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## A refractive error study in western region of Uttar Pradesh

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### Abstract

Refractive error is the leading global problem throughout the world and India also affected moderately with this type of problem. In India most of peoples either they are male or female, whatever they are old, whatever the profession and habitat, various peoples can identified who are suffering with the refractive error diseases acutely, moderately and severely. So this study is focused on the identification of refractive error cases among the peoples of western Uttar Pradesh especially from the Meerut, Muzaffar Nagar and Bahpat. During this study the different type of refractive error cases are identified among the peoples using different inclusion criteria like Gender, Age, Occupation and living area. During this study the various patients were identified with the conform cases of Myopia, Hypermetropia and Astigmatism and Presbyopia.

**Keywords:** Refractive error, myopia, hypermetropia, astigmatism, presbyopia, eye disorders

### Introduction

The most common problem in the world, including in India, is eye disease and other eye-related conditions. In current situation most individuals enduring with different eye issue essentially the one straightforward vision issue. Numerous eye conditions are brought on by the demands of work and the use of electronic devices like computers, laptops, and mobile phones in the educational and work processes. During the Covid-19 pandemic, most office work and education at various schools, colleges, and universities were conducted online. As a result, a large portion of India's population developed an addiction to electronic devices and now suffers from a variety of vision issues, including itchininess, eye swelling, and refractive errors.

Therefore, this study is carried out in eye clinics and eye camps with populations ranging in age from 05 to 30 years, primarily from the districts of Meerut, Baghpat, and Muzaffar Nagar. Data are collected at random through a questionnaire survey during eye clinic visits and eye camps, and the questionnaire is implemented clearly and carefully to obtain the desired data for the research <sup>[1, 2, 3]</sup>.

A type of vision problem known as refractive errors makes it difficult to see clearly. They occur when the state of your eye prevents light from precisely focusing on your retina, which is a layer of tissue near the back of your eye that catches light.

The most well-known kind of vision problem is refractive error. More than 150 million Indians have a refractive error - anyway many understand that they could see well. This is why eye exams are so important <sup>[5]</sup>.

The incidence of refractive error in children in India is a significant issue that affects public health and necessitates coordinated efforts on the part of a number of stakeholders, including members of the healthcare workforce, educators, and parents. Refractive errors was the primary driver of visual impedance in kids matured somewhere in the range of 7 and 15 years in rustic India <sup>[6, 7]</sup>.

At the time of the initial examination, 70 percent of those who had visual acuity of 20/40 or worse in the superior eye benefited from wearing spectacles <sup>[8]</sup>.

The most common symptoms of refractive errors are blurred vision. Other symptoms include:

- Double vision
- Hazy vision
- Halos or glares around lights
- Squinting
- Headaches or migraines
- Eye strain (soreness or fatigue in your eyes)
- Difficulty focusing (especially when reading or looking at a screen)
- Blurring of vision
- Watering
- Photophobia
- Eye ache

**Material & Methods**

**Study site**

This study was focused at the region of Western Uttar Pradesh, Districts Meerut, Baghpat and Muzzafar Nagar. Meerut is located between northern latitudes of 28.98°N and eastern longitudes of 77.70°E, Baghpat is located between northern latitudes of 28.57°N and eastern longitudes of 77.13°E and Muzzafar Nagar is located between northern latitudes of 29.47°N and eastern longitudes of 77.69°E. The selected areas are notified with 1467 villages (2756.68 km<sup>2</sup>). Climate of these regions are usually moderate, humid and dry, cold and chill, and warm and wet. This study was done with the support of Manik Eye Care & Optical Centre, Meerut, and Department of Optometry, School of Sciences (SOS), OPJS University. Sample was collected from the OPD and various camps organized in this selected areas [9, 10].

**Source of Data**

Patients with vision problems, having difficulty to visualize the objects of near and far are examined by optometrist in the OPD (out patients department) and Eye camps of different places in Merrut, Baghpat and Muzzafar Nagar region. Their case history and findings of diagnostic tests consider as the samples for this study. Primarily, we have screened earlier diagnosis of patients as per their sign and symptoms as well as their occupation.

**Method of Data Collection**

Demographic data such as age, gender, occupation, and ethical group were obtained through good structured questionnaire and the presenting complaints like blur vision,

hazy vision, and headaches were observed and noted for records. Further, these patients are examined with the various diagnostic devices and their records are documented as data. The systemic examination was done and the finding was recorded on a predesigned Performa of the hospital.

**Pathological Investigation**

We have used the pathological standard protocols to find refractive error. Pre-designed Performa were used to record the information from the case records of the selected patients that were investigated for refractive error diagnosis and treatment. Following tests are conducted to identify the various cases of refractive error [11, 12].

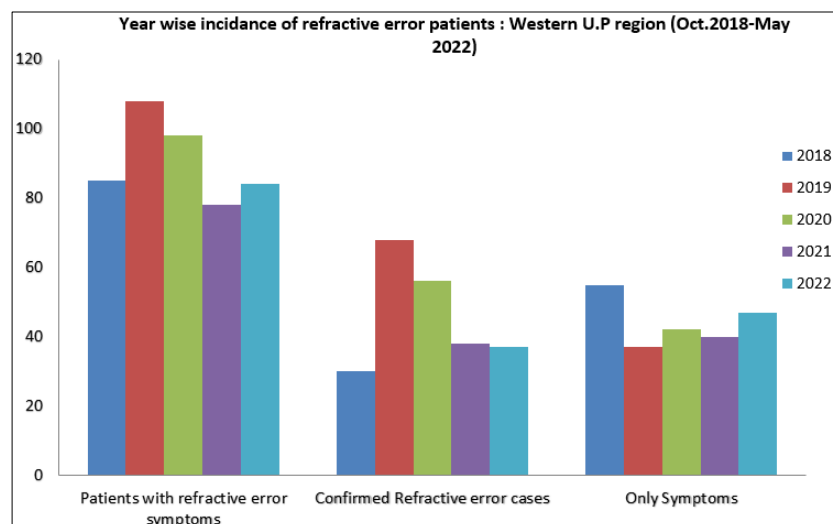
1. Visual Activity Test
2. Snellen Test
3. Random-E test
4. Retinoscopy
5. Post Mydriatic Test

**Results**

Study was conducted on 450 patients with the symptoms of refractive errors were studied from the duration of October 2018 to May 2022. All the patients were screened by using Snellen Testing, Retinoscopy, Radmo E-Test and Post Medriatic to confirm out of 450 patients, 221 patients results within normal ranges. The observations of the analysis reveals out of 229 patients confirmed refractive error diagnosis.

**Table 1:** the table demonstrates the year wise distribution of the patients from the year 2018-2022. Total number of patients with refractive error symptoms, number of refractive errors diagnosis positive and number of patients with only refractive error symptoms.

Year	Patients with refractive error symptoms	Confirmed refractive error cases	Only symptoms
In 2018	85	30	55
In 2019	105	68	37
In 2020	98	56	42
In 2021	78	38	40
In 2022	84	37	47
Total	450	229	221
Average during five years	90	45.80	44.20
% frequency	100%	50.88%	49.12%



**Fig 1:** Year wise distribution of the patient with refractive error symptoms and confirmed refractive error cases

The plot demonstrating the year wise patient distribution, 2018 – 2022, from left to right. As demonstrated in above section, observations suggest that 450 patients with refractive error symptoms and complain were selected for this study and 229 patients were identified having refractive error using Snellen Test, Retinoscopy, Post-Medriatic Test and Radom E-test analysis method and also revealed 221 patients were normal result of refractive errors, during the year 2018–2022 (Table 2). In 2019, we got the more refractive error patients samples in clinic. Overall in five years, 50.88% refractive error symptoms and regarding complains patients were observed to link with confirmed refractive error (Figure 1) [13, 14, 15].

### Age wise distribution

This plot indicates the 189 patients are form the age group of 0-10 in which 97 are confirmed cases of refractive error, 156 patients are form the age group of 10-20 years in which 74 are confirmed cases of refractive error and 105 patients from the age group of 20-30 years in which the 58 patients are the conform cases of refractive error.

**Table 2:** Shows the number of patient's distribution according to age group

Types of patients	0-10 Years	10-20 Years	20-30 Years
Total Patients of refractive error symptoms	189	156	105
Confirmed refractive error cases	97	74	58
Only Symptoms	92	82	47

### Gender Association

Further, we aimed to investigate gender variation frequency among refractive error patients from the region of Western Uttar Pradesh like Meerut, Baghpat and Muzzafar Nagar. Primarily, we observed the frequency of patients with refractive error patients among both gender i.e., male and female. Observations indicate that out of 450 symptomatic patients 289 are male (64.22%) the sign and symptoms in male patients and 161 female (42.44%) the sign and symptoms in female patients were associated with high symptom of refractive error. In case of refractive error patients, we observed 153 males (52.94%) and 76 females (47.20%) patients were confirmed refractive error patients. Interestingly, gender variations of about (5.74%) of symptomatic patients were observed and (50.88%) confirmed refractive error patients in both gender in period of 2018-2022 [16, 17].

**Table 3:** Shows the number of patient's according to gender

Types of Patients	Female	Male
Total Patients of refractive error symptoms	161	289
Confirmed refractive error cases	76	153
Only Symptoms	85	136

### Occupation association study

In this study the 450 number of random patients are selected for the study and part form 450 only 229 patients are found those who have confirm cases of refractive errors. During this study the occupation of patients are closely monitor to analyze the data on patients according to occupation of patients [18].

**Table 4:** Shows the distribution of patients according to occupation

Types of Occupation	No. of Patients
Teachers	16
Students	88
House Wife	56
Doctor	14
Farmer	19
Daily Workers	14
Others	12

### Cases of refractive error

**Table 5:** Shows the types of refractive error among the patients

Types of refractive error	No. of patients
Myopia	76
Hypermetropia	85
Astigmatism	38
Presbyopia	30

Among the confirmed cases of refractive errors we found the maximum cases of myopia and hypermetropia where the 76 patients are detected with myopia and 85 are detected with hypermetropia where the only 38 patients has astigmatism and 30 has the conform cases of presbyopia.

### Conclusion

This study focused on the study of refractive error in western Uttar Pradesh, including the districts of Baghpat, Muzzafar Nagar, and Meerut. During the research, appropriate questions were used to collect data, and the data were analyzed to determine the percentage of patients who are infected with refractive error diseases and the factors that influence the occurrence of refractive error in each patient. The findings of the study strongly suggest that the patients' occupation, sex, gender, use of electronic devices, diet Therefore, this study clearly demonstrates that approximately 48% of the selected population of patients can be treated with various ocular lenses for refractive error. Refractive blunder illnesses can be determined effectively to have the referenced test in this exploration in the segment of materials and strategies and can be dealt with effectively with the assistance of different treatment choices referenced in this examination.

### Conflict of Interest

There is no conflict of interest in this study.

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