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Original Research Article

A Cross-Sectional Study on the Distribution and Pattern of Refractive Errors among Patients Attending a Tertiary Care Centre

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Abstract:

Background: One of the most prevalent eye conditions and a major cause of visual impairment in the world is the refractive errors. Although they are readily diagnosed and can be corrected, uncorrected refractive errors remain a major challenge in the public health of a population, especially in developing countries where awareness and access to eye care services are limited.

Aim: To determine the distribution and trend of refractive errors in patients in a tertiary care centre.

Methodology: The research is done through the use of clinical data of patients visiting the ophthalmology department of a Shree Narayan Medical Institute and Hospital, Saharsa, Bihar, India in one year. Information of demographic factors and kinds of refractive errors are gathered and examined through the use of descriptive statistics techniques of frequency and percentage.

Results: The patients are majorly the young and middle-aged populations, which means that refractive errors are more prevalent among the active population. The most common refractive error is noted to be myopia which is followed by hypermetropia and astigmatism. The results also indicate a rising tendency of refractive errors which can probably be linked to lifestyle behaviors like extended near work and screen time.

Conclusion: Refractive errors continue to be a significant source of visual impairment and ocular morbidity. Regular screening and timely correction are critical in the detection of early impairment of the visual system to achieve a better quality of life and decrease the load of preventable visual impairment.

Keywords: Refractive Errors, Myopia, Hypermetropia, Astigmatism, Visual Impairment, Tertiary Care Centre.

Introduction

Refractive error has been one of the most prevalent eye disorders in the world, and is a major cause of visual impairment in people of all ages. They arise when the eye fails to focus the light on the retina as it should lead to the blurred or distorted vision. Myopia (nearsightedness), hypermetropia (farsightedness), astigmatism, and presbyopia are the significant categories of refractive errors and differ in their presentation and severity based on anatomy and physiology [1]. Although it is easy to diagnose and correct refractive errors, uncorrected refractive errors still remain a major public health problem.

In the past, corrective lenses were seen as a way to easily correct refractive errors in visual impairment, which was viewed as insignificant. Nevertheless, the unawareness, insufficient access to eye care services [2], and socioeconomic barriers have led to high rate of uncorrected refractive errors in the world. Standardizing definitions and classification systems are becoming a more important focus in recent years to enhance diagnosis and management. Leading organizations in the world like the World Health Organization have identified refractive errors as one of the priority areas in the care of the eye and have come up with guidelines to help in avoiding avoidable blindness and impairments of the eye [3].

The causes of refractive errors are changes in the optical properties of the eye such as corneal curvature, lens strength, and axial length. Myopia is commonly related to a lengthy eyeball, whereas hypermetropia is a consequence of a reduced axial length. Astigmatism is caused by uneven curvature of the cornea or lens and is characterized by distorted vision both at short and long distances [4]. Daily activities like reading, driving and occupational

work may be impacted greatly by these conditions thus lowering the overall productivity and quality of life.

Refractive errors are known to be one of the causes of visual impairment across the globe. The uncorrected refractive errors affect hundreds of millions of people, which makes it one of the primary causes of preventable blindness, according to the estimates by the World Health Organization. The prevalence differs widely among different regions, with the most prevalence being in urban populations and those who are of younger age especially following the rise in screen time and lifestyle changes [5]. In developing nations, the lack of access to eye care services only worsens the situation.

Refractive errors form a large percentage of the ocular morbidity in the Indian environment. Research done both in cities and countryside has shown that there is an increasing trend, particularly among school-going children and young adults. Genetic predisposition, extended near work, bad lighting, and irregular eye checkups are some of the factors that have led to the rising prevalence [6]. National programs are in place to control blindness, but even with these measures, there are still a significant number of cases of blindness that are either not diagnosed or corrected, especially in underserved areas.

In addition to the clinical effects, refractive errors have significant social and economic impact as well. Visual impairment may result into low academic performance, low efficiency at workplace, and higher chances of accidents. It also has a financial cost to individuals and healthcare systems in terms of cost of corrective action and loss of productivity [7]. Moreover, uncorrected refractive errors may adversely affect mental health, resulting in a lack of confidence and social involvement.

To avoid long-term visual complications, it is necessary to detect and properly correct refractive errors early. Periodical eye screening, and more so in the high-risk groups is vital in detecting cases at the early stages [8]. Developments in diagnostic methods and awareness has contributed to better care of refractive errors, but there are still gaps in the availability and use of eye care services.

The current research intends to perform a cross-sectional study on the distribution and trend of refractive errors among patients in a tertiary care centre. Through the analysis of clinical information, the study aims to determine common types of refractive errors and related trends, which will help in enhancing the knowledge and design of effective eye care interventions.

Methodology

Research Design: The study is done as a retrospective observational study to assess the clinical profile and etiological factors of the abnormal uterine bleeding (AUB) among women of reproductive age. The retrospective design allows one to examine patient data collected in the past to identify clinical presentation and diagnosis trends.

Study Area: The research is done at the Department of Ophthalmology, Shree Narayan Medical Institute and Hospital, Saharsa, Bihar, India.

Study Duration: The research is conducted during one year.

Study Population: The study population includes the women who are diagnosed with the abnormal bleeding of the uterus at the age of 18-45 years and who are diagnosed during the period of the study. The eligible cases are identified by the use of predefined inclusion and exclusion criteria on the hospital records.

Sample Size: The sample size of the study is 150 patients, meeting the eligibility criteria, and with a complete medical record.

Inclusion Criteria

- Reproductive aged women (18-45 years old).
- Patients who have a definite diagnosis of abnormal uterine bleeding.
- Access to complete clinical/diagnostic records.

Exclusion Criteria

- Pregnant women
- Women of postmenopausal bleeding.
- Unfinished or missing medical history of patients.
- Cases where bleeding is due to causes unrelated to AUB

Data Collection Procedure: The data are gathered retrospectively using the records of the hospital cases, outpatient and inpatient registers, and diagnostic reports. The results obtained are as follows:

- **Demographic information:** Age and other pertinent features.
- **Clinical presentation:** Type and duration of bleeding.
- **Laboratory results:** Hemoglobin levels
- **Imaging findings:** Ultrasonography findings.
- **Etiological diagnosis:** Diagnosed by the PALM-COEIN system.

All information is captured in a systematic fashion in a structured format of data collection to maintain consistency and reliability.

Study Variables

- **Independent Variables:** Age, period of symptoms and type of bleeding.
- **Dependent Variables:** Etiological classification, anemia status and ultrasound results.

Statistical Analysis: Descriptive statistical techniques, such as frequency and percentage distribution, are used to analyze the collected data. The findings are in tabular form to enable easy interpretation.

Results

The section presents the results of the research on the basis of the data about 150 patients with abnormal uterine bleeding that is summarized in tabular forms to allow easy interpretation of the clinical-diagnostic patterns.

Table 1: Age Distribution of Patients

Age Group (Years)	Number of Patients	Percentage (%)
18–25	18	12
26–30	30	20
31–35	42	28
36–40	36	24
41–45	24	16
Total	**150**	**100**

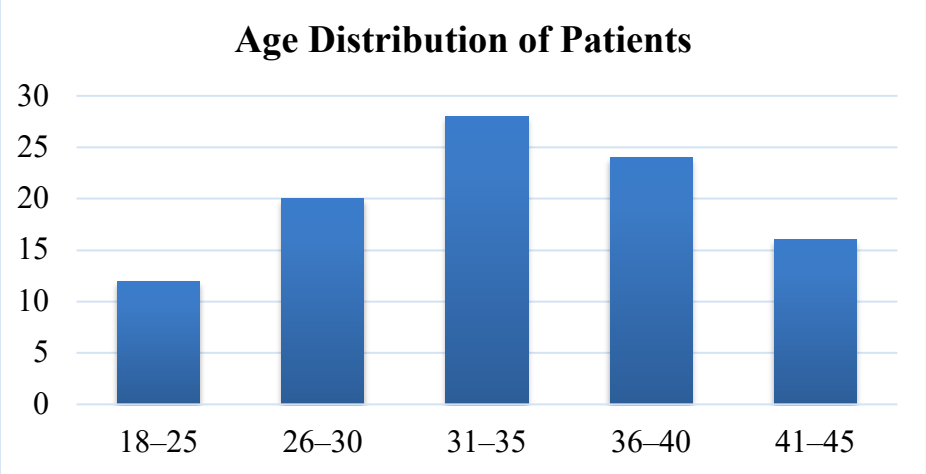

Figure 1: Visual Representation of Age Distribution of Patients

Table 1 indicates the distribution of the patients with abnormal uterine bleeding according to age with the highest number of cases falling under the 31-35 years category. Women aged 36-40 years follow, which implies that AUB is more prevalent in the late reproductive age. A relatively high percentage of cases is also noted in 26-30 years age group and relatively lower cases are found in women aged 18-25 years. The age group of 41-45 years has an average percentage indicating that AUB is still impacting women at the age when they are near perimenopause. In general, Table 1 indicates that AUB prevalence is more likely to rise as individuals get older, peaking in the mid to late reproductive years.

Table 2: Presenting Complaints

Symptom	Number of Patients	Percentage (%)
Menorrhagia	60	40
Metrorrhagia	30	20
Polymenorrhea	20	13.3
Oligomenorrhea	18	12
Intermenstrual Bleeding	22	14.7
Total	**150**	**100**

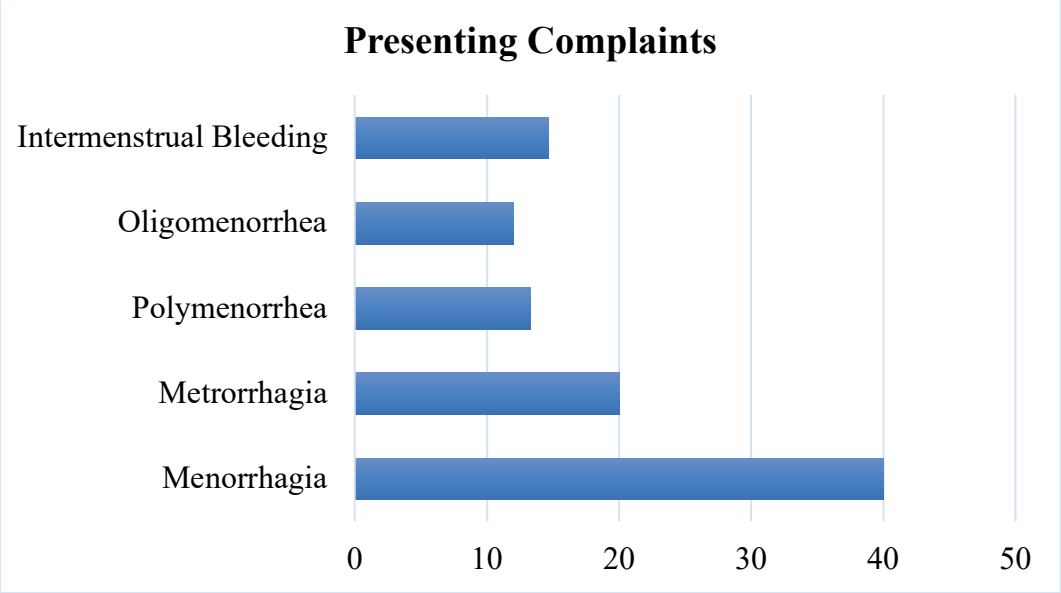

Figure 2: Visual Representation of Presenting Complaints

Table 2 shows the distribution of presenting complaints of patients with abnormal uterine bleeding. It demonstrates that the most frequent symptom is menorrhagia, which was reported by 60 patients (40%), and excessive menstrual bleeding is the main clinical issue. This is followed by metrorrhagia in 30 patients (20%), which is irregular bleeding during inter-cycle. In 22 patients (14.7%), intermenstrual bleeding is seen, whereas polymenorrhagia and oligomenorrhea are also reported in 20 patients (13.3%), and 18 patients (12%), respectively. On the whole, Table 2 demonstrates that the key presenting complaints of women with abnormal uterine bleeding are heavy and irregular bleeding patterns.

Table 3: Duration of Symptoms

Duration	Number of Patients	Percentage (%)
< 3 months	28	18.7
3–6 months	46	30.7
6–12 months	40	26.6
> 1 year	36	24
Total	**150**	**100**

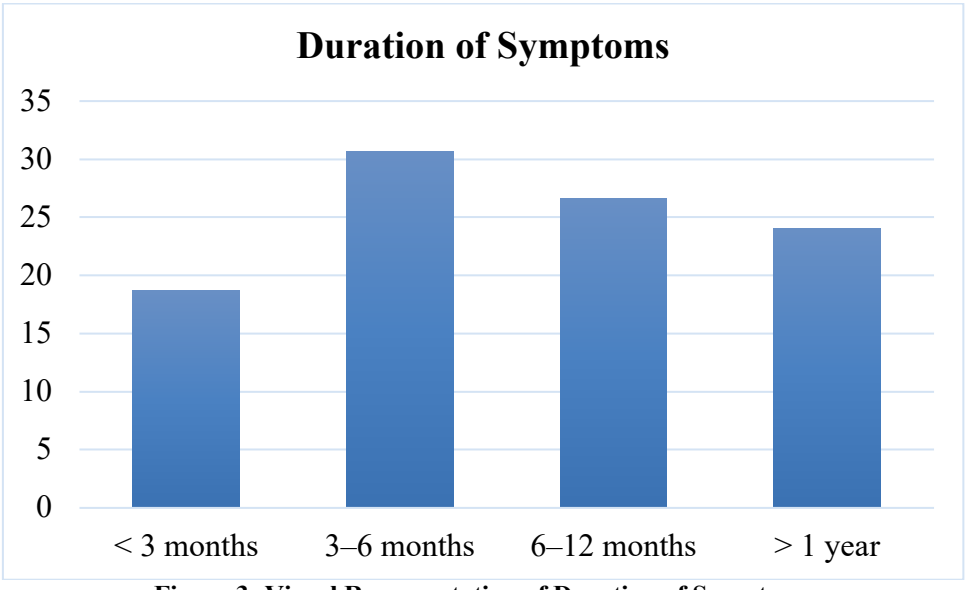

Figure 3: Visual Representation of Duration of Symptoms

Table 3 shows the duration of symptoms of abnormal uterine bleeding among patients. It demonstrates that the most frequent cases of symptoms were 3-6 months, which included 46 patients (30.7%), which means that most women refer to a doctor during this time. This is then succeeded by those having a symptom duration of 6-12 months, with a population of 40 patients (26.6%), which implies that some of the cases took a long time to seek medical attention. Another significant figure was the percentage of patients who experienced the symptoms over a period of over one year (36 (24%)) indicating the chronic nature of the condition in some patients. In the meantime, 28 (18.7%) patients reported on symptoms of less than 3 months. On the whole, Table 3 indicates that many patients have long-term symptoms before they seek medical attention.

Table 4: Etiological Classification (PALM-COEIN)

Category	Number of Patients	Percentage (%)
Polyp	10	6.7
Adenomyosis	22	14.7
Leiomyoma (Fibroid)	48	32
Malignancy/Hyperplasia	8	5.3
Ovulatory Dysfunction	30	20
Endometrial Causes	12	8
Iatrogenic	6	4
Not Classified	14	9.3
Total	**150**	**100**

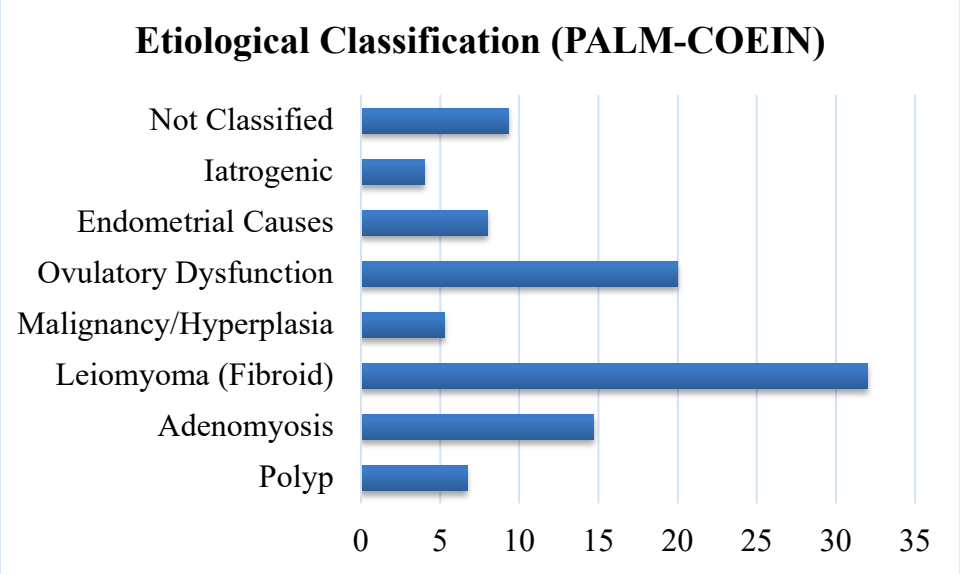

Figure 4: Visual Representation of Etiological Classification (PALM-COEIN)

Table 4 shows the etiological classification of abnormal uterine bleeding, according to the PALM-COEIN system. It demonstrates that leiomyoma (fibroid) is the most prevalent cause that has been diagnosed in 48 patients (32%), and which reflects the preponderance of structural abnormalities. The next important non-structural cause is ovulatory dysfunction, which was found in 30 patients (20%). Adenomyosis is described in 22 patients (14.7%), with those that could not be specifically identified having a number of 14 patients (9.3%). Endometrial causes and polyps also play a role in 12 patients (8%), and 10 patients (6.7%), respectively. Malignancy or hyperplasia is detected in 8 patients (5.3%), which shows a fairly lower yet significant percentage. The least common causes are the iatrogenic, which are observed in 6 patients (4%). In general, Table 4 shows that abnormal uterine bleeding is caused by both structural and non-structural factors, and fibroids are the most common etiology among the study population.

Table 5: Hemoglobin Levels (Anemia Status)		
Hemoglobin Level (g/dL)	**Number of Patients**	**Percentage (%)**
< 8 (Severe)	20	13.3
8–10 (Moderate)	50	33.3
10–12 (Mild)	48	32
> 12 (Normal)	32	21.4
Total	**150**	**100**

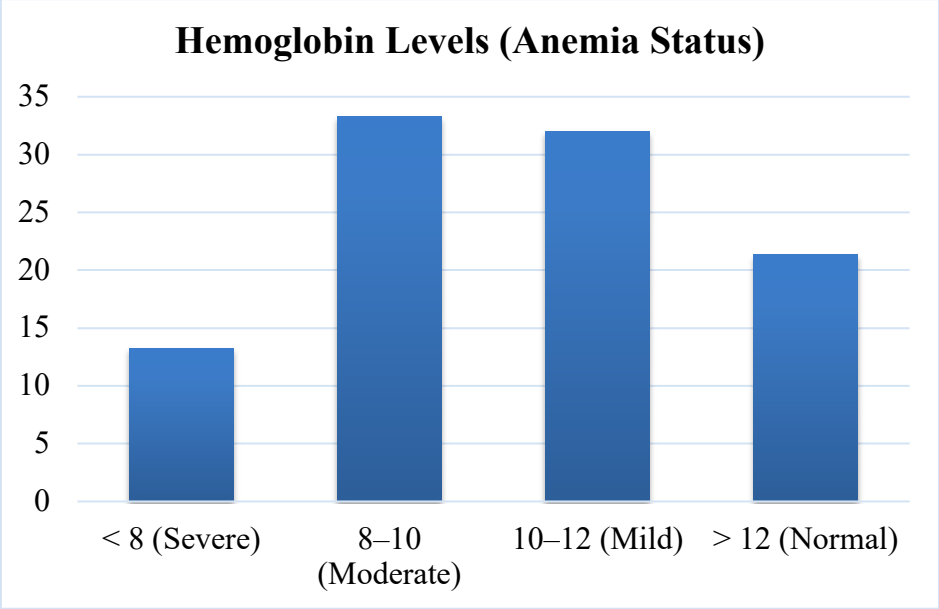

Figure 5: Visual Representation of Hemoglobin Levels (Anemia Status)

Table 5 shows the level of hemoglobin of patients, which indicates the anemia status of women with abnormal uterine bleeding. It reveals that moderate anemia is the most prevalent as it is found in 50 patients (33.3%), and mild anemia is closely behind, with 48 patients (32%). The number of patients with severe anemia is 20 (13.3%), which means that a considerable number of patients have a severe deficiency of hemoglobin. In the meantime, 32 patients (21.4%) are normal in hemoglobin levels. In general, Table 5 shows that most patients with abnormal uterine bleeding have different levels of anemia, with the clinical effect of persistent or excessive bleeding.

Table 6: Ultrasound Findings		
Finding	**Number of Patients**	**Percentage (%)**
Fibroid	50	33.3
Adenomyosis	20	13.3
Endometrial Thickening	18	12
Polyp	12	8
Normal	50	33.3
Total	**150**	**100**

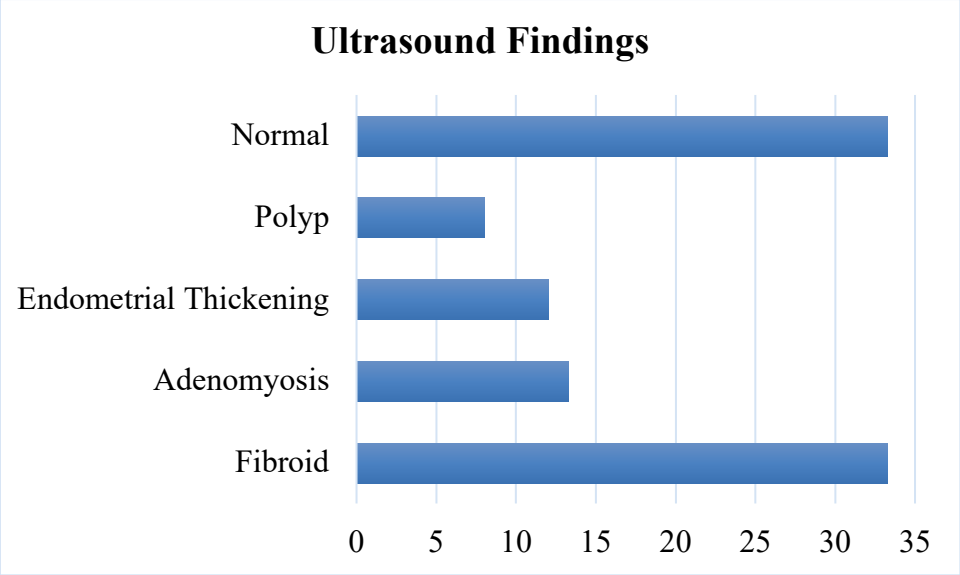

Figure 6: Visual Representation of Ultrasound Findings

The outcomes of ultrasound of the patients with abnormal uterine bleeding are presented in Table 6. It shows that the most frequently diagnosed abnormality was fibroid occurring in 50 patients (33.3%), which indicates its great role as a structural cause. Even the percentage of patients with normal ultrasound results is equal (50 (33.3%)) which shows that non-structural causes are not few. Adenomyosis is present in 20 patients (13.3%), and endometrial thickening in 18 patients (12%). The rarest are polyps which have been detected in 12 patients (8%). In general, Table 6 demonstrates that structural abnormalities are often detected with the help of ultrasound, but a significant number of patients do not have any structural pathology.

Discussion

The current research examines the occurrence and pattern of refractive errors among the patients seeking tertiary care facilities and offers valuable information that concurs with and diverges findings of the past studies. The research results underscore differences in the demographic distribution, clinical presentation, and prevalence patterns of refractive errors, which could be determined by the regional, environmental, and lifestyle-related factors.

The distribution of age in the present study suggests that the refractive errors are more common in the younger and middle-aged people. The discovery is in line with the research done by Nishant et al. (2020) [14] that indicated more prevalence of refractive errors in younger populations in Bihar. On a similar note, Majumder et al. (2018) [10] also noted that the presence of refractive errors is frequently reported in patients visiting outpatient departments of tertiary care hospitals, especially in the group of the active and working-age population. Nonetheless, studies carried out in other geographical areas have recorded differences in age distribution, which can be explained by the differences in the access to healthcare, levels of awareness, and screening.

The clinical pattern in the present study is similar to the results of various hospital-based studies in that the refractive errors are predominant. A shifting trend in the incidence of refractive errors has been noted by Rajput and Shetty (2020) [11], whereby there is a growing burden on lifestyle factors including long hours in front of the screen and near work. Likewise, Webber (2012) [15] pointed out that refractive disorders form a significant percentage of visual impairment cases both in urban and rural areas, and they have to have better refractive services.

The current research results are also corroborated by the more general body of ophthalmic studies which show that refractive errors constitute a substantial part of ocular morbidity in the tertiary care environment. According to Lakho and Ali (2015) [12] and Felix (2017) [13], refractive errors and other visual issues are some of the most frequent diseases seen in eye clinics, and these problems often comprise a significant percentage of the outpatient visits. These results support the increasing weight of refractive errors and the importance of systematic screening and early intervention.

Moreover, the trend in this research is consistent with the results of other studies carried out in other regions of the globe. Eze et al. (2010) [16] and Rai et al. (2019) [9] indicated that ocular conditions, such as refractive errors, exhibit significant population variability but are also a significant cause of visual impairment in tertiary care centres. Similarly, the research performed in Ethiopia and Odisha by Demissie and Demissie (2014) [19] and Bhoi et al. (2018) [17] underlines that refractive

errors are always one of the most common diagnoses in ophthalmic practice.

The rising incidence of refractive errors may also be attributed to lifestyle and environmental changes. The increased use of digital devices, decreased outdoor activities, and increased educational demands have also played a significant role in the increased prevalence of refractive errors and especially myopia. According to AlHarkan et al. (2020) [18], the referral patterns of tertiary care hospitals are becoming more overwhelmed with disorders of the visual impairment, such as refractive errors, which is why primary and secondary eye care facilities should be enhanced. Besides the clinical implications, refractive errors have severe social and economic implications as well. According to Saxena et al. (2016) [20], ocular conditions (such as refractive errors) are not treated, thus leading to poor productivity and a high healthcare burden. The current investigation lends credence to this view by showing that a significant number of patients who visit healthcare facilities have refractive defects, and, therefore, these defects should be diagnosed and treated in a timely manner.

Conclusion

The present research finds that refractive errors are a major ocular morbidity of patients visiting a tertiary care centre, especially in young and middle-aged patients. The large proportion of conditions like myopia, then other refractive errors, is indicative of the increasing influence of lifestyle choices like more screen time and more near work. The results indicate that a significant number of cases are not fixed or diagnosed, so there is a necessity to know better and have access to eye care services. Regular screening and the timely and proper correction is important in avoiding visual impairment and improving the quality of life. Generally, the research highlights the need to reinforce eye health initiatives and put up preventive measures to minimize the number of individuals affected by refractive errors in society.

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