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# Profile of Ophthalmic Causes of Headache – A Prospective Study

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## Abstract

Headache is the most common cause encountered in ophthalmological practice. It is mistaken that all headaches are associated with refractive errors and other ocular diseases. However, it can be an alarming sign in many cerebral disorders and be a key indication for intervention. The study emphasizes determining the causes of headaches and quantifying the ocular causes. Purposive sampling of the subjects above five years presenting with a headache was included in the study. Data was collected with the help of proforma. Cross references from other specialties like ENT, medicine, dentistry, and neurology were taken. Out of 500 subjects in our study, 391 patients (78.2%) directly attended the ophthalmology OPD with headache. In contrast, 109 (21.8%) were referred from other (ENT, Medicine, Dental, Neurology, Surgery) specialties to ophthalmology OPD because of evaluation of headache. A wide range of differential diagnoses must be considered when evaluating patients with headaches with ocular pain or visual disturbances. Hence, the ophthalmologist is the first physician to triage these patients.

**Keywords:** Headache; Ophthalmic; Benign; Refractive errors; Causes

## Introduction

Headaches are a common but vague problem of modern lifestyle affecting middle-aged individuals worldwide. It mainly affects productivity and quality of life<sup>1</sup>. Differentiating it into low-risk, benign, and high-risk often becomes challenging since the associated symptoms are the same. It is one of the most common non-specific symptoms of the ophthalmic disease. Primary headaches present as visual

complaints, while secondary headaches involve visual pathways<sup>2</sup>. Because of this intricate relationship between the brain and eye, patients usually interpret their condition to present first to ophthalmology<sup>2,3</sup>.

Often, patients cannot differentiate a headache from pain around the eye, which is neglected, and headaches with asthenopic symptoms will be due to uncorrected refractive errors<sup>4</sup>.

A headache may also sometimes be life-threatening, as in a hypertensive emergency, benign intracranial hypertension, or intracranial space-occupying lesions where ophthalmic opinion aids the diagnosis and management<sup>2</sup>. Benign headaches, such as migraine, keratitis, glaucoma, and sinusitis, need long follow-ups for proper evaluation<sup>5</sup>.

Patients complaining of headaches encountered in ophthalmic practice are either due to reference from other specialties to rule out headache syndromes. Though ophthalmic evaluation is included in investigating the headache patient, not all are of ophthalmic origin. Headache patients presenting directly to ophthalmology project common perceptions in them related to the eye.

Thus, this study intends to explore the profile of ophthalmic causes in patients with a headache and to establish the importance and necessity of ocular examination in such patients.

## Objectives

1. To estimate the proportion of ophthalmic causes among patients presenting with a headache to an ophthalmology clinic.
2. To correlate and characterize different ocular pathologies presenting with headache

## Materials and Methods

A Prospective observational study was conducted in the Department of Ophthalmology at a tertiary care rural hospital in Karnataka on a total of 500 Adults attending the Ophthalmology outpatient department and patients getting referred from other departments with headaches between May 2019 and July 2019.

Purposive sampling of all the subjects of either gender aged above five years presenting with a Acute/ Chronic headache was included, and already diagnosed and treated cases of a headache were excluded from the study to avoid the overlapping of the causes. Data was collected with the help of proforma. After taking the consent, a detailed history with special emphasis on the type, duration, site, and associated features of a headache (nausea, vomiting, blurring of vision) was noted. A detailed eye examination was performed under a slit lamp, including refraction and funduscopy using 90D. After a thorough investigation, they were referred to other specialties like ENT, medicine, dentistry, and neurology to rule out the different causes of headaches. In each department after thorough history taking and clinical examination and necessary investigations like ENT- Endoscopy, CT/MRI Paranasal air sinuses etc, Medicine/ neurology- CT/MRI brain were done. Subsequently, the potential diagnosis for the headache was more precisely delineated.

Data was entered into a Microsoft Excel sheet and was analyzed using IBM SPSS version-22 software. Categorical data

was represented in the form of frequencies and proportions. Continuous data was expressed as mean and standard deviation.

## Results

Of 500 subjects in our study, 333(66.6%) were female, and 167(33.4%) were males. 41.4% of the subjects were in the 16-30yrs age group, followed by 23.2% in the 5-15yrs age group, 16.6% in the 31-45yrs age group, 9.8% in the 46-60yrs age group, and 9% in more than 60yrs age group. Three hundred ninety-one patients (78.2%) directly attended the ophthalmology OPD with headaches. In contrast, 109 (21.8%) were referred from other (ENT, Medicine, Dental, Neurology, Surgery, etc.) departments to ophthalmology OPD because of the evaluation of headache (Table 1). One hundred sixteen patients (23.2 %) presented with associated ocular symptoms like eye strain, burning in the eye, eye pain, redness, and colored halos along with headache. One hundred fifty patients (30 %) had other symptoms like sinus pain, nausea, dizziness, earache, dental pain, neck pain, etc. 80 patients (16 %) had mixed symptoms, which were vague and radiating types of headache. The remaining 45 patients (9%) had just headaches.

After complete examination and review with other departments, 208 patients (41.6%) had headaches of ocular cause. Among them, 167 patients (33.4%) had presented to ophthalmological evaluation by themselves, and 41 patients (8.2%) were referred from other departments. Two hundred ninety-two patients (59.6%) were reviewed by other departments mentioned above, and the causes were diagnosed respectively.

Further headaches due to medical causes were present in 37% of the subjects, ENT was the cause in 15%, and headache due to other causes was present in 6.4% (Table 2).

Among ocular causes for headaches, the most commonly encountered etiology is refractive errors in 108 patients (51.9%), which includes uncorrected/ under-corrected myopia, astigmatism, and hypermetropia. Corneal causes like keratitis, trauma, foreign body, and corneal edema were seen in 23 patients (11.05%), which is more common in males aged 15- 45. 27 patients (12.98%) with paralytic squint presented with headache and diplopia. Other less common causes like uveitis, glaucoma, and herpes zoster ophthalmic were seen with more ocular symptoms and less headache. Other rare causes were scleritis, Pigment dispersion syndrome, and neuro-ophthalmic, which were seen with significant headaches (Table 3).

Among females, 41.4% of the subjects had ocular cause for headache, and in males, 41.9% had ocular cause for headache. P value 0.828, no statistically significant difference was found between Etiological factors of headache and gender. Table 4 shows increased number of medical and ocular causes of headache in the age group of 16-30years. However there is no statistically significant difference in the etiological factors of headache and age group.

**Table 1.** Shows the pattern of ocular and non-ocular causes of headache presented to ophthalmology and non-ophthalmological departments

Patients with ocular and non-ocular causes of headache	Patients presenting to ophthalmology with headache	Patients presenting to other departments with headache
	391	109
208 Ocular	167	41
292 Non-ocular	224	68

**Table 2.** Distribution of subjects according to Etiological factors of headache

Causes	Frequency	Percent %
Ocular	208	41.6
Medical	185	37.0
ENT	75	15.0
Primary headache	32	6.4
Total	500	100.0

**Table 3.** Distribution of subjects according to ocular causes of headache

Ocular causes of headache	No. of cases	Percentage %
Refractive errors	108	51.9
Corneal pathology	23	11.05
Squint	27	12.98
Glaucoma	11	5.28
Pigment dispersion syndrome	03	1.44
Herpes zoster ophthalmicus	11	5.5
Uveitis	14	6.73
Scleritis	08	3.84
Neuro-ophthalmic causes	03	1.44
<b>Total</b>	<b>208</b>	<b>100</b>

**Table 4.** Distribution of subjects according to Etiological factors of headache and age group. P value 0.930, no statistically significant difference was found between Etiological factors of headache and age group

Age	ENT		Medical		Ocular		Others	
5-15yrs	17	14.7%	46	39.7%	47	40.5%	6	5.2%
16-30yrs	28	13.5%	74	35.7%	92	44.4%	13	6.3%
31-45yrs	13	15.7%	33	39.8%	32	38.6%	5	6.0%
46-60yrs	7	14.3%	18	36.7%	21	42.9%	3	6.1%
>60yrs	10	22.2%	14	31.1%	16	35.6%	5	11.1%

## Discussion

Headache is a localized or generalized pain with discomfort anywhere in the head or face resulting from several conditions that may be serious or not. Often, benign headaches like migraines are more bothering in daily activities, and neurological headaches have false localizing signs such as ocular pain or visual disturbances, which are diagnosed very late.

In our study, 41.4% of the subjects were in the 16-30yrs age group, followed by 23.2% of the subjects were in 5-15yrs age group, 16.6% of the subjects were in 31-45yrs age group, 9.8% of the subjects were in 46-60yrs age group and 9% of the subjects were more than 60yrs. Similar findings were reported

in a prospective study by Jain S et al., where the maximum patients (47%) were 16–30 years old<sup>1</sup>.

Studies by Dhir<sup>6</sup> and Ahmed and Zuberi<sup>7</sup> found the maximum incidence of headache in the age group of 20–30 and 15–20 years, respectively. Marasini et al. also observed that the non-presbyopic adult group has headaches every six patients out of ten<sup>8</sup>. The reason can be stress due to education, career and family conflicts etc. We might have seen more cases in the 16-30-year-old age group. In our study, 66.6% of the subjects were female and 33.4% were male.

Similar observations were seen in a study by Jain S et al., where female preponderance (56%) was noted, which may be

attributed to females' psychological and emotional stress<sup>1</sup>. In a few studies by Marasini et al. and Dhir, females were more than males<sup>6,8</sup>.

78.2% (391) of subjects with varying degrees of headache and associated symptoms have presented themselves to the ophthalmology OPD. Though only 29% (116) of these subjects had associated ocular symptoms, the remaining related symptoms had also presented to eye OPD for the first time. This may explain the general assumption that all headaches are associated with eye problems. It is known that the evaluation of headaches needs a multidisciplinary approach and time taken to recognize the critical signs.

In our study, headache occurring secondary to the ocular cause was seen in 41.6% (208), the medical cause was 37% (185) of the subjects, ENT cause was present in 15% (75) of the subjects, and other cause was present in 6.4% (32) of the subjects. In a study done by Jain S<sup>1</sup> showed that headache due to ophthalmic causes was found in 36% of cases, followed by primary headache in 27%, ENT in 17%, medical causes in 12%, and miscellaneous in 9% cases. However, few studies, like Queiroz et al.<sup>9</sup> found the prevalence of primary headache in the general population as 37.2%, and the rest had secondary causes. This was contradictory to our study's observations.

In our study, among ocular causes for headache, 36.53% of them had Refractive error, 33.65% of them had astigmatism, muscle imbalance was present in 12.98%, posterior segment abnormalities were present in 9.13%, and anterior segment abnormalities were present in 8.17%.

In a study by Jain S<sup>1</sup> among ophthalmic causes, refractive error, including presbyopia, was seen in 65% of cases, followed by anterior segment abnormalities in 21%, muscle imbalance in 18%, and diseases of the posterior segment in 5% of cases.

A cross-sectional study<sup>3</sup> done in Karachi showed the maximum causes being corneal ulcers (5.80%) followed by glaucoma (3.96%) and endophthalmitis (1.06%). Marasini et al.<sup>8</sup> found the highest incidence of headache associated with refractive errors in 44% of cases; astigmatism was observed in 63.63% of subjects, hypermetropia in 27.27%, and myopia in 9.09% of cases. Kaimbo et al reported that 12% of patients with anterior segment disease, such as glaucoma and uveitis, are associated with headache<sup>10</sup>. The reason is that any ocular inflammatory disease and acute rise in intraocular pressure may cause pain in and around the eye and also cause headaches<sup>11</sup>. Acute elevations in intraocular pressure are usually associated with pain, while an eye with a similar pressure of gradual onset may be asymptomatic.

A study based on causative factors for headaches reported by Uzma Fasih et al. showed ocular cause being threefold times higher than non-ocular<sup>3</sup>. To the author's knowledge, there are not many studies done to validate this data. So, this

study can validate the data on the frequency of ophthalmic causes in headache patients and when the patient needs an ophthalmic reference. This is intended to be a tool for guidelines on referral and management for a treating physician. This helps to save time wasted in evaluation, and immediate management is achieved. This study supports the student to understand how to evaluate a case of a headache from the ophthalmological point of view.

## Conclusion

Headaches often stem from ophthalmic disorders, emphasizing the crucial role of an ophthalmologist in their diagnosis and effective management. A thorough history and comprehensive ocular examination are essential for success in this regard. Additionally, adopting a multidisciplinary approach and conducting meticulous history-taking are paramount, as they play a key role in identifying potentially life-threatening conditions that require immediate intervention.

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