



PROPORTION AND AWARENESS OF DIABETIC RETINOPATHY AMONG TYPE II DIABETIC PATIENTS ATTENDING OPHTHALMOLOGY OUTPATIENT DEPARTMENT IN A TERTIARY HOSPITAL IN KERALA- A CROSS SECTIONAL STUDY

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**ABSTRACT**

Diabetic retinopathy, a microangiopathy affecting the small retinal vessels, is a major complication of diabetes and a leading cause of visual impairment and preventable blindness in the working age group.

**Aims:** a) To find out proportion of Diabetic Retinopathy b) to assess the awareness of Diabetic Retinopathy, among the Type II Diabetic patients attending the Ophthalmology OP

**Materials And Methods:** A Cross sectional study was conducted on 350 type II diabetic patients. A dilated fundus examination was done to find out diabetic retinopathy. A questionnaire was designed in regional language which included their personal details, demographic data and questions to assess their awareness about retinopathy.

**Results:** Out of 350 type II DM patients, 19.1% had Diabetic Retinopathy (DR). 17% of DR patients were in the age group less than 50 years. Duration of diabetes, associated comorbidities and uncontrolled blood sugars increased risk of DR. A good knowledge of retinopathy was seen in 81(23.1%) of participants. Statistical association of awareness with literacy, occupation and duration of disease was noted. Media and books were the main source of information about retinopathy

**Conclusion:** There is a strong need to create awareness about this preventable blinding condition in the community as well as among health care providers.

**KEYWORDS :** Diabetes Mellitus, Diabetic Retinopathy, Prevalence, Awareness, Screening

**INTRODUCTION**

Diabetes Mellitus is a challenging public health problem in India with more than 77 million affected<sup>(1)</sup>. Its predicted that by year 2030, around 98 million Indians will be diabetics. The genetic factors along with environmental influences like obesity due to the rising living standards and sedentary life style, urban migration are all factors making this an intense problem. Among the Indian states, Kerala has the highest prevalence of 17% compared to the national average of 8% making it the 'Diabetic Capital of India'<sup>(1)</sup>. In spite of better health care and literacy which Kerala boasts of, it is not getting translated to health literacy. With better access to treatment and increased life expectancy, complications like Diabetic Retinopathy (DR) are also rising which is a major cause of ocular morbidity and blindness in the working age group, having a huge impact on the human productivity and quality of life. About a fifth of diabetic patients develop retinopathy and accounts for about 1.06% global blindness and 1.16% of visual impairment<sup>(2)</sup>. The prevalence of DR in India is 16.9%, visual impairment 13% and blindness 2.1%<sup>(2)</sup>. This is a disease of the small retinal vessels; mild changes progressing over years to sight threatening complications, which, if detected early and treated on time can prevent blindness. The main risk factors for progression of retinopathy are duration of diabetes, poor metabolic control, co-existing hypertension, nephropathy, dyslipidaemia, anaemia, smoking and pregnancy. Periodic screening is the key to prevent the patient from going into the sight threatening stage. A high level of awareness about diabetes and retinopathy among the population is needed to avoid the delay in diagnosis and management.

**MATERIALS AND METHODS**

A hospital based cross sectional study was conducted in the ophthalmology OPD from April 2018- March 2019 to find out the proportion of Type II diabetic patients with diabetic retinopathy changes and to find out the awareness about the condition among the study participants.

Sample size was set at 350; calculated using the formula

$$Z\alpha^2pq/d^2$$

[ $z\alpha=1.96$ ,  $p(\text{Prevalence})=21$  (AIOS DR eye screening study 2014)  $q=100-p$ ,  $d=\text{allowable error}(20\% \text{ of } p)$ ]

Consecutive type II diabetics were included in the study. Those excluded were patients with no clear view of retina, those who did not give consent or were unable to comprehend the questionnaire properly.

Clearance was obtained from Institutional ethics committee. Consent was signed by the participant. Study tool was a questionnaire prepared in regional language comprising of questions on demographics, the duration and treatment of diabetes, their control of the disease and also questions regarding their awareness on diabetic retinopathy. The questionnaire was filled by the patient or assisted by the invigilator where needed. General and ocular examination was done. After measuring IOP and blood pressure, anterior segment was examined on slit lamp. Pupil was dilated using Tropicamide eye drops and fundus examined by slit lamp bio microscopy with +78/90D lens and Indirect ophthalmoscope. Retinopathy if present, was graded based on the Early Treatment Diabetic Retinopathy Study (ETDRS) classification

**Statistical Analysis**

The collected data was coded, entered in Microsoft excel sheet and analysed using SPSS version 20. Proportion of retinopathy was expressed as frequency and percentage. Awareness about retinopathy was measured by analysing the responses to a 10 point questionnaire. A score less than 4 (<40%) was rated as poor and 4 or more (>40%) as good knowledge. Relationship between socio demographic variables and DR awareness was tested by applying chi-square test; statistical significance was fixed at 5% level.

**RESULTS**

This study included 350 type II diabetic patients of which

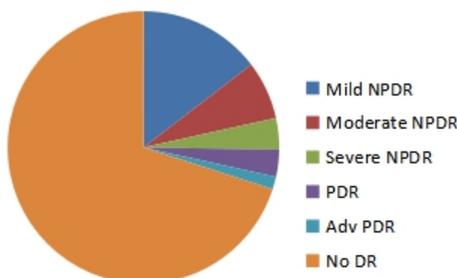
161(46%) were males and 189(54%) females. The mean age of the participants was 58.52±10.50 years(33- 85 years). The educational level of the participants ranged from school drop outs to post graduates. The majority were jobless or unskilled labourers (86%).

The mean duration of DM was 9.6 ±7.7years(2months-44years). 213(60.9%) had family history of DM. 27(7.7%) reported intake of indigenous medicine. 296(84.6%) and 48(13.1%) were on OHA and insulin respectively. In 27(7.7%)nephropathy, in 3(0.9%) cardiac disease and in 98(27.9%) hypertension coexisted. (Table 1)

**Table 1: Socio Demographic And Diabetic Status Of Study Population (N=350)**

Variable	Frequency	Percentage
<b>Gender</b>		
Male	161	46
Female	189	54
<b>Age in years</b>		
30-50yrs	88	25.1
51-70yrs	217	62
>70yrs	45	12.9
<b>Residence</b>		
Urban	181	51.7
Rural /semi urban	169	48.3
<b>Education</b>		
Did not complete 10th	199	56.9
Completed school	117	33.4
degree	31	9.4
P G degree	3	0.8
<b>Duration of diabetes</b>		
<5 years	140	40
5-10years	85	24.3
11-15years	52	14.9
16-20years	42	12
>20 years	31	8.9
<b>Family history of DM</b>		
Yes	213	60.9
No	137	39.1
<b>Comorbidities</b>		
Hypertension	62	17.7
Diabetic nephropathy	37	10.6
Heart disease	3	0.8
<b>Glycaemic control</b>		
Yes	122	34.9
Mostly not	108	30.9
Never	120	34.3

Of the 350 participants, 67 (19.1%) had some form of retinopathy. 29(18%) were males and 38(20.1%) females. 59 eyes (44%) showed mild, 28(20.9%) with moderate and 15(11.1%) had severe non proliferative diabetic retinopathy(NPDR). 13 eyes (9.5%) had proliferative retinopathy (PDR) and 6(4.4%) had advanced PDR. Diabetic maculopathy was seen in 17 patients(4.9%).

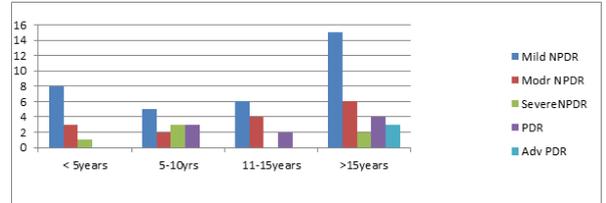


**Figure 1: Prevalence Of Diabetic Retinopathy Based On Severity**

**Table 2: Distribution Of Diabetic Retinopathy**

TYPE OF DR	Right eye	Left eye
Mild NPDR	28(46.7%)	31(50.8%)
Moderate NPDR	15(25%)	13(21.3%)
Severe NPDR	8(13.3%)	7(11.5%)
PDR	7(11.7%)	6(9.8%)
Advanced PDR	2(3.3%)	4(6.6%)
DR status	60(100%)	61(100%)

Retinopathy was seen in 12(8.6%) within 5 years of onset of DM. 13(15.3%) within 6-10 years, 12(23.1%) between 11 - 15years and 30(41.1%) with duration more than 15 years showed retinopathy (Figure2).



**Figure 2: Distribution Of Diabetic Retinopathy Based On Duration Of The Disease**

DR increased with age, affecting 15(17%) in the age group 30-50yrs ,46(21.2%) between 51-70yrs and 6(13.3%) over 70yrs. 49(23%)with positive family history, 62(20.9%) on OHA and 20(43.5%) on insulin had retinopathy. 36(28.3%) who responded that their glycaemic levels were controlled and 64(20.6%) who frequently visited their physician for DM control had DR. 36(53.7%) and 15(22.4%) of them had associated HT and nephropathy respectively(Table 3)

**Table 3: Association Of Diabetic Retinopathy To Socio Demographic Variables.**

Variable	DR present	DR absent	p value
<b>Age group</b>			0.40
30-50years	15(17%)	73(83%)	
51-70years	46(21.2%)	171(78.8%)	
>70years	6(13.3%)	39(86.7%)	
<b>Gender</b>			0.36
Male	29(18%)	132(82%)	
Female	38(20.1%)	151(79.9%)	
<b>Duration of DM</b>			0.000
<5years	12(8.6%)	128(91.4%)	
6-10years	13(15.3%)	72(84.7%)	
11-15years	12(23.1%)	40(76.9%)	
> 15 years	30(41.9%)	43(58.9%)	
<b>Family history</b>			0.01
Yes	49(23%)	164(77%)	
No	18(13.1%)	119(80.9%)	
<b>With HT</b>			0.000
Yes	36(53.7%)	31(46.3%)	
No	62(21.9%)	221(78.1%)	
<b>With CKD</b>			0.000
Yes	15(22.4%)	52(77.6%)	
No	12(4.2%)	271(95.8%)	

Among the 350 diabetic patients, awareness about DR was poor in 269(76.9%) and good in 81(23.1%). 257(73.4%) knew that DM affects various organs in the body. 228(65.1%) knew it affects the eye. 136(38.9%) had heard of DR and 93(26.6%) knew it can cause blindness.

Source of information was the treating physician in only 52(14.9%).Mass media and books accounted in 73(20.9%) and friends or relatives in 38(10.9). 16(18.9%) who visited the department on that day was sent by physician for an eye check up. 258(73.7%) came for complaints of drop of vision and 10(2.9%) came on their own will to look for any complications due to diabetes.57 (16.3%) knew about some risk factors

accelerating retinopathy. Only 26(7.4%) had heard of any treatment options with 127(36.3%) opining that control of diabetes alone can prevent retinopathy. 20(5.7%) thought that further visit to ophthalmologist was needed only when vision dropped whereas 67(19.1%) opined that screening should be as per doctor's advice. Only 86(24.6%) had a previous retinal screening.

Awareness of retinopathy was better in males, in those less than 50 years, in those with a family history and in patients with DM of more than 10 years. Awareness was poor in patients who said their DM was not controlled. Awareness was also influenced by the educational level and occupation of patients.

**Table 4: Association Of Awareness Of Retinopathy To Socio Demographic And Diabetic Variables**

Characteristics	Good awareness	Poor awareness	P value
<b>Gender</b>			<i>0.14</i>
Male	42(26.1%)	119(73.9%)	
Female	39(20.6%)	150(79.4%)	
<b>Education</b>			<i>0.001</i>
School	65(20.6%)	251(79.4%)	
Degree and PG	16(47.1%)	18(52.9%)	
<b>Occupation</b>			<i>0.008</i>
No job	34(18.4%)	151(81.6%)	
Unskilled	27(23.3%)	89(76.7%)	
Skilled	14(37.8%)	23(62.2%)	
professional	6(50.0%)	6(50.0%)	
<b>Duration Of Diabetes</b>			<i>0.01</i>
< 10 years	56(20.2%)	221(79.8%)	
> 10 years	25(34.2%)	48(65.8%)	
<b>Age</b>			<i>0.81</i>
30-50 years	22(25.0%)	66(75%)	
51-70 years	50(23.0%)	167(77.0%)	
51-70 years	9(20.0%)	36(80.0%)	
<b>Positive family history</b>			<i>0.08</i>
Yes	55(25.8%)	158(74.2%)	
No	26(19.0%)	111(81.0%)	

**DISCUSSION**

In this study population, the prevalence of DR was 19.1% which is slightly above the national data of 16.9%<sup>(2)</sup>. Various studies across the country have shown prevalence to vary from 17.6%-28.2% which may be due to the different life styles, the ease of accessibility to health care or the design pattern adopted in the study<sup>(3)</sup>

Retinopathy was seen almost equally but with a slight female preponderance but in most other studies, males were affected more<sup>(4,5)</sup>. The proportion of patients with various grades of NPDR was 76% and with PDR 13.9%. This is almost in concurrence with previous studies by Rishab et al and Agarwal et al<sup>(2,8)</sup>. Significant association was seen between DR and duration of diabetes ( $p < 0.01$ ) as in other previous studies by Raman et al, Wisconsin epidemiological survey (WESDR) etc<sup>(3,9,10)</sup>. No significance was associated with age and DR in this study. Significant association of DR was seen with positive family history( $p < 0.01$ ), patients on OHA( $p < 0.02$ ) and insulin users( $p < 0.001$ ) comparable to studies by Jayaleshmi et al, CURES study<sup>(6,7)</sup>. Significant association( $p < 0.001$ ) between retinopathy and comorbidities like systemic hypertension and nephropathy noted, similar to earlier studies by Maskari et al and the DIAMOND study<sup>(11,12)</sup>.(Table 3)

The number of patients who had poor awareness of diabetic retinopathy was high in this study, like in the DIAMOND study<sup>(11)</sup>. Awareness ranged from 17.01-30.9% among various hospital based studies in India<sup>(13)</sup>. 65.1% in the study knew that it can affect the eye. 38.9% had heard about retinopathy and 26.6% said it can cause blindness which are comparable to

studies conducted by D venugopal et al and Manu et al<sup>(13,14)</sup>. Source of information was physician in only 52(14.9%) which is in contrast to most studies where the main source of information about diabetic retinopathy was the treating doctor<sup>(14,15,16)</sup>.

Significant association ( $p < 0.01$ ) was seen in knowledge of retinopathy to the duration of disease similar to studies by Rani et al, GVS Murthy et al<sup>(17,19)</sup>. Though not significant, ( $p < 0.81$ ) knowledge was more in patients of 51-70 year group and among males( $p < 0.14$ ). Significant association between awareness and level of education( $p < 0.001$ ) and occupation ( $p < 0.008$ ) noted which were similar to studies by Fatma et al and D venugopal et al, Rani et al and Hussain et al<sup>(13,17,18,20)</sup>.

Only 26(7.4%) knew some treatment for DR, as in studies in Karnataka and Goa<sup>(13,14)</sup>. 20(5.7%) opined visit to ophthalmologist is needed only when vision is affected whereas 86% in the diamond study and 70.7% in the Manu AS study thought so<sup>(11,14)</sup>. 75.1% did not know about screening. Significant association( $p < 0.005$ ) in the number of patients who underwent previous screening for retinopathy with duration of diabetes less than and more than 10 years(21.3% and 37% respectively) was seen. 24.6% had done earlier screening whereas a national survey pointed out that only 10% had previously screened for retinopathy<sup>(2)</sup>. No significant association of awareness with a positive family history, religion or place of residence noted (Table 4)

Limitation of the study is, it is hospital based and the sample size is small. So this cannot be extrapolated to the entire population of the state.

**CONCLUSION**

There is an urgent need to improve awareness about diabetic retinopathy, its risk factors and complications among the community, as early intervention and treatment can definitely bring down sight threatening complications due to it. Considerable effort is needed to improve this awareness. Mass media can play a large role in spreading awareness which might encourage patients to undergo eye check ups. In the operational guidelines for DR published in Indian Journal of Ophthalmology(IJO)<sup>(21)</sup>, emphasis is laid on DR screening and management becoming an integral component of the existing public health system. At the community level, in PHCs and CHCs, along with screening for diabetes, their visual acuity can be tested, IEC materials (information, education, communication) in simple language distributed and counselling and referral to secondary or tertiary centres when required can be implemented. The scope of tele-medicine can be utilised in less accessible areas, where images using non mydriatic fundus camera can be taken by trained persons and images transmitted to nodal centre for reading. It has also advised more screening camps for DM and thereafter if needed, for DR. It also recommended that the physician taking primary care of the patient in clinics can also educate them, screen for retinopathy periodically or refer them to an ophthalmologist for the same.

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