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Seasonal Trends in Patient Visits and Common Ocular Site of Abnormalities: A Study from a Tertiary Eye Hospital in Western Uttar Pradesh, India.

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ABSTRACT :

AIM:

To assess the seasonal pattern of patients' presentation at the tertiary eye hospital and leading sites of ocular abnormality.

METHODS:

This was a retrospective descriptive observational study. The medical records of 1200 patients were reviewed. Only the first-time visiting patients were included in this study. Patients were categorized into paying and non-paying groups to determine the prevalence of visual impairment (VI) in both groups. VI was categorized according to WHO VI categories. Seasons were classified using seasonal classification by Indian Metrological Department.

RESULT: Of the patients, 487 (50.2%) were males, and 483 (49.8%) were females. The abnormal anatomical site with maximum frequency for the right eye was the lens (451, 46.6%), followed by the refractive error (182, 18.8%), cornea (53, 5.5%), and conjunctiva (49, 5%), and a similar pattern was observed in the left eye. The majority of the patients (610, 62.9%) had no VI. The monsoon season has the highest footfall (319, 32.9%).

CONCLUSION:

A significant number of patients who visited eye hospitals had different grades of VI. The cataract and refractive errors are the leading causes of visual impairment. The monsoon season has maximum patient footfall. The findings of this study will help improve patient care process management in eye hospitals.

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INTRODUCTION:

The global burden of visual impairment is a significant public health concern, with approximately 1 billion individuals affected by uncorrected refractive errors and cataracts identified as the primary cause, according to the World Health Organization[1]. Despite the fact that more than 80 percent of visual impairment cases are preventable or treatable, the scarcity of eye care services places millions of people at risk of vision loss. In India, eye diseases constitute a considerable health burden, drawing attention from policymakers[2].

The prevalence and distribution of eye disorders vary across regions, economic statuses, and demographic groups. Understanding these patterns is crucial as certain conditions may lead to blindness if left untreated[3]. The Andhra Pradesh Eye Disease Study (APEDS) highlighted cataracts and refractive errors as the leading causes of blindness and moderate visual impairment in India[4]. Studies on ocular morbidity patterns have indicated cataracts, corneal scars, glaucoma, refractive errors, and retinal diseases as major causes of blindness in adults,

while trachoma, vitamin A deficiency, and squint prevail among children[5,6]. Retrospective analyses conducted in developing economies such as Sudan and Nigeria reveal that cataracts, refractive errors, allergic conjunctivitis, and glaucoma are among the primary reasons for eye hospital visits[7,8]. The variability in ocular disease trends underscores the importance of regional and demographic-specific analysis[9].

Environmental factors also contribute to blindness prevalence, with conditions like xerophthalmia and trachoma thriving in specific settings. Global prevalence rates of visual impairment vary significantly, ranging from 0.1 to 0.3% in the western world to 1.5% in Africa[10]. Limited access to eye care services exacerbates the burden of preventable or treatable blinding diseases such as cataracts, glaucoma, and diabetic retinopathy.

Uttar Pradesh (U.P.), home to approximately 200 million people and divided into 71 districts, is the most populous state in India. Moradabad district, located in western U.P., serves as the focus area for this study[11]. Despite its substantial population, Uttar Pradesh faces challenges in providing adequate eye care, with an insufficient ratio of surgeons to population, falling short of the WHO recommendation[12].

This research aims to analyse the seasonal patterns of patient presentations and prevalent ocular abnormalities at a tertiary eye hospital. By elucidating the pattern of ocular morbidity within our population, this study endeavours to provide essential evidence for the development and implementation of effective eye care strategies, including prevention and treatment measures.

METHODOLOGY:

This study employed a retrospective descriptive observational design, conducted at a tertiary eye care institute in Uttar Pradesh, India. The outpatient department (OPD) of the hospital comprises two sections: the paying section (PS) and the non-paying section (NPS). Primary examinations for all patients included complaint and history-taking, visual acuity assessment, refraction using a streak retinoscope, anterior segment examination with a slit lamp, and intraocular pressure estimation with a Goldman applanation tonometer, performed by optometrists. Ophthalmologists verified optometrists' findings, conducted posterior segment examinations, established diagnoses, and formulated management plans for each patient. Medical records of patients presenting for the first time between January 1, 2022, and December 31, 2022, were included in the analysis. Data collection encompassed demographic characteristics, patients' visual impairment (VI) based on presenting visual acuity (PVA), month of visit, ocular diagnosis, and site of abnormality. Patients recorded PVAs were categorized according to WHO visual impairment categories: no VI (PVA 20/20 to 20/60), moderate VI (PVA worse than 20/60 to 20/200), severe VI (PVA worse than 20/200 to 20/400), and blindness (PVA worse than 20/400 to No light Perception). The month of the visit was recorded to assign a season based on the Indian Meteorological Department's seasonal classification: Summers (March to May), Monsoons (June to September), Post-monsoon (October to November), and Winters (December to February)[13]. Incomplete patient records lacking the specified parameters were excluded from the study.

A list of medical record numbers (MRN) collected underwent random sampling using an online randomizer to derive a final list. The study selected an initial set of 600 MRN for PS patients and another set of 600 MRN for NPS patients, contributing to the final cohort of patients studied.

RESULT:

A total of 1200 medical records were reviewed, with data from 970 (80.8%) patient records included, while 230 (19.2%) were excluded due to incomplete data. Among the included records, 487 (50.2%) belonged to male patients, and 483 (49.8%) belonged to female patients (Table 1). PS patients' records accounted for 538 (55.5%) of the total, while NPS patients' records comprised 432 (44.5%) (Table 2).

Table 3, presents the frequency distribution of common anatomical sites of abnormality leading to ocular diseases for both the right and left eyes. In the right eye, the anatomical site with the highest frequency was the lens (451, 46.6%), followed by refractive error (182, 18.8%), cornea (53, 5.5%), conjunctiva (49, 5%), vitreoretinal (42, 4.3%), orbit & globe (18, 1.8%), eyelid and eyelashes (16, 1.6%), glaucoma (13, 1.3%), binocular vision anomalies (13, 1.5%), optic disc (12, 1.2%), ocular injury (3, 0.3%), and the remainder classified as emmetropia (118, 12.2%). A similar pattern was observed in the left eye, with the lens (450, 46.5%), refractive error (175, 18%), and cornea (69, 7.2%) being the most common sites of abnormality.

Of the total patients, 610 (62.9%) presented with no visual impairment (VI), while 241 (24.8%) exhibited moderate VI, 50 (5.2%) severe VI, and 60 (6.2%) were blind. Additionally, 9 (0.9%) patients, newborns undergoing Retinopathy of Prematurity (ROP) screening, were not assessed for VI (Table 4).

Figure 1, illustrates the monthly distribution of patient visits, with October recording the highest number of visits (128, 13.2%) and February the lowest (55, 5.7%). The seasonal pattern, as shown in Table 5, indicates the highest patient footfall during the monsoon season (319, 32.9%), while the summer season witnessed the lowest (209, 21.5%).

Table 6, highlights that NPS group patients exhibited a higher prevalence of VI across all categories compared to PS group patients ($p<0.05$, chi-square test).

Table 1: Gender distribution of patients attending the Hospital

	n	Female	Male
Children (0 - 17)	115	55	60
Adults (18 - 39)	203	95	108
Presbyopic (40 - 60)	309	162	147
Elderly (61 - Above)	343	176	167
Total	970	488	482

Table 2: Status of patient as per Hospital criteria

Status	Frequency	%
NP	432	44.5
P	538	55.5
Total	970	100.0

Table 3: Frequency distribution of the anatomical site of abnormality

Disease Site	Right Eye		Left Eye		Total	
	n	%	n	%	n	%
Lens	451	46.6	450	46.5	901	46.4
Refractive Error	182	18.8	175	18	357	18.4
Emmetropia	118	12.2	117	12.2	235	12.1
Cornea	53	5.5	69	7.2	122	6.3
Conjunctiva	49	5	49	5	98	5.1
Vitreoretinal	42	4.3	43	4.4	85	4.4
Orbit & Globe	18	1.8	16	1.6	34	1.8
Eyelid & Eyelashes	16	1.6	16	1.6	32	1.6
Glaucoma	13	1.3	14	1.4	27	1.4
Binocular vision anomalies	13	1.5	9	0.9	22	1.1
Optic Disc	12	1.2	8	0.8	20	1.0
Ocular Injury	3	0.3	4	0.4	7	0.4

Table 4: Depicting patients flow in different seasons of the year

Season	n	%
Monsoon	319	32.9
Post - Monsoon	229	23.6
Winters	213	22.0
Summers	209	21.5
Total	970	100.0

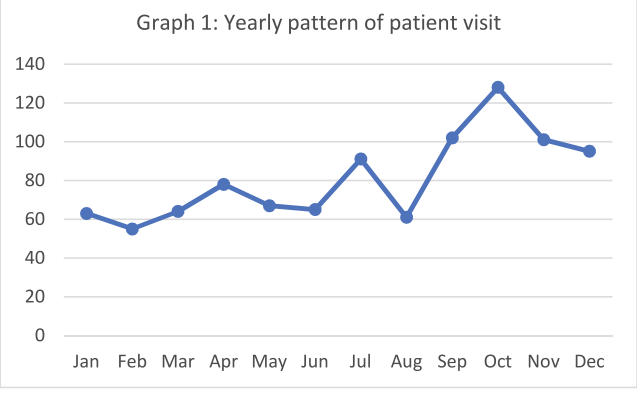
Table 5: Distribution of VI by Seasons

Seasons	VI Category				Total
	Blindness	Moderate VI	No VI	Severe VI	
Monsoon	20	72	203	20	315
Post-Monsoon	16	62	139	11	228
Summers	11	51	133	11	206
Winters	13	56	135	8	212
Total	60	241	610	50	961

Table 6: Distribution of VI as per P and NP criteria

Category	VI Category				Total
	Blindness	Moderate VI	No VI	Severe VI	
NP	34 (7.88%)	141 (32.71%)	231 (53.6%)	25 (5.8%)	431
P	26 (4.91%)	100 (18.87%)	379 (71.6%)	25 (4.72%)	530
Total	60	241	610	50	961

Figure 1: Showing yearly pattern of patient visit into eye healthcare facility



DISCUSSION:

In our study, we observed no significant difference in eye health-seeking behaviour between males and females, indicating equal participation across genders. This contrasts with findings from studies by Oladigbolu, K. K., et al[14]. and Ali, Atif B. Mohamed[6], which reported male predominance. The disparity could be attributed to the geographical variation in study populations, as Oladigbolu and Ali's studies were conducted in Nigeria and Sudan, respectively, whereas ours includes a mix of urban and rural participants. Barman D, Mishra M[15] conducted a study on eye care-seeking behaviors in Indians, revealing equal participation by both genders, aligning with our findings.

The most common ocular abnormalities noted in our study were lens-related issues, followed by refractive errors and emmetropia, consistent with previous research[1,4,10]. However, studies focusing on paediatric populations in western Uttar Pradesh identified refractive errors and convergence insufficiency as major morbidities, reflecting age-specific differences[16]. Our study encompassed a broad age range, hence the variation in findings.

We found that a majority of patients (62.9%) presented with no visual impairment (VI), with fewer patients exhibiting severe VI, consistent with findings by Ajaiyeoba, Ayotunde I., et al[17]. in a study on children using the same VI criteria. In contrast, Odayappan, Annamalai, et al[18]. reported a higher prevalence of moderate VI (70.5%) among low vision clinic attendees, indicating different patient profiles due to varied study settings.

Our study identified the monsoon season as the period with the highest patient visits, with October recording the peak footfall. This contrasts with Gorski, Matthew, et al.'s study on infectious keratitis, which reported maximum cases during the summer season[19]. Seasonal patterns of ophthalmic diseases vary regionally, with studies indicating increased incidences of diseases like acute angle-closure glaucoma and retinal vascular diseases during winters[21-24], and infectious diseases like adenovirus conjunctivitis peaking in spring and summer[25-26]. Although we did not analyse disease-specific seasonal patterns, our findings challenge common perceptions, where winters are often considered peak months for eye hospital visits. Future long-term studies with larger sample sizes are warranted to validate our results.

Limitations of our study include a small sample size and a short duration of one year, limiting generalizability to all tertiary eye care settings. Nonetheless, our findings contribute valuable data for planning effective eye care facilities, assessing and intervening in common ocular conditions, and reducing blindness and severe visual impairment. Additionally, insights into seasonal patient visit patterns and common ocular abnormalities may enhance patient care services at tertiary eye care centres.

CONCLUSION:

In conclusion, our study highlights lens, cornea, and conjunctiva as major anatomical sites for ocular morbidity, with refractive errors emerging as the second most prevalent issue among patients. A substantial proportion of patients (36.2%) exhibited varying degrees of visual impairment, emphasizing the importance of creating visual impairment-friendly healthcare environments in hospitals. The monsoon season and October month recorded peak patient footfalls, indicating potential trends in healthcare-seeking behaviour.

The insights gained from this study offer valuable guidance for eye care managers and healthcare professionals in optimizing hospital processes and management strategies. By understanding the prevalent ocular conditions, seasonal patterns of patient visits, and the prevalence of visual impairment, hospitals can better tailor their services to meet the needs of the community and improve overall patient care.

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