Mapping the Burden of Vitreoretinal Disease in Adults: Insights from a Tertiary Eye Care Center.

Abstract

Background: Posterior segment eye diseases are a significant cause of irreversible blindness. Among these, diabetic retinopathy (DR) and age-related macular degeneration (ARMD) are the most prevalent, while retinal vascular occlusion, hereditary dystrophies, and hypertensive retinopathy contribute substantially. This study aimed to assess the patterns of vitreoretinal disease in adults who visited a tertiary care hospital.

Methods: A cross-sectional study was conducted involving 280 consecutive patients (>18 years) who were newly diagnosed with vitreoretinal disease at a tertiary eye care center over a six-month period. Demographic data, systemic illnesses, and ocular findings were also collected.The examinations included assessments of visual acuity, slit-lamp evaluation, fundus examination, and ancillary imaging (optical coherence tomography/B scan).

Results: The results were analyzed using descriptive statistics.Of the 280 patients, 66.8% were male and 48.9% were aged 50–69 years. The most prevalent condition was DR (24.6%), followed by ARMD (13.0%), hereditary retinal degeneration (10.9%), and retinal vascular occlusion (8.0%). Non-proliferative DR (75.4%) was more prevalent than proliferative DR (24.6%).The most frequent comorbidities were cataracts (9.8%), glaucoma (7.0%), and refractive errors (6.3%).The systemic associations included diabetes mellitus (61.6%) and hypertension (22.5%). Bilateral blindness was observed in 14.6% of patients, predominantly among those aged > 60 years.

Conclusion: Diabetic retinopathy is the leading posterior segment disorder, highlighting the necessity for early detection and targeted interventions.Regular screening, patient awareness,

and teleophthalmology are crucial for mitigating avoidable blindness caused by vitreoretinal disease.

Keywords- ARMD, DR, Glaucoma, Refractive Error

Introduction: Posterior segment eye diseases, which affect the vitreous, choroid, retina, and optic disc, often result in irreversible vision loss and significant ocular morbidity. Retinal diseases are a major concern because of their frequent association with vision loss. Understanding the range of vitreoretinal diseases is essential for developing effective diagnostic and treatment strategies. This study aimed to examine the patterns of vitreoretinal disease in patients visiting the vitreoretinal clinic of a tertiary care center in India. According to the National Programme for Control of Blindness and Visual Impairment (NPCB & VI), posterior segment disorders accounted for 4.7% of blindness in India (2006–2007), following cataracts (62.6%), refractive errors (19.7%), and glaucoma (5.8%). Population-based studies have reported a prevalence of vitreoretinal diseases ranging from 8.56% to 21.02% in individuals aged > 40 years. Diabetic retinopathy (DR) and age-related macular degeneration (ARMD) are among the most prevalent vitreoretinal disorders. DR is a leading cause of blindness worldwide and the most common cause of vision loss in working-age adults in the United States. The burden of DR is increasing in developing countries because of the rising prevalence of diabetes mellitus. ARMD accounts for 8.7% of total blindness globally and is a leading cause of visual impairment in industrialized countries. Early recognition and management of these conditions are crucial to prevent severe visual disabilities.Retinal vascular disorders, such as central retinal artery occlusion (CRAO) and retinal vein occlusion (RVO), also significantly contribute to visual impairment.CRAO is often embolic in origin, whereas RVO is the second most common retinal vascular disorder after DR, with a prevalence ranging from 0.44% to 1.6%.Retinal detachment (RD) is another critical condition

that requires surgical intervention, with the highest prevalence observed in individuals in their seventh decade of life.Inherited retinal dystrophies, including retinitis pigmentosa (RP), are major contributors to progressive vision loss. The global prevalence of RP is estimated to be between 1 in 9,000 and 1 in 750, with significantly higher rates reported in India than in other countries. Other posterior segment diseases, such as pathological myopia and central serous chorioretinopathy, further increase the disease burden.Optical coherence tomography (OCT) has revolutionized the diagnosis and management of vitreoretinal diseases by providing high-resolution, non-invasive imaging of retinal structures. Given the significant impact of posterior segment diseases on vision loss and blindness, studying their patterns is essential for improving early diagnosis, treatment outcomes, and preventive strategies. The findings of this study will contribute to better planning and allocation of resources for vitreoretinal care.

Material and Methods:

Study Design: This was a cross-sectional study.

Sample Size: The study included 280 participants.

Sampling Technique: Purposive sampling was used.

Sample Site: The study was conducted in the Ophthalmology Outpatient Department (OPD) of a tertiary health center.

Total Study Period: The study was conducted over a period of 6 months during January 2025- June 2025

Inclusion Criteria:

1) All patients provided written informed consent to participate in the study.

2) All patients aged > 18 years with newly diagnosed vitreoretinal diseases.

Exclusion Criteria:

1) Patients with pre-existing vitreoretinal disease who were undergoing treatment.

2) Patients aged < 18 years.

3) Patients with open or penetrating injury

Study Method:

All patients above 18 years of age with vitreoretinal diseases who attended the ophthalmology OPD of a tertiary healthcare center were evaluated as follows: sociodemographic data, including age and sex, were recorded.

A comprehensive clinical history was obtained as part of a routine ophthalmic evaluation.Patients were examined according to the established protocol, which included the assessment of unaided visual acuity using a Snellen's chart.Best-corrected visual acuity was also assessed.Dilatation and slit-lamp examinations were also performed.Fundus examinations were performed using direct or indirect methods.Optical coherence tomography (OCT) or B-scan was performed when necessary.All findings and diagnoses were documented on a data collection sheet.

Outcome:

1) Documented patterns of vitreoretinal diseases in terms of frequency and percentages.

2) To Document the associated risk factors in patients presenting with vitreoretinal diseases and the proportion of sociodemographic (age and sex) profiles in frequency and percentage.

Statistical analysis: Data entry and analysis were performed using MS Excel version 2016 (Microsoft Corporation, USA), and Open Epi version 3.1 (Emory University, USA).

The analysis was performed using frequency tabulation and percentage.

All participants were treated in compliance with the ethical guidelines of the Declaration of Helsinki, and informed written consent was obtained from each individual prior to participation

Results: -

This observationalstudy analyzed the patterns ofposterior segment disease in adult patients visiting a tertiary care center. A total of280patients diagnosed with Posterior Segment Eye Diseases were examined.

The present study aimed to analyze the patterns of posterior segment disease in adult patients visiting a tertiary care center.

- Out of the 280 patients in the study, most of the patients 48.9% were between the age of 50-69 years followed by 30-49(24.3%), 18-29(17.1%) and 70- 79(9.6%)
- Male patients (66.8 %) were more than female patients (33.2 %).
- Of the 280 patients, most presented with diabetic retinopathy (24.6%), followed by age-related macular degeneration (13.0%), Hereditary Retinal Degeneration and Macular Dystrophy (10.9%), Retinal Vascular Occlusion (8.0%), Vitreo-Macular Traction (5.3%), myopia (5.2%), and Hypertensive Retinopathy (5.0%).

- Of the 69(138 eyes) patients who presented with diabetes, 104 eyes were diagnosed with NPDR and 34 with PDR, suggesting a high prevalence of NPDR.
- CSME was found in 83 eyes, of which 68 eyes were associated with diabetic retinopathy and 15 eyes were associated with retinal vein occlusion (RVO).
- Among the 38 patients who presented with ARMD, 22(61.8%) were diagnosed with ARMD. patients were male and 16 (42.10%) were female. Wet ARMD had a higher prevalence (57.90%) than Dry ARMD (38.1%).
- Of the 280 patients, 17 presented with optic nerve diseases, among which 70.59% presented with AION, 17.65% presented with papillitis, and 11.76% with Optic Neuritis.
- 45 patients presented with retinal vascular occlusion, of whom 38(84.44%) had retinal vein occlusion and 7(15.56%) had retinal artery occlusion.
- Cataracts (9.82%) and refractive errors (6.25%) were the most common preventable causes of blindness in this study.
- Among the 10 patients with Eales disease, two had pulmonary/extrapulmonary TB as a systemic illness.
- Eleven patients had CSCR, among which 4 them four had stress, one had non-alcoholic liver disease, and one had eclampsia as a risk factor.
- Vitreoretinal diseases were most common in patients aged > 60 years, and most (51.2%) patients presented with significant visual impairment.
- Of the 139 (24.82%) blind eyes, 57 were unilaterally blind and 41 were bilaterally blind.
- Among the 280 patients 61.6% patients were diabetic, 22.5% patients were hypertensive and 3.6% had hyperlipidaemia

Observations:-

This was an observationalstudy that analyzed the pattern ofposterior segment diseases in adult patients visiting a tertiary care center.A total of280patients diagnosed with Posterior Segment Eye Diseases were examined.

TableNo.1:GendersWiseDistribution(N=280)

	TotalNo.ofPatients	**Percentage**
Male	187	66.8%
Female	93	33.2%

Ofthe 280patients,187(66.8%)weremen and 93(33.2%)were women.

Table 2:Comparison ofgender-wisedistributionofpatientswithotherstudies.

	Presentstudy(%)
Male	66.8%(n=187)
Female	33.2%(n=93)

The male-to-femaleratiowas(1.5:1)in the presentstudy.

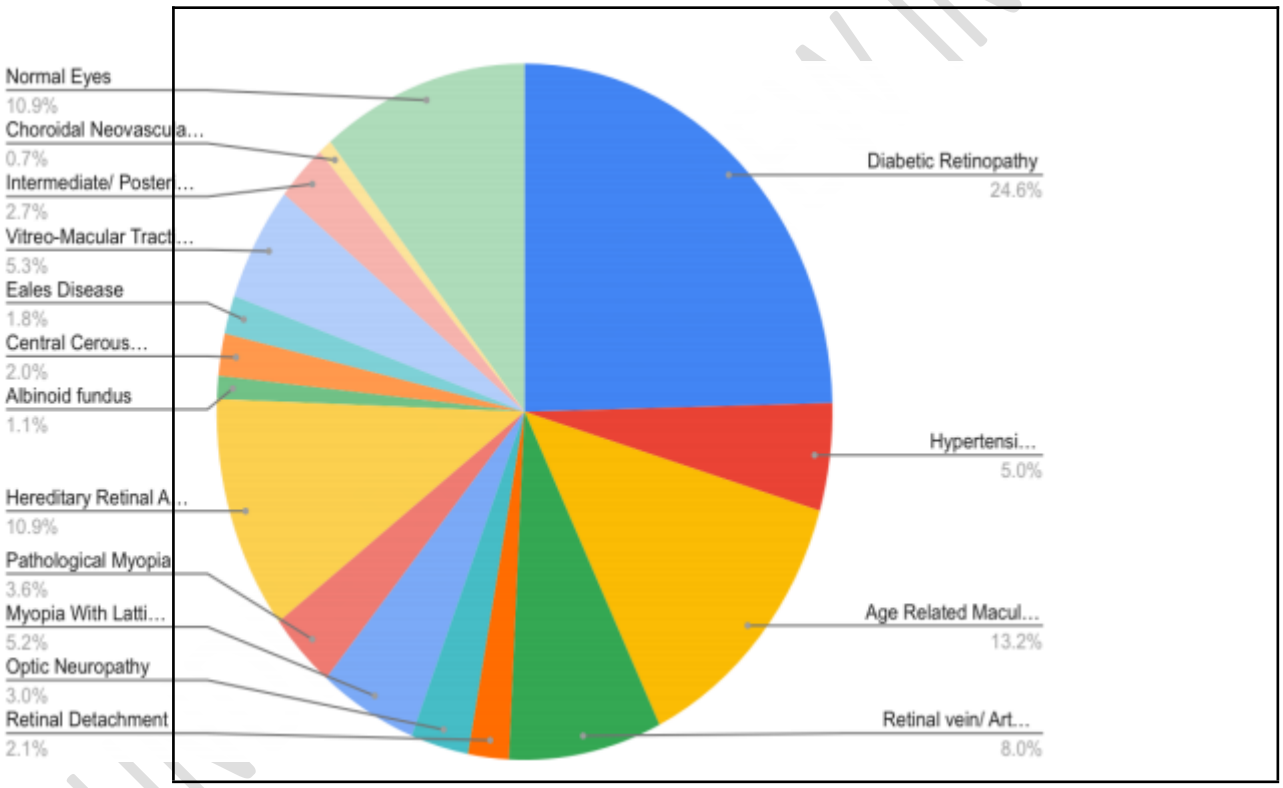
TableNo.3:Agegroupwisedistributionofpatientshavingposteriorsegment eye diseases (N=280)

Agegroups	**Numbersofpatients**	**Percentage**
18-29years	48	17.1%

30-49years	68	24.3%
50-69years	137	48.9%
70-89years	27	9.6%

Almosthalfofthepatients (48.9%) belongto 50-69years age group followed by30-49years (24.3%) age group and 18-29years (17.1%) ofage groups. 9.6% ofpatientsbelongstothe70-89yearsofagegroup.

ChartNo.1:DistributionofpatternofposteriorsegmentEyediseaseofpatients.

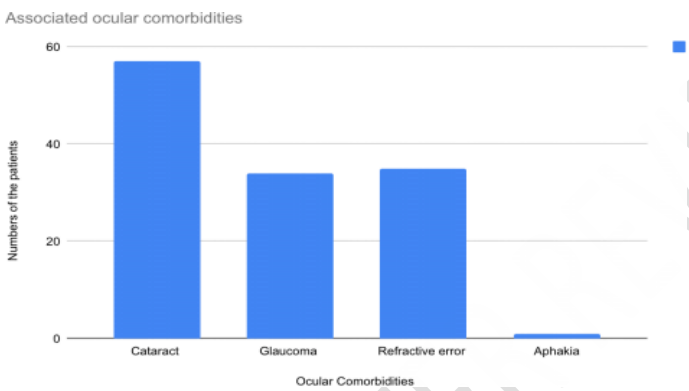


Out of 280 patients, the most common condition was Diabetic Retinopathy, affecting 24.6%, followed by Age-Related Macular Degeneration at 13.0%, Hereditary Retinal Degeneration and Macular Dystrophy at 10.9%, Retinal VascularOcclusionat8.0%,VitreomacularTractionat5.3%,Myopiaat5.2%, and Hypertensive Retinopathy at 5.0%

A total of 45 patients were diagnosed with Retinal Vascular Occlusion,of which 38 had Retinal Vein Occlusion, and 7 were diagnosed with Retinal Artery Occlusion. Out of38patients with Retinal Vein Occlusion 15(39.47) patients had CSME and 5 (13.15%) patients had Vitreous haemorrhage

17patients were diagnosed with optic nerve diseases, ofwhich12 (70.59%) had Anterior Ischemic Optic Neuropathy (AION), 3 (17.65%) had Papillitis, and 2 (11.76%) were diagnosed with Optic Neuritis.

ChartNo.2:Otherassociated ocular comorbiditiesamong studypatients.

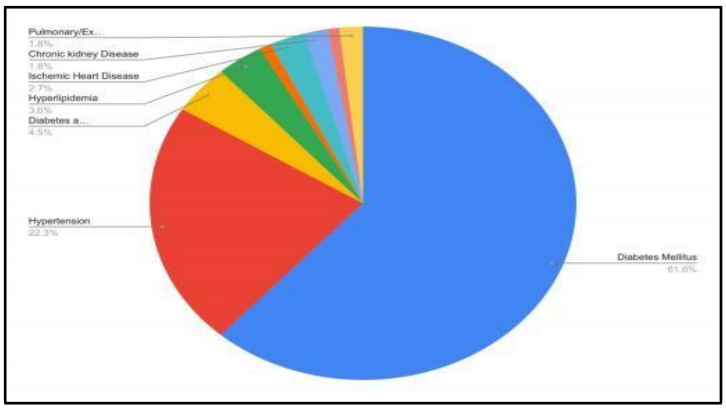


Outof560eyesexamined127(22.67%)eyeshadassociatedocular comorbidities with vitreoretinal diseases.

Cataracts(9.82%)followedbyrefractiveerror(6.25%)werethemost common preventable cause ofblindness.

Glaucomawasobservedin34 patients(7.0%),likelyduetolowawareness and poor compliance with glaucoma treatment among patients.

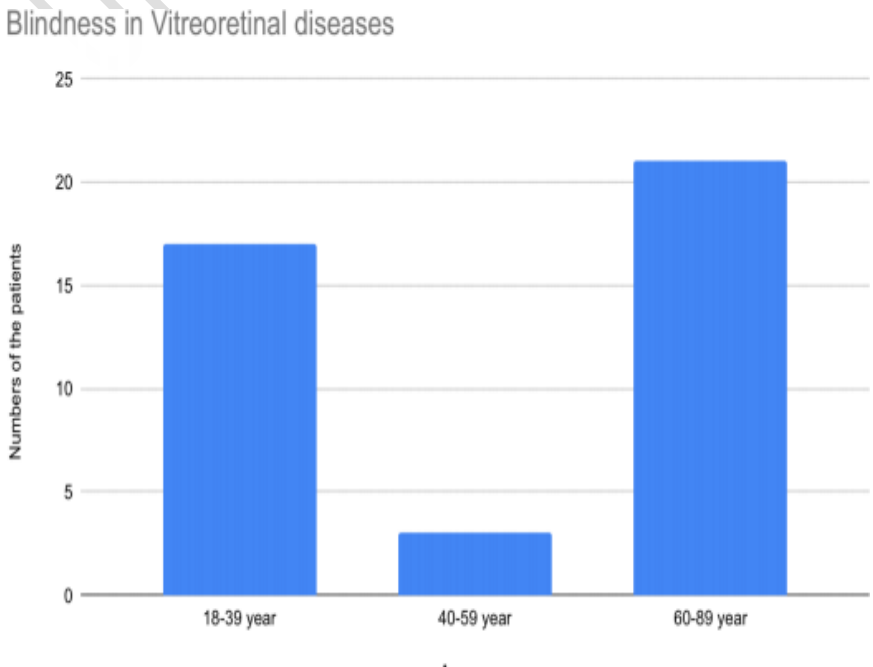
ChartNo.3:DistributionofsystemicillnessinpatientswithVitreoretinal diseases



Diabetes mellitus (61.6%, n=68) was the most common systemic illness associatedwithvitreoretinaldiseasesfollowedbyhypertension(22.5%,n=25) and Hyperlipidemia (3.6%, n=4)

AccordingtoWHO,therewerenearly102.26 millioncasesof diabetesin India in 2016 with a prevalence of 7.8% (7.9% in males and 7.5% in females).[5.] Persons with known diabetes had poor awareness of the need for annual retinal examinations for diabetes complications such as DR.Among Hypertensive patients,7 patients (28%) had retinal vein occlusion and two (8.0%) had Anterior Ischemic Optic Neuropathy. Patients with pulmonary or extrapulmonaryTB hadEalesdisease. Onepatientwithpapillitishadpituitaryadenomaon MRI.

ChartNo.4:Patients havingbilateralblindnessindifferentage group



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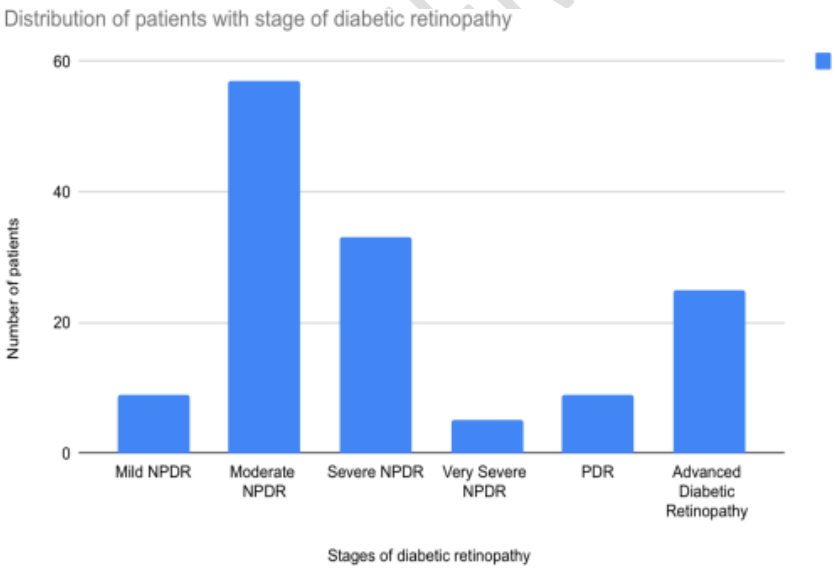
According to WHO and NPCB classification ofblind person is the one with less than 3 meters fingers counting in better eye with best corrected visual acuity.In the present study, the majority ofblind patients were over 60 years ofage, accounting for 51.2% of the cases. This aligns with the understanding that vitreoretinal diseases are most prevalent in this age group.

Out of 139 (24.82%) blind eyes, 57 patients had unilateral blindness and 41 patients (14.64%) had bilaterally blindness Among patientsaged18 to39 years, blindnesswas predominantlyattributed to retinitispigmentosa in13patients, while 1patient hadpathological myopia and 2 patients were diagnosed with rod-cone dystrophy.

Blindness above the age of40years was due to advanced diabetic retinopathyin 11 patients, age related macular degeneration in 9 patients, pathological myopia in 5patients and AION in1patient

ChartNo.5:Staging ofDiabeticRetinopathy



InthePresentstudyNonproliferativediabeticretinopathywasmorecommon

(n=104,75.4%)thanproliferativediabeticretinopathy(n=34,24.6%).

Out of 69 patients with diabetic retinopathy 53 (76.81%) were male and 16(23.19%) were female. It suggests that prevalence of diabetes was less in females than males.

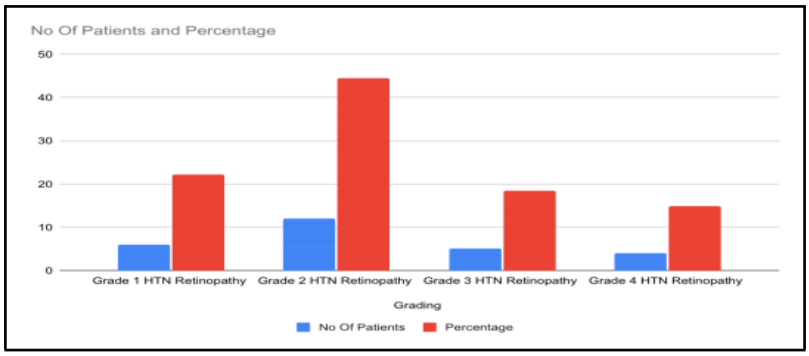
Clinically significant macular edema (CSME) shown in image 1 was found in 83 eyes out of which 68 eyes

Image 1 Fundusphotoshowing SevereNPDRwithCSME

(81.92%) were associated with diabetic retinopathy while 15 eyes (18.07%) were associated with retinal vein occlusion

Out of 11 patients ofbilateral blindness 9 had advanced diabetics retinopathy and 2 had severe NPDR

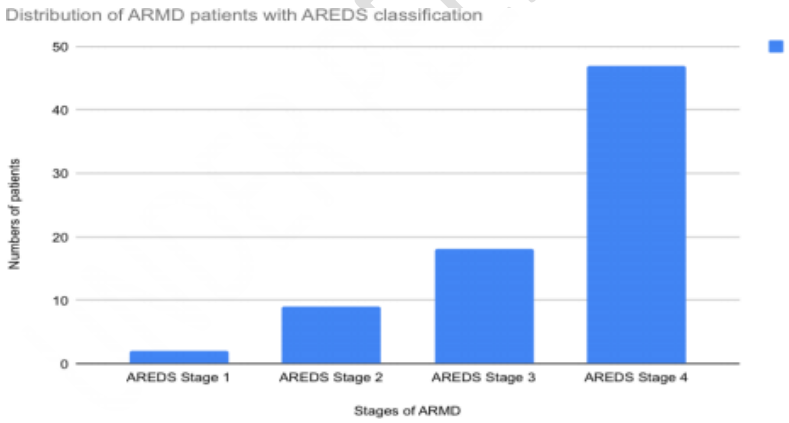
ChartNo.6:Grading OfPatientswithHypertensive Retinopathy



The distribution ofhypertensive retinopathy among the studied cases revealed the following:

Grade 2 hypertensive retinopathy had the highest prevalence, affecting 12 eyes(44.44%). Both grade 3 and grade 1 hypertensive retinopathy was observed in 6 eyes (22.22%) while Grade 4 hypertensive retinopathy was present in 4 eyes.(18.51%)

ChartNo.7:Distribution ofpatientswithARMD accordingtoAREDS Classification



Among all patients with age-related macular degeneration (ARMD), AREDS Stage 4 was the most prevalent observed in 47 patients followed by AREDS Stage 3, which included 18 patients and AREDS Stage 2 with 9 patients. AREDS Stage1 had only 2patients.All patients with ARMD are above 50 years of age and most ofthe patients arrives in tertiary care centre with advanced stage.

In the present study, Wet ARMD was more common (61.8%, n=47) than dry ARMD (38.1%, n=29) as patients with Active CNVM referred to our centre from peripheral hospital for treatment.AmongthetotalARMDpatients,22(57.90%)weremaleand16(42.10%)were females.

DISCUSSION

Table 1:Comparison ofthe sexdistributionofpatientswithotherstudies.

	Presentstudy(%)	**AbebeDet al.(%)**	**Borooahet al. (%)**	**Bhimb.rai etal**
Male	66.8%(n=187)	63.1%(n=466)	67.53%(n=244)	53%(n=1544)
Female	33.2%(n=93)	36.9%(n=272)	32.47%(n=140)	47%(n=1369)

The male-to-femaleratiowas(1.5:1)in the presentstudy.

The percentage ofmales and females in the present study is comparable to that in the study by Abebe D et al.(27) and M. Borooah et al.(28)

TableNo.2:Comparison ofage groupwith otherstudy put this section in discussion with other studies.

Agegroups	**Presentstudy(%)**	**AbebeD etal.**
21-59years	56.78%(n=169)	59.7%(n=441)
60-89 years	36.42%(n=102)	32.1%(n=337)

Abebe D et al. (27)Conducted study whose results are comparable to the present study in which most of the patients belong to 21-59 years of age group.

In thePresentstudy, patients below the age of 18 years were excluded and also the sample size was less than that ofAbebe D et al.(27) study.

Table3:Comparison ofthetop fivepatternsofVitreoretinalDiseasesin patients in the present study with those in other comparative studies.

Vitreoretinal Diseases	**Present study(%)**	**mb.raiet al (%)**	**Abebe D et al. (%)**	**Thapaet al.(%)**	**Onakpaya et al. (%)**
Diabetic Retinopathy	24.6%	21.8%	21.3%	2.15%	29.8%
AgeRelated Macular Degeneration	13.0%	23.5%	14%	35.43%	16%
Hypertensive Retinopathy	5.0%	4.56%	5.3%	4.35%	4.9%
Hereditary Retinal Degenerations	10.9%	5.93%	2.4%	0.32%	7.6%
Retinalvascular occlusion	8.0%	11.28%	5%	3.2%	8.0%

Comparativestudies have indicated that Diabetic Retinopathy is the mostprevalent vitreoretinal disease, a finding consistent with the results of the present study. AgerelatedmaculardegenerationprevalencewaslessinthePresentstudy (13.0%)as comparedto Thapa et al.study(26) (35.43%) andBhimb.rai et al.(25)study (23.5%)

Hypertensive retinopathy was more prevalent in the study by Rai et al. (25) than in the present study.

In the present study, Hereditary Retinal Degeneration was the most common finding (10.9%), which was higher than that reported in other studies. This can be attributed to the fact that patients with hereditary retinal degeneration visit to our centerfor diagnosis or to obtain a visual impairment certificate. In the present study, cataracts were observed in 9.82% ofpatients, glaucoma in 7.0%, and refractive errors in 6.25% of patients. In comparison, Abebe et al. (27) reported a significantly higher cataract prevalence of 33.5%, while the glaucoma prevalencewas similarat 6.07%.Image 2,3 shows rare maculopathy.

Image 2 Fundusphotoshowing Bull eye maculopathy due to HCQ

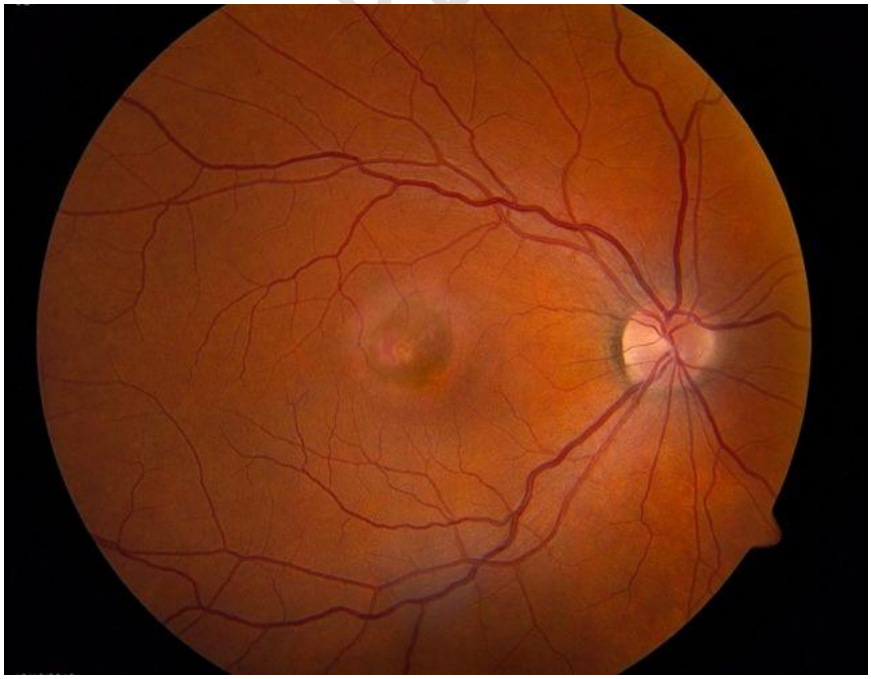


Image 3 Fundus photoshowing Acute idiopathic maculopathy

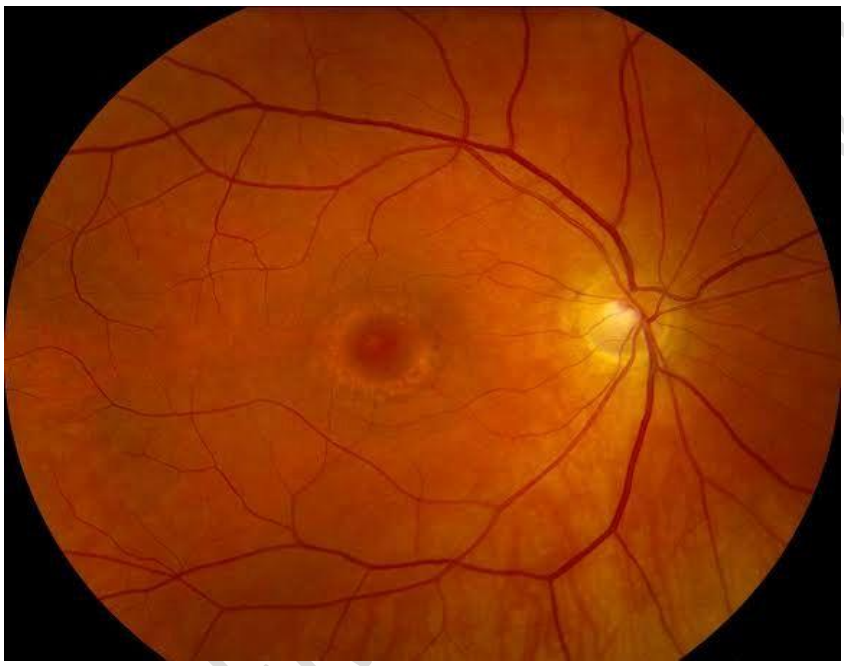
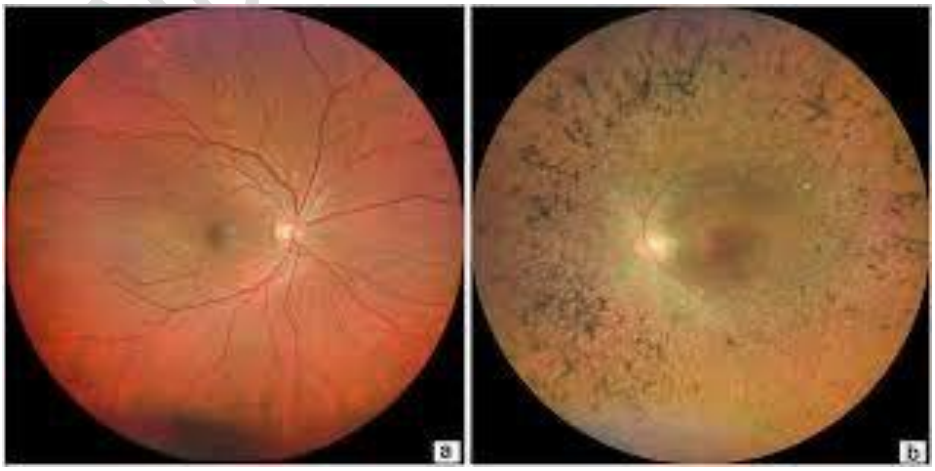


Image 4 Fundusphotoshowing Unilateral Retinitis Pigmentosa



	Cataract	Glaucoma	Refractiveerror
Presentstudy(%)	9.82%	7.0%	6.25%
AbebeDetal.(256)	33.5%	6.07%	-

TableNo.4,5:Comparison ofocular comorbiditieswith other study and ComparisonbasedonsystemicIllnesstoother studies.

In the presentstudy, the prevalence of diabetes was61.6%,significantly higher than the 26.5% reported by Abebe D et al.(27) and the 24.6% observed by Bhim B. Rai et al. (25) According to WHO, there were nearly102.26 million cases of diabetes in India in 2016 with a

	Diabetesmellitus	Hypertension	Hyperlipidemia
Presentstudy(%)	61.6%	22.3%	3.6%
AbebeDetal(%)	26.5%	6.3%	2.8%
Bhimb.rai et al	24.6%	34.0%	-

prevalence of 7.8% (7.9% in males and 7.5% in females)(5) Bhim b. raietal. (25)observedthathypertensiveretinopathywas more common (34.0%) than in the present study.

Table 4 Comparisonbasedonocular comorbiditiestoother studies.

Table 5 ComparisonbasedonsystemicIllnesstoother studies.

diabetes in India in 2016 with a prevalence of 7.8% (7.9% in males and 7.5% in females)(5.)

Bhim b. raietal.(25)observedthathypertensiveretinopathywas more common (34.0%) than in the present study.

Table6: Comparisonofblindnesswithother studies.

	Bilaterally blind
Presentstudy(%)	14.64%
Onakpayaetal(%)	5.2%
AbebeD etal.	29.7%

Onakpayaetal. (22)Studyshowedthatthe number of patients with bilateral blindness waslower (5.2%)than that in thepresentstudy.Abebe D et al (27).observed that 29.7% of patients were bilaterally blind, as the sample size was larger than that in the present study.

TableNo.7:ComparisonofpatientsofDiabeticRetinopathytootherstudies.

	Non proliferativediabetic retinopathy	**Proliferativediabetic retinopathy**
Presentstudy(%)	75.4%	24.6%
YangQH etal	83.3%	17.0%
Onakpayaetal	65.7%	34.7
Bhimb.rai et al	74.8%	25.2%

YangQH etal.(23) study noted that the prevalence ofNPDR were 83.3% and PDR were 17.0% which is nearly comparable to the present study.

Onakpayaet al.(22)reported a prevalence of non-proliferative diabetic retinopathy (NPDR) of 65.7%,which is lowerthanthat found in the present study. In contrast, the prevalence ofproliferative diabetic retinopathy (PDR) was reported at 34.7%, which is higher than that observed in the present study

Table8:Comparison ofpatients with ARMD with otherstudies.

	DryARMD	WetARMD
Presentstudy	38.1%	61.8%
JayshreeMPetal.	75.84%	24.26%
Onakpayaetal.	86.1%	13.9%
Bhimb.rai et al.	79.2%	20.8%

In the present study, the prevalence of wet age-related macular degeneration (ARMD) was higher than that ofdry ARMD, a finding that contrasts with the studies conducted by Jayshree MP et al.(24),Onakpaya et al.(22),and Bhim B. Rai et al.(25) where dry ARMD was more prevalent.

The increased prevalence of wet ARMD in our study may be attributed to the higher number of patients referred to our center specifically for diagnosis and treatment.

Results:-

This observationalstudy analyzed the patterns ofposterior segment disease in adult patients visiting a tertiary care center. A total of280patients diagnosed with Posterior Segment Eye Diseases were examined.

- The present study aimed to analyze the patterns of posterior segment disease in adult patients visiting a tertiary care center.
- Out of the 280 patients in the study, most of the patients 48.9% were between the age of 50-69 years followed by 30-49(24.3%), 18-29(17.1%) and 70- 79(9.6%)
- Male patients (66.8 %) were more than female patients (33.2 %).
- Of the 280 patients, most presented with diabetic retinopathy (24.6%), followed by age-related macular degeneration (13.0%), Hereditary Retinal Degeneration and Macular Dystrophy (10.9%), Retinal Vascular Occlusion (8.0%), Vitreo-Macular Traction (5.3%), myopia (5.2%), and Hypertensive Retinopathy (5.0%).

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- Among the 38 patients who presented with ARMD, 22(61.8%) were diagnosed with ARMD. patients were male and 16 (42.10%) were female. Wet ARMD had a higher prevalence (57.90%) than Dry ARMD (38.1%).
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- Eleven patients had CSCR, among which 4 them four had stress, one had non-alcoholic liver disease, and one had eclampsia as a risk factor.
- Vitreoretinal diseases were most common in patients aged > 60 years, and most (51.2%) patients presented with significant visual impairment.
- Of the 139 (24.82%) blind eyes, 57 were unilaterally blind and 41 were bilaterally blind.
- Among the 280 patients 61.6% patients were diabetic, 22.5% patients were hypertensive and 3.6% had hyperlipidemia.

Conclusion: -

The current research, titled “Mapping the Burden of Vitreoretinal Disease in Adults: Insights from a Tertiary Eye Care Center”. In this study, cataracts and refractive errors were the leading causes of preventable blindness.These findings highlight the importance of proactive screening for diabetes and age-related conditions and the necessity for effective management of these issues.Teleophthalmology, which involves remote retinal screening through fundus photography, is becoming increasingly popular as a useful tool to decrease the incidence of blindness.

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