Study of prevalence of retinopathy in noninsulin dependent diabetes mellitus at a tertiary hospital

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Abstr<u>act</u> Background: Diabetic retinopathy (DR) is a common microvascular complication, an important complication among adults and elderly. India being the diabetic capital of the world and DR being the most common cause for visual impairment and blindness; it becomes empirical to assess the factors for its rising prevalence, which will significantly contribute in reducing the progression of DR. In present study prevalence of retinopathy in non-insulin dependent diabetes mellitus patients was studied at a tertiary hospital. Material and Methods: Present study was a hospital- based, observational, cross-sectional study conducted in 200 already diagnosed non-insulin dependent, type 2 diabetic patients, attending medicine OPD for routine follow up. Subjects were evaluated for diabetic retinopathy by fundus examination after dilating the eyes. Direct and indirect ophthalmoscopy was done. Findings were noted and subjects were categorized as no retinopathy (No DR), non-proliferative (NPDR) and proliferative diabetic retinopathy (PDR) using the ETDRS classification. Results: Total 200 patients were studied, 55% were male and 45% were female. No significant difference was noted for age as well as duration of diabetes between male and female patients. 200 patients were examined for retinopathy and classified according to Early Treatment Diabetic Retinopathy Study (ETDRS) aimed at grading retinopathy in the context of overall severity of ophthalmoscopic signs. Most common age group was 51-60 years (39%) followed by 61-70 years (34%). No diabetic retinopathy noted in 68 % patients, while proliferative diabetic retinopathy noted in 9%. Mild NPDR (10%), Moderate NPDR (8%) and Severe NPDR (6%) was noted in study patients. In present study age was not statistically related to stage of diabetic retinopathy. Most patients had duration less than 5 years, none of them had diabetic retinopathy features. Nonproliferative diabetic retinopathy (NPDR) and proliferative diabetic retinopathy (PDR) was noted along with progression of duration of diabetes and correlation was statistically significant. Conclusion: Increasing duration of diabetes mellites has a definite influence on the risk and progression of diabetic retinopathy. Keywords: Diabetic retinopathy, NPDR, PDR, diabetes mellites.

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Dr Kiran Martand Bhirud, Associate Professor, Department of Ophthalmology, Dr. Ulhas Patil Medical College, Jalgaon, Maharashtra, INDIA. **Email:** <u>kiranbhirud66@gmail.com</u> Received Date: 20/11/2019 Revised Date: 19/12/2019 Accepted Date: 11/01/2020

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INTRODUCTION

India harbours 31.7 million diabetics and the number is going to rise to an alarming 79.4 million by 2030.¹ According to World Health Organisation; diabetic retinopathy is 4.8% of the 37 million cases of blindness throughout the world. Diabetic retinopathy is a chronic progressive, potentially sight-threatening disease of the retinal microvasculature associated with the prolonged hyperglycemia and other conditions linked to diabetes mellitus such as hypertension.³ Diabetic retinopathy (DR) is a common microvascular complication, an important complication among adults and elderly. DR is of two types, nonproliferative diabetic retinopathy (NPDR) and proliferative diabetic retinopathy (PDR). Severity of

How to cite this article: Kiran Martand Bhirud, Darshana Pankaj Shah. Study of prevalence of retinopathy in non-insulin dependent diabetes mellitus at a tertiary hospital. *MedPulse International Journal of Ophthalmology*. April 2021; 18(1): 07-10. https://www.medpulse.in/Ophthlmology/ NPDR depends on microaneurysms, hemorrhages, cotton wool spots, and beading of veins and can progress to PDR. Inherit characteristic of PDR is neovascularization. Its either PDR or diabetic maculopathy that is responsible for vision loss. Risk surveillance for diabetic retinopathy and their effective management have helped in markedly reducing the risk of visual acuity and blindness in developed countries.⁴ India being the diabetic capital of the world and DR being the most common cause for visual impairment and blindness; it becomes empirical to assess the factors for its rising prevalence, which will significantly contribute in reducing the progression of DR. In present study prevalence of retinopathy in non-insulin dependent diabetes mellitus patients was studied at a tertiary hospital.

MATERIAL AND METHODS

Present study was a hospital- based, observational, crosssectional study conducted in the Department of Ophthalmology, Dr. Ulhas Patil Medical College, Jalgaon, with help from department of medicine. Study duration was of 6 months. Study was approved by institutional ethical committee.

Inclusion criteria

• 200 already diagnosed non-insulin dependent, type 2 diabetic patients, attending medicine OPD for routine follow up

Exclusion criteria

- Patients with hazy media whose fundi could not be examined
- patients with any other eye disease.

Study was explained to patients and informed consent was taken. Demographic and clinical data regarding age, gender, age at onset of diabetes, duration of diabetes, history of smoking, history of alcohol intake, mode of treatment was documented. General physical examination done. Then the subjects were evaluated for diabetic retinopathy by fundus examination after dilating the eyes. Direct and indirect ophthalmoscopy was done. Findings were noted and subjects were categorized as no retinopathy (No DR), non-proliferative (NPDR) and proliferative diabetic retinopathy (PDR) using the ETDRS classification. Data was collected and analysed with Microsoft excel sheet. Statistical analysis was done using descriptive statistics. Chi square test was used for statistical correlation and p value less than 0.05 was considered as statistically significant.

RESULTS

Total 200 patients were studied, 55% were male and 45% were female. No significant difference was noted for age as well as duration of diabetes between male and female patients.

	Table 1: Demographic profile of the population under study.						
Gender	No. of participants	Age in years	Duration of diabetes in years (Mean±SD)				
	(%)	(Mean±SD)					
Males	110 (55%)	55.19 ± 11.82	11.23 ± 6.47				
Females	90 (45%)	56.94 ± 9.18	10.91 ± 6.82				
P value	0.59	0.56	0.62				

200 patients were examined for retinopathy and classified according to Early Treatment Diabetic Retinopathy Study (ETDRS) aimed at grading retinopathy in the context of overall severity of ophthalmoscopic signs. Most common age group was 51-60 years (39%) followed by 61-70 years (34%). No diabetic retinopathy noted in 68 % patients, while proliferative diabetic retinopathy noted in 9%. Mild NPDR (10%) , Moderate NPDR (8%) and Severe NPDR (6%) was noted in study patients. In present study age was not statistically related to stage of diabetic retinopathy.

Table 2: Association between age	and stage of diabetic retinopathy.
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Age (yrs.)	No. of patients	No DR (%)	Mild NPDR (%)	Moderate NPDR (%)	Severe NPDR (%)	PDR (%)
41-50	34 (17%)	30 (15%)	1 (1%)	1 (1%)	0	2 (1%)
51-60	78 (39%)	59 (30%)	6 (3%)	4 (2%)	3 (2%)	6 (3%)
61-70	67 (34%)	42 (21%)	9 (5%)	7 (4%)	4 (2%)	5 (3%)
> 70	21 (11%)	5 (3%)	4 (2%)	3 (2%)	5 (3%)	4 (2%)
Total	200	136 (68%)	20 (10%)	15 (8%)	12 (6%)	17 (9%)

(DR - Diabetic retinopathy, NPDR - nonproliferative diabetic retinopathy, PDR- proliferative diabetic retinopathy). Most patients had duration less than 5 years, none of them had diabetic retinopathy features. Nonproliferative diabetic retinopathy (NPDR) and proliferative diabetic retinopathy (PDR) was noted along with progression of duration of diabetes and correlation was statistically significant.

Duration of	No. of patients	No DR (%)	Mild NPDR (%)	Moderate	Severe NPDR	PDR (%)
DM (yrs.)				NPDR (%)	(%)	
1-5	55 (28%)	55 (28%)	0	0	0	0
6-10	31 (16%)	28 (14%)	2 (1%)	0	0	1 (1%)
11-15	27 (14%)	22 (11%)	3 (2%)	0	0	2 (1%)
16-20	33 (17%)	18 (9%)	4 (2%)	3 (2%)	3 (2%)	5 (3%)
21-25	31 (16%)	11 (6%)	6 (3%)	5 (3%)	4 (2%)	5 (3%)
> 25	23 (12%)	2 (1%)	5 (3%)	7 (4%)	5 (3%)	4 (2%)

Table 3: Association between duration of diabetes mellitus and stage of diabetic retinopathy.

(DR - Diabetic retinopathy, NPDR - nonproliferative diabetic retinopathy, PDR- proliferative diabetic retinopathy).

DISCUSSION

Risk factors for the development of retinopathy and visual loss include type of diabetes, duration of diabetes, poor glycemic control, poor blood pressure control, deranged lipid profile, obesity, obstructive sleep apnea (OSA), pregnancy and anaemia. The duration of diabetes is probably the strongest predictor for development and progression of retinopathy.⁴ Diabetic macular edema (DME)³ is the most frequent cause of visual impairment in diabetic patients. DME occurs after breakdown of the blood-retinal barrier because of leakage of dilated hyper permeable capillaries and microaneurysms. It is categorized as focal or diffuse.

• Diffuse - usually presents area of capillary non-perfusion with or without cystic changes.

• Focal - characterized by focal leakage from specific capillary lesions

Navak S et al.,⁵ noted that the overall prevalence of DR in diabetic population was 25%, which correlates with 23.8% and 22% prevalence of DR reported by National Urban Diabetic Society⁶ and AIOS DR eye screening study 2014⁷. In present study a higher prevalence (32%) was noted. The prevalence of diabetes and DR is less in rural population compared to urban, educated and affluent population as observed in one study carried out in rural population of Chennai. The reason being reduced physical energy expenditure as a result of sedentary lifestyle and unhealthy dietary practices hence socioeconomic status plays a significant role in influencing the development of diabetes and its complications.8 Mani K9 studied 200 subjects, 63 subjects (31.5%) were affected with diabetic retinopathy (nonproliferative retinopathy=22.5%, proliferative retinopathy=9%). Prevalence of mild, moderate and severe nonproliferative retinopathy was 7.5% each. Significant association was found between diabetic retinopathy and duration of diabetes. Therefore, periodic screening of diabetic patients should be carried out for early detection and prevention of loss of vision. Mani K⁹ observed an association between duration of diabetes and diabetic retinopathy. Binary logistic regression analysis also showed an independent association between duration of diabetes and diabetic retinopathy. This result supported the fact that duration of diabetes is the strongest predictor for development of DR. Mehta K et al.,¹⁰ done a univariate regression analysis and noted that advancing age (>55 years), duration of diabetes (DOD) >10 years, systolic (>120mmHg), diastolic blood pressure (>80mmHG), smoking, sedentary life style, total cholesterol (>200mg/dl), low density lipoproteins (LDL) cholesterol (>150mg/dl) and high-density lipoprotein (HDL) cholesterol (< 40 mg/dl) as risk factors. In multivariable logistic regression analysis, age>65 years, DOD>10 years, SBP>120mmHg, DBP>80mmHg, total cholesterol >200mg/dl, sedentary life style and smoking were observed to be substantial risk variables influencing independently the risk of DR in the population of Punjab. Higher prevalence of NPDR (33.98%) and PDR (31.50%) existed in the population of Punjab, which is regulated by age (>65 years), DOD>10 advancing vears, SBP>120mmHg, DBP>80mmHg, total cholesterol >200mg/dl, sedentary life style and cigarette smoking. A strong correlation between hypertension and diabetic retinopathy is evident from the perspective that unnecessarily increased blood flow to the retinal capillaries may damage endothelium of the eye in the subjects having diabetes.¹¹ Raman R noted that duration of diabetes after five years is significantly associated with the risk of DR in more than half of the patients (P<0.001). Duration of diabetes is observed to be very risky (OR 6.01, 95% CI 2.63-13.75, P<0.05) in Chennai and rural population of Tamil Nadu.¹² It is also validated that aggressive control of blood pressure in T2DM subjects attenuates the risk of blindness, requirement of photocoagulation and progression of diabetic retinopathy.¹³ The most effective way of preventing the risk of vision loss from diabetes mellitus is patient education about the need for screening for retinopathy even in the absence of any visual complaints. This unfortunately, is too often, the most neglected aspect in the care of patients with diabetes mellitus.

CONCLUSION

Spreading knowledge of diabetes and related complications will motivate individuals with diabetes to visit ophthalmologists. Increasing duration of diabetes mellites has a definite influence on the risk and progression of diabetic retinopathy.

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