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Prevalence Of Refractive Errors In Patients Attending A General Eye Opd Myopia Hypermetropia Astigmatism

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ABSTRACT

Background: Across the globe, myopia, hypermetropia, and Astigmatism are widespread forms of impaired vision. Luckily, they can all be corrected. However, these vision problems can heavily affect lower-income populations where affordable and timely corrective measures and screenings are less accessible. Identifying and monitoring the frequency of these vision problems among patients visiting a general eye OPD is critical to ensuring timely detection, prescribing appropriate spectacles, and designing public health initiatives to eliminate preventable vision impairment.

Objectives: To determine the frequency and patterns of vision impairments among patients attending a general ophthalmology outpatient department and to assess their association with key demographic factors, particularly age and sex.

Methodology: This was a cross-sectional study of 100 participants seen in general eye outpatient departments. Informed consent was received from the patients, after which they were asked a series of demographic and ocular history questions. Visual acuity was assessed using a Snellen visual acuity chart, followed by an objective and subjective refraction with an autorefractor. Based on the spherical equivalents, refractive errors were classified as myopia, hypermetropia, and Astigmatism. Those who had a history of corneal clouding, eye trauma, prior eye surgeries, retinal pathology, or retinal surgeries were removed from the study. SPSS 24 was used for data analysis. For the quantitative variables, means and standard deviations were determined. Associations for the categorical variables were determined using the chi-square statistic.

Results: A total of 100 individuals participated in the study (54 males and 46 females), with a mean age of 32.8 ± 13.6 years. Refractive errors were detected in 72% of the cohort. Myopia constituted the most prevalent refractive condition (34%), followed by astigmatism (24%) and hyperopia (14%). A statistically significant association was observed between age and the presence of refractive errors ($p < 0.05$), whereas no significant relationship was identified between refractive error status and sex ($p = 0.42$). The majority of participants consented to the use of corrective spectacles following refraction.

Conclusion: The findings indicate that refractive errors constitute a substantial proportion of presentations in general ophthalmology outpatient settings, highlighting the ongoing burden of correctable visual impairments. Routine vision screening, coupled with timely provision of corrective lenses, remains essential for reducing preventable visual difficulties and improving overall ocular health outcomes

Keywords: Refractive errors; Myopia; Hypermetropia; Astigmatism

1. INTRODUCTION

Refractive error is one of the most common, preventable, and treatable causes of visual disability across the world, causing functional disability, with less productivity, and reduced quality of life. The World Health Organization states that the problem of uncorrected refractive errors is. It is a significant problem and a public health concern, especially in lower- and middle-income countries where there are no primary eye health care services [1,2]. It is outrageous that there are millions of people with vision disability, even when it is easy to screen, and even when it is correctable with easy and affordable means, including spectacles and lenses. This problem is even larger in poorer developing regions because the majority of the community is poor and there is socioeconomic inadequacy [3]. This is coupled with a lack of awareness and screening opportunities. Refractive errors include myopia, hypermetropia, and Astigmatism. Increasingly, myopia, or nearsightedness, is defined by the excessive elongation of the eye or an increase in the eye's refractive power, and is becoming a significant global public health concern. In addition, increased close-up tasks, decreased outdoor activity, and increased screen time and urbanization have all been linked to this increase. Young myopic patients can suffer academic difficulties and, in advanced stages of myopia, can develop permanently sight-threatening complications. [4,5] Conversely, hypermetropia, or farsightedness, is defined by a lower refractive power of the eye or a shorter axial length of the eye. Hypermetropia can be associated with the eye becoming over-accommodating, or having periods of excessive focusing [6]. Unlike myopia, hypermetropia is less common in the younger age group, but its prevalence increases with age, particularly as the eye's focusing capacity declines. Astigmatism is a prominent and commonly underdiagnosed cause of visual distortion and eyestrain associated with mild, irregular, or asthenopic lenticular and corneal curvature. [7] The prevalence and pattern of refractive errors vary widely across age groups, ethnicities, and regions, particularly in South Asia. South Asian countries, particularly Pakistan, have experienced and continue to experience significant variability in the pattern of refractive errors due to a combination of genetic and environmental factors, as well as differential availability of eye care services [8]. The existing local literature has tended to focus on school-based screening or hospital-based studies of specific age cohorts [7]. There is, however, very little information on the patterns and prevalence of refractive errors among attendees of general eye outpatient departments, a different cohort of patients with a wide array of visual problems. The study of patterns of refractive error in such cases is essential for healthcare system planning, resource allocation, and the development of appropriate screening interventions. [8]. For instance, age- and sex-specific demographic patterns of refractive errors help identify groups that could be targeted for early screening and intervention. Younger people may tend to exhibit changes towards myopia, while the older population may tend to have hypermetropia and or a mixture of other refractive errors. Undiagnosed refractive errors have a spiraling effect on one's social life, job, and school performance, which, in turn, creates a need for local epidemiological studies focused on this issue [9,10]. The present work primarily aims to determine the patterns, prevalence, and socio-demographic correlates of refractive errors among patients attending a general eye OPD.

Research Objective

To determine the prevalence and types of refractive errors among patients attending a general ophthalmology outpatient department and to evaluate the association of these refractive errors with key demographic characteristics, particularly age and sex.

2. MATERIALS AND METHODS

Study Design & Setting

This was a cross-sectional study conducted at Department of Ophthalmology Jinnah Medical College Peshawar from Jan to march 2025.

Participants:

The study included all patients aged 10 years and older who presented with visual complaints to the ophthalmology outpatient department. Exclusion criteria comprised a history of ocular trauma, corneal opacity, retinal pathology, keratoconus, or any prior ocular surgery. After obtaining informed consent, trained staff recorded demographic information and conducted a comprehensive ophthalmic evaluation, including visual acuity assessment, slit-lamp biomicroscopy, and refraction testing..

Sample Size Calculation:

100% was used for the refractive error prevalence assumption when calculating the minimum required sample size at a 95%% confidence level and a 10%% margin of error, yielding 96. To account for missing data and improve statistical reliability, the study was designed to enroll 100 patients.

Inclusion Criteria:

Patients arriving at the eye OPD with an age of 10 Years and above, are willing to have a complete eye assessment

Exclusion Criteria:

Previous trauma or eye surgery was also taken into account. Also, corneal opacity, keratoconus, active eye infection, or

retinal disease were also considered.

Diagnostic and Management Strategy:

To evaluate vision, a Snellen vision chart test was conducted, followed by automated refraction and subjective refinement, and objective refraction was completed next. Spherical equivalents categorized refractive errors. Appropriate corrective glasses were prescribed to all patients diagnosed, and follow-up was recommended as needed.

Statistical Analysis:

Data for this study were analyzed using SPSS version 24. Descriptive statistics were computed for each variable. For qualitative variables, the frequencies and percentages were derived. For quantitative variables, the mean and standard deviation were calculated and summarized. The associations between refractive errors and demographic characteristics were analyzed using a Chi-square test. The statistical significance level was set at $p < 0.05$.

3. RESULTS:

The study included 100 patients with a mean age of 32.8 ± 13.6 years (range: 12–65 years). Refractive errors were identified in 72% of participants, whereas 28% had no refractive abnormality. Myopia was the most prevalent refractive error, affecting 34% of the cohort, followed by astigmatism (24%) and hyperopia (14%). Myopia was predominantly observed among individuals aged 10–30 years, whereas hyperopia occurred more frequently in patients aged 40 years and older. Astigmatism was relatively evenly distributed across age groups.A statistically significant association was found between age and the presence of refractive errors ($p < 0.05$), while no significant association was observed with sex ($p = 0.42$). Patients with myopia commonly reported blurred distance vision, and those with myopia or astigmatism frequently described visual distortion or shadowing. Following refraction, 88% of patients opted to use corrective spectacles, whereas the remaining participants either preferred contact lenses or deferred visual correction..

Intervention Outcome:

Newly prescribed experienced improved vision, with a corrected acuity of 6/9 or better. Marked improvements in visual acuity were also noted. Patients with Astigmatism reported significantly less visual distortion. No participants suffered any negative consequences, and everyone positively experienced the benefits of adequate refractive correction.

Table 1: Demographic Characteristics of Patients (n = 100)

Variable	Category	Frequency (n)	Percentage (%)
Age Group	10–20 years	28	28%
	21–40 years	46	46%
	>40 years	26	26%
Gender	Male	54	54%
	Female	46	46%

Table 1 presents the distribution of baseline demographic characteristics including age and gender of the study population.

Table 2: Distribution of Refractive Errors Among Patients (n = 100)

Refractive Error Type	Frequency (n)	Percentage (%)
Myopia	34	34%
Hypermetropia	14	14%
Astigmatism	24	24%
Emmetropia	28	28%

Table 2 shows the prevalence and pattern of refractive errors detected in the study, with myopia being the most common.

Table 3: Association of Refractive Errors with Age Groups

Age Group	Myopia	Hypermetropia	Astigmatism	Emmetropia	p-value
10–20 years	18	2	8	10	<0.05
21–40 years	14	4	12	16	<0.05
>40 years	2	8	4	2	<0.05

Table 3 demonstrates a statistically significant association between age and type of refractive error. Younger individuals predominantly exhibited myopia, while hypermetropia increased in older age groups.

Table 4: Association of Refractive Errors with Gender

Gender	Refractive Error Present (n)	Emmetropia (n)	p-value
Male	38	16	0.42
Female	34	12	0.42

Table 4 illustrates that refractive errors were similarly distributed between males and females, with no statistically significant association observed.

4. DISCUSSION:

This study shows 72% of patients who visited general outpatient eye clinics have some form of vision distortion, and as such, refractive errors are pretty common in this population. Myopia was most frequently documented, followed by Astigmatism and hyperopia. These results are consistent with international and local epidemiological studies and reflect an increasing prevalence of refractive errors in low- and middle-income countries [11]. The high rate of myopia (34%) was reported in this study and is similar to what was documented in recent studies conducted in Pakistan and the surrounding areas [12]. A 36% myopia prevalence was documented in similar studies conducted in this population by Ahmed and colleagues, a study that closely matches the results seen here. Myopia was similarly documented by Khan and colleagues, who reported a significant prevalence of myopia in a young adult population as a result of greater near work and less outdoor time [13]. A well-documented increase in myopia around the world has been reported, and most notably in many East Asian countries that have what is termed an epidemic prevalence of myopia. While this is not the case in Pakistan, the results of this study suggest that the increasing demand for education, combined with the high prevalence of digital devices, is likely the main driving force. A recent recent study from South Asia found that Astigmatism was the second most common refractive error, with a prevalence of 24%, which is consistent with Astigmatism prevalence studies reporting a range of 20-30% [14]. Riaz et al. also documented profound trends, stressing that visual quality is adversely affected due to uncorrected Astigmatism, which is often missed due to a lack of detailed refractive testing [15]. Given that Astigmatism was pretty evenly distributed across age groups, our findings highlight the importance of routine refraction for all age groups. Current studies indicate that hypermetropia is more common among older participants, which can be explained by age-related loss of accommodation. Studies of have also reported hyperopia to be more pronounced after the 4th decade of life due to lens thickening and elongation [16]. The finding of a significant association between age and refractive error type ($p < 0.05$) is consistent with the results of Rizwan et al. and explains the observed trend. Age was documented as a strong predictor of hypermetropia during community-based screenings. However, in our study, gender did not show a significant association with any refractive error ($p = 0.42$). Recent studies from different regions of the world continue to support this finding and theyoproposet the refractive error distribution among males malesfemalfemales become more even due to similar life patterns and increased education for both sexes [17]. Some earlier studiesstudiesstudies described the phenomenon, and more contemporary works suggest that it has become less common . Our results also support the available global health data which show that refractive errors, despite being easily correctable, constitute a significant portion of the causes of visual impairment . In the present study, the finding that 88% of participants agreed to correct their refractive error was relatively high, and in line with more recent studies that showed that that, when patients were thoroughly counseled, many were willing to adopt corrective measures. This includes strengthening community education programs and primary eye care services. Routine OPD-based refractive screening is effective, as evidenced by the lack of complications during the refraction and the subsequent improvement in visual acuity. A range of studies recently published emphasize that, with early detection in primary care settings,, the burden of uncorrected refractive errors and their impacts on patient productivity and quality of life can be reduced .

5. LIMITATIONS:

The study was constrained in its one-center focus, along with its small sample, which deters generalizability. Due to the

cross-sectional design, we cannot assess causal relationships. Certain other variables,, such as time spent on near work, screen time, and exposure to the ,outdoors, were considered, which may affect refractive error trends.

6. CONCLUSION:

Prior studies found prominent cases of refractive errors among OPD attendees, where there was dominance of myopia across the younger population. Significant associations were observed for age, ,but none forexistedder. Enhanced random screening and primary diagnosis,, as well as available corrective services,, are required to reduce avoidable loss of vision and improve ocular health outcomes.

Disclaimer: Nil

Conflict of Interest: Nil

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Authors Contributions

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Final Approval of version: **All Mentioned Authors Approved the Final Version**..

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