



Pattern of Retinal Diseases in Patients Attending a Tertiary Eye Care Centre: A Cross-Sectional Study.

Dr. VNL. Supriya Rekapalli¹, Dr. K. Tejaswi^{2*}, Dr. Abdul Subhan³.

¹Final Year Post Graduate, Department of Ophthalmology, Kamineni Institute of Medical Sciences, Narketpally, Telangana, India.

²Associate Professor, Department of Ophthalmology, Kamineni Institute of Medical Sciences, Narketpally, Telangana, India.

³Assistant Professor, Department of Ophthalmology, Kamineni Institute of Medical Sciences, Narketpally, Telangana, India.



Correspondence:

Dr. K. Tejaswi.

Associate Professor, Department of Ophthalmology, Kamineni Institute of Medical Sciences, Narketpally, Telangana, India.

Email:

tejasreddy.kotla@gmail.com

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Abstract

Background: Retinal diseases are important causes of visual impairment, particularly in patients with systemic vascular risk factors. Hospital-based data from tertiary eye care centres define the local spectrum of retinal morbidity and support service planning.

Objectives: To assess the pattern of retinal diseases among patients attending the retina clinic of a tertiary eye care centre and describe their demographic profile, symptoms, laterality, systemic comorbidities, diabetic retinopathy severity and visual acuity status.

Methods: This hospital-based cross-sectional study included 100 adult patients attending the retina clinic at Kamineni Institute of Medical Sciences, Narketpally, Telangana, India, from August 2024 to July 2025. Demographic data, systemic history, presenting symptoms, duration, laterality, best-corrected visual acuity and retinal diagnosis were recorded after detailed ophthalmic evaluation. Data were summarized descriptively.

Results: The mean age was 54.2 ± 16.4 years, and 56.0% were males. Diabetes mellitus and systemic hypertension were present in 40.0% and 36.0% of patients, respectively. Diminution of vision was the leading symptom, reported by 68.0%. Unilateral involvement was seen in 54.0%. Diabetic retinopathy was the most common retinal disease, accounting for 32.0%, followed by age-related macular degeneration in 18.0%, retinal vein occlusion in 12.0%, retinal detachment in 10.0% and hypertensive retinopathy in 9.0%. Among diabetic retinopathy cases, moderate non-proliferative diabetic retinopathy was the commonest stage. Visual acuity between $<6/18$ and $6/60$ was observed in 42.0% of patients. **Conclusion:** Retinal vascular disorders formed the major disease burden in this tertiary care population. Diabetic retinopathy was the leading condition, followed by age-related macular degeneration and retinal vein occlusion, indicating the need for integrated screening of diabetes, hypertension and retinal disease.

Keywords: Retinal diseases; diabetic retinopathy; age-related macular degeneration; retinal vein occlusion; tertiary eye care; cross-sectional study.



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INTRODUCTION

Retinal diseases constitute a major component of ocular morbidity because they affect the neurosensory tissue responsible for central and peripheral vision. Their clinical spectrum ranges from slowly progressive macular disorders to acute vascular and tractional conditions requiring urgent intervention. With population ageing, urbanization, diabetes, hypertension and longer survival after chronic systemic disease, retinal disorders have gained increasing relevance in routine ophthalmic practice. Global estimates of visual impairment continue to identify posterior segment diseases, including diabetic retinopathy and age-related macular degeneration, as important contributors to irreversible vision loss [1,2]. This changing pattern places greater responsibility on tertiary eye care centres, where patients often present after referral from primary or secondary facilities.

The pattern of retinal morbidity differs across regions according to demographic structure, systemic disease burden, access to screening and referral behaviour. Hospital-based studies from Nepal, Bhutan and Ethiopia have shown that diabetic retinopathy, age-related macular degeneration, hypertensive retinopathy, retinal detachment and retinal vein occlusion contribute substantially to vitreo-retinal clinic workload [3-6]. Such data are valuable because tertiary centres manage both common retinal conditions and advanced cases with visual threat. They also provide insight into the proportion of patients presenting late, the requirement for imaging, and the need for laser, intravitreal therapy or vitreoretinal surgery.

Diabetic retinopathy has become particularly important in India because of the high diabetes burden and variable screening coverage. Large Indian studies have reported diabetic retinopathy among a significant proportion of patients with diabetes, with vision-threatening disease creating a sustained demand for retinal services [7,8]. Hospital-based diabetic populations

often show higher proportions because symptomatic and referred patients are enriched in tertiary settings [9]. Similarly, age-related macular degeneration increases with age and contributes to visual disability in older adults, with Indian studies documenting both early and late forms of the disease [10,11]. Vascular disorders such as retinal vein occlusion and hypertensive retinopathy are closely linked with systemic hypertension and other atherosclerotic risk factors [12]. Retinal detachment, though less frequent than vascular and degenerative diseases, requires prompt detection because treatment delay can affect visual recovery [13].

Against this background, local data from tertiary eye care centres are useful for clinical planning, patient counselling and preventive strategies. The objective of the present study was to assess the pattern of retinal diseases among patients attending the retina clinic of Kamineni Institute of Medical Sciences, Narketpally, Telangana, India. The study also aimed to describe the demographic profile, systemic comorbidities, presenting symptoms, symptom duration, laterality, diabetic retinopathy severity and best-corrected visual acuity status of the study population.

METHODOLOGY

Study design and setting: This hospital-based cross-sectional study was conducted in the retina clinic of Kamineni Institute of Medical Sciences, Narketpally, Telangana, India. The study period extended from August 2024 to July 2025. The centre functions as a tertiary eye care facility receiving patients directly from outpatient services and through referrals for posterior segment evaluation.

Study population: The study included 100 adult patients aged 18 years and above who attended the retina clinic during the study period and were diagnosed with a retinal disease. A consecutive sampling approach was followed until the required sample size was reached. Patients with significant media opacity preventing adequate fundus evaluation, history of recent ocular trauma requiring emergency primary repair, incomplete clinical records or unwillingness to provide consent were excluded.

Data collection: Demographic variables included age, sex and residence. Clinical details included presenting complaint, duration of symptoms, laterality of retinal involvement, history of diabetes mellitus, systemic hypertension and coexistence of both conditions. Presenting symptoms were grouped as diminution of vision, floaters, metamorphopsia and photopsia. Duration of symptoms was categorized as less than one month, one to six months and more than six months.

Ophthalmic evaluation: All patients underwent best-corrected visual acuity assessment, anterior segment examination with slit-lamp biomicroscopy and dilated posterior segment examination. Fundus evaluation was performed using indirect ophthalmoscopy and slit-lamp biomicroscopy with a fundus lens. Fundus photography, optical coherence tomography and B-scan ultrasonography were used whenever clinically indicated. Diabetic retinopathy was graded as mild, moderate or severe non-proliferative diabetic retinopathy and proliferative diabetic retinopathy using standard clinical severity concepts derived from international diabetic retinopathy classification systems [14]. Other retinal diagnoses were made based on clinical findings and supportive imaging where required.

Outcome variables: The primary outcome variable was the pattern of retinal diseases in the study population. Secondary outcomes included distribution of presenting symptoms, symptom duration, laterality, systemic comorbidities, severity pattern among diabetic retinopathy cases and visual acuity category in the affected or worse eye.

Statistical analysis: Data were entered into a spreadsheet and checked for completeness before analysis. Continuous variables were expressed as mean and standard deviation. Categorical variables were summarized as frequencies and percentages. As the study was descriptive in design, no inferential comparison was planned.

Ethical considerations: The study was conducted in accordance with institutional ethical standards and the principles of the Declaration of Helsinki. Approval was obtained from the Institutional Ethics Committee of Kamineni Institute of Medical Sciences, Narketpally. Written informed consent was obtained from all participants before enrolment. Confidentiality of patient information was maintained throughout data collection, analysis and manuscript preparation.

RESULTS

A total of 100 patients attending the retina clinic of a tertiary eye care centre were included in the study. The mean age of the study population was 54.2 ± 16.4 years. Most patients were above 50 years of age, with 25.0% in the 51-60 years group and 27.0% above 60 years. Males constituted 56.0% of the participants, while females formed 44.0%. Rural residence was reported by 58.0% of patients. Diabetes mellitus was present in 40.0%, systemic hypertension in 36.0%, and coexistence of both diabetes and hypertension in 22.0% of patients (Table 1).

Table 1. Baseline demographic and systemic clinical profile of the study population

Variable	Category / Value	Frequency / Mean	Percentage / SD
Total sample size	—	100	100.0
Age, years	Mean $\pm$ SD	54.2	$\pm$ 16.4
Age group	18–30 years	12	12.0
	31–40 years	14	14.0
	41–50 years	22	22.0
	51–60 years	25	25.0
	>60 years	27	27.0
Sex	Male	56	56.0
	Female	44	44.0
Residence	Rural	58	58.0
	Urban	42	42.0
Diabetes mellitus	Present	40	40.0
Systemic hypertension	Present	36	36.0
Both diabetes and hypertension	Present	22	22.0

Diminution of vision was the most common presenting complaint, reported by 68.0% of patients. Floaters were observed in 16.0%, followed by metamorphopsia in 10.0% and photopsia in 6.0%. Regarding symptom duration, 46.0% of patients presented within one to six months, 30.0% had symptoms for more than six months and 24.0% presented within one month. Unilateral retinal involvement was slightly more common than bilateral involvement, accounting for 54.0% and 46.0%, respectively (Table 2).

Table 2. Presenting symptoms, duration of symptoms, and laterality

Variable	Category	Frequency	Percentage
Presenting complaint	Diminution of vision	68	68.0
	Floaters	16	16.0
	Metamorphopsia	10	10.0
	Photopsia	6	6.0
Duration of symptoms	<1 month	24	24.0
	1–6 months	46	46.0
	>6 months	30	30.0
Laterality	Unilateral	54	54.0
	Bilateral	46	46.0

Diabetic retinopathy was the most common retinal disease, accounting for 32.0% of cases. Age-related macular degeneration was the second most common retinal disorder, observed in 18.0% of patients. Retinal vein occlusion and retinal detachment were seen in 12.0% and 10.0% of patients, respectively. Hypertensive retinopathy accounted for 9.0%. Other retinal conditions included non-diabetic macular edema, central serous chorioretinopathy, retinitis pigmentosa and miscellaneous retinal disorders (Table 3).

Table 3 retinal diseases among the study population. Pattern of

Retinal disease	Frequency	Percentage
Diabetic retinopathy	32	32.0
Age-related macular degeneration	18	18.0
Retinal vein occlusion	12	12.0
Retinal detachment	10	10.0
Hypertensive retinopathy	9	9.0
Macular edema due to non-diabetic causes	7	7.0
Central serous chorioretinopathy	6	6.0
Retinitis pigmentosa	4	4.0
Other retinal disorders	2	2.0
Total	100	100.0

Among patients with diabetic retinopathy, non-proliferative diabetic retinopathy was more frequent than proliferative disease. Moderate non-proliferative diabetic retinopathy was the commonest stage, contributing 37.5% of diabetic retinopathy cases, followed by mild non-proliferative diabetic retinopathy in 25.0%. Severe non-proliferative diabetic retinopathy and proliferative diabetic retinopathy each accounted for 18.8% of diabetic retinopathy cases. Based on best-corrected visual acuity in the affected or worse eye, 42.0% of patients had visual acuity between <6/18 and 6/60, while 18.0% had <6/60 to 3/60 and 10.0% had <3/60 (Table 4).

Table 4. Diabetic retinopathy severity and visual acuity status

Variable	Category	Frequency	Percentage
Diabetic retinopathy severity	Mild NPDR	8	25.0
	Moderate NPDR	12	37.5
	Severe NPDR	6	18.8
	Proliferative diabetic retinopathy	6	18.8
	Total diabetic retinopathy cases	32	100.0
Best-corrected visual acuity	6/6 to 6/18	30	30.0
	<6/18 to 6/60	42	42.0
	<6/60 to 3/60	18	18.0
	<3/60	10	10.0
	Total study population	100	100.0

Note: Percentages for diabetic retinopathy severity were calculated among diabetic retinopathy cases (n=32); visual acuity percentages were calculated among the total study population (n=100).

Overall, retinal vascular disorders formed the major disease burden in this tertiary eye care population. Diabetic retinopathy was the leading retinal condition, followed by age-related macular degeneration and retinal vein occlusion. The findings indicate that systemic vascular risk factors, particularly diabetes mellitus and hypertension, contributed substantially to retinal morbidity in the study population.

DISCUSSION

The present cross-sectional study describes the spectrum of retinal diseases among 100 patients attending a tertiary retina clinic in Telangana. The study population had a mean age of 54.2 years, and more than half of the patients were above 50 years. This age profile is consistent with the known tendency of retinal vascular and degenerative diseases to increase with advancing age. Earlier hospital-based studies from Nepal, Bhutan and Ethiopia also reported a substantial retinal disease burden among middle-aged and older adults, although the ranking of individual disorders varied across settings [3-5].

Diabetic retinopathy was the leading retinal diagnosis in the present study, accounting for 32.0% of cases. This finding is clinically important because 40.0% of the study population had diabetes mellitus and 22.0% had both diabetes and hypertension. Indian screening studies have shown diabetic retinopathy in a meaningful proportion of persons with diabetes, while hospital-based data often show a higher proportion because patients are usually symptomatic, referred or already diagnosed with systemic disease [7-9]. The predominance of non-proliferative diabetic retinopathy in our series, especially moderate non-proliferative disease, suggests a window for timely intervention before irreversible proliferative complications become common.

Age-related macular degeneration was the second most common retinal disease, representing 18.0% of patients. This pattern agrees with population and hospital-based observations identifying AMD as an important retinal disorder among older Indian adults [10,11]. The high proportion of patients above 60 years in the present study supports the age-related nature of this finding. AMD contributes to central visual difficulty, metamorphopsia and impaired reading ability, and its burden is expected to increase as life expectancy improves. Regular macular evaluation in older patients attending ophthalmic services remains essential.

Retinal vein occlusion and hypertensive retinopathy together formed an important vascular subgroup. Retinal vein occlusion accounted for 12.0% and hypertensive retinopathy for 9.0% of cases. This is relevant because systemic hypertension was present in more than one-third of the study population. Meta-analytic evidence has identified hypertension and other atherosclerotic risk factors as major correlates of retinal vein occlusion [12]. These findings reinforce the need for coordinated management between ophthalmologists and physicians, especially for blood pressure control, glycaemic control and cardiovascular risk assessment.

Retinal detachment was diagnosed in 10.0% of patients, which reflects the role of tertiary centres in managing vision-threatening posterior segment emergencies. Rhegmatogenous retinal detachment has recognized associations with age, myopia, vitreoretinal degeneration and previous ocular procedures [13]. In the present study, 28.0% of patients had visual acuity worse than 6/60 in the affected or worse eye. This indicates that a notable proportion arrived with advanced visual impairment. Delayed presentation, limited awareness of retinal symptoms and referral barriers could explain this finding. Overall, the study highlights the importance of retinal screening in patients with diabetes and hypertension, early evaluation of new visual symptoms and strengthening of tertiary retinal services.

Limitations

This study has certain limitations. It was conducted in a single tertiary retina clinic with a sample of 100 patients; therefore, findings reflect hospital attendance rather than community prevalence. Selection bias, referral bias and limited follow-up restrict causal interpretation. Laboratory risk-factor profiling and advanced imaging were not uniformly available for every participant. Longitudinal outcome assessment was outside the scope of this analysis.

CONCLUSION

In this cross-sectional study, retinal vascular disorders formed the major disease burden among patients attending a tertiary eye care centre. Diabetic retinopathy was the leading retinal disease, followed by age-related macular degeneration, retinal vein occlusion, retinal detachment and hypertensive retinopathy. Diabetes mellitus and systemic hypertension were common associated comorbidities, supporting the close relationship between systemic vascular disease and retinal morbidity. Diminution of vision was the predominant presenting symptom, and a considerable proportion had moderate to severe visual impairment at presentation. These findings highlight the need for regular retinal screening, early referral, systemic risk-factor control and strengthened retina services at tertiary care level for reducing preventable visual loss and irreversible blindness.

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