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Prevalence of Diabetic Retinopathy in Diabetic Patients; A Hospital Based Study at KD Medical College, Mathura.

Nitin Singh Salaria[1], Yelda Vyas[2], Malhar Vyas[3]

[1]Associate Professor, Department of Ophthalmology, KD Medical college, Mathura, [2]Assistant Professor, Department of Pathogy, KD Medical college, Mathura, [3]Senior Resident, Department of Ophthalmology, KD Medical college, Mathura.

Abstract

Background: India is the country which presently has more than 40 million people suffering with diabetes and this number will become up to 80 million by 2030. Diabetic retinopathy is among the most common ophthalmic complication of diabetes mellitus. WHO has estimated that diabetic retinopathy is responsible for about 4.8% of the 37 million cases of blindness throughout the world. Therefore the present study was designed to assess the prevalence of diabetic retinopathy in diabetic patients in Mathura region. **Subjects and Methods:** Out of 1716 patients attending the OPD, 225 cases with Type 2 Diabetes in KD Medical College, Mathura were enrolled in the study by universal sampling. A Detailed fundus examination was done by indirect ophthalmoscopy and +90D biomicroscopy. A thorough systemic examination was done. Investigations like Routine blood investigations, Urine examination, Fasting plasma glucose and 2hr post prandial glucose, was advised and undertaken. **Results:** Out of 1716 patients (Males: 944; Females: 772) screened for Type 2 Diabetes, 225 patients had type 2 diabetes consisting of 1378 Males and 87 Females. Prevalence of Type 2 Diabetes among the study population was 13.11 %. (14.61% For males and 11.26% for females). Prevalence of Diabetic Retinopathy in our study population was 31.11%. Prevalence of DR was 29.71% among males and 33.33% among females. In our study, majority of the patients having Diabetic retinopathy (38.57%) were in the age group 61-70 years followed by patients >70 years (28.57%). Below the age of 60 years, less than 20% of patients had Diabetic retinopathy. **Conclusion:** Diabetic retinopathy is a major health problem in patients with type 2 Diabetes. Risk factors such as Age, Duration of Diabetesn, Hyperglycemia etc. should be taken into account for regular check-ups and early detection of diabetic retinopathy.

Keywords: Diabetes Mellitus, Diabetic retinopathy, Prevalence, Mathura.

Corresponding Author: Dr. Yelda Vyas, Assistant Professor, Department of Pathogy, KD Medical College, Mathura.

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Introduction

One hundred seventy one million people are currently affected by diabetes mellitus throughout the world. Moreover, it has been estimated that three hundred sixty six million people will be affect by 2030 with the most rapid growth in law and middle income countries.[1] India is the country which presently has more than 40 million people suffering with diabetes and this number will become up to 80 million by 2030.[2] There is a marked difference between the prevalence of diabetes in urban area (12.1%) and rural area (6.4%) of India.[3-5]

Diabetic retinopathy is among the most common ophthalmic complication of diabetes mellitus. WHO has estimated that diabetic retinopathy is responsible for about 4.8% of the 37 million cases of blindness throughout the world.[6] The incidence of blindness is 25 times higher in people with diabetes than in general population.[7] The estimates of the prevalence of diabetic retinopathy in India suggest that there are more than 5.6 million people with diabetic retinopathy with more than 0.3 million suffering from proliferative retinopathy.[8]

Diabetic retinopathy develops in nearly all persons with Type I diabetes and in more than 77% of those with Type 2 diabetes who survive over 20 years with the disease.[9] There is evidence that retinopathy begin to develop at least 7-12 years before the clinical diagnosis of Type 2 diabetes.[10,11]

Studies of various complications in Indian diabetics is therefore of great interest and very few studies are available on the prevalence of diabetic retinopathy from India.[12]

Therefore the present study was designed to assess the prevalence of diabetic retinopathy in diabetic patients in Mathura region.

Subjects and Methods

A Prospective study to Estimate the prevalence of Diabetic Retinopathy in Type 2 Diabetes in relation to risk factors was conducted in the outpatient department of Ophthalmology at KD Medical College, Mathura, from March 2018 to August 2018.

Out of 1716 patients attending the OPD, 225 cases with Type 2 Diabetes in KD Medical College, Mathura were

enrolled in the study by universal sampling. They all satisfied the predefined Inclusion criterion.

A careful and detailed history regarding Duration, Type and Treatment of Diabetes, Family History and associated systemic diseases such as Hypertension, Nephropathy, Neuropathy and Non-healing was taken. Data was collected on the basis of a predefined semi-structured performa. The project was approved by the institutional ethics committee.

Ophthalmic Examination:

A detailed Eye examination included:

Examination of adnexae and extraocular structures i.e the examination of face, orbits, eyebrows, eyelids, palpebral fissure, extraocular movements and lacrimal sac. Recording of Best corrected visual acuity (BCVA) and intraocular pressure (applanation) was done.

Examination of anterior segment was done by slit lamp biomicroscopy.

A Detailed fundus examination was done by indirect ophthalmoscopy and +90D biomicroscopy. Non-proliferative Diabetic Retinopathy (NPDR) was diagnosed by the presence of Microaneurysms, Dot Blot hemorrhages, hard exudates or cotton wool spots. Proliferative Diabetic Retinopathy (PDR) was defined as the presence of abnormal new vessels on the disc or elsewhere. Retinopathy was classified according to the Diabetic Retinopathy Study (DRS) and Early treatment Diabetic Retinopathy Study (ETDRS). 13, 14 Due to limited resources and large number of patients, retinal photography followed by Fluorescein Angiography (if required) was done only in patients with evidence of retinopathy.

Systemic examination and Investigations:

A thorough systemic examination was done. Investigations like Routine blood investigations, Urine examination, Fasting plasma glucose and 2hr post prandial glucose, was advised and undertaken.

Diagnosis of Diabetes was made in each case when Fasting Plasma Glucose (FPG) > 126 mg/dL (7.0 mmol/L) or 2hr Post Prandial Glucose > 200mg/dL (11.1 mmol/L) after a 75g glucose load121 or any patient with a history of Diabetes on Treatment.

Statistical Analysis:

Once data was collected and tabulated using MS Office Excel, the tabulated data was then analyzed on SPSS version 16.0 in 2 parts:

1. Descriptive Analysis: Percentages, Proportions, Mean and Standard Deviations
2. Inferential Analysis: unpaired student t-tests, chi-square and binary logistic regression.

Results

Table 1: Diabetic patients among screened cases.

	No. of Patients	Males	Females
Diabetic Patients	225	138	87
Non-Diabetics	1491	806	685
TOTAL	1716	944	772
Prevalence of DM	13.11%	14.61%	11.26%

Out of 1716 patients (Males: 944; Females: 772) screened for Type 2 Diabetes, 225 patients had type 2 diabetes consisting of 1378 Males and 87 Females.

Prevalence of Type 2 Diabetes among the study population was 13.11 %. (14.61% For males and 11.26% for females)

Table 2: Age distribution of study population.

Age (years)	No of cases	Percentage (%)
40-50	82	36.44 %
51-60	70	31.11 %
61-70	53	23.55 %
>70	20	8.88%

Out of the total 225 cases of Diabetes Mellitus, majority of the cases (36.44%) were in the age group 40-50 years followed by 31.11% in the age group of 51-60 years, 23.55% in age group of 61-70 years and 8.88% in the age group of >70 years.

Mean age of our study participants was 55.68 + 9.48. Mean age among males was 55.2 + 10.8 years and among females was 55.9 + 9.12 years.

Table 3: Sex distribution of study population

	Number of patients	Percentage (%)
Males	138	61.33 %
Females	87	38.77 %
Total	225	100%

Out of the total 225 cases, 138 cases were males (61.33%) while 87 cases (37.33%) were females, showing male preponderance.

Table 4: Diabetic retinopathy and type 2 diabetes

Sex	Study Population	Retinopathy present	Prevalence
Total	225	70	31.11%
Male	138	41	29.71%
Female	87	29	33.33%

Prevalence of Diabetic Retinopathy in our study population was 31.11%. Prevalence of DR was 29.71% among males and 33.33% among females.

Table 5: Age distribution among retinopathy patients

Age (years)	No of cases	%
41-50	9	12.85%
51-60	14	20%
61-70	27	38.57%
>70	20	28.57%

In our study, majority of the patients having Diabetic retinopathy (38.57%) were in the age group 61-70 years followed by patients >70 years (28.57%). Below the age of 60 years, less than 20% of patients had Diabetic retinopathy.

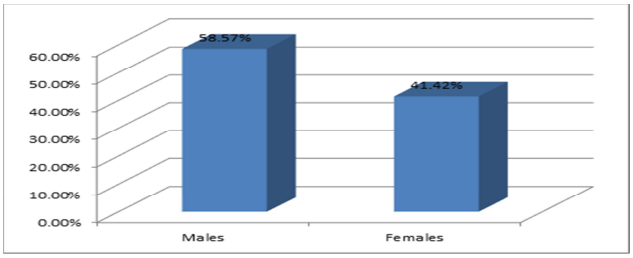

Figure 1: Sex distribution among diabetic retinopathy patients

Out of 70 diabetic retinopathy patients, 41 cases (58.57%) were males and 29 cases (41.42%) were females, showing male preponderance.

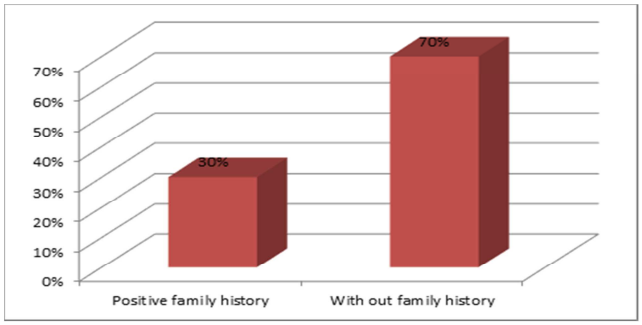

Figure 2: Family history and diabetes

In our study, 21 diabetic retinopathy patients (30%) had a positive family history of type 2 Diabetes whereas 49 patients (70%) had a negative family history.

There was no statistical significance between family history and diabetic retinopathy in our study (P>0.05)

Table 8: Age of patient and diabetic retinopathy in type 2 diabetes

Age Group of Pts.	Total	Retinopathy Patients	
		No. of Patients	Percentage (%)
40-50	82	9	10.97 %
51-60	70	14	20 %
61-70	53	27	50.94 %
> 70	20	20	100 %

Diabetic retinopathy was seen in 100% of patients above 70 years of age followed by more than 50% in the age group 61-70 years of age. 20% of patients in the 51-60 age group and 10.97% of patients in the age group of 41-50 years had diabetic retinopathy. Our study shows the prevalence of diabetic retinopathy increases with the age of the patient.

In our study, Prevalence of diabetic Retinopathy was 83.87% and 94.11% with duration of Diabetes of 10-15 years and >15 years respectively. Our study shows that Prevalence of Diabetic retinopathy increases with duration of Diabetes. Mean duration of Diabetes in our study was 7.16 + 4.92 years.

Table 9: Duration of diabetes and prevalence of diabetic retinopathy

Duration (yrs)	Total	Retinopathy	
		No. of Patients	Percentage (%)
<5	114	10	8.77 %
5-10	63	18	28.57 %
10-15	31	26	83.87 %
>15	17	16	94.11 %

Discussion

Diabetic retinopathy is an emerging public health problem with both medical and economic considerations involved. It is now considered as the commonest cause of new cases of legal blindness among the working age individuals both in developing and developed countries.

P Namperumalsamy et al,[15] found higher rates of diabetic retinopathy among males.124 In the clinic cohort in Chennai, Diabetic Retinopathy appeared to be prevalent more in the males compared to females (sex ratio 2: 1).[16]

A similar preponderance has been reported from the CURES Eye study,[17] UKPDS study and the Hyderabad study thus supporting our results.[18,19]

Masalikoshimura et al,[20] in their prospective study observed mean age was 58.8 years. P Namperumalsamy et al,[15] found mean age was 47.0 years [SD=12.7 years] and found higher prevalence of Diabetic Retinopathy among patients >45 yrs of age.

Results of the current study showed that we observed different types of Retinopathy in 70 patients out of 225 i.e Prevalence of Diabetic Retinopathy in the present study was 31.11% (29.71% among males and 33.33% among females). Findings of our study are consistent with previous studies.

Ramchandran et al,[20] observed retinopathy in 714 i.e. 23.7% cases out of 3010 patients of type 2 diabetes. M.W. Knuiman,[21] reported prevalence of retinopathy at 28% in Perth, Western Australia130.

Caird et al,[22] found a diabetic retinopathy prevalence rate of 36.8% in a survey that involved 4076 diabetic patients with over ten years duration of diabetes.

In our study, 30% diabetic retinopathy patients had a positive family history of type 2 Diabetes where as 70% patients had a negative family history. These findings are consistent with the findings of earlier studies.

The results of the Diabetes Control and Complications trial (DCCT) showed that a family history of either diabetic nephropathy or retinopathy is associated with an increased risk of diabetic microvascular complications in relatives with Type 1 Diabetes mellitus.[23]

A study by Reema M et al,[24] concluded that Familial clustering of diabetic retinopathy was three times higher in siblings of Type 2 diabetic subjects with diabetic retinopathy. The results show that the siblings of Type 2 diabetic patient with DR are 3.5 times more prone to develop retinopathy. However, there was no statistical significance between family history and Diabetic retinopathy in our study (P>0.05)

In the present study prevalence of diabetic retinopathy was increased with advancing age. Hence, there were higher number of retinopathy patients in age groups 61-70 years and >70 years as compared to lower age groups. The Odd's ratio in our study of retinopathy with respect to age was 1.052 (95% CI 0.999-1.107). However, Age was not a statistically significant risk factor for the prevalence of Diabetic retinopathy in our study (P>0.05)

Similarly, P Namperumalsamy et al,[15] found higher prevalence of Diabetic Retinopathy among patients >45 yrs of age. Alike, Chatziralli et al,[25] found prevalence of Diabetic retinopathy to be 61.66% above the age of 15 years and concluded that age did not represent an independent risk factor for Retinopathy but rather it was a confounding effect

of age, as older age and longer duration of DM are two factors closely associated with each other.

The mean duration of diabetes was 7.16 + 4.92 years. In our study the duration of Diabetes was the strongest predictor for development and progression of Diabetic Retinopathy (P<0.05). Our results show that 83.87% of patients having duration of diabetes more than 10 years had Diabetic Retinopathy whereas 99.99% of patients having duration of Diabetes more than 15 years had retinopathy in comparison to 7.07% of patients with duration of diabetes less than 5 years. Our results were in accordance with various other studies.[19,17]

Dandona et al,[19] reported that 87.5 per cent of those with >15 year duration of diabetes had DR compared with 18.9 per cent of those who had <15 year duration.

In the CURES Eye study, 41.8 per cent had DR after 15 years of diabetes and severity of DR proportionally increased with longer duration of diabetes. In addition, it has been demonstrated that for every five year increase in duration of diabetes, the risk for DR increased by 1.89 times.[17]

Conclusion

Diabetic retinopathy is a major health problem in patients with type 2 Diabetes. As new therapies for DR and its associated complications emerge, the need to collect and monitor new epidemiological data becomes increasingly important to be able to evaluate the impact and effectiveness of these therapies. Risk factors such as Age, Duration of Diabetes, Hypertension, Hyperglycemia, Hyperlipidemia etc. should be taken into account for regular check-ups and early detection of diabetic retinopathy.

Given the large number of diabetic subjects in India, even with the lower prevalence rates the actually number of patients with DR would be large. This underscores the need for routine retinal screening of diabetic individuals annually to detect DR and prevent visual impairment.

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