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Study the incidence of diabetic retinopathy with relation to duration of diabetes mellitus

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Abstract
Introduction: Diabetes mellitus (DM), also known as simply Diabetes [1], is a group of metabolic diseases in which there are high sugar levels over a prolonged period [2]. This high blood sugar produces the symptoms of frequent urination, increased thirst, and increased hunger.
Methods: This cross sectional study was conducted on 200 Diabetic patients of long standing duration and with clinical suspicion of diabetic retinopathy. These patients were selected from Ophthalmology Department of Mathura Das Mathur Hospital associated with Dr. SN Medical College, Jodhpur.
Results: The incidence of diabetic retinopathy was 32% in our study. Among the study 30.83% was male and 34.32% was females.
Conclusions: Diabetic retinopathy is a major health problem in patients with 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.

Keywords: Diabetic patients, direct ophthalmoscopy, retinoscopic features

Introduction
Diabetes mellitus (DM), also known as simply Diabetes [1], is a group of metabolic diseases in which there are high sugar levels over a prolonged period [2]. This high blood sugar produces the symptoms of frequent urination, increased thirst, and increased hunger. Untreated diabetes can cause many complications [3]. Acute complications include diabetic ketoacidosis and non ketotic hyperosmolar comma [4]. Serious long-term complications include heart disease, stroke, kidney failure, foot ulcer and damage to the eyes (diabetic retinopathy) [3]. Diabetes is due to either the pancreas not producing enough insulin, or the cells of the body not responding properly to the insulin produced [5]. There are three main types of diabetes mellitus:
Type-1 DM results from the body's failure to produce enough insulin. This form was previously referred to as "Insulin-Dependent Diabetes Mellitus" (IDDM) or "Juvenile Diabetes". The cause is unknown.
Type-2 DM begins with insulin resistance, a condition in which cells fail to respond to insulin properly. As the disease progresses a lack of insulin may also develop [6]. This form was previously referred to as Non-Insulin-Dependent Diabetes Mellitus (NIDDM) or "Adult Onset Diabetes". The primary cause is excessive body weight and not enough exercise. Diabetic Retinopathy is damage to the retina caused by complications of diabetes, which can eventually lead to blindness [7]. It is microvascular complication of diabetes, which affects up to 80 percent of all patients who have had diabetes for 10 years or more [8]. Despite these intimidating statistics, research indicates that at least 90% of these new cases could be reduced if there was proper and vigilant treatment and monitoring of the eyes [9]. The longer a person has diabetes, the higher his or her chances of developing diabetic retinopathy [10]. Each year in the United States, diabetic retinopathy accounts for 12% of all new cases of blindness. It is also the leading cause of blindness for people aged 20 to 64 years [11].

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Material and Methods: This cross sectional study was conducted on 200 Diabetic patients of long standing duration and with clinical suspicion of diabetic retinopathy. These patients were selected from Ophthalmology Department of Mathura Das Mathur Hospital associated with Dr. SN Medical College, Jodhpur. Criteria for diagnosis of diabetes The diagnosis of diabetes mellitus was performed according to American Diabetes Association guidelines.

According to ADA Guidelines FPG 126 mg/d. Fasting is defined as no caloric intake for at least 8hrs OR

Symptoms of hyperglycemia and a casual plasma glucose>200mg/d. Casual is defined as any time of day without regard to time since last meal. The classic symptoms of hyperglycemia include polyuria, polydypsia and unexplained weight loss. Inclusion criteria:

All cases of Diabetes above the age of 30 years who were come to Ophthalmology Department of Mathura Das Mathur Hospital were included in this study.

Exclusion Criteria
Following patients, after taking proper history, were excluded from the study
1. Patients who were non-compliant.
2. Patients who were under 30 years of age
3. Any patient with corneal opacity or lenticular opacities which precluded proper fundus examination
4. Pregnant and Lactating women
5. Immunocompromised patients
6. Patient with renal insufficiency and Cardiovascular Diseases Method of Data collection
7. A minimum of 200 Diabetes patients were selected for this study.
8. A careful and detailed history of patients was taken regarding the duration and symptoms of the diabetes.
9. The patients were inquired about patient's age, gender, and duration of diabetes.
10. Laboratory evaluations were consisted of measuring fasting blood glucose and Examination of the posterior segment of eye by Direct Ophthalmoscopy.
11. Diabetic patient divided in to various study group in relation to age, sex and duration of diabetes.

Ophthalmic examination
Before examination of patient a detailed history regarding his age, onset and duration of diabetes, personal history [smoking, family history etc], his last blood pressure measurement, any drug taken history other than antidiabetic, patient last fasting blood sugar and his other Biochemical blood examination history like lipid profile, urine examination, renal function test, history of any eye surgery, any other treatment were taken.
After this detailed history carefull external examination of eye [include eye brow, eye lashes, cornea] was done.

Fundus examination
Ophthalmoscopic examination included a detailed fundus examination done by direct ophthalmoscopy. Direct Ophthalmoscopy was done after pupillary dilatation by 0.8% tropicamide and 5% phenylephrine eye drops. Diabetic retinopathy was diagnosed by the presence of microaneurysms, blot hemorrhages or cotton wool spots presence of abnormal new vessels on the disc of retina of both eyes

Table 1: Age distribution of study population

Age (in yrs)	Number of cases	Percentage
31-40	16	8
41-50	67	33.5
51-60	55	27.5
61-70	47	23.5
>70	15	7.5

Table 2: Sex distribution of study population

Sex	Number of cases	Percentage
Male	133	66.5
Female	67	33.5

Out of the total 200 cases, 133 cases were males (66.5%) while 67 cases (33.5%) were females, showing male preponderance.

Table 3: Diabetic retinopathy with diabetes mellitus

Sex	Study population	Retinopathy present	Incidence
Male	133	41	30.83
Female	67	23	34.32
Total	200	64	32

Incidence of diabetic retinopathy in our study population was 32%. Incidence of diabetic retinopathy was 30.83% in male and 34.32% among female.

Table 4: Age distribution among diabetic retinopathy patients

Age (in yrs)	Number of cases	Retinopathy present	Percentage
31-40	16	3	4.69
41-50	67	10	15.63
51-60	55	13	20.31
61-70	47	25	39.06
>70	15	13	20.31

In our study majority of the patients having diabetic retinopathy were in age group 61-70 years is 39.06%, followed by patients 51-60 and >70 is 20.31%. Below the age of 50 years its <16% of patients had diabetic retinopathy.

Table 5: Sex distribution among diabetic retinopathy patients

Sex	Male	Female	Total	% Male	% Female
DR Present	41	23	64	64.06	35.94
DR Absent	92	44	136	67.65	32.35

Out of 64 diabetic retinopathy patients 41 cases (64.06%) were male and 23 cases (35.94%), showing male preponderance.

Table 6: Duration of diabetes and incidence of diabetic retinopathy

Duration (in yrs)	Total number of cases	Retinopathy present	Percentage
<5	93	6	6.45
5-10	66	23	34.85
11-15	26	21	80.77
>15	15	14	93.33

In our study incidence of diabetic retinopathy was 80.77% and 93.33% with duration of diabetes of 10-50 years and >15 years respectively. Our study shows that incidence of diabetic retinopathy increases with duration of diabetes. Mean duration of diabetes in our study was 6.91±4.58 years.

Table 7: Blood sugar levels and diabetic retinopathy

	No. of cases	Mean FBS	Sd. Deviation
Retinopathy	64	215.43	37.72
Non Retinopathy	136	157.68	38.47

In our study the mean FBS among patients having diabetic retinopathy was 215.43±37.72 mg/dl, which was significantly higher than the non-retinopathy patient having diabetes.

Table 8: Relation of FBS with DR in different age groups in Males [n = 41]

Age (in yrs)	Mean FBS [mg%]	SD ±
31-40	231.5	12
41-50	241.75	24.09
51-60	225.2	46.09
61-70	211	27
>70	180.3	51
All	212.34	40.6

In our study the maximum mean FBS in male age group 41-50 (241.75±24.09) and minimum mean FBS in age group (180.3±51) >70 years.

Table 9: Relation of FBS with DR in different age groups in Females [n = 23]

Age (in yrs)	Mean FBS [mg%]	SD ±
31-40	203	0
41-50	225.75	38.06
51-60	196	28.96
61-70	223.8	25.6
>70	259.6	7.5
All	220.69	30.07

In our study the maximum mean FBS in female age group >70 (259.6±7.5) and minimum mean FBS in age group (196±28.96) 51-60 years.

Table 10: Relation of Duration of DM with DR in different age groups in Males [n = 41]

Age (in yrs)	Mean Duration [Years]	SD ±
31-40	7	1.41
41-50	7.75	1.48
51-60	9.6	5.63
61-70	10.9	4
>70	10.4	5.4
All	10.78	4.70

In our study the maximum mean duration (10.9±4) in male age group 61-70 and minimum mean duration (7±1.4) in age group 31-40 years.

Table 11: Relation of Duration of DM with DR in different age groups in Females [n = 23]

Age (in yrs)	Mean Duration [Years]	SD
31-40	6	0
41-50	8	3.36
51-60	10.33	4.22
61-70	11.9	3.9
>70	13.6	6.8
All	10.78	4.41

In our study the maximum mean duration (13.6±6.8) in male age group >70 and minimum mean duration (6±0) in age group 31-40 years.

Discussion and Conclusions

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.

This study presents the incidence of retinopathy in a cohort of Western Rajasthan diabetic patients from city of Jodhpur. This was study on all patients attending the OPD of ophthalmologic department MDM Hospital attached to Dr. S.N. Medical College, Jodhpur. Diabetic retinopathy is a major health problem in patients with 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.

The possible risk factor responsible for the development of DR are duration of diabetes, poor glycemic control, advance age, among all these risk factor duration of diabetes is the most significant risk factor for the development of the diabetic retinopathy. All the patients' diabetes mellitus and longer duration should be screened for the diabetic retinopathy. Poor glycemic control revealed increase incidence of diabetic retinopathy. All the diabetic patients have age >55 years should be screened for diabetes retinopathy with high suspicion. Given the large number of diabetic subjects in Indian, even with the lower incidence 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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