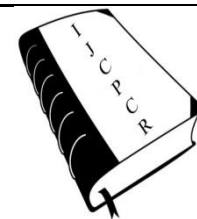




International Journal of  
**Current Pharmaceutical & Clinical  
Research**



www.ijcpcr.com

## **TO STUDY RELATED RISK FACTORS OF DIABETIC RETINOPATHY AMONG THE DIABETES MELLITUS PATIENTS IN INDIA**

**Chandriga Sankaranarayanan<sup>1\*</sup>, Arunachala D Edukondalu<sup>2</sup>**

<sup>1</sup>Assistant Professor of Ophthalmology, Sri Lakshmi Narayana Institute of Medical sciences, Pondicherry, (Affiliated to Bharath University, Chennai), India.

<sup>2</sup>Associate Professor of Anaesthesia, Sri Lakshmi Narayana Institute of Medical sciences, Pondicherry, (Affiliated to Bharath University, Chennai), India.

### **ABSTRACT**

Diabetic retinopathy (DR) is one of the most serious complications of diabetes mellitus (DM). It is the maximum not unusual motive of blindness a number of the running age group inside the advanced global and the fifth main purpose of world blindness. The objective of this study was to determine the Incidence and related risk factors of diabetic retinopathy among the diabetic mellitus patients. A cross sectional hospital based study. This was a hospital based cross-sectional study performed inside the department of Ophthalmology. A total of 1000 type 2 diabetes mellitus patients from January 2010 to December 2010 underwent detailed ocular examinations for diabetic retinopathy. The International Classification of diabetic retinopathy was followed to categorize the severity of retinopathy. Out of 1000 patients with DM, n=184(18.4%) had DR, among which, more males were affected 112 (61%) than females were n=72 (39.1%). 169(91.8%) had NPDR and ME were 78(42.3%). The duration of diabetes was seen to be highest in patients more than 20 years, of which, 31.4% (n=22) were affected with retinopathy. Continuous effort is required from health-care professionals in counseling diabetic patients about the role of blood sugar level in reducing the risk of onset and progression of DR.

**Key words:** ocular examination, retina, type 2 diabetes mellitus, Diabetic retinopathy

### **INTRODUCTION**

Usually Diabetes mellitus (DM) is one of the most not unusual persistent illnesses global, and it continues to growth in incidence and disease burden. DR (Diabetic retinopathy), a regular difficulty of DM, is the main motive of impaired imaginative and prescient in adults international and Patients with DR may additionally suffer from broken blood vessels of the light-sensitive tissue at the back of the retina and either diabetes [1], type 2, or gestational may additionally lead to DR headaches. 1 Such as Hypertension, smoking, hyperlipidemia, and a few races were recommended as elements for DR progressions among DM in sufferers. [2]

DR is one of the most extreme complications of diabetes that imposes a super burden at the patient, the

health-care machine and the global financial system. It entails damage to the microvasculature of the retina from prolonged exposure to the metabolic adjustments related to diabetes. [3] Three Visual impairment due to DR has a significant impact on patients' pleasant of existence, and might compromise their potential to manage their diabetes mellitus efficiently, that can in turn have a effective impact at the incidence of different diabetic complications and negative impact on average lifestyles suspense and productiveness. [4]

Screening for DR is suggested via more than one expert corporations. [5] Based at the most current American Diabetes Association guidelines, screening for DR using a dilated eye exam is recommended for young patients who have had type 1 diabetes for 3 to five

Corresponding Author :- **Dr. Chandriga Sankaranarayanan** Email : splendour86@yahoo.com

years, furnished that they may be 11 years or older or have started puberty, whichever comes first. Among young patients with kind 2 diabetes, screening is recommended at prognosis and yearly thereafter. [6] Although a dilated and complete eye examination by way of an ophthalmologist remains the standard of care for retinal screening, fundus photography without or with artificial intelligence-based totally strategies for factor-of-care detection of DR serves as an accurate screening tool for DR, is feasible for use amongst young patients with diabetes, increases adherence to encouraged screening, and is price-powerful. [7]

High incidence of DR additionally imposes a large economic burden and public health situation on the countrywide healthcare gadget. This emphasizes the want for epidemiologic studies on diabetes-associated complications a few of the diabetic population. Despite the outcomes of this problem, and its growing occurrence of diabetes in India, there are few specific estimates of the prevalence of DR in India and no such posted statistics to be had in Sikkim until date. We purpose to estimate the Incidence and related risk factors of diabetic retinopathy among the diabetic mellitus patients. Across sectional hospital based study.

**MATERIAL AND METHODS**

A hospital-based prospective cross-sectional study was carried out from January 2010 to December 2010 at ophthalmology department Sri Lakshmi Narayana Institute of Medical sciences, Pondicherry. A total of 1000 patients with type 2 diabetes mellitus (DM) attending the ophthalmology department (OPD), were selected with approval from the Institutional Ethics Committee (IEC). Detailed history along with blood pressure measurement and written informed consent were obtained from each patients prior to the study in the study period, who fulfilled the inclusion criteria were studied. Patients with mature cataracts and hazy media, those with hypertensive retinopathy, exposure to radiation and sickle cell disease were also excluded as they could mimic fundus features with diabetic retinopathy Exclusion Criteria in this study. Inclusion criteria. Patients with 18 years of age and above, diagnosed with Type 2 DM, following the standard diagnostic criteria recommended by American Diabetic Association.

Demographical, arthrological, habits, and the other health related information for each participant were obtained by standardized face-to-face questionnaires performed by the nursing staff of the institutes during the cross-sectional study. The data regarding telescreening and laboratory test were also collected for the study purposes. Each patient was subjected to measure intraocular

pressure (IOP) by Tonometry procedure using Icare HOME tonometer (Icare Finland Oy Vantaa, Finland). IOP was measured by physicians. It is a ratio of the diameter of the cup portion of the optic disc to the total diameter of the optic disc.

Sociodemographic data and relevant medical history were filled into the pretested semi-structured questionnaire. Laboratory test results of fasting blood glucose (FBG) and lipid profile were obtained, in which a single record of recent FBG level was taken. Blood pressure was measured in sitting position after 5–10 min of rest. Hypertension is defined as systolic BP of  $\geq 140$  mmHg and/or diastolic BP of  $\geq 90$  mmHg. [BMI was calculated from weight in kilograms and height in meters squared and categorized according to WHO classification. Best-corrected visual acuity was taken using Tumbling E Snellen visual acuity chart and patient sitting at 6 m position, and classified according to WHO grading of visual acuity [12] as follows: visual acuity better or equal to 6/18 – normal; visual acuity  $\leq 6/24$  and better than or equal to 6/60 – moderate visual impairment; visual acuity  $< 6/60$  and better than or equal to counting fingers at 3 m – severe visual impairment; visual acuity less than counting fingers at 3 m – blindness; the results for the eye with better visual acuity was recorded.

Visual acuity was assessed by Snellen chart. To diagnose DR in diabetic patients, 90D and binocular indirect ophthalmoscopy examination was done by a single examiner after dilating the pupils of both eyes by 1% Tropicamide eye drops. Grading of the retinal changes was made using the Diabetic Retinopathy Study guidelines and recorded in six categories: mild, moderate, and severe nonproliferative retinopathy and early, high risk, and advanced proliferative retinopathy. DME was diagnosed when there were hard exudates on the macula and/or macular thickening obvious on slit-lamp examination and clinically significant macular edema (CSME) was diagnosed based on ETDRS study criteria. In cases of asymmetric involvement of eyes, the eye with the most severe DR grade was taken.

In patients with concomitant central or branch retinal vein occlusion, the DR grade in the eye not involved in the vein occlusion was used. All data were collected and recorded by an ophthalmologist, and all diagnoses were confirmed by a retina specialist at the retina clinic of the study center.

**RESULTS**

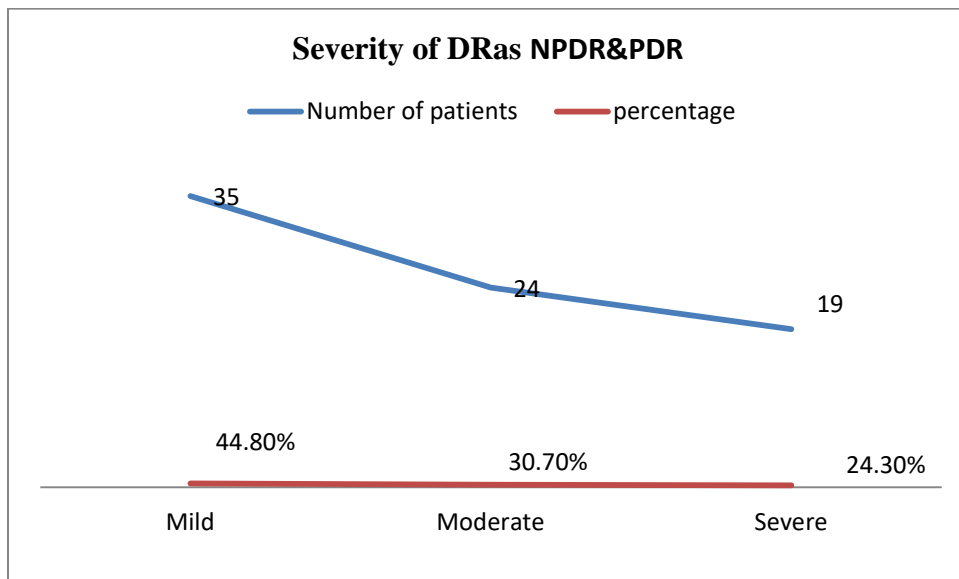
In present study, out of 1000 patients with DM, n=184 (18.4%) had DR, among which, more males were affected 112 (61%) than females were n=72 (39.1%).

**Table 1: Frequency distribution of patients with DM and diabetic retinopathy**

	Total(1000)	%	DM+DR(174)	%
Males	612	61.2	112	61
Females	388	38.8	72	39.1

Table 2: Shows the classification of severity of patients with diabetic retinopathy such as NPDR, PDR

Severity of DR	Number of patients	percentage
Mild	92	54.4%
Moderate NPDR	53	31.3%
Severe NPDR	9	5.3%
PDR	15	8.8%
Total	169	91.8%

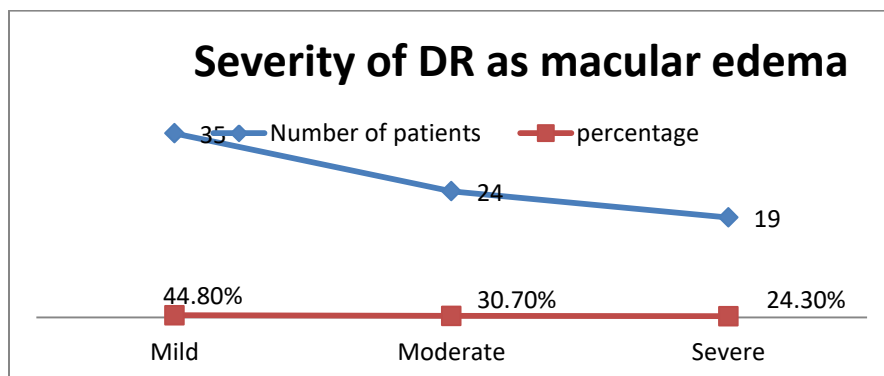


It was observed that out of 184 patients with DR, 169(91.8%) had NPDR, which on further categorization, showed n=92 (54.4%) with mild, n=53 (31.3%) with

moderate and n=9 (5.3%) with severe NPDR, whereas 8.8% (n=15) patients had PDR.

Table3: shows the classification of severity of patients with diabetic retinopathy as macular edema

Severity of macular edema	Numberof patients	percentage
Mild	35	44.8%
Moderate	24	30.7%
Severe	19	24.3%
Total	78	99.8%

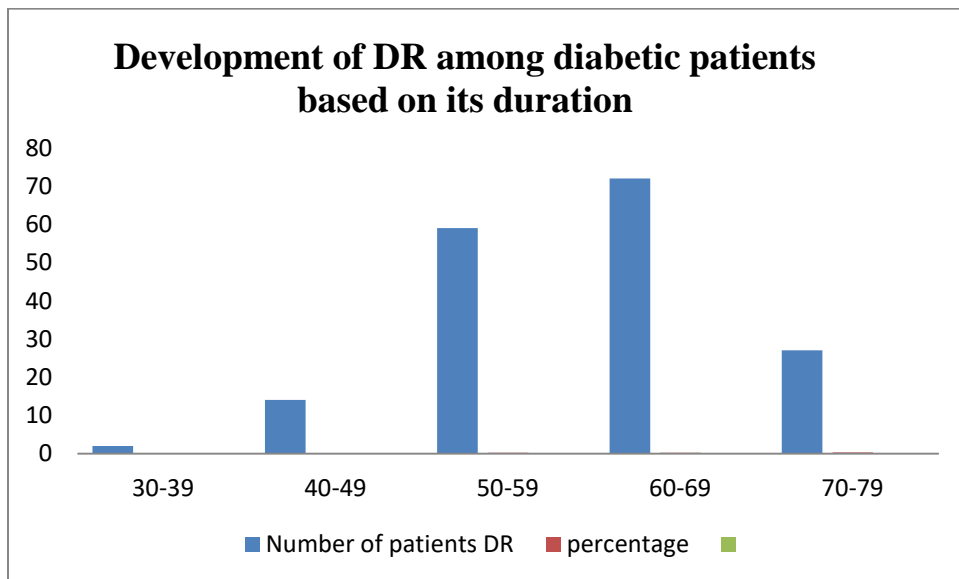


The patients with ME were 78(42.3%), among which 35(44.8%) were mild, 24(30.7%) were moderate and

19 (24.3%) patients suffered from severe ME.

**Table 4: Determination to development of DR among diabetic patients based on its duration.**

Duration of DM	Number of patients DM	Number of patients DR	percentage
<5 yrs	258	8	3.1%
5-9 yrs	436	69	15.8%
10-14 yrs	152	56	36.8%
15-19 yrs	84	29	34.5%
>20 yrs	70	22	31.4%



The duration of diabetes was seen to be highest in patients more than 20 years, of which, 31.4%(n=22) were affected with retinopathy. Four hundred thirty six patients had diabetes for 5-9 years 69(15.8%), including 56(36.8%) with DR.

other hand, n=69 (15.8%) developed retinopathy among 436 patients having diabetes for 5-9 years and 3.1% (n=8) had retinopathy among 258 patients who were diabetic for less than 5 years.

Out of 84 patients with diabetes for a period of 15-19 years, 29(34.5%) developed retinopathy. On the

**Table 5: Shows the proportion of DR patients according to the age group.**

Age of the patient	Number of patients DM	Number of patients DR	percentage
30-39	29	2	6.8%
40-49	220	14	6.3%
50-59	321	59	18.3%
60-69	305	72	23.6%
70-79	100	27	27%
>80	25	10	40%

The chances of development of retinopathy increases within increasing age. 40% were found to be having DR above 80 years of age, followed by 27% in the age group of 70-79 years, 23.6% were between 60-69 years of age and 18.3% between the age group of 50-59 years. In the age group of 40-49 years, 6.3% had retinopathy whereas

only 6.8% patients were observed between 30-39 years of age.

**DISCUSSION**

DR is one of the most severe micro vascular complications in patients with diabetes and is a most important cause of irreversible vision loss in working-aged

adults from 20–80 years. The high incidence of DR in type 2 diabetic patients imposes a large economic burden. Sternness of hyperglycemia, presence of blood pressure and duration of diabetes are widely recognized as major hazard for the development of DR. [8-9]

In our study, the prevalence of DR was 18.4% which is correlated [10] (18.1%) in studies done in the southern states of India. Here NPDR was more established as compared to PDR just like in Bamashmus MA et al study. [11] This may be due to differences in the frequency of DR may be non-existent among type 2 diabetic patients of different geographical origins and ethnic groups, however the opportunity may be explored with the aid of doing large populace based research across the country

In present study males were more affected (55.17%) than females because gender bias and social barriers to treatment modifying access to screening and treatment are known to exist. Our study results duration of diabetes to be related with the development of DR and the percentage of patients affected with DR increases based on the increasing duration of Type 2 Diabetes Mellitus.

According to our findings, DR appeared as early as <5 yrs of DM in 3.1% of the population and fifteen.Eight% sufferers developed DR after 20 years of DM. This exam bolstered the truth that the duration of DM is the unmarried most common predictor to have an effect

on the severity of DR similar with [12] have a look at. On category of DR based totally on its severity, we located that the most range of patients had mild NPDR accompanied by way of mild and severe paperwork.

In our take a look at confirmed that diabetic patients above 80 years of age were determined to have the best dominance of DR while the lowest frequency become observed between 30-39 years of age. [13] study shown the overall age standardized prevalence of DR to be 23.6% with an average age of fifty eight years much like that discovered whereas in our take a look at [18]. Three% sufferers with retinopathy had been observed to be between the age institution of 50-59 years. Only 10% of sufferers had their retina tested at the first attendance and none had annual retinal exam. As a result in gift look at, we tried to generate knowledge surrounded by way of the diabetics approximately the reimbursement of early and normal ocular exam.

## CONCLUSION

The high predominance of DR in our study implies the require to progress routine patient care including treatment facility. Continuous effort is required from health-care professionals in counseling diabetic patients about the role of blood sugar level in reducing the risk of onset and progression of DR. Health education for diabetic patients necessary to check the diabetes related eye complications is suggested

## REFERENCE

1. Lechner J, O'Leary OE, Stitt AW, *et al.* The Pathology Associated With Diabetic Retinopathy. *Vision Res*, 139, 2010, 7–14.
2. Jampol LM, Glassman AR, Sun J, *et al.* Evaluation and Care of Patients With Diabetic Retinopathy. *N Engl J Med*, 382(17), 2010, 1629–37.
3. TesfahunEjigu, AsamereTsegaw, *et al.* Prevalence of Diabetic Retinopathy and Risk Factors among Diabetic Patients at University of Gondar Tertiary Eye Care and Training Center, *African Journal of Ophthalmology*, 28 (2), 2009.
4. Leasher JL, Bourne RR, Flaxman SR, Jonas JB, Keeffe J, Naidoo K, *et al.* Global estimate on the number of people blind or visually impaired by diabetic retinopathy: A meta-analysis from 1990-2010. *Diabetic Care*, 39, 2009, 1643-9.
5. Donaghue KC, MarcovecchioML, Wadwa RP, *et al.* ISPAD Clinical Practice Consensus Guidelines 2018: microvascular and macrovascular complications in children and adolescents. *Pediatr Diabetes*, 19(suppl 27), 2008, 262-274.
6. Wolf RM, Channa R, Abramoff MD, Lehmann HP, *et al.* Cost-effectiveness of autonomous point-of-care diabetic retinopathy screening for pediatric patients with diabetes. *JAMA Ophthalmol*, 138(10), 2010, 1063-1069.
7. B.Sai Ravi kiran, T.Mohana Lakshmi, R.Srikumar, E. Prabhakar Reddy, *et al.* Increase in total antioxidant capacity and high levels of oxidative stress in diabetes mellitus and metabolic syndrome. *International Journal of Pharmaceutical Sciences Research and Review*. 40(1), 2010, 271-277.
8. The diabetes control and Complications Trial Research Group: The effect of intensive treatment of diabetes on the development and long-term complications in insulin-dependent diabetes mellitus. *N Engl J Med*, 329, 1993, 977–86.
9. UK Prospective Diabetes Study (UKPDS) Group: Intensive blood-glucose control with sulphonyl ureas or insulin compared with conventional treatment and risk of complications in patients with type 2 diabetes. *Lancet*, 352, 1998, 837–53
10. Raman R, Rani PK, Reddi RS, Gnanamoorthy P, Uthra S, Kumaran manickavel, *et al.* Prevalence of diabetic retinopathy in India: Sankara Nethralaya diabetic retinopathy epidemiology and molecular genetics study report 2. *Ophthalmology* 116, 2009, 311-8
11. Bamashmus MA, Gunaid AA, Khandekar RB, *et al.* Diabetic retinopathy, visual impairment and ocular status among patients with diabetes mellitus in Yemen: a hospital-based study. *Indian J Ophthalmol*, 57, 2009, 293-8.18.

12. Rani PK, Raman R, Chandrakantan A, Pal SS, Perumal GM, Sharma T, *et al.* Risk factors for diabetic retinopathy in self-reported rural population with diabetes. *J Postgrad Med*, 55, 2009, 92-6.
13. Yau J, Rogers S, Kawasaki R, Lamoureux E, Kowalski J, Bek T, *et al.* Global Prevalence and Major Risk Factors of Diabetic Retinopathy. *Diabetes Care*, 35, 2010, 556-64.