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RESEARCH ARTICLE

MAPPING THE BURDEN OF VITREORETINAL DISEASE IN ADULTS: INSIGHTS FROM A TERTIARY EYE CARE CENTER

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Key words:-

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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.

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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.

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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 observational study analyzed the patterns of posterior segment disease in adult patients visiting a tertiary care center. A total of 280 patients 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 observational study that analyzed the pattern of posterior segment diseases in adult patients visiting a tertiary care center. A total of 280 patients diagnosed with Posterior Segment Eye Diseases were examined.

Table No.1: Genders Wise Distribution (N=280)

	Total No. of Patients	Percentage
Male	187	66.8%
Female	93	33.2%

Of the 280 patients, 187 (66.8%) were men and 93 (33.2%) were women.

Table 2: Comparison of gender-wise distribution of patients with other studies.

	Present study (%)
Male	66.8%(n=187)
Female	33.2%(n=93)

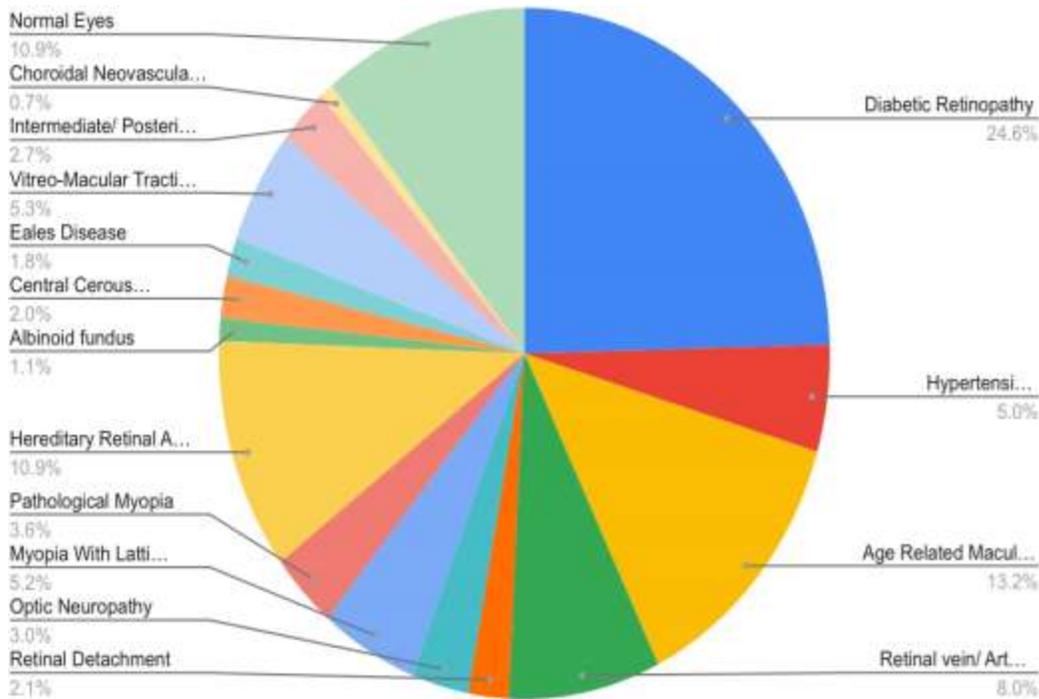
The male-to-female ratio was (1.5:1) in the present study.

Table No.3: Age group wise distribution of patients having posterior segment eye diseases (N=280)

Age groups	Numbers of patients	Percentage
18-29 years	48	17.1%
30-49 years	68	24.3%
50-69 years	137	48.9%
70-89years	27	9.6%

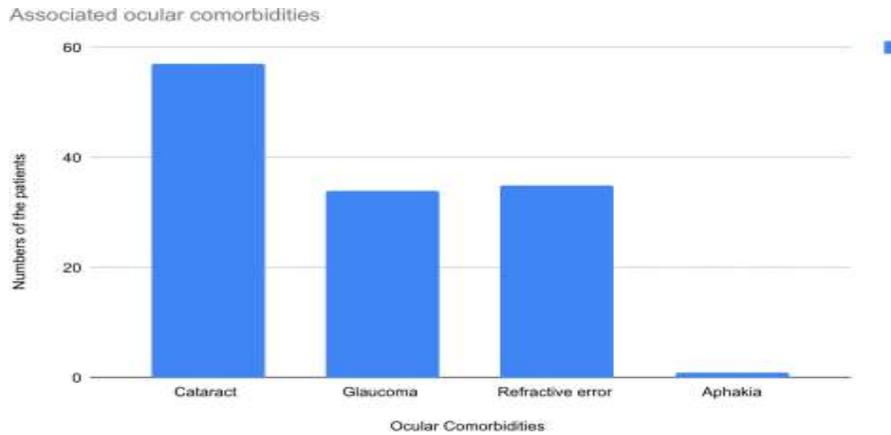
Almost half of the patients (48.9%) belong to 50-69 years age group followed by 30-49 years (24.3%) age group and 18-29 years (17.1%) of age groups. 9.6% of patients belongs to the 70-89 years of age group.

Chart No.1: Distribution of pattern of posterior segment Eye disease of patients.



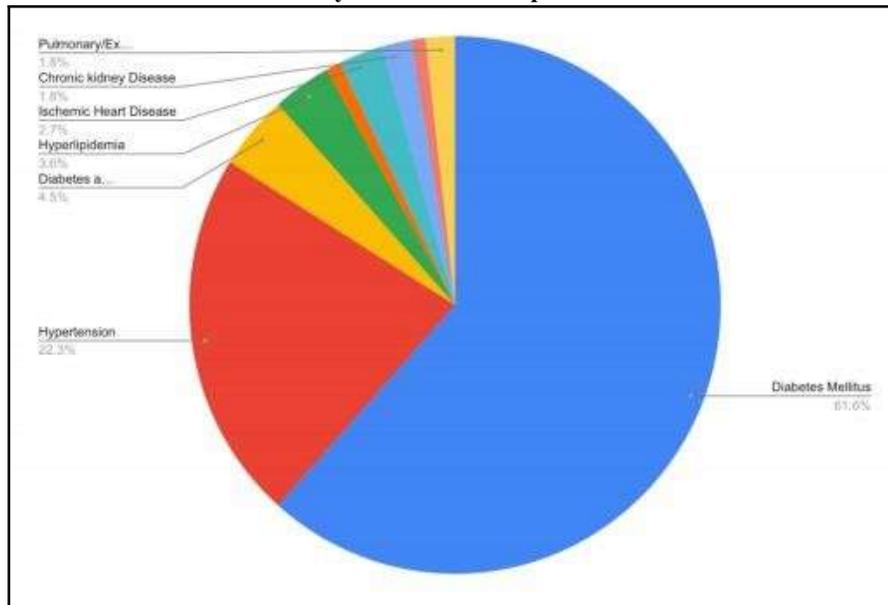
Out of 280 patients, the most common condition was Diabetic Retinopathy, affecting 24.6%, followed by Age-Related Macular Degeneration at 13.0%, Hereditary Retinal Degeneration and Macular Dystrophy at 10.9%, Retinal Vascular Occlusion at 8.0%, Vitreomacular Traction at 5.3%, Myopia at 5.2%, and Hypertensive 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 of 38 patients with Retinal Vein Occlusion 15(39.47) patients had CSME and 5 (13.15%) patients had Vitreous haemorrhage 17 patients were diagnosed with optic nerve diseases, of which 12 (70.59%) had Anterior Ischemic Optic Neuropathy (AION), 3 (17.65%) had Papillitis, and 2 (11.76%) were diagnosed with Optic Neuritis.

Chart No. 2: Other associated ocular comorbidities among study patients.



Out of 560 eyes examined 127 (22.67%) eyes had associated ocular comorbidities with vitreoretinal diseases. Cataracts (9.82%) followed by refractive error (6.25%) were the most common preventable cause of blindness. Glaucoma was observed in 34 patients (7.0%), likely due to low awareness and poor compliance with glaucoma treatment among patients.

Chart No. 3: Distribution of systemic illness in patients with Vitreoretinal diseases

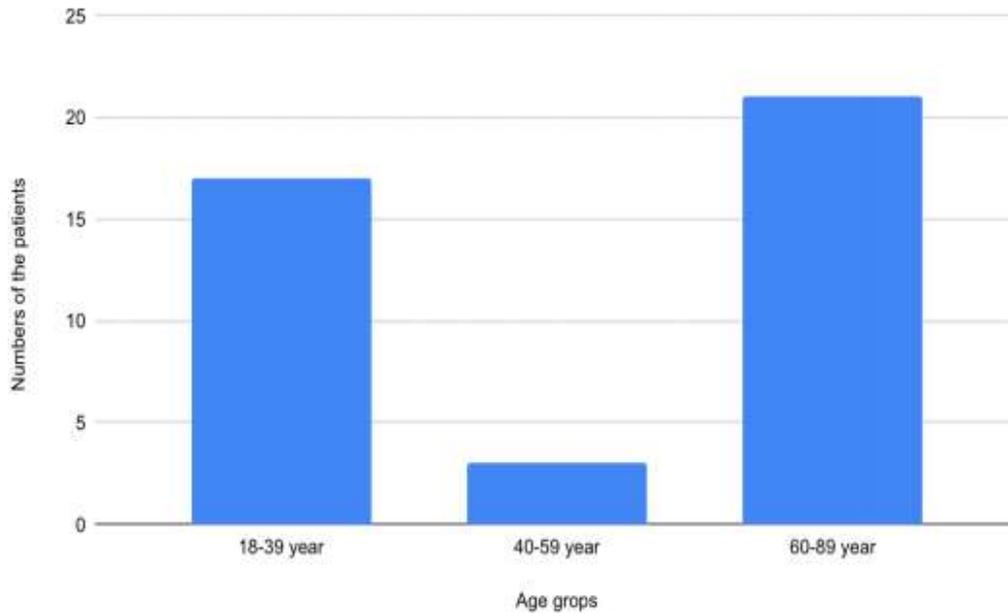


Diabetes mellitus (61.6%, n=68) was the most common systemic illness associated with vitreoretinal diseases followed by hypertension (22.5%, n=25) and Hyperlipidemia (3.6%, n=4) According to WHO, there were nearly 102.26 million cases of diabetes in India in 2016 with a prevalence of 7.8% (7.9% in males 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 extrapulmonary TB had Eales disease. One patient with papillitis had pituitary adenoma on MRI.

Chart No.4: Patients having bilateral blindness in different age group

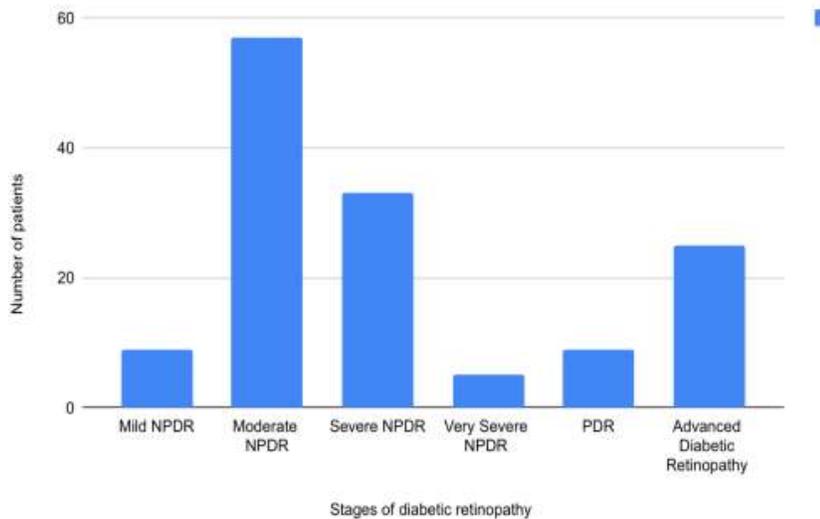
Blindness in Vitreoretinal diseases



According to WHO and NPCB classification of blind 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 of blind patients were over 60 years of age, 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 patients aged 18 to 39 years, blindness was predominantly attributed to retinitis pigmentosa in 13 patients, while 1 patient had pathological myopia and 2 patients were diagnosed with rod-cone dystrophy. Blindness above the age of 40 years was due to advanced diabetic retinopathy in 11 patients, age related macular degeneration in 9 patients, pathological myopia in 5 patients and AION in 1 patient.

Chart No.5: Staging of Diabetic Retinopathy

Distribution of patients with stage of diabetic retinopathy

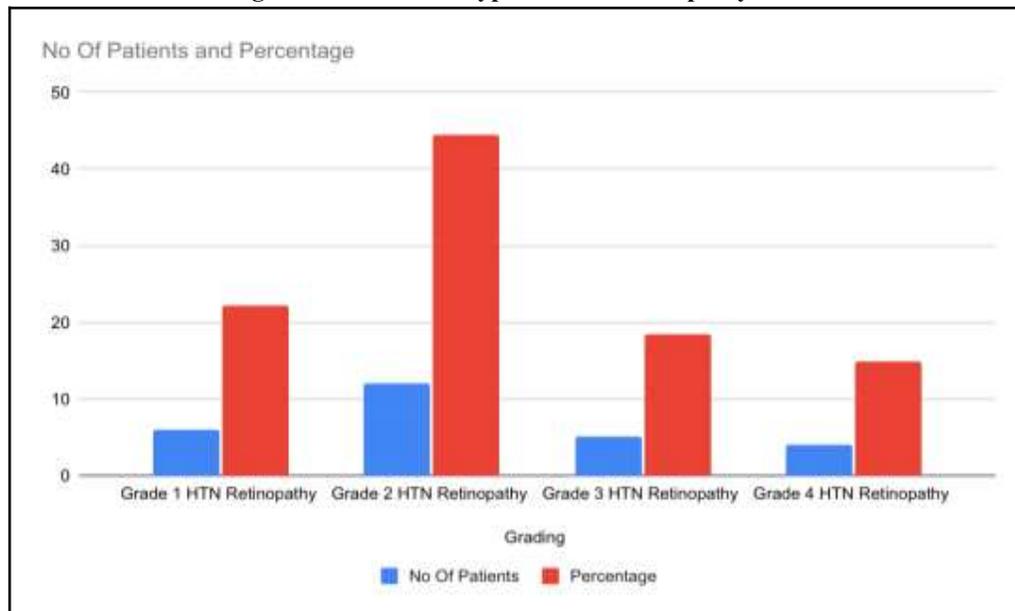


In the Present study Non proliferative diabetic retinopathy was more common (n=104,75.4%) than proliferative diabetic retinopathy (n=34,24.6%). Out of 69 patients with diabetic retinopathy 53 (76.81%) were male and 16(23.19%) were female. It suggests that prevalence of diabetes was less in females than males. Clinically significant macular edema (CSME) shown in image 1 was found in 83 eyes out of which 68 eyes (81.92%) were associated with diabetic retinopathy while 15 eyes (18.07%) were associated with retinal vein occlusion Out of 11 patients of bilateral blindness 9 had advanced diabetics retinopathy and 2 had severe NPDR

Image 1 Fundus photo showing Severe NPDR with CSME

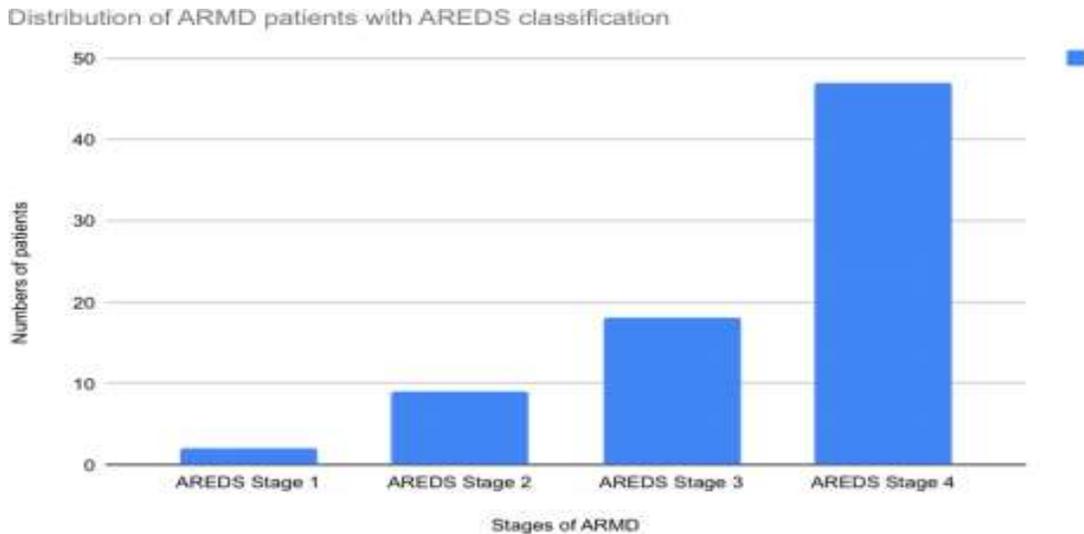


Chart No.6: Grading of Patients with Hypertensive Retinopathy



The distribution of hypertensive 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%)

Chart No.7: Distribution of patients with ARMD according to AREDS 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 Stage 1 had only 2 patients. All patients with ARMD are above 50 years of age and most of the 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. Among the total ARMD patients, 22(57.90%) were male and 16 (42.10%) were females.

Discussion:-

Table 1: Comparison of the sex distribution of patients with other studies.

	Present study (%)	Abebe D et al. (%)	Borooah et al. (%)	Bhim b.raai et al
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-female ratio was (1.5:1) in the present study. The percentage of males 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)

Table No.2: Comparison of age group with other study put this section in discussion with other studies.

Age groups	Present study (%)	Abebe D et al.
21-59 years	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 the Present study, patients below the age of 18 years were excluded and also the sample size was less than that of Abebe D et al. (27) study.

Table 3: Comparison of the top five patterns of Vitreoretinal Diseases in patients in the present study with those in other comparative studies.

Vitreoretinal Diseases	Present study (%)	n b.raai et al (%)	Abebe D et al. (%)	Thapa et al. (%)	Onakpaya et al. (%)
Diabetic Retinopathy	24.6%	21.8%	21.3%	2.15%	29.8%
Age Related 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%
Retinal vascular occlusion	8.0%	11.28%	5%	3.2%	8.0%

Comparative studies have indicated that Diabetic Retinopathy is the most prevalent vitreoretinal disease, a finding consistent with the results of the present study. Age related macular degeneration prevalence was less in the Present study (13.0%) as compared to Thapa et al.study (26) (35.43%) and Bhim b.raai 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 center for diagnosis or to obtain a visual impairment certificate. In the present study, cataracts were observed in 9.82% of patients, 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 prevalence was similar at 6.07%.Image 2,3 shows rare maculopathy.

Image 2 Fundus photo showing Bull eye maculopathy due to HCQ

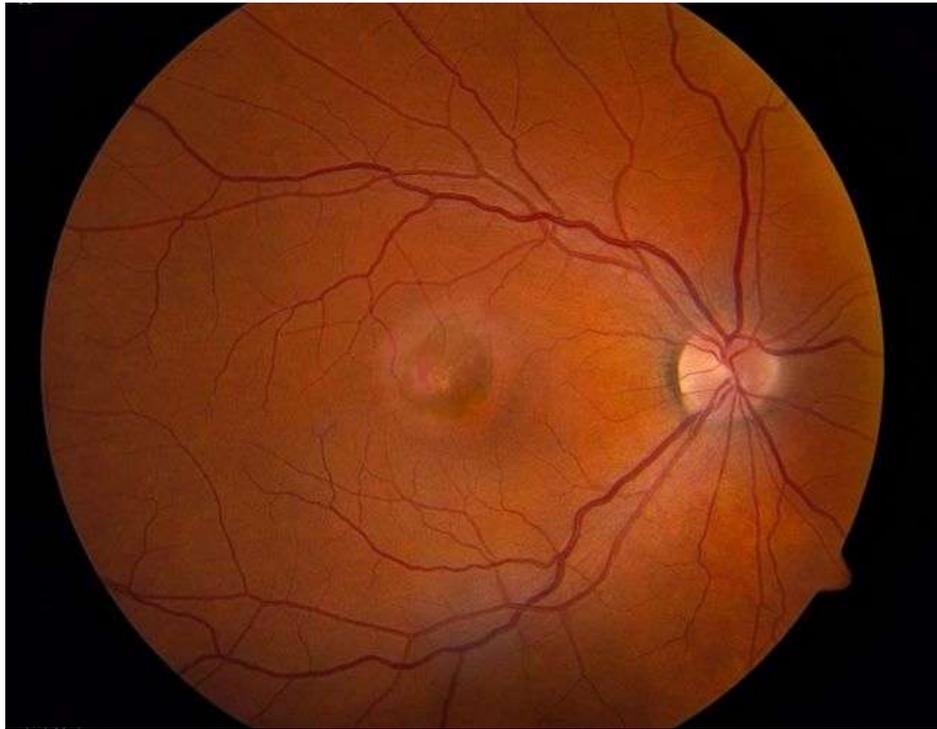


Image 3 Fundus photo showing Acute idiopathic maculopathy

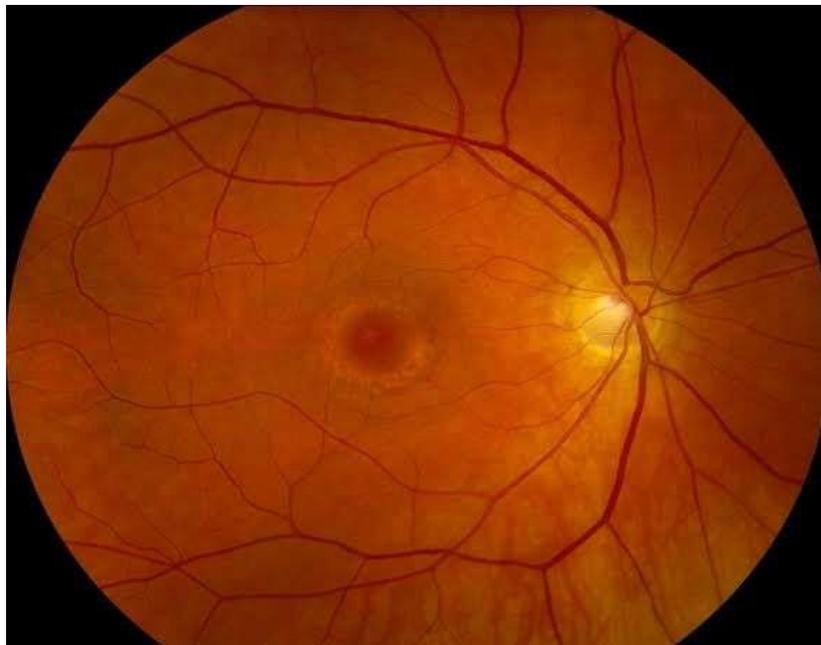
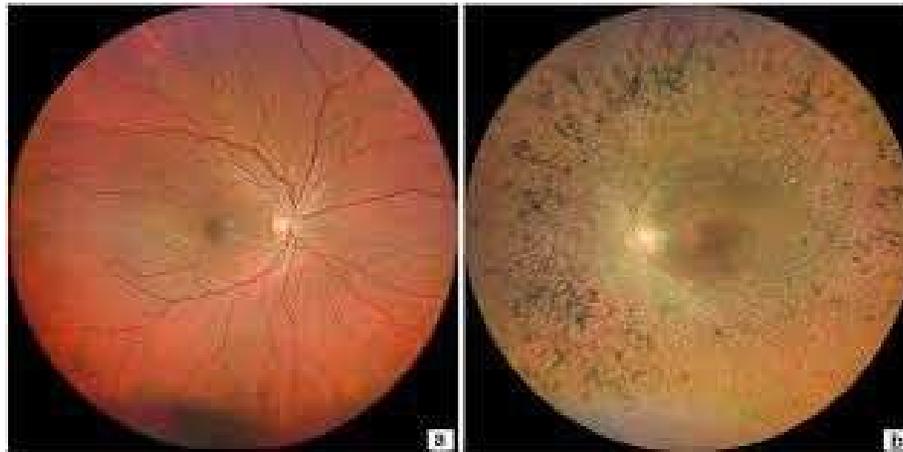


Image 4 Fundus photo showing Unilateral Retinitis Pigmentosa



In the present study, the prevalence of diabetes was 61.6%, 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 nearly 102.26 million cases of diabetes in India in 2016 with a prevalence of 7.8% (7.9% in males and 7.5% in females)(5) Bhim b. rai et al. (25) observed that hypertensive retinopathy was more common (34.0%) than in the present study.

Table 4 Comparison based on ocular comorbidities to other studies.

	Diabetes mellitus	Hypertension	Hyperlipidemia
Present study(%)	61.6%	22.3%	3.6%
Abebe Detal(%)	26.5%	6.3%	2.8%
Bhim B.Rai Et Al	24.6%	34.0%	-

Table 5. Comparison based on systemic illness to other studies.

	Diabetes mellitus	Hypertension	Hyperlipidemia
Present study (%)	61.6%	22.3%	3.6%
Abebe D et al (%)	26.5%	6.3%	2.8%
Bhim b.raii et al	24.6%	34.0%	-

Table No. 4, 5: Comparison of ocular comorbidities with other study and Comparison based on systemic Illness to other studies.

Table 5 Comparison based on systemic Illness to other studies. diabetes in India in 2016 with a prevalence of 7.8% (7.9% in males and 7.5% in females)(5.) Bhim b. rai et al. (25) observed that hypertensive retinopathy was more common (34.0%) than in the present study.

Table 6: Comparison of blindness with other studies.

	Bilaterally blind
Present study (%)	14.64%
Onakpaya et al (%)	5.2%
Abebe D et al.	29.7%

Onakpaya et al. (22) Study showed that the number of patients with bilateral blindness was lower (5.2%) than that in the present study. 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.

Table No.7: Comparison of patients of Diabetic Retinopathy to other studies.

	Non proliferative diabetic retinopathy	Proliferative diabetic retinopathy
Present study (%)	75.4%	24.6%
Yang QH et al	83.3%	17.0%
Onakpaya et al	65.7%	34.7
Bhim b.raii et al	74.8%	25.2%

Yang QH et al.(23) study noted that the prevalence of NPDR were 83.3% and PDR were 17.0% which is nearly comparable to the present study. Onakpaya et al.(22)reported a prevalence of non-proliferative diabetic retinopathy (NPDR) of 65.7%, which is lower than that found in the present study. In contrast, the prevalence of proliferative diabetic retinopathy (PDR) was reported at 34.7%, which is higher than that observed in the present study

Table 8: Comparison of patients with ARMD with other studies.

	Dry ARMD	Wet ARMD
Present study	38.1%	61.8%
Jayshree MP et al.	75.84%	24.26%
Onakpaya et al.	86.1%	13.9%
Bhim b.raii et al.	79.2%	20.8%

In the present study, the prevalence of wet age-related macular degeneration (ARMD) was higher than that of dry 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 observational study analyzed the patterns of posterior segment disease in adult patients visiting a tertiary care center. A total of 280 patients 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 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.

Conflicts of Interest & Financial Disclosure:

None of the authors have any financial or conflicting interests to disclose.

Funding:-

None Data

Availability:

On Data can be made available upon request. The corresponding author has full access to all the data in the study and takes responsibility for the integrity of the data and accuracy of the data analysis.

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