

## To Determine The Ophthalmic Causes Of Headache In Patients Attending Tertiary Care Centre Eye OPD At Tumkur

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### Abstract

**Background And Objectives:** Headache is the most common symptom with multiple etiological factors which play a role in the pathogenesis. It is difficult to find out the exact cause of it. Headache due to ocular cause is a well-known fact. The objectives of this study were: 1. To determine the various ocular causes of headache. 2. To estimate the proportion of patients, attending to ophthalmology outpatient department with headache. **Methods:** All the patients attending outpatient department of ophthalmology at our institute with headache from November 2017 to October 2019 were examined after taking informed consent. Such enrolled subjects, were evaluated clinically for the ocular causes of headache. 180 patients with ocular causes of headache were further evaluated by doing investigative procedures like visual acuity, refraction, slit-lamp examination, fundoscopy, retinoscopy. If required tonometry and gonioscopy were performed. Patients with non-ocular causes of headache were referred to department of oto-rhino-laryngology, general medicine and psychiatry. The data collected was analyzed using SPSS software. **Results:** In our study, most common age group affected was 16-30 years 46.7%. Females were more commonly affected (69.4%) than males. Proportion of ocular causes of headache was found to be 35%. Refractive error (68.9%) was the most common cause of ocular headache followed by presbyopia in 18.8%, muscle imbalance in 12.2% and others like glaucoma, papilloedema, uveitis, coloboma. Among the refractive errors, astigmatism (35.8%) was most common followed by hypermetropia (28.8%). **Conclusion:** Headache due to ocular problems is very frequent. So during the management of a case of headache ocular causes should be kept in mind. Patients with headache are to be investigated to rule out eye related disorders especially for the refractive errors and binocular vision anomalies. So, it is very important to give emphasis on thorough examination and referring to an appropriate specialist in a patient with headache.

**Keywords:** Ocular headache, Refractive errors, Astigmatism, Hypermetropia, Presbyopia

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### Introduction

Headache is one of the important causes of disability worldwide [1]. Headache is one of the common symptoms patients seek medical attention, and is responsible for more disability than any other neurological problem. It mainly affects the productive years and carrier-making period of life and therefore it has a tremendous socioeconomic impact. Even though it is a common complaint, it is often misdiagnosed and inadequately treated. Headache is multifactorial in origin. Differential diagnosis of headache has a long list, probably longest than all the diseases [2]. Headache can arise from so many conditions that range from benign to catastrophic. A careful clinical approach is necessary for the diagnosis and successful management of the cause of headache. Some headaches are symptoms of medical emergencies, placing the ophthalmologist in the frontline of their recognition and management. One must keep in mind the "red flags," and timely referral to other specialists is crucial in the management of headaches [3]. Since 90% of the headaches are simple primary headaches and can be diagnosed based on history alone, it is important to take detailed history. Possibility of the ocular causes of headache should always be kept in mind during management of a case of headache. Due to the close link between the

eyes and headaches, an ophthalmologist may play an important role in establishing the correct diagnosis and management of headache. Though the headache management is not always easy but it is often rewarding. The contribution of ophthalmologist in the evaluation of a patient and in the diagnosis of the cause of headache is outlined. When asthenopia due to refractive error or an organic eye disease is the cause of the headache, the ophthalmologist will not only diagnose the etiology but also cures the patient by adequate therapy. When headache is the sign of a central nervous system disease, the ophthalmologist can provide valuable information to the neurologist regarding nature and localization of the process.

#### Objectives

1. To estimate the proportion of patients, attending to ophthalmology outpatient department with headache.
2. To determine the ocular causes of headache.

#### Methodology

A Cross sectional study was conducted at department of ophthalmology OPD at Sri Siddhartha medical college hospital and research Centre, Tumkur with subjects presenting with headache from November 2017 to October 2019.

Based on Jain.S et al. study- a tertiary hospital based study conducted among 1520 participants entitled "Clinical study of headache with special reference to ophthalmic cause" in 2009 in which a detailed questionnaire and clinical tests were done- the average prevalence rates of 36% were taken as representative for calculating sample size [4].

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Using the following formula for calculation of sample size for prevalence studies using confidence level of 95% and precision of 0.07%

$$n = [Z^2P(1-P)] / d^2$$

Where

n is the sample size,

Z is the Z statistic for level of confidence (1.96),

P= expected prevalence (36%) and

d is the precision (0.07),  $n = [ 1.96^2 \times 0.36 (1-0.36) ] / 0.07^2$

We obtained a sample size of **180**.

**Inclusion criteria**

1.All patients presenting with headache to our department.

**Exclusion criteria**

- 1.Patients with non-ocular causes.
- 2.Severely ill and debilitated patients.
- 3.Pregnancy& lactation.

All patients those who presented with headache to the Department of Ophthalmology were examined and those with ocular causes were enrolled for the study after explaining the study requirement in the language they understand and written informed consent was taken. Such enrolled subjects, were evaluated clinically.

From 6 meters' distance, using Snellen's chart or E chart visual acuity was assessed. Then all the patients underwent slit lamp

examination, autorefractometry readings were taken and patients were dilated with tropicamide eye drops. After dilatation, fundus examination was done followed by wet retinoscopy and acceptance given. Patients were asked to follow up after 3 days for post mydriatic testing and correction was given.

Based on the fundus findings, certain patients were subjected to IOP measurement and gonioscopic examination. CT scan & other relevant investigations were done to confirm the diagnosis in few cases.

Patients with non-ocular causes of headache were referred to medicine, psychiatry or other concerned departments.

The data collected was entered in excel spread sheet. Descriptive statistical analysis was done by mean and standard deviation for quantitative variables and frequency and percentages for categorical variables. The association between categorical variables was analyzed by using Chi square test. The data was analyzed by using SPSS statistical software version 20.

**Results**

In our study, on an average 50 patients presented with headache every month to our OPD. In that about 15 – 20 cases were found to be having ocular causes. With this, the proportion of Ocular causes of headache was **35%**.

**Table 1: Distribution of Social Profile among study subjects**

		Frequency	Percentage
Age Group	<=15 years	15	8.3
	16 – 30	84	46.7
	31 – 45	52	28.9
	>45 years	29	16.1
Gender	Male	55	30.6
	Female	125	69.4
Occupation	Students	67	37.2
	Housewife	63	35.0
	Farmer	21	11.7
	Clerk, Tailor	6	3.3
	Technical Personnel	6	3.3
	Others	17	9.4

Out of 180 patients with ophthalmic causes of headache, 84 patients (46.7%) were in the age group of 16 – 30 years followed by 52 patients (28.9%) who were in the age group of 31 – 45 years. Headache is more common among the females. In this study there

were 125 females (69.4%) and 55 males (30.6%). Headache associated with ocular cause is more common in students about 37.2% followed by housewives 35%.

**Table 2: Distribution of Headache and its characteristics among study subjects**

		Frequency	Percentage
Head ache Duration	Acute	19	10.6
	Sub-acute	46	25.6
	Chronic	115	63.9
Headache Region	Frontal	119	66.1
	Occipital	20	11.1
	Combined	41	22.8
Final Correction	O D	10	5.6
	< 1 D	118	65.6
	1.25 - 2 D	41	22.8
	> 2 D	11	6.1

Chronic headache is more common than acute and sub-acute type. Frontal headache is more common and is seen in 66.1% of the cases. Patients with final correction of less than 1 diopter will have more

headache than those with higher powers. In this study it is about 65.6% and it is significant.

**Table 3:Ophthalmic causes of headache**

		Frequency	Percentage
Diagnosis	Astigmatism	82	35.8%
	Hypermetropia	66	28.8%
	Presbyopia	43	18.8%
	Others	28	12.2%

	Mixed	9	3.9%
	Myopia	1	0.4%
Type of Astigmatism	Simple Myopic	33	40.2
	Compound Myopic	8	9.8
	Simple Hypermetropic	4	4.9
	Mixed	37	45.1

Astigmatism (35.8%) is the most common ocular cause of headache. 2<sup>nd</sup> most common cause is hypermetropia seen in 28.8% cases, followed by presbyopia. other causes accounts for 12.2%. Most common ocular cause of headache is the refractive errors in that astigmatism followed by hypermetropia, presbyopia and other causes like glaucoma, papilloedema, strabismus. In Astigmatism patients who presented with headache, mixed type of astigmatism is seen in 45.1% of the patients followed by simple myopic type of astigmatism which is seen in 40.2% of the cases.

#### Discussion

Although headache is a most common complaint, it has a significant impact on the public health as well as personal health. Though headache management is not easy always but it is often rewarding. The contribution of an ophthalmologist in the diagnosis and evaluation of a patient with headache is outlined. When asthenopia or an organic eye disease is the cause of the headache, the ophthalmologist can not only diagnose the aetiology but also cure the patient by adequate therapy. In our study, the proportion of ocular causes of headache was found to be 35%. Shashi Jain in their study reported that the ocular headache was found in 36% of the patients[4].

In our study population, maximum incidence of headache was found to be in the age group of 16 – 30 years (46.7%). In the age group 31 – 45 years incidence was found to be 28.9%. Shashi Jain in their study reported that maximum incidence in the age group of 15 – 30 years (46.8%), Similar findings were reported by Dhir and Ahmed and Zuberi who found that the maximum incidence of headache in the age group of 20–30 years and 15–20 years respectively[4-6].

Headache in this particular age group can be due to psychological stress caused by educational pressures for career development, work stress, emotional factors and family conflicts. In our study, the incidence of headache was found to be higher in females (69.4%) than in males (30.6%) in all age groups. Similar findings are seen in other studies done by Shashi Jain, Lanchner, Donahue, and Dhir who reported incidence of headache in females to be 56.5%, 58.3%, 56%, and 57% in their respective studies[4-8]. Marasini et al. also reported the higher incidence of headache in females[9]. The higher incidence of headache in females may be due to the higher emotional instability, hormonal variation and psychological stress. In our study headache due to ocular causes was mostly seen in students (37.2%) followed by housewives (35%). Shashi Jain and Brown and Kronfeld also reported the similar results with 52% and 60% of student group having headache in their study[4,10]. Headache in this age group could be because of home and school environment which puts pressure for better performance in the studies[9]. In our study chronic headache was more common and was seen in 63.9 % of the cases. In our study frontal headache was more common, seen in about 66.1% of the cases. Shashi Jain in their study also reported that 67.7% of patients had anterior headache. Marisani et al also reported that frontal headache was seen in 49% of the cases in their study[9]. Ciliary pain is primarily frontal in origin as the ophthalmic division of trigeminal nerve is represented most caudally. In our study, the incidence of headache was a slightly higher in refractive errors 68.9%, presbyopia in 18.8% cases, followed by other causes about 12.2% like muscles imbalance and anterior and posterior segment abnormalities. Similar findings were also observed by Shashi Jain[4]. Uzma fasih also reported that 14.78% of presbyopics had headache[11]. In our study, there were 8 cases of glaucoma, in that 3 were POAG, 3 were LIG and 2 cases were PACG. 6 cases were

glaucoma suspect, 5 were papilledema. Exotropia in 5 cases and 1 was esotropia. 2 in uveitis and 1 was coloboma. Kaimbo in their study reported 12% patients with anterior segment disease such as glaucoma and uveitis associated with headache[12]. Any inflammatory disease of the eye and acute rise in IOP may cause pain in and around the eye and can also cause headache. Acute increase in the IOP is usually associated with eye pain, while an eye with a similar pressure of gradual onset may be asymptomatic. An acute angle-closure glaucoma is the most common painful glaucoma and some forms of secondary glaucoma's like lens induced glaucoma are also associated with acute pressure spikes and pain[2,13]. Dhir also noticed muscle imbalance for near (mainly exophoria) to be more important in causing headache. Binocularity and parallelism are maintained by the extraocular muscles under the controlling influence of fusion. In case of muscle imbalance, extraocular musculature is put under strain, which is richly supplied with pain-sensitive nerve endings and leads to ocular asthenopia and headache[14]. Papilledema was reported in 2(0.53%) cases in study done by Uzma fasih[11]. Papilledema often warrants urgent neuroimaging to rule out the causes like tumour, hydrocephalus or bleeding[15]. In our study, the most common refractive error was astigmatism, which occurred in 35.8% cases followed by hypermetropia (28.8%). Shashi Jain also reported that astigmatism (42.37%) is the most common refractive error followed by hypermetropia (21.46%) in causing headache[4]. Ahmed and Zuberi also found astigmatism in 59% and hypermetropia in 11% of patients with headache[16]. Marasini also found that astigmatism was seen in 63.63%, hypermetropia in 27.27%, and myopia in 9.09% cases[9]. Patwardhan and Sharma also claimed the same trend of refractive error prevalence in headache patients[17]. Mechanism of headache from ciliary muscles contraction in hypermetropia of equal or different degrees where patients accommodate to see clearly and in astigmatism, especially of low degree or moderate degree, where muscles contract irregularly may cause more severe headache[4]. In our study, there were 65.6% of patients with refractive error less than 1 Dioptre, 22.8% patients within 1.25 to 2 Dioptre. Similar observations were reported by Shashi Jain, Griffith, who stressed that small astigmatism errors were responsible for more severe ocular asthenopia[4,18]. Cogan also reported that small refractive errors, especially hypermetropia and astigmatism, causes headache[19]. In our study it is significant with p value < 0.001.

The reason for the higher incidence of headache in hypermetropic astigmatism and mixed astigmatism may be that involuntary, sustained excessive accommodative efforts put the eyes under strain. In our study mixed type of astigmatism was more common and was seen in 45.1% of astigmatic followed by simple myopic astigmatism (40.2%). Shashi Jain in their study reported that the most common type of astigmatism was simple hypermetropic astigmatism (16%) followed by simple myopic astigmatism (14.5%). Akinici has also reported the higher prevalence of headache in compound and mixed astigmatism[20].

#### Conclusion

Headache due to ocular problems is very frequent. So during the management of a case of headache ocular causes should be kept in mind. Patients with headache are to be investigated to rule out eye related disorders especially for the refractive errors and binocular vision anomalies. So, it is very important to give emphasis on

thorough examination and referring to an appropriate specialist in a patient with headache.

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