



To study the clinical correlation of headache and refractive error subtypes

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Abstract

Purpose: *The prevalence of refractive errors is 13 to 80%.The uncorrected refractive errors are associated with headache. Examination & correction of defect will reduce headache. Minor refractive errors cause more headache & symptoms than major refractive errors.*

Material & Methods: *150 patients with headache due to refractive error were included. A descriptive cross-sectional study. Subjects were evaluated like visual acuity, refraction, slit-lamp examination, retinoscopy were done. The type and amount of refractive error were estimated.*

Results: *Females (72%) suffer more than males from headache. Refractive errors are more commonly associated with frontal headache (67%). 82.7% of patients had a visual acuity 6/18 and better. 43.6% of astigmatics, 33% of hypermetropes presented with headache.*

Conclusion: *Most of the cases of astigmatism & hypermetropia presents with headache than blurring of vision. Ciliary muscle contraction & accommodation results in higher rate of headache in hypermetropes and astigmatics.*

Keywords: *Headache, Astigmatism, Hypermetropia.*

Background

Headache and refractive errors are the common health problems in general population. The prevalence of refractive errors (RE) in the general population was reported to be from 13 to 80% based on variety of geographic areas and age group¹⁻³. Studies on ocular headache have reported the role of different ocular diseases like glaucoma, uveitis, optic neuritis, visual anomalies like refractive errors, accommodative and vergence deficiencies as the cause of headache. The uncorrected refractive errors are often associated with frontal and /or occipital headache⁴. A careful examination and possible

correction of defect has been observed to reduce headache. Thomas.et.al noted that about 21% people with headache consult ophthalmologists for headache⁵. Whittington reported that among 1400 consecutive patients attending for refraction, 45% complained headache as a chief complaint⁶. Gordon.et.al claimed that minor refractive error often caused more headache and symptoms than major refractive error⁷. Ciliary muscle strain has also been found to be the possible cause of headache.

According to the International Headache Society (HIS), the criteria for the headache related to refractive errors are:

- (a) uncorrected refractive errors or miscorrected refractive errors;
- (b) mild frontal pain as well as eye pain;
- (c) pain that is relieved by resting but getting worse by doing visual tasks at the distance for a long time when visual acuity is impaired.⁸

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, ophthalmologist can not only diagnose the cause but also cure the patient by adequate therapy.

Materials and Methods

150 patients attending ophthalmology OPD at with headache due to refractive error were included in the study. A descriptive cross-sectional study, was conducted after obtaining approval from Institutional Ethics Committee. Patients were enrolled for the study after written informed consent.

Such enrolled subjects underwent ophthalmic examinations including best corrected visual acuity with a Snellen chart at 6 m, slit-lamp examination, cycloplegic refraction and retinoscopy were done. Refractive errors of both eyes were estimated using the retinoscopy and then refined with subjective refraction. The type of refractive error and amount of refractive error were estimated.

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

The maximum incidence of headache (43.3%) was found in the age group of 16–30 years, followed

by in the age group of 31–45 years (31.3%). The incidence was the lowest (10%) in the age group of less than 15 years [Table 1]. The incidence was higher in females (72%) than males (28%) [Table 2]. Students were found to be most commonly affected (37.3%) followed by housewives (36%), farmers (10.7%), clerks (3.3%), technical personnel (4%), and others (10%)[Table 3]. Chronic headache is more common (64%)[Table 4].Frontal headache(67.3%) is more common in refractive errors [Table 5]. The most common refractive error was astigmatism, which observed in 43.6% cases followed by hypermetropia (33%) and presbyopia (20.1%) [Table 6]. The most common type of astigmatism was mixed astigmatism (44.9%), simple myopic astigmatism (37.2%), compound myopic astigmatism (11.5%), simple hypermetropic astigmatism (6.4%) [Table 7]. Amount of refractive error less than 1 D was detected in 69.3% cases, 23.3% cases between 1.25 and 2 D. Only 7.3% cases had more than 2 D of refractive error [Table 8]. Astigmatism less than 1D causes more headache and is significant in our study [Table 9].

Table 1 Age distribution of Headache

Age	Frequency	Percent
<=15 years	15	10.0
16 - 30	65	43.3
31 - 45	47	31.3
>45 years	23	15.3
Total	150	100.0

Table 2 Distribution of headache among two sexes

Sex	Frequency	Percent
Male	42	28.0
Female	108	72.0
Total	150	100.0

Table 3 Occupation of patients having headache due to ocular causes

Occupation	Frequency	Percent
Students	56	37.3
Housewife	54	36
Farmer	16	10.7
Clerk, Tailor	5	3.3
Technical Personnel	4	2.7
Others	15	10.0
Total	150	100.0

Table 4 Headache distribution based on duration

Headache Duration	Frequency	Percent
Acute	13	8.7
Subacute	41	27.3
Chronic	96	64.0
Total	150	100.0

Table 5 Headache distribution based on region

Headache Region	Frequency	Percent
Frontal	101	67.3
Occipital	20	13.3
Combined	29	19.3
Total	150	100.0

Table 6 Final dioptric correction of headache

Diagnosis	Frequency	Percent
Myopia	2	1.1%
Mixed	4	2.2%
Presbyopia	36	20.1%
Hypermetropia	59	33.0%
Astigmatism	78	43.6%
	100.0%	100.0%

a. Dichotomy group tabulated at value 1.

Table 9 Amount of dioptric power in various type of astigmatism in headache

FINAL CORRECTION	Astigmatism				
	Simple Myopic	Compound Myopic	Simple Hypermetropia	Mixed	Total
< 1 D	24 (51.1%)	3 (6.4%)	5 (10.6%)	15 (31.9%)	47 (100.0%)
1.25 - 2 D	4 (16.7%)	2 (8.3%)	0 (0.0%)	18 (75.0%)	24 (100.0%)
> 2 D	1 (14.3%)	4 (57.1%)	0 (0.0%)	2 (28.6%)	7 (100.0%)
Total	29 (37.2%)	9 (11.5%)	5 (6.4%)	35 (44.9%)	78 (100.0%)

Chi-Square value:30.379; P-Value: <0.001

Discussion

In our study, headache was found to be common in the age group of 16 – 30 yeras (43.3%). Shashi jain in their study also reported that maximum incidence in the age group of 15 – 30 years (46.8%).⁹ Headache in this particular age group can be due to stress caused by educational pressures , work stress, emotional factors and family conflicts .

In our study, headache was found to be higher in females (72%) than in males. Similar findings are seen in other studies done by Shashi jain, Lanchner who reported incidence of headache in females to be 56.5%, 58.3%, 56%, and 57% in their respective studies ^{9,10}. It can be due to the higher emotional instability , hormonal variation and psychological stress in females.

Table 7 Types of refractive errors causing headache

ASTIGMATISM	Frequency	Percent
Simple Myopic	29	37.2
Compound Myopic	9	11.5
Simple Hypermetropia	5	6.4
Mixed	35	44.9
Total	78	100.0

Table 8 Final dioptric correction of the refractive error

Final Correction	Frequency	Percent
< 1 D	104	69.3
1.25 - 2 D	35	23.3
> 2 D	11	7.3
Total	150	100.0

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.^{9,11}

In our study chronic headache was more common and was seen in 64 % of the cases. Frontal headache was more common, seen in about 67.3 % of the cases. Shashi jain in their study also reported that 67.7% of patients had anterior headache⁹. Ciliary pain is primarily frontal in origin as the ophthalmic division of trigeminal nerve is represented most caudally.¹²

In our study, the most common refractive error was astigmatism, which occurred in 43.6 % cases followed by hypermetropia (33 %). Shashi jain also reported that astigmatism (42.37%) is the most

common refractive error followed by hypermetropia (21.46%) in causing headache⁹. Marasini also found that astigmatism was seen in 63.63%, hypermetropia in 27.27%, and myopia in 9.09% cases¹³. Patwardhan and Sharma also claimed the same trend of refractive error prevalence in headache patients.¹⁴

Mechanism of headache in hypermetropia is from ciliary muscles contraction, where patients accommodate to see clearly and in astigmatism, especially in lower degree, where muscles contract irregularly which causes more severe headache.

In our study, there were 69.3% of patients with refractive error <1 D, 23.3% patients within 1.25 to 2 D. Similar observations were reported by Shashi jain, Griffith, who stressed that small astigmatism errors were responsible for more severe ocular asthenopia.^{9,15} Cogan also reported that small refractive errors, especially hypermetropia and astigmatism, causes headache.¹⁶

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.

Conclusion

Patients with astigmatism & hypermetropia presents more commonly with headache than blurring of vision. Ciliary muscle contraction & accommodation results in higher rate of headache in hypermetropes and astigmatics. A detailed clinical history, examination and proper correction of refractive error can help in relieving the headache and thereby improves the quality of life.

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