

A CLINICAL STUDY ON PREVALENCE AND PATTERN OF REFRACTIVE ERROR IN A TERTIARY CARE HOSPITAL

Ophthalmology

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ABSTRACT

Aim: The work was undertaken to study the prevalence and pattern of refractive error, its treatment and visual outcome and demographic picture.

Materials and Methodology: 1000 patients with refractive were enrolled for study after fulfilling the inclusion criteria. Visual acuity was tested by Snellen's chart and diagnosis was made by autorefractometry. Distributions of refractive error among 3 ethnic groups were recorded along with recording of age and gender. Their incidences were calculated. Patients were placed in 3 groups depending on the extent of pre-treatment visual acuity. Prevalence of myopic, hypermetropia and astigmatism were assessed. Further, the distribution of various degrees of myopia and hypermetropia were also evaluated. Visual were assessed after treatment with spectacle.

Results: Male patients (54.2%) were more than the females(45.8%). Myopia (49%) was the most common refractive error while low degree of refractive error namely myopia (77.55%) and hypermetropia(80.47%) were more prevalent than high degrees(myopia-2.86% and hypermetropia-3.25%). Satisfactory visual acuity was attained in most of the cases(94% attained 6/6).

Conclusion: Since refractive error is widely prevalent and has a socioeconomic impact, Ophthalmologist must create awareness in the society and provide appropriate medical services on large scale.

KEYWORDS

refractive error, myopia, hypermetropia, visual acuity, prevalent.

INTRODUCTION:-

Uncorrected refractive is the main cause of low vision and second major cause of blindness. An estimated 153 million people are visually impaired due to uncorrected refractive error of whom 8 million are blind. Refractive errors are disorders, not diseases. This disorder is easily correctable. While contact lens and refractive surgery are among the effective solution for refractive error, spectacles remain the most affordable solution that can be effectively dispensed to the large underserved population^[1]. While refractive error affects people irrespective of age, sex and ethnicity, refractive error is the main cause of visual impairment in children aged between 7 and 15 years in rural India^[2] and is similarly prevalent in urban India and in fact throughout the globe. It is estimated that there are 1.4 million blind children in the world, two thirds of whom live in the developing countries^[3]. Childhood blindness in one of the priorities in vision 2020: the right to sight^[4]. It has also been noticed a significant number of refractive error cases are never recognized and treated. These people in their presbyopic age present with uncorrected refractive errors^[5].

Of all the blinds in India, 30% lose their eyesight before the age of 20 years, which is why early detection and treatment of visual impairment in children is undoubtedly of utmost importance^[6]. Poor vision in childhood affects the performance in school or at work and has a negative influence on the future life of the child^[7]. Among the refractive errors, myopia is the most common and its prevalence is currently attracting worldwide attention as recent studies report its dramatic increase over the last 20 years. Moreover planning of youth's career is very much dependent on the visual acuity^[8]. Because of increasing realization of the enormous need for correction of refractive error worldwide, this condition has been considered one of the priorities of global initiative for the elimination of avoidable blindness: Vision 2020–The Right to sight^[9].

MATERIALS AND METHOD:-

This prospective study was undertaken at Regional Institute of Ophthalmology, Gauhati Medical College, Guwahati from August, 2018 to November, 2018 to study the prevalence and pattern of refractive error among the patients attending Eye OPD and to evaluate the visual outcome on treatment. It was also aimed to determine the demographic picture of refractive error population at the hospital.. At first, the total number of eye patients attending outpatient dept. and also the number of refractive error patients among them were recorded during the period. From this, we calculated and determined the incidence of refractive error prevailed among the outdoor patients.

Thereafter, 1000 refractive error patients were selected by simple random sampling. The study population consisted of both male and female individuals with age ranging from 10-70 years.

Patients with hazy media, other ocular disorders and systemic diseases were excluded from the study Individuals with different types of refractive errors in each eye (one eye myopic and other eye hypermetropic) were also not included in our study. After testing the visual acuity and on being diagnosed as case of refractive error on autorefractometer or by retinoscopy (in case of children), selected patients are subjected to further assessment. Those with different degrees of refractive error in each eye, the worse eye was taken for assessment. Distribution of refractive error among the 3 ethnic group of Assam (classified as Assamese, Bengali and other) were recorded during assessment. Thereafter, the number of patients with myopia, hypermetropia and astigmatism were noted. Myopia with or without astigmatism was placed in one group, hypermetropia with or without astigmatism were grouped in another group and only astigmatism cases were taken in the third group.

Further, the myopic patients were sub-grouped as low myopia (less than -3D), medium myopia (-3D to -6D) and high myopia (greater than -6D) and their numbers in each subgroup are noted. Similarly, hypermetropes were placed in subgroups as low (up to 2D), moderate (2.25D - 5D) and high (greater than 5D) and their numbers were also noted. Best corrected visual acuity (BCVA) achieved after spectacular correction in each patient was recorded. Presbyopia corrections were also given to those above 40 years. The results obtained in respect of different parameters and patterns of refractive error including visual outcome were analysed and calculated for determining their prevalence and related aspects.

OBSERVATION AND RESULTS:-

The study population consisted of 1000 patients selected by simple random sampling. Beforehand, we determined the incidence of refractive error among all the Eye patients attending our OPD in four months period. The results and observations are presented below:-

(1) Incidence of refractive error among eye patients attending Eye OPD:-

Table -1: Incidence of refractive error

Total no. of eye patients	10,794
No. of patients with refractive error	4,010
Incidence of refractive error	37.15%

Incidence of refractive error

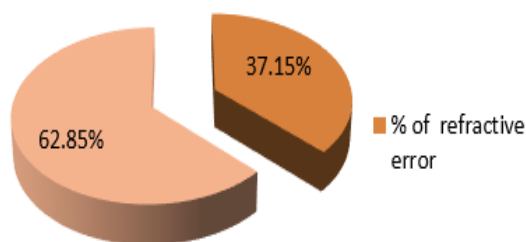


Figure-1

The above table and figure shows the incidence of refractive error in our hospital based study.

2. Distribution of refractive error among different ethnic group of Assam attending Eye OPD:-

Table-2: Distribution of ethnic group

Ethnic group	Number	Percentage
Assamese	690	69%
Bengali	170	17%
Other	140	14%

The incidence of refractive error was 69% in Assamese population followed by 17% in Bengali people and others constituted 14%.

3. Distribution of refractive error among males and females:-

Table-3: Gender distribution

Gender	Number	Percentage
Male	542	54.2%
Female	458	45.8%

Pie diagram showing gender distribution

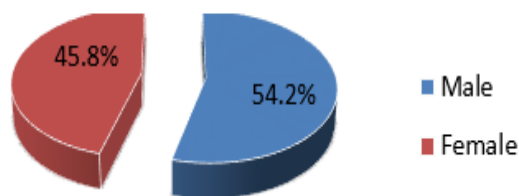


Figure-2

The refractive error was seen to be more prevalence among male (54.2%) population than females (45.8%).

4. Distribution of refractive error among different age group:-

Table-4: Age distribution

Age group in years	Number	Percentage
10-20	150	15%
21-30	140	14%
31-40	196	19.6%
41-50	270	27%
51-60	148	14.8%
61-70	96	9.6%

The maximum number of refractive patient was in the age between 41-50 years (27%) and minimum number of cases were in the age group between 60-70years (9.6%).

5. Prevalence of visual acuity of different degrees among refractive error patients:

Table-5: visual acuity among refractive error patients

Visual acuity	No. of patients	Percentage
6/9 - 6/18	700	70%
6/24 - 6/60	250	25%
>6/60	50	5%

As high as 700 patients (70%) had visual acuity in between 6/9 - 6/18 and only 50 cases (5%) had visual acuity less than 6/60.

6. Prevalence of Myopia, Hypermetropia and Astigmatism among refractive error patients:-

Table-5: Prevalence of different refractive error

Type of refractive error	Number	Percentage
Myopia	490	49%
Hypermetropia	430	43%
Astigmatism	80	8%

Prevalence of different refractive error

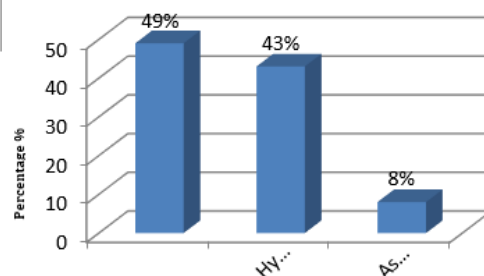


Figure-3

The above table and figure shows that prevalence of myopia was maximum with 49% whereas hypermetropia accounted for 43% and astigmatism was least with 8%.

7. Distribution of different degrees of myopia:-

Table-6: Different degrees of myopia

Myopia	Number	Percentage
Low	380	77.55%
Medium	96	19.59%
High	14	2.86%

Different degrees of myopia

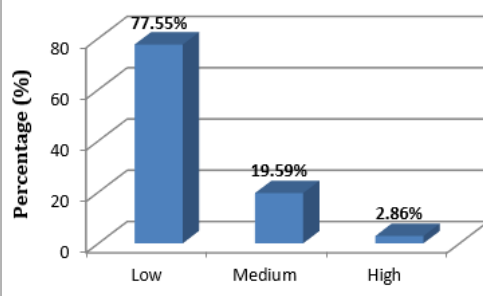


Figure-4

8. Distribution of different degrees of hypermetropia:-

Table-7: Different degrees of hypermetropia

Hypermetropia	Number	Percentage
Low	346	80.47%
Moderate	70	16.28%
High	14	3.25%

It was observed that the low degrees hypermetropia prevailed maximally with 80.47%, moderate degrees hypermetropia with 16.28% and high hypermetropia was with 3.25% only.

9. Visual outcome in refractive error cases on correction with spectacle:-

Table-8: Visual outcome in refractive error

No of patients	Percentage (%)	Visual acuity achieved
940	94%	6/6
25	2.5%	6/9
25	2.5%	6/12
10	1%	<6/18

The visual outcome in our refractive error patients following spectacle correction was highly satisfactorily with 94% of patients attained normal vision of 6/6. 2.5% patients achieved 6/9 vision and another 2.5 attained 6/12 vision and the cause of lower vision after

correction might be due to mild amblyopia. In 1% cases, the vision remained at or below 6/18 in whom there were gross myopic degeneration involving central fundus.

DISCUSSION:-

Refractive error is one of the most common causes of visual impairment around the globe and covers an enormous population of the society which needs careful and extensive attention for prompt visual recovery. In our prospective study, the incidence of refractive error among Eye OPD attending individuals was observed to be 35.17%. Our finding was a hospital based study. Similar hospital based prevalence was determined in a Nigerian Hospital in which 20.7% patients had refractive error [10] which is lower than our finding. Jabeen Rahul et al in 2013, in their study found the prevalence of refractive error to be 54.62% in adolescents in outpatient attendees of Preventive Ophthalmic clinic [11] which is higher than our study.

The prevalence of refractive error in Assamese population was 96%, in Bengali population it was 17% and others constituted 14%. This shows that there is difference in prevalence of refractive error in different ethnic group. This is substantiated by one US study at Baltimore in which among whites the incidence of myopia was 28.1% whereas in blacks it was 19.4% [12]. The gender distribution of refractive error patients in the present study corroborates with other studies as shown:-

Table-9

	Present study	Jabeen Rahul et al in 2013 [11]	Md. Zia-ul-Haque Ansari et al in 2007 [12]
Gender	Percentage	Percentage	Percentage
Male	54.2%	53.01%	57.07%
Female	45.8%	46.99%	42.93%

In all the above studies, male prevalence was found to be more than females. Our study showed maximal number of refractive error patients in the age group between 61-70 years (27%) and minimum in age group between 61-70 years (9.6%) whereas Md. Zia-ul-Haque Ansari et al in their study found highest prevalence of refractive error in the age group between 10-20 years (40-85%) and least in age group of 1-10 years (10:19%) [12]. In another study by Ashok Kr. Narsani et al (2012) observed maximum refractive error (28%) in ages between 26-30 years and minimum (22.09%) in ages between 36-40 years [13]. As regards visual acuity of different degrees in our study, 70% of patients had visual acuity between 6/9 - 6/18, 25% had visual acuity in between 6/24 - 6/60 and only 5% had visual acuity >6/60 before correction. This shows that maximum number of patients of refractive error had mild degree of visual impairment.

The prevalence of myopia, hypermetropia and astigmatism among refractive error population as reported by different authors at different times along with our study are presented below:-

Table-10

Type of refractive error	Jabeen Rahul et al in 2013 [11]	Md. Zia-ul-Haque Ansari et al in 2007 [12]	K. Malu et al 2014 [10]	Present study
	Percentage	Percentage	Percentage	Percentage
Myopia	50.59%	84%	35.8%	49%
Hypermetropia	14.17%	13.96%	29.5%	43%
Astigmatism	35.23%	2.05%	34.8%	8%

In the aforementioned studies, myopia was noticed to be mostly prevalent than other types of refractive error. Our present study and the study of Md. Zia-ul-Haque et al, both showed higher incidence of Hypermetropia. Astigmatism was found to reflect variable incidence in the above studies.

The prevalence of different degrees of myopia (low, medium and high) and different grades of hypermetropia (low, moderate and high) were also evaluated in our study and are presented below along with similar studies of other workers:-

Table-11

Degrees of myopia	N.Y. Koomson et al in 2013 [14]	K. Malu et al in 2014 [10]	Present study
	Percentage	Percentage	Percentage
Low	75.45%	42.3%	77.55%
Medium	15.78%	3.5%	19.59%
High	8.77%	0.7%	2.86%

The incidence of low myopia was highest whereas high myopia was minimally seen in the above studies. The present study is comparable with the findings of N.Y. Koomson et al while it is lower in K. Malu et al's study. Further, in our study, prevalence of low, moderate and high hypermetropia were 80.47%, 16.28% and 3.25% respectively whereas K. Malu et al in their study in a Nigerian hospital found low, high and extreme hypermetropia to be of 23.1%, 0.3% and 1.2% respectively and were of lower rate than our study.

The visual outcome of our study population after correction of refractive error with spectacle was very satisfactorily since as high as 94% of patients achieved 6/6 vision (Best corrected visual acuity - BCVA). In a few patients whose visual acuity remained below 6/6 after correction was either due to amblyopia or gross myopic degeneration. K. Malu and C. Ojabo in 2014 in Nigeria noticed that BCVA increased the number of patients with normal visual acuity from 48.1% to 96.35% which is almost identical with our study finding. It has been rightly remarked that correction of uncorrected refractive error improved the vision specific quality of life of community dwelling older persons [15].

CONCLUSION:-

From a prospective study it can be established that prevalence of refractive error among all ocular disorders in outpatient department is enormous and it constitutes about one third of ocular morbidities. In its demographic front, age of the study population ranged from 10 to 70 years with male preponderance. Majority of the patients had mild visual impairment while others had moderate to severe impairment in vision. Myopia leads in prevalence among various types of refractive error. Besides, low degree of myopia and hypermetropia prevailed more than the higher degrees. The visual acuity attained on glass correction was very satisfactory. Considering the prevalence of refractive error in a large population of the society leading to visual impairment and blindness and its socio economic impact, it is the responsibility of ophthalmologist group and paramedical staff to create awareness regarding this ocular health hazard, screen the patients on large scale and eliminate the error by providing prompt and appropriate treatment. This would also contribute towards achieving the goal for vision 2020.

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