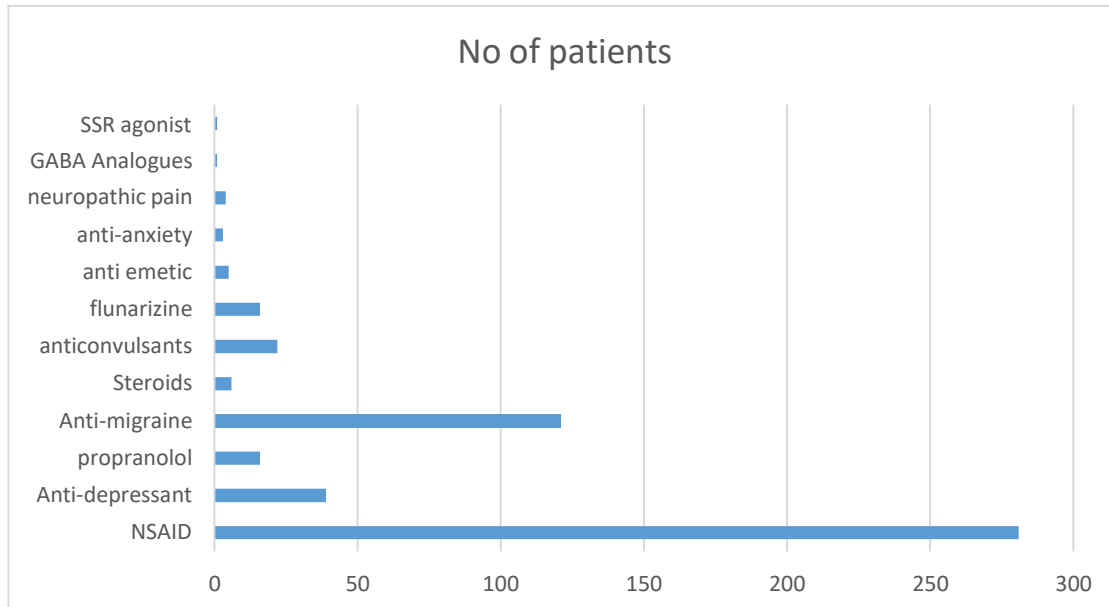
In this study, it was seen that the patients who suffered with headaches were mostly in the age group of 18-28 in females were dominant. Chronic Headache was the common type headache was seen in most of our study population. Fibromyalgia was the major concurrent disease found in the headache patients. NSAIDs were the major class of drugs prescribed for the patients with common headache, whereas Anti-migraine drugs like Triptans were specifically prescribed for the migraine patients. Headache associated with periorbital pain holocranial throbbing type was the major complaint received from the study population during this study period.

**Figure 1: Age distribution of study population according to gender**



**Figure 1:** The table presents the frequency of female and male patients and total number of patients with various concurrent diseases

**Figure 2: Most frequently prescribed Medications**



**Figure 2:** From the above graph we can observe that most of the patients are treated with analgesics and along with analgesics few migraine patients were treated with anti-migraine drugs and then followed by anti-depressants, anticonvulsants, beta blocker to treat different kinds of headache.

**Table 1:** Distribution of study population according to Age Group

Age Range	Total Number of Patients	Percentage (%)
18-28	85	29.31
29-38	51	17.59
39-48	66	22.76
49-58	42	14.48
>58	46	15.86
Total	290	100
Mean(SD)	41.5±8.0	

The table presents the frequency and percentage of patients in different age ranges. The mean and standard deviation of the age of the patients is also reported.

**Table 2:** Different types of headaches among study population

Type of headache	Male	Females	Total
Chronic headache	73	89	162
New onset Headache	0	1	1
Chronic headache migraine without aura	15	60	75
Cervicogenic headache	9	22	31
Simple Headache	14	15	29
Vertiginous headache	0	1	1
Vestibular migraine	2	12	14
Acute status migraine	1	0	1
Migraine overlaps with Tension type headache	0	2	2

The table presents the frequency of male and female and total number of patients with various types of headaches.

**Table 3:** Chronic headache in different age groups

Chronic headache			
Age	Males	Females	Total
18-28	23	12	35
29-38	11	13	24
39-48	10	28	38
49-58	10	22	32
>58		19	33

The table presents the frequency of male and female patients and total number of patients with chronic headache in different age ranges.

**Table 4:** Chronic headache migraine without aura in different age groups

Chronic headache migraine without aura			
Age	Males	Females	Total
18-28	10	24	34
29-38	1	19	20
39-48	3	14	17
49-58	1	2	3
>58	0	1	1
Mean $\pm$ SD	-	-	23 $\pm$ 5.6

The table presents the frequency of male and female patients and total number of patients with chronic headache migraine without aura in different age ranges. The mean and standard deviation of the total number of patients with chronic headache migraine without aura is also reported.

**Table 5:** Cervicogenic headache in different age groups

Cervicogenic headache			
Age	Males	Females	Total
29-38	1	3	4
39-48	4	6	10
49-58	1	6	7
>58	3	3	6

The table presents the frequency of male and female patients and total number of patients with cervicogenic headache in different age ranges.



**Table 6:** Simple Headache in different age groups

Simple Headache			
Age	Males	Females	Total
18-28	5	8	13
29-38	4	1	5
39-48	1	2	3
49-58	0	2	2
>58	4	2	6

The table presents the frequency of male and female patients and total number of patients with simple headache in different age ranges.

**Table 7:** Vestibular Migraine in different age groups

Vestibular migraine			
Age	Males	Females	Total
18-28	0	2	2
29-38	0	1	1
39-48	0	7	7
49-58	0	0	0
>58	2	2	4

The table presents the frequency of male and female patients and total number of patients with vestibular migraine in different age ranges.

**Table 8:** Frequency and distribution of different types of headaches among patients

Type of Headache	Age	Males	Females	Total
Migraine overlaps with Tension type Headache	39-48	0	1	1
New onset Headache	18-28	0	1	1
Vertiginous headache	18-28	0	1	1
Acute status migraine	18-28	1	0	1

The table presents the frequency of male and female patients and total number of patients with various types of headaches in different age groups.

**Table 9:** Tests recommended to confirm headache and most concurrent diseases

Tests conducted	Total
RBS	133
CRP	133
CBC	131
ESR	131
Serum creatinine	130
Urine routine by microscopy	69
MRI	62
CT scan	53
EEG	12
Serum electrolytes	3
CT brain Plain R/O secondary cause	2
MRI brain plain to R/O central cause	1
serum PSA	1

The table presents the frequency of patients who underwent various tests for the diagnosis of headache and any associated diseases.

**Table 10:** Types of Therapies used to manage head ache in the study population

Therapy type	Number (%)	Medication	Number (%)
Mono therapy	118 (40.69)	NSAID	111(94.06)
		Anti-migraine	6(5.08)
Dual therapy	134 (46.20)	NSAID, Anti-migraine	87(64.92)
		NSAID, Anti-depressant	26(19.40)
		NSAID, anticonvulsants	13(9.70)
		NSAID, antiemetic	3(2.23)
		NSAID, Steroids	2(1.49)
		Anti-depressant, Steroids	1(0.74)
		Anti-depressant, Anti-migraine	1(0.74)
		NSAID, neuropathic pain	1(0.74)
Poly therapy	38 (13.10)	NSAID, propranolol, flunarizine, Anti-migraine	10(26.31)
		NSAID, Anti-migraine, anticonvulsants	8(21.05)
		NSAID, Anti-depressant, Anti-migraine	5(13.15)
		NSAID, propranolol, flunarizine	4(10.52)
		Anti-depressant, NSAID, neuropathic pain	2(5.26)
		NSAID, Anti-migraine, antiemetic	2(5.26)
		Anti-depressant, anti-anxiety, steroids, NSAID	1(2.63)
		propranolol, flunarizine, NSAID, Steroids	1(2.63)
		Anti-migraine, NSAID, Anti-depressant, anti-anxiety	1(2.63)
		Steroids, NSAID, GABA Analogues	1(2.63)
		Anti-depressant, anti-anxiety, NSAID	1(2.63)
NSAID, Anti-migraine, neuropathic pain	1(2.63)		
Anti-depressant, propranolol, flunarizine, NSAID, SSR agonist, anticonvulsants	1(2.63)		

The table presents the frequency and percentage of patients who received monotherapy, dual therapy or poly therapy with various medications. The frequency and percentage of patients who received each medication is also reported.

**Table 11:** Medications for various types of Headaches.

Type of headache	Medication
Chronic headache	NSAIDS, Anti-Depressant, Anti-Anxiety, Steroids, Anti Emetics, Anti-Convulsants
New onset Headache	NSAIDS, Anti-Depressant, Propranolol, Flunarizine, SSR agonist, Anti-Convulsants
Chronic headache migraine without aura	Anti-Migraine drugs, Anti Emetics, NSAIDS, GABA Analogues
Migraine overlap with Tension type headache	Anti-Migraine drugs, Anti Emetics, Propranolol, Flunarazine, NSAIDS
Cervicogenic headache	NSAIDS, Anti Deppresants
Headache	NSAIDS, Anti Migraine
Vertiginous headache	NSAIDS, Anti Migraine
Vestibular migraine	Anti-Migraine drugs, Anti Emetic, NSAIDS
Acute status migraine	Anti-Migraine drugs, Anti Emetics, NSAIDS

The table presents the medication combinations used to treat various types of headaches received by the patients.

**Table 12:** Headache associated Complaints in the study population

Complaints/symptoms/signs	Count
Headache associated with periorbital pain holocranial throbbing type	134
Headache	91
Neck pain radiating to nape of neck	60
Giddiness	19
Sleep disturbance	13
Body pains	8
Multiple somatic complaints	6
Fever	4
Body pains with weakness	4

Lower back pain	4
Vomiting	3
Tingling and numbness	3
Palpitations	2
Heaviness of head	1
Neck pain radiating to nape of neck and interscapular area - associated with nausea	1
Headache holocranial throbbing type- intermittent	1
Eye pain	1
Headache associated with periorbital pain holocranial throbbing type- RT side - U/L	1
Vertigo	1
Cough	1
Balls- post ictal Headache	1
Headache RT side U/L - throbbing type	1
Chronic Headache	1
Multiple joint pains associated with swelling	1
Convulsions	1
Nausea	1
BLUL pain	1
Chills	1
Behaviour abnormality	1
Neck pain	1
Irregular menstrual cycle	1
Electrical shock like sensation	1
Memory disturbance	1
Lower back pain radiating to both limbs	1
Ear pain	1

The table presents the frequency of patients reported various symptoms or signs associated with headache. The complaints ranged from headache to neck pain, giddiness, sleep disturbance, fever, vomiting etc.

**Table 13:** Distribution of concurrent diseases according to gender

S. No	Concurrent diseases	Females	Males	Total
1.	Fibromyalgia	61	28	89
2.	Cervicaldisc diseasewith radiculopathy	42	24	66
3.	Hypertension	24	22	46
4.	Type 2 diabetes mellitus	18	14	32
5.	GastritiswithGERD	19	8	27
6.	Peripheral neuropathy	13	11	24
7.	Gastritis	17	6	23
8.	Vertigo	12	10	22
9.	Hypothyroidism	17	3	20
10.	Anemia	18	0	18
11.	Gastroesophageal reflux disease	12	6	18
12.	Insomnia	8	6	14
13.	Seizures disorder	5	7	12
14.	Anxietyneurosis	5	6	11
15.	Cervicaldiscdisease	6	4	10
16.	Acute febrile illness underevaluation	6	3	9
17.	Cervicallumbosacraldiscdiseasewith radiculopathy	4	3	7
18.	Lumbo sacral disc disease	6	1	7
19.	Upper respiratory tract infection	4	2	6
20.	Urinary tract infection	5	1	6
21.	Polyarthritis	5	0	5
22.	Acceleratedhypertension	2	2	4
23.	Allergicbronchitis	3	1	4
24.	Allergicrhinitis	4	0	4
25.	Hypertriglyceridemia	2	2	4
26.	Migraine	1	3	4
27.	Simple partial seizures	2	2	4

28.	Lumbo sacral disc disease with radiculopathy	2	1	3
29.	Seizures	0	3	3
30.	Vitamin B12 deficiency	2	1	3
31.	Anxiety	2	0	2
32.	Behaviour abnormality	2	0	2
33.	Bronchial asthma	2	0	2
34.	Cervical lumbo sacral disc disease with radiculopathy	1	1	2
35.	Dyslipidemia	1	1	2
36.	Hyperuricemia	0	2	2
37.	Lumbosacral disc disease	2	0	2
38.	Mild disc buldge	0	2	2
39.	Neurosis	2	0	2
40.	Partial seizures	2	0	2
41.	Thrombocytopenia	2	0	2
42.	Tremors	1	1	2
43.	Vitamin D deficiency	2	0	2
44.	Acute febrile illness	0	1	1
45.	Alcohol withdrawal syndrome	0	1	1
46.	Amenorrhea	1	0	1
47.	Angioneurotic edema	1	0	1
48.	Blepharospasm	1	0	1
49.	Carpel tunnel syndrome	1	0	1
50.	Cervical lumbodisc disease with radiculopathy	0	1	1
51.	Cervical lumbosacral disc disease	1	0	1
52.	Chronic pharyngitis	1	0	1
53.	Compressive myelopathy	0	1	1
54.	Dyselectrolemia	0	1	1
55.	Ear pain	0	1	1
56.	Febrile illness	1	0	1
57.	Fever with thrombocytopenia	1	0	1

58.	Fungal sinusitis	0	1	1
59.	Generalised anxiety disorder	1	0	1
60.	Glosso pharyngeal neuralgia	0	1	1
61.	Hemi facial spasm	1	0	1
62.	Hyperbilirubinemia	0	1	1
63.	Hyperthyroidism on treatment	1	0	1
64.	Hypoglycemic attack	0	1	1
65.	Hypotension	1	0	1
66.	Hypothyroidism on treatment	1	0	1
67.	Ischemic heart disease	0	1	1
68.	Leukorrhea	1	0	1
69.	Localised vitiligo	1	0	1
70.	Left hemifacial spasm	1	0	1
71.	Left optic neuritis	0	1	1
72.	Lymph adenopathy	0	1	1
73.	Menopause	1	0	1
74.	Migraine without aura	1	0	1
75.	Multiple somatic complaints	1	0	1
76.	Pansinusitis	1	0	1
77.	Parkinson's	1	0	1
78.	Polycystic ovarian disease	1	0	1
79.	Sensory seizures	1	0	1
80.	Small vessel ischemia	0	1	1
81.	Somatoform disorder	1	0	1
82.	Psoriatic arthritis	1	0	1
83.	Tinnitus in left ear	0	1	1
84.	Trigeminal neuralgia	0	1	1
85.	URTI sinusitis	0	1	1
86.	Urticaria	1	0	1
87.	Vitamin D and vitamin B12 deficiency	0	1	1

The table presents the frequency of female and male patients and total number of patients with various concurrent diseases.



**REFERENCE:**

1. Beghi E. The value of epidemiology in headache. *The Journal of Headache and Pain*. 2015 Dec;16(Suppl 1):A43.
2. Fischer M, Wille G, Klien S, Broessner G. Headache disorders in a tertiary care headache outpatient clinic in Austria. *The Journal of Headache and Pain*. 2013 Feb;14(1):1-.
3. Agarwal V, Chaurasia RN, Mishra VN, Joshi D, Misra S. Clinical profile of headache from a tertiary care center in eastern India. *International journal of general medicine and pharmacy (IJGMP)*. 2013;2(3):9-14.
4. Hadia R, Kapadi V, Parekh K, Naidu S, Prakash S, Chandrakar V, Rajput HS. A Cross Sectional Observational Study to Assess Clinical Characteristics, Prescription Pattern and Health Related Quality of Life in Migraine Patients at Tertiary Care Teaching Hospital. *Journal of Young Pharmacists*. 2022 Jul 1;14(3).
5. Bartleson JD, Cutrer FM. Migraine update. *Minnesota medicine*. 2010 May;93(5):36-41.
6. Lavados PM, Tenhamm E. Consulting behaviour in migraine and tension-type headache sufferers: a population survey in Santiago, Chile. *Cephalalgia*. 2001 Sep;21(7):733-7.
7. Bogduk N. Cervicogenic headache: anatomic basis and pathophysiologic mechanisms. *Current pain and headache reports*. 2001 Aug;5:382-6.
8. Gracia-Naya M. Chronic tension headache in the neurological outpatient clinics. *Revista de Neurologia*. 2000 Nov 1;31(10):929-32.
9. Li X, Zhou J, Tan G, Wang Y, Ran L, Chen L. Clinical characteristics of tension-type headache in the neurological clinic of a university hospital in China. *Neurological Sciences*. 2012 Apr;33:283-7.
10. Sauro KM, Rose MS, Becker WJ, Christie SN, Giammarco R, Mackie GF, Eloff AG, Gawel MJ. HIT-6 and MIDAS as measures of headache disability in a headache referral population. *Headache: The Journal of Head and Face Pain*. 2010 Mar;50(3):383-95.
11. Manandhar K, Risal A, Steiner TJ, Holen A, Linde M. The prevalence of primary headache disorders in Nepal: a nationwide population-based study. *The journal of headache and pain*. 2015 Dec;16(1):1-0.
12. Ge R, Chang J, Cao Y. Headache disorders and relevant sex and socioeconomic patterns in adolescents and young adults across 204 countries and territories: an updated global analysis. *The Journal of Headache and Pain*. 2023 Aug 18;24(1):110.

13. Lipton RB, Bigal ME, Steiner TJ, Silberstein SD, Olesen J. Classification of primary headaches. *Neurology*. 2004 Aug 10;63(3):427-35.
14. Murtaza M, Kisat M, Daniel H, Sonawalla AB. Classification and clinical features of headache disorders in Pakistan: a retrospective review of clinical data. *PloS one*. 2009 Jun 8;4(6):e5827.
15. Genc H, Baykan B, Bolay HA, Uluduz D, Unal-Cevik I, Kissani N, Luvsannorov O, Togha M, Ozdemir AA, Ozge A. Cross-sectional, hospital-based analysis of headache types using ICHD-3 criteria in the Middle East, Asia, and Africa: the Head-MENAA study. *The journal of headache and pain*. 2023 Mar 13;24(1):24.
16. Manzoni GC, Stovner LJ. Epidemiology of headache. In *Handbook of clinical neurology* 2010 Jan 1 (Vol. 97, pp. 3-22). Elsevier.
17. Rho YI. The Pathophysiology of Primary Headaches. *Ann Child Neurol*. 2006; 14(2):175-183.
18. Wang Y, Zhou J, Fan X, Li X, Ran L, Tan G, Chen L, Wang K, Liu B. Classification and clinical features of headache patients: an outpatient clinic study from China. *The journal of headache and pain*. 2011 Oct;12:561-7.
19. Al Khalili Y, Asuncion RM, Chopra P. Migraine Headache In Childhood. In *StatPearls [Internet]* 2023 Mar 4. StatPearls Publishing.
20. Tachibana H, Danno D. Clinical characteristics and pharmacological treatment of new daily persistent headache (NDPH). *The Journal of Headache and Pain*. 2013 Feb;14(Suppl 1):P62.
21. Nadig R, Namapally US, Sarma GR, Mathew T. Outpatient burden of neurological disorders: A prospective evaluation of 1500 patients. *Neurology India*. 2019 May 1;67(3):708.
22. Prakash S, Chavda BV, Mandalia H, Dhawan R, Padmanabhan D. Headaches related to triptans therapy in patients of migrainous vertigo. *The Journal of Headache and Pain*. 2008 Jun;9(3):185-8.
23. Sanin LC, Mathew NT, Bellmeyer LR, Ali S. The International Headache Society (IHS) headache classification as applied to a headache clinic population. *Cephalalgia*. 1994 Dec;14(6):443-6.
24. Radtke A, Neuhauser H. Prevalence and burden of headache and migraine in Germany. *Headache: The Journal of Head and Face Pain*. 2009 Jan;49(1):79-89.
25. Ng JY, Hanna C. Headache and migraine clinical practice guidelines: a systematic review and assessment of complementary and alternative medicine recommendations.

- BMC complementary medicine and therapies. 2021 Dec;21(1):1-4.
26. Merikangas KR. Contributions of epidemiology to our understanding of migraine. *Headache: The Journal of Head and Face Pain*. 2013 Feb;53(2):230-46.
  27. Benbir G, Karadeniz D, Göksan B. The characteristics and subtypes of headache in relation to age and gender in a rural community in Eastern Turkey. *Agri*. 2012 Jan 1;24(4):145-52.
  28. Baykan B, Ertas M, Karli N, Akat-Aktas S, Uzunkaya O, Zarifoglu M, Siva A, Saip S, MIRA–Neurology Study Group. The burden of headache in neurology outpatient clinics in Turkey. *Pain Practice*. 2007 Dec;7(4):313-23.
  29. Roessler T, Zschocke J, Roehrig A, Friedrichs M, Friedel H, Katsarava Z. Administrative prevalence and incidence, characteristics and prescription patterns of patients with migraine in Germany: a retrospective claims data analysis. *The journal of headache and pain*. 2020 Dec;21:1-6.
  30. Sader E, Rayhill M. Headache in Pregnancy, the Puerperium, and menopause. *In Seminars in neurology* 2018 Dec (Vol. 38, No. 06, pp. 627-633). Thieme Medical Publishers.
  31. Ramasamy B, Karri M, Venkat S, Andhuvan G. Clinical profile and triggers of migraine: an Indian perspective. *Int J Res Med Sci*. 2019 Apr;7(4):1050-4.
  32. Brito HO, Barbosa FL, Dos Reis RC, Fraga D, Borges BS, Franco CR, Zampronio AR. Evidence of substance P autocrine circuitry that involves TNF- $\alpha$ , IL-6, and PGE2 in endogenous pyrogen-induced fever. *Journal of Neuroimmunology*. 2016 Apr 15;293:1-7.
  33. Sajobi TT, Amoozegar F, Wang M, Wiebe N, Fiest KM, Patten SB, Jette N. Global assessment of migraine severity measure: preliminary evidence of construct validity. *BMC neurology*. 2019 Dec;19(1):1-9.
  34. Stovner LJ, Hagen K, Jensen R, Katsarava Z, Lipton RB, Scher AI, Steiner TJ, Zwart JA. The global burden of headache: a documentation of headache prevalence and disability worldwide. *Cephalalgia*. 2007 Mar;27(3):193-210.
  35. Vyas MV, Wong A, Yang JM, Thistle P, Lee L. The spectrum of neurological presentations in an outpatient clinic of rural Zimbabwe. *Journal of the Neurological Sciences*. 2016 Mar 15;362:263-5.
  36. Silberstein SD. Practice parameter: Evidence-based guidelines for migraine headache (an evidence-based review): Report of the Quality Standards Subcommittee of the American Academy of Neurology. *Neurology*. 2000 Sep 26;55(6):754-62.

37. Jena SS, Jena M, Dash M, Mishra S, Behera IC. Migraine: Pattern of Prescription & Adverse Drug Reaction Profile in A Tertiary Care Teaching Hospital. *Journal of Pharmaceutical Sciences and Research*. 2015 Mar 1;7(3):111.
38. Nash A, Goodday S, Liu Q, Fuller A, Bankhead C, Webber C, Nevado-Holgado AJ, Cader MZ. Concurrent comorbidities substantially alter long-term health behaviours and outcomes of headache patients. *medRxiv*. 2020 Oct 20:2020-10.
39. Wöber C, Holzhammer J, Zeitlhofer J, Wessely P, Wöber-Bingöl Ç. Trigger factors of migraine and tension-type headache: experience and knowledge of the patients. *The journal of headache and pain*. 2006 Sep;7:188-95.
40. Sjaastad O, Saunte C, Hovdahl H, Breivik H, Grønbæk E. "Cervicogenic" headache. An hypothesis. *Cephalalgia*. 1983 Dec;3(4):249-56.