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### RESEARCH ARTICLE

#### STUDY OF OCULAR MANIFESTATIONS IN PATIENT WITH CHRONIC KIDNEY DISEASE IN TERTIARY CARE RURAL HOSPITAL

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##### Manuscript History

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#### Abstract

**Purpose:** To study the occurrence of various ocular manifestations exhibited by patients with Chronic Kidney Disease (CKD) and to analyse the findings.

**Materials and Methods:** An observational, cross sectional, descriptive study was conducted at a tertiary care hospital after the approval of ethical committee for duration of 1 year (July 2022- July 2023). A total of 50 patients of all age group, either sex, diagnosed with CKD irrespective of the haemodialysis status were evaluated. Detailed history and examination including visual acuity, anterior segment and fundus examination with direct and indirect ophthalmoscope was conducted.

**Result:** Majority of CKD cases were noted in the age group of more than 60 years (40%) with male predominance of 66%. Out of 50 cases, 13 (26%) were hypertensives, 8 (16%) were diabetics and 3 patients had both. Out of 50 patients, 6 (12%) and 13 (26%) showed signs of hypertensive and diabetic retinopathy respectively. Retinal detachment was noted in 2 patients, one had signs of pathological myopia and vitreous hemorrhage was noted in 1 patient.

**Conclusion:** Most patients of CKD are detected in advanced stages. Hence it becomes imperative to detect CKD at an early stage and retard the progress of renal disease. Eye can be used as a window to kidney status so that necessary treatment can be given before irreversible changes occur. Thus, early ocular screening is of utmost importance in such patients.

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#### Introduction:-

Chronic kidney disease (CKD) is an emerging health problem worldwide. There are rising incidents of CKD hence there is a notable mortality and morbidity.

The kidney and eye share some striking structural developmental, physiological, and pathological pathways. For example, both glomerulus and choroid have extensive vascular network, the inner retina and GF barrier share similar developmental pathways and renin-angiotensin aldosterone hormone cascade is found both in kidney and eye.

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CKD and the major eye diseases such as age-related macular degeneration (AMD), diabetic retinopathy (DR), glaucoma, and cataract are strongly associated with age and metabolic and vascular risk factors, such as hypertension, diabetes and smoking.

Accordingly, it has long been suggested that kidney and eye diseases may be closely linked. Ocular manifestations such as retinal microvascular parameters have been shown to be predictive of CKD development, and patients with CKD may be at higher risk for AMD, DR, glaucoma, and cataract. CKD may also manifest in the eye as associated developmental abnormalities of oculorenal syndromes.

#### **Aim**

To study the occurrence of various ocular manifestations exhibited by patients with Chronic Kidney Disease(CKD) and to study the findings.

#### **Objectives:-**

1. To conduct a thorough clinical examination of patients with CKD
2. To study occurrence of various ocular manifestations exhibited by patients with CKD and study the findings.
3. To study the common risk factors related to CKD and ocular manifestations.

#### **Materials and Method:-**

An observational, cross sectional, descriptive study of 50 patients was conducted at a tertiary care hospital for a duration of 1 year (July 2022- July 2023).

#### **Inclusion Criteria:**

1. Patients of all age group of either gender.
2. Patients of all stages of CKD, with or without renal transplant.
3. All patients on dialysis.

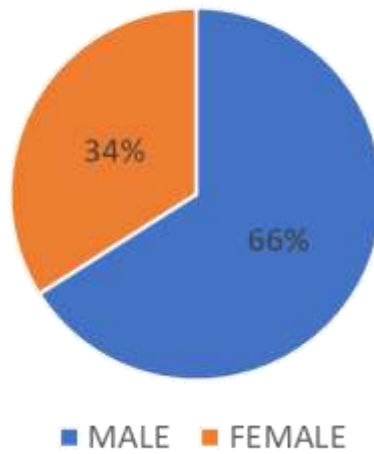
#### **Exclusion Criteria:**

1. Patients with parents/guardians not willing to give written informed consent.
2. Patients with acute eye conditions (e.g mild pain, photophobia ,red eye, copious mucopurulent discharge, superficial conjunctival congestion, chemosis)

#### **Results:-**

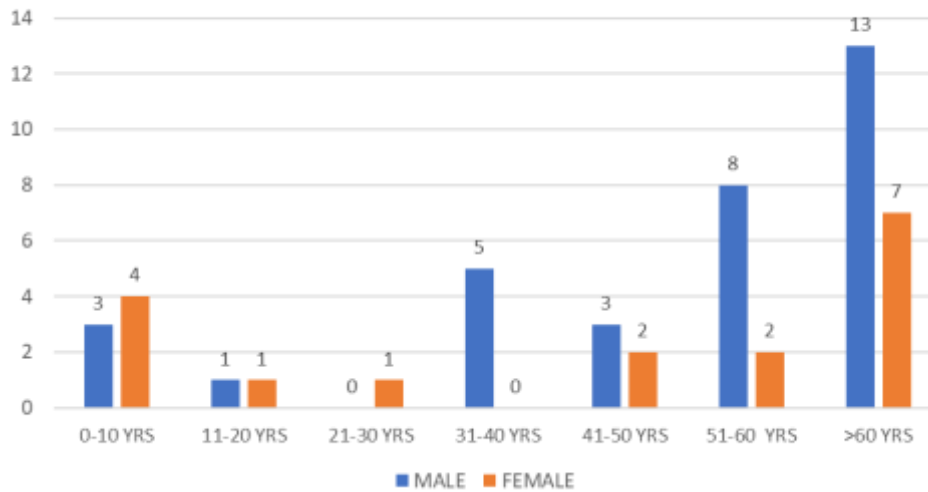
<b>GENDER DISTRIBUTION</b>	<b>NO. OF CASES</b>	<b>PERCENTAGE</b>
MALE	33	66 %
FEMALE	17	34 %

### GENDER DISTRIBUTION



Out of 50 patients studied, it was noted that there was male predominance i.e 33(66%).

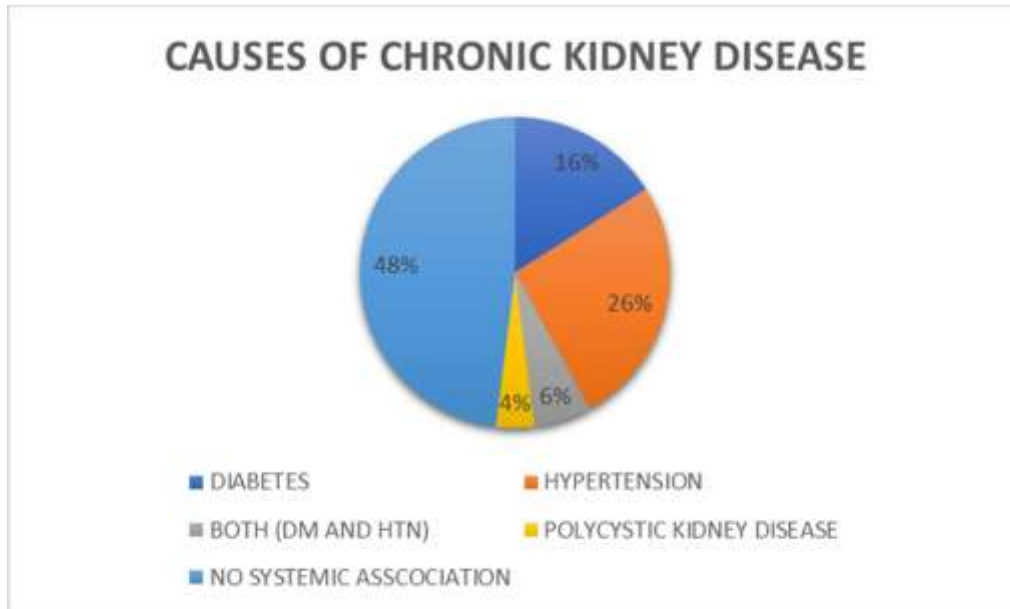
### AGE PREVALENCE IN CKD PATIENTS



AGE GROUP (YEARS)	MALE	FEMALE
0-10 YRS	3	4
11-20 YRS	1	1
21-30 YRS	0	1
31-40 YRS	5	0
41-50 YRS	3	2
51-60 YRS	8	2
> 60 YRS	13	7

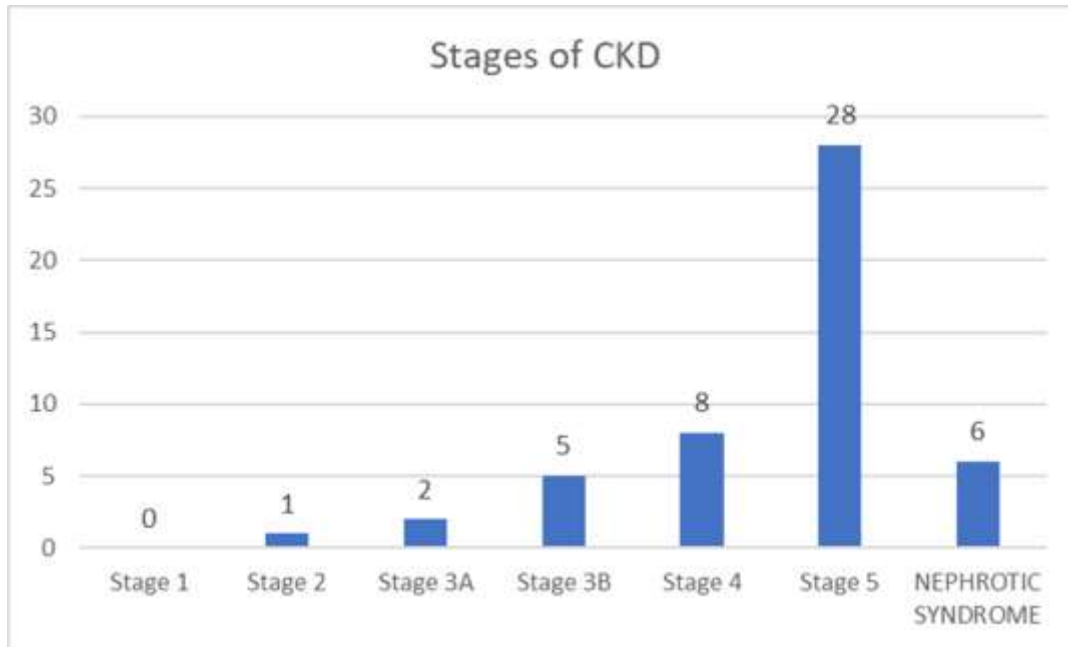
- Maximum number of CKD cases for both males and females were noted in the age group of more than 60 years.

CAUSES OF CKD	NO. OF CASES	PERCENTAGE
DIABETES	8	16
HYPERTENSION	13	26
BOTH (DM AND HTN)	3	6
POLYCYSTIC KIDNEY DISEASE	2	4
NO SYSTEMIC ASSOCIATION	24	48



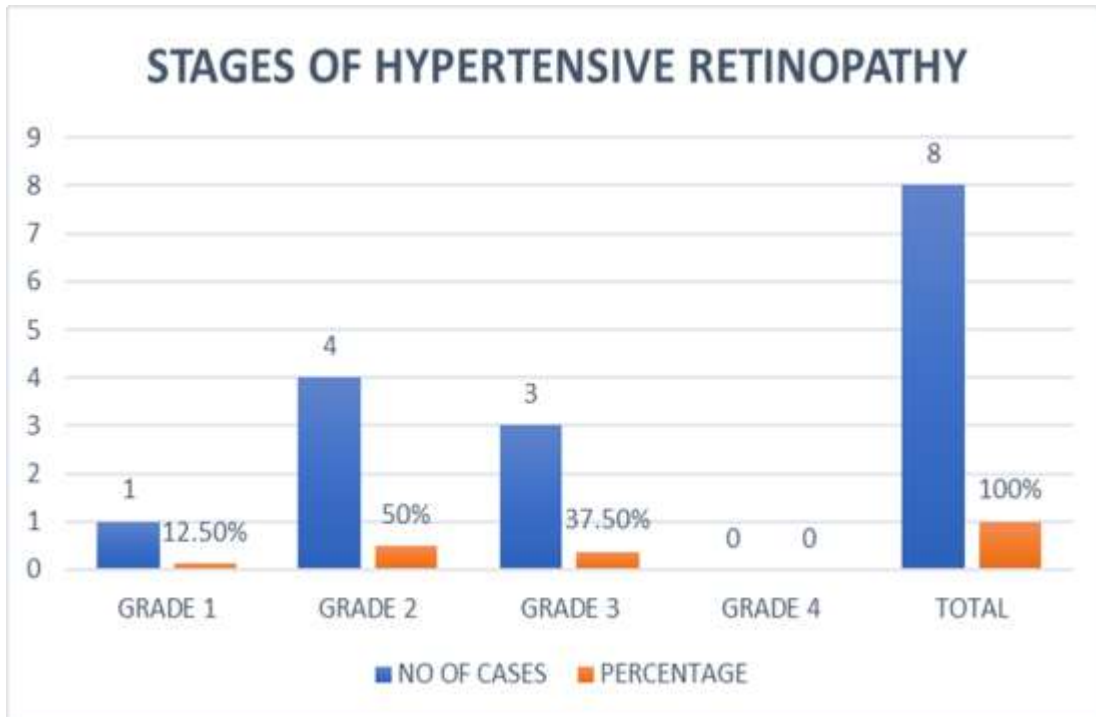
- In our study, we observed that about 16% of the CKD patients were already a known case of diabetes, 26% hypertensives, 6% had both and 4% were cases of polycystic kidney disease whereas 48% were not a known case (did not show any systemic association)

STAGES OF CKD	NO OF PATIENTS	%
STAGE 1	0	0
STAGE 2	1	2
STAGE 3A	2	4
STAGE 3B	5	10
STAGE 4	8	16
STAGE 5	28	56
NEPHROTIC SYNDROME	6	12



- Out of 50 patients taken for the study, it was observed that majority i.e 28(56%) patients were in stage 5 of CKD followed by stage 4 i.e 8(16%) and nephrotic syndrome cases were 6(12%).

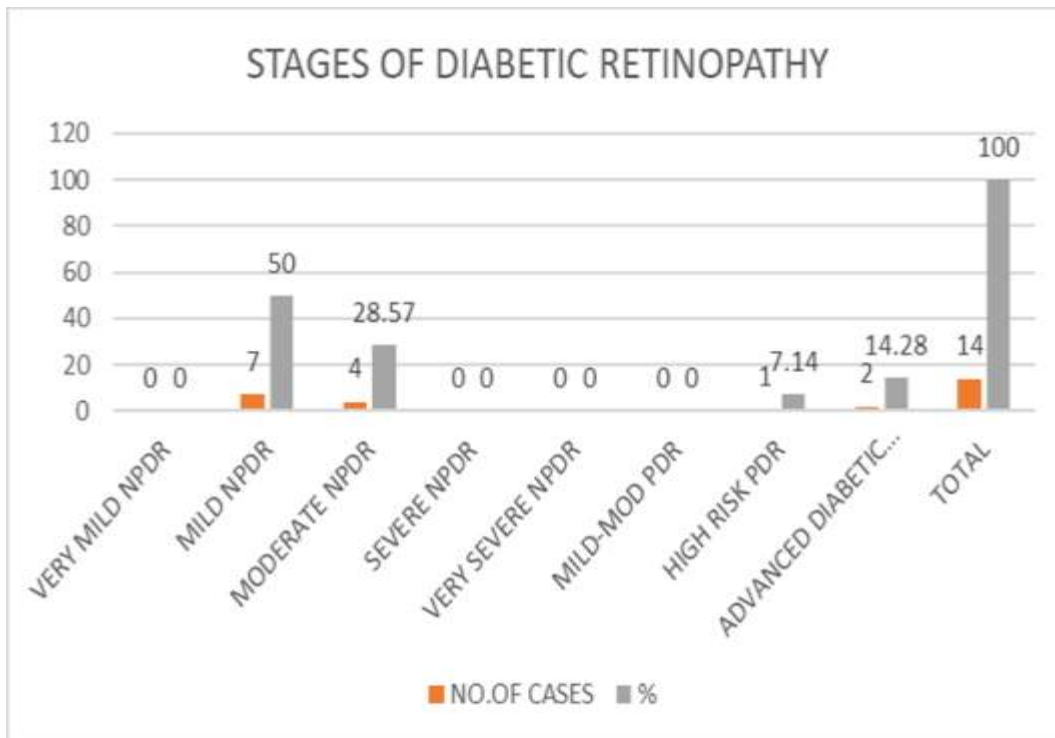
STAGES OF HYPERTENSIVE RETINOPATHY(KEITH-WAGNER-BARKER)	NO OF CASES	PERCENTAGE
GRADE 1	1	12.5 %
GRADE 2	4	50 %
GRADE 3	3	37.5 %
GRADE 4	0	0
TOTAL	8	100%



Total hypertensive fundus changes were seen in 8 patients ,out of which majority i.e 4(50%) were of Grade-2 findings followed by Grade-3.

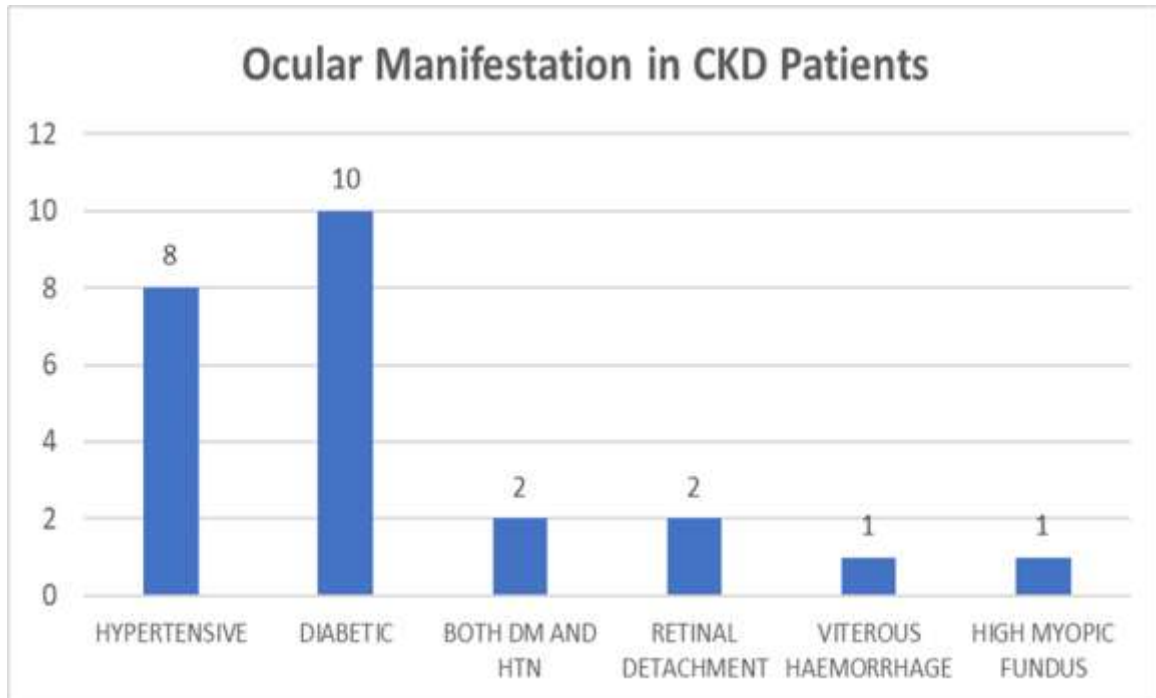
STAGES OF DIABETIC RETINOPATHY (ETDRS CLASSIFICATION)	NO. OF CASES	PERCENT AGE
VERY MILD NPDR	0	0
MILD NPDR	7	50
MODERATE NPDR	4	28.57
SEVERE NPDR	0	0
VERY SEVERE NPDR	0	0
MILD-MOD NPDR	0	0
HIGH RISK PDR	1	7.14
ADVANCED DIABETIC EYE DISEASE	2	14.28
TOTAL	14	100





VARIOUS OCULAR MANIFESTATIONS IN CKD PATIENTS	NO. OF PATIENTS	%
HYPERTENSIVE	8	33
DIABETIC	10	41
BOTH	2	8.3
RETINAL DETACHMENT	2	8.3
VITEROUS HAEMORRHAGE	1	4.1
HIGH MYOPIC FUNDUS	1	4.1
TOTAL	24	100





The various ocular findings which we noted in our study are, diabetic retinopathy 41% followed by hypertensive retinopathy 33%, both DM and HTN along with Retinal Detachment findings being at 8.3%.

### Discussion:-

1. In the study done by L. Bajracharya et al who observed that the maximum incidence was in the age group of 48.3+/-14.9 years and in our study the maximum incidence was in the age group of more than 60 years.<sup>5</sup>
2. Ratio of male : female in our study is 1.94:1, whereas the study done by L. Bajracharya et al observed the male to female ratio was 2.3:1.<sup>5</sup>
3. In our study, majority of the patients did not show any systemic association followed by hypertension 13(26%) and diabetes mellitus 8(16%), whereas in the study of L. Bajracharya et al the commonest cause of CRF was hypertension, 43 out of 119 (36.1%), followed by diabetes mellitus (27.7%) and glomerulonephritis (20.2%)<sup>5</sup>
4. There were two cases of bilateral, exudative type retinal detachment in patients with severe grade of renal disease, all the findings were similar with other case reports given by M Goldstein et al, HP Liao et al, I Steiness et al, A Hornblase et al and P Sharpstone et al<sup>6,7</sup>
5. Total patients which showed hypertensive retinopathy were 8, out of which majority i.e 4(50%) were of Grade-2 findings followed by Grade 3.
6. Mild NPDR diabetic findings were noted in majority of the cases which had diabetic retinopathy followed by Moderate NPDR and Advanced Diabetic eye disease.
7. Out of 50 patients taken for the study, it was observed that majority i.e 28(56%) patients were in stage 5 of CKD followed by stage 4 i.e 8(16%) and Nephrotic Syndrome cases were 6(12%).
8. The various ocular findings which we noted in our study are, Diabetic Retinopathy 41% followed by Hypertensive Retinopathy 33%, both DM and HTN along with Retinal Detachment findings being at 8.3%.

### Conclusion:-

Most patients of CKD are detected in advanced stages. Hence it becomes imperative to detect CKD at an early stage and retard the progress of renal disease. Eye can be used as a window to kidney status so that necessary treatment can be given before irreversible changes occur. Thus, early ocular screening is of utmost importance in such patients.

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