

## Original Research

### Prevalence of diabetic retinopathy in non-insulin dependent diabetes mellitus patients

<sup>1</sup>Rekha S, <sup>2</sup>Mohd Shahbaaz, <sup>3</sup>R C Krishnakumar

<sup>1,2</sup>Assistant Professor, <sup>3</sup>Medical Director, PK Das Institute of Medical Sciences, Vaniamkulam, Ottapalam, Kerala, India

#### ABSTRACT:

**Aim:** To assess the prevalence of diabetic retinopathy in non-insulin dependent diabetes mellitus patients (NIDDM) patients.

**Methodology:** One hundred ninety- NIDDM patients of both genders were recruited and the prevalence of diabetic retinopathy was assessed. Parameters such as duration of diabetes, family history, hypertension, BMI etc. were recorded.

**Results:** Out of 190 patients, males were 110 (57.8%) and females were 80 (42.2%). Out of 190 type II DM patients, mild non-proliferative retinopathy was seen in 40 (21%), moderate non-proliferative retinopathy in 26 (13.6%) and severe non-proliferative retinopathy in 12 (6.3%) patients. The difference was significant ( $P < 0.05$ ). Out of 78 patients with DR, family history was positive in 40. Duration of diabetes was  $< 5$  years in 24 and 5-10 years in 54 patients. DR was present in patients with BMI  $< 24.9$  in 12, 25-29.9 in 26 and  $> 30$  in 40 patients. Hypertension was present in 44 patients. The difference was significant ( $P < 0.05$ ). **Conclusion:** The results of the study revealed that maximum cases of DR were seen in patients with a positive family history of diabetes, patients with a history of hypertension, BMI  $> 30$ , and those with 5-10 years of diabetes.

**Key words:** diabetes, diabetic retinopathy, family

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**Corresponding author:** Mohd Shahbaaz, Assistant Professor, PK Das Institute of Medical Sciences, Vaniamkulam, Ottapalam, Kerala, India

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#### INTRODUCTION

Among the oldest diseases that humans have ever encountered is likely diabetes mellitus (DM). About 3000 years ago, it was first mentioned in an Egyptian manuscript. The distinction between type 2 and type 1 DM was established in 1936. In 1988, type 2 diabetes was initially identified as a part of the metabolic syndrome.<sup>1</sup> The most prevalent kind of diabetes mellitus (DM) is type 2, also referred to as non-insulin dependent DM. It is typified by hyperglycemia, insulin resistance, and relative insulin shortage. Interactions between genetic, environmental, and behavioural risk factors lead to type 2 diabetes.<sup>2</sup> Because of the quick changes in the sociodemographic and economic spheres, there will likely be an increase in the number of diabetic patients in the upcoming years. A blood glucose level that is consistently elevated leads to widespread vascular injury, which can result in a variety of macro and micro vascular problems. By 2030, it's predicted that 79.4 million Indians will suffer from diabetes. It is anticipated that the number of people with diabetes

complications will rise in tandem with the fast rise in the number of people with the disease.<sup>3</sup>

Diabetes's long-term microvascular consequence affecting the eyes is called diabetic retinopathy (DR). The prevalence and distribution of diabetic retinopathy (DR) in India have not been well documented in research.<sup>4</sup> A retinal vascular condition known as diabetic retinopathy develops as a side effect of diabetes mellitus (DM). It is a major cause of blindness that frequently affects adults in their working years. It is distinguished by indications of either increased retinal vascular permeability or retinal ischemia, including microaneurysms, haemorrhages, cottonwool spots, intraretinal microvascular abnormalities, venous caliber abnormalities, and neovascularization.<sup>5,6</sup> We performed this study to assess prevalence of diabetic retinopathy in NIDDM patients.

#### METHODOLOGY

This observational, prospective study comprised of one hundred ninety- NIDDM patients of both genders.

The approval from ethical review committee of the institute was obtained. All selected patients gave their written consent before starting the study.

Demographic profile of each patient such as name, age, gender, etc. was entered in the case sheet. An experienced eye surgeon carefully performed eye examination. The diagnosis of DR was confirmed after treating eye with 1% tropicamide eye drop using a 90 diopter of Volk lens and slit lamp biomicroscope. Retinopathy was classified as mild non-proliferative

retinopathy (level 14 up to but not including level 40), moderate non-proliferative retinopathy (level 40 up to but not including level 50) and severe retinopathy (level >50, including severe non-proliferative and proliferative retinopathy). The duration of diabetes, family history, hypertension, BMI etc. were also recorded. The results were compiled and subjected for statistical analysis using chi-square test. P value less than 0.05 was considered significant.

**RESULTS**

**Table I Gender wise patient distribution**

Gender	Number	Percentage
Male	110	57.8%
Female	80	42.2%

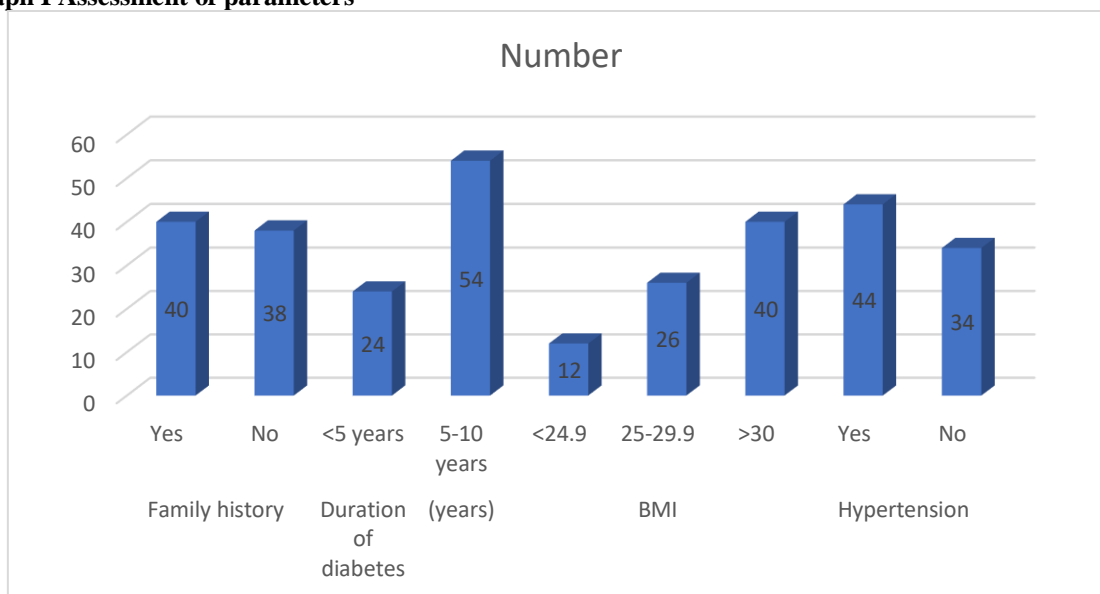
Out of 190 patients, males were 110 (57.8%) and females were 80 (42.2%) (Table I).

**Table II Prevalence of diabetic retinopathy**

Diabetic retinopathy	Number (%)	P value
Mild non-proliferative retinopathy	40 (21%)	0.05
Moderate non-proliferative retinopathy	26 (13.6%)	
Severe non-proliferative retinopathy	12 (6.3%)	

Out of 190 type II DM patients, mild non-proliferative retinopathy was seen in 40 (21%), moderate non-proliferative retinopathy in 26 (13.6%) and severe non-proliferative retinopathy in 12 (6.3%) patients. The difference was significant (P< 0.05) (Table II).

**Graph I Assessment of parameters**



Out of 78 patients with DR, family history was positive in 40. Duration of diabetes was <5 years in 24 and 5-10 years in 54 patients. DR was present in patients with BMI<24.9 in 12, 25-29.9 in 26 and >30 in 40 patients. Hypertension was present in 44 patients. The difference was significant (P< 0.05) (Graph I).

**DISCUSSION**

Diabetes mellitus (DM) is a group of chronic metabolic conditions, all of which are characterized by elevated blood glucose levels resulting from the body's inability to produce insulin or resistance to insulin action or both.<sup>7,8</sup> Worldwide, there are around 451 million diabetic patients. There are hints that diabetic retinopathy (DR) is a major contributor to

visual impairment in India. Blindness and other visual impairments are very common in India. One to one and a half percent of the world's population is thought to be blind.<sup>9</sup> The priorities must be based on trustworthy population-based statistics in order to address the significant burden of blindness. Some in India believe that DR is increasingly contributing to vision impairment.<sup>10</sup> We performed this study to

assess prevalence of diabetic retinopathy in NIDDM patients.

Our results showed that out of 190 patients, males were 110 (57.8%) and females were 80 (42.2%). Most vision loss due to diabetic retinopathy is avoidable, through primary prevention (intensive control of hyperglycemia, hypertension, and of other risk factors for diabetic retinopathy), and secondary prevention (detecting high-risk diabetic retinopathy in time to apply palliative laser therapy).<sup>11,12</sup> Because diabetic retinopathy is often asymptomatic during the period in which laser photocoagulation should be applied, screening of asymptomatic persons is needed to minimize the risk of vision loss.<sup>13,14</sup>

In our study, out of 190 type II DM patients, mild non-proliferative retinopathy was seen in 40 (21%), moderate non-proliferative retinopathy in 26 (13.6%) and severe non-proliferative retinopathy in 12 (6.3%) patients. Ramawat et al<sup>15</sup> observed that overall, prevalence of DR in type 2 patients of western India was 33.9%. Prevalences of non-proliferative DR and proliferative DR were 25.5% and 8.33% respectively. Statistically significant differences (p value<0.05) were observed between prevalences of DR in each group of patients which was classified, and duration of diabetes. Prevalence of CSME (clinically significant macular oedema) was 6.5%. Associated hypertension showed a statistically significant (p value<0.05%), higher prevalence of DR.

It was found that out of 78 patients with DR, family history was positive in 40. Duration of diabetes was <5 years in 24 and 5-10 years in 54 patients. DR was present in patients with BMI <24.9 in 12, 25-29.9 in 26 and >30 in 40 patients. Hypertension was present in 44 patients. Namperumalsamy et al<sup>16</sup> estimated the prevalence of diabetic retinopathy (DR) and the possible risk factors associated with DR. Among the 25 969 persons screened for diabetes mellitus (DM), 2802 (10.8%) were found to have DM. DR was detected in 298 (1.2%) of 25 969 subjects. The age-gender-adjusted prevalence of DR is 0.05% for rural and 1.03% for urban areas. The overall age-gender-cluster adjusted prevalence of DR was 0.74%. Diabetic retinopathy was present in 12.2% of the DM population.

Rema et al<sup>17</sup> assessed the prevalence of retinopathy in 448 consecutive newly diagnosed type 2 diabetic patients. Of the 438 patients with assessable photographs, 32 (7.3%, 95% confidence interval 5.0 to 10.2) had retinopathy. None of the variables tested showed a significant association with retinopathy on univariate or multivariate logistic regression analysis. Narendran et al<sup>18</sup> found that among the 5212 examined people (92% response rate), 68 (26.2%) of 260 people with self-reported history of diabetes had diabetic retinopathy. The age-sex adjusted prevalence of diabetes among people aged 50 years and older was 5.1% and of diabetic retinopathy among the diabetics was 26.8%. Non-proliferative diabetic retinopathy (94.1%) was the

most common form of retinopathy seen. Two eyes were blind (presenting vision <6/60) as a result of retinopathy.

## CONCLUSION

The results of the study revealed that maximum cases of DR were seen in patients with a positive family history of diabetes, patients with a history of hypertension, BMI >30, and those with 5-10 years of diabetes.

## REFERENCES

1. Ferris FL III. How effective are treatments for diabetic retinopathy? *JAMA*. 1993; 269:1290-1291.
2. The Eye Diseases Prevalence Research Group. Causes and prevalence of visual impairment among adults in the United States. *Arch Ophthalmol*. 2004;122:477-485.
3. Roy MS, Klein R, O'Colmain BJ, et al. The prevalence of diabetic retinopathy among adult type 1 diabetic persons in the United States. *Arch Ophthalmol*. 2004;122: 546-551.
4. Alemu Mersha G, Alimaw YA, Woredekal AT. Prevalence of diabetic retinopathy among diabetic patients in Northwest Ethiopia—A cross-sectional hospital-based study. *PLoS ONE* 2022;17(1): e0262664.
5. Dandona L, Dandona R, Naduvilath TJ, McCarty CA, Rao GN. Population based assessment of diabetic retinopathy in an urban population in southern India. *British Journal of Ophthalmology*. 1999 Aug 1;83(8):937-40.
6. Kempen JH, O'Colmain BJ, Leske MC, Haffner SM, Klein R, Moss SE, Taylor HR, Hamman RF. The prevalence of diabetic retinopathy among adults in the United States. *Archives of ophthalmology* (Chicago, Ill.: 1960). 2004 Apr 1;122(4):552-63.
7. Looker HC, Knowler WC, Hanson RC. Changes in BMI and weight before and after the development of type 2 diabetes. *Diabetes Care* 2001;24:1917-22.
8. Klein R, Klein BE, Moss SE, Linton KL. The Beaver Dam Eye Study: retinopathy in adults with newly discovered and previously diagnosed diabetes mellitus. *Ophthalmology*. 1992;99:58-62.
9. Leske MC, Wu SY, Hyman L, et al. Diabetic retinopathy in a black population: the Barbados Eye Study. *Ophthalmology*. 1999;106:1893-1899.
10. Mitchell P, Smith W, Wang JJ, Attebo K. Prevalence of diabetic retinopathy in an older community: the Blue Mountains Eye Study. *Ophthalmology*. 1998;105: 406-411.
11. West SK, Klein R, Rodriguez J, et al. Diabetes and diabetic retinopathy in a Mexican American population: Proyecto VER. *Diabetes Care*. 2001;24:1204-1209.
12. Lachin JM. *Biostatistical Methods*. New York, NY: John Wiley & Sons Inc; 2000. 22. Boyle JP, Honeycutt AA, Narayan KM, et al. Projection of diabetes burden through 2050: impact of changing demography and disease prevalence in the US. *Diabetes Care*. 2001;24:1936-1940.
13. Stratton IM, Kohner EM, Aldington SJ, et al. UKPDS 50: risk factors for incidence and progression of retinopathy in type II diabetes over 6 years from diagnosis. *Diabetologia* 2001;44:156-63.
14. Agardh E, Agardh CD, Koul S, et al. A four-year follow-up study on the incidence of diabetic

- retinopathy in older onset diabetes mellitus. *Diabet Med* 1994;11:273–8.
15. Ramavat PR, Ramavat MR, Ghugare BW, Vaishnav RG, Joshi MU. Prevalence of diabetic retinopathy in Western Indian type 2 diabetic population: A hospital-based cross-sectional study. *Journal of clinical and diagnostic research: JCDR*. 2013 Jul;7(7):1387.
  16. Namperumalsamy P, Kim R, Vignesh TP, Nithya N, Royes J, Gijo T, Thulasiraj RD, Vijayakumar V. Prevalence and risk factors for diabetic retinopathy: a population-based assessment from Theni District, south India. *Postgraduate medical journal*. 2009 Dec 1;85(1010):643-8.
  17. Rema M, Ponnaiya M, Mohan V. Prevalence of retinopathy in non-insulin-dependent diabetes mellitus at a diabetes centre in southern India. *Diabetes Res Clin Pract*. 1996;34:29–36.
  18. Narendran V, John RK, Raghuram A, Ravindran RD, Nirmalan PK, Thulasiraj RD. Diabetic retinopathy among self-reported diabetics in southern India: a population-based assessment. *Br J Ophthalmol*. 2002;86:1014–18.