

A Hospital-Based Observational Study Assessing Prevalence of Retinopathy in Non-Insulin Dependent Diabetes Mellitus Patients

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Abstract

Aim: The aim of the present study was to examine the prevalence of retinopathy and its relation with various risk factors in type 2 diabetic patients.

Material & Methods: This was a hospital-based observational cross-sectional study. The study was conducted in the Department of Medicine and, Department of Ophthalmology for one year. 100 already diagnosed type 2 diabetic subjects were included in the study.

Results: There were 52 male and 48 females. Duration of diabetes was slightly longer in the female participants. 30 subjects i.e. 30% were having diabetic retinopathy. 70% i.e. 70 subjects were having no retinopathy. Out of 30 patients with DR, 9 patients had NPDR -30%, 4 patients had PDR -13.34%. Statistically significant changes were observed between age and stage of diabetic retinopathy. Significant association was found between diabetic retinopathy and duration of diabetes.

Conclusion: Therefore, periodic screening of diabetic patients should be carried out for early detection and prevention of loss of vision.

Keywords: Diabetes mellitus, Diabetic retinopathy, Duration of diabetes

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Introduction

Type 2 diabetes mellitus (DM) is a group of disorders characterized by hyperglycemia and associated micro vascular (retinal, renal, possibly neuropathic), macro vascular (coronary, peripheral vascular), and neuropathic (autonomic, peripheral) complications. Unlike Type 1 diabetics, patients are not absolutely dependent upon insulin for life, even though many of these patients are ultimately treated with insulin. [1] India harbours 31.7 million diabetics and the number is going to rise to an alarming 79.4 million by 2030. [2] In India with the epidemic rise in type 2 diabetes mellitus² as reported by the World Health Organization (WHO). Diabetic retinopathy (DR) is one of the most common chronic complications of diabetes mellitus (DM).

DR is characterized by gradually progressive alterations in the retinal microvasculature, leading to areas of retinal non-perfusion, increased vascular permeability, and pathologic intraocular proliferation of retinal vessels. ³ DIABETIC retinopathy (DR) is a leading cause of blindness worldwide, accounting for 2% of legally blind and 10% of those with severe visual handicap, according to the World Health Organization.

Worldwide, the prevalence rates of DR range from 9% to 71%, and these are expected to increase over the next 20 years of those with diabetes mellitus. [3-6]

The identification of risk factors is important for the evolution of better management strategies for diabetic retinopathy. Stratton et al reported that older age, male gender, hyperglycemia (persistently raised HbA1c), hypertension and smoking were significantly associated with the incidence and progression of retinopathy in type 2 diabetic patients. [7] High levels of hemoglobin A1c (HbA1c) for long duration are important risk factor for progression to high risk proliferative diabetic retinopathy and decreased visual acuity. Intensive glycaemic control for long duration (HbA1c levels normal or near normal) reduces the risk of retinopathy significantly. Intensive therapy is most effective when initiated early in the course of the diabetes, demonstrating a beneficial effect over the course and progression of retinopathy. [8,9]

Our objective was to find out various risk factors associated with retinopathy in type 2 diabetes mellitus.

Material & Methods

This was a hospital- based observational cross-sectional study. The study was conducted in the department of medicine and, Department of Ophthalmology, Nalanda Medical College and Hospital, Patna, Bihar, India for one year. 100 already diagnosed type 2 diabetic subjects were included in the study. Patients with hazy media whose fundi could not be examined and patients with any other eye disease were excluded from the study. The study was explained to the subject and once the consent was received.

Inclusion Criteria:

- All patients with type II diabetes who have just received a diagnosis.
- Patients aged 30 to 60 years.
- Male and Female.

Exclusion Criteria:

- Diabetes mellitus type I patients.
- Individuals having hypertension.
- Patients undergoing any type of retinal surgery.
- Patients that refused to participate in the trial.

Methodology

patients who met the inclusion and exclusion criteria and had recently been diagnosed with type II diabetes mellitus (according to the operational definition) and presented to the outpatient department of Medicine NMCH ,patna were

chosen. Data regarding age, gender, age at onset of diabetes, duration of diabetes, history of smoking, history of alcohol intake, mode of treatment was documented. Height and weight was measured. Blood pressure was recorded with mercury sphygmomanometer.

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.

Statistical Analysis

With the help of SPSS version 26, statistical analysis was carried out. For quantitative variables, such as age and disease duration, the results are shown as mean and SD (standard deviation). Quantitative factors such gender, educational attainment, family income, and the presence or absence of the diabetic retinopathy were calculated in terms of frequency and percentage. Stratifications were used to control the effect modifiers such as gender, age, educational attainment, income of family, and duration of disease. The post-stratification chi square analysis is used to examine their influence on results, and a p-value of 0.05 or above was considered significant.

Results

Table 1: Demographic profile of the population under study

No. of participants (N= 100)	Age in years (Mean±SD)	Duration of diabetes in years (Mean±SD)
Males (N=52)	58.94±8.52 (67-52)	12.78±7.73 (21-5)
Females (N=48)	62.68±8.32 (70-53)	14.94±9.22 (23-5)
N (%)		

There were 52 male and 48 females. Duration of diabetes was slightly longer in the female participants.

Table 2: Distribution of sample in terms of diabetic retinopathy and stages of diabetic retinopathy

Diabetic retinopathy	N	%
Yes	30	30
No	70	70
Stages of diabetic retinopathy		
No DR	17	56.66
Mild NPDR	3	10
Moderate NPDR	3	10
Severe NPDR	3	10
PDR	4	13.34

30 subjects i.e. 30% were having diabetic retinopathy. 70% i.e. 70 subjects were having no retinopathy. Out of 30 patients with DR, 9 patients had NPDR -30%, 4 patients had PDR -13.34%.

Table 3: Association between age and stage of diabetic retinopathy

Age (yrs)	No DR	Mild NPDR	Moderate NPDR	Severe NPDR	PDR	P- value
41-50	6	0	0	0	1	0.00
51-60	5	1	1	1	1	
61-70	3	1	1	1	1	
> 70	3	1	1	1	1	

Statistically significant changes were observed between age and stage of diabetic retinopathy.

Table 4: Association between duration of diabetes mellitus and stage of diabetic retinopathy

Duration of DM (yrs)	No DR	Mild NPDR	Moderate NPDR	Severe NPDR	PDR	P- value
1-5	4	0	0	0	0	0.000
6-10	3	0	0	0	0	
11-15	3	1	1	0	1	
16-20	3	1	1	1	1	
21-25	2	1	1	1	1	
> 25	2	0	0	1	1	

Significant association was found between diabetic retinopathy and duration of diabetes.

Discussion

Diabetic retinopathy is a microvascular complication affecting the eyes of both type 1 and type 2 diabetes mellitus. It is one of the leading causes of visual impairment in industrialized countries in the working age group and one of the frequent causes of blindness in developing countries like India. According to World Health Organisation; diabetic retinopathy is 4.8% of the 37 million cases of blindness throughout the world. [10] India harbours 31.7 million diabetics and the number is going to rise to an alarming 79.4 million by 2030. [11] In India with the epidemic rise in type 2 diabetes mellitus as reported by the World Health Organization (WHO) diabetic retinopathy is fast becoming an important cause of visual disability. Although extensive studies have been carried out to find the prevalence of diabetic retinopathy in Type 1 diabetic subjects, relatively few studies have been attempted regarding the prevalence of diabetic retinopathy in Type 2 diabetes mellitus. Overall, prevalence of DR in hospital based studies including present study was higher as compared to those in population based epidemiological studies. [12-17] This may be due to the fact that there was a referral bias among the diabetic patients who were reported to tertiary care centres. Therefore, with larger number of diabetics reporting to the tertiary hospital, it is more likely that prevalence of complications may also be larger.

There were 52 male and 48 females. Duration of diabetes was slightly longer in the female participants. 30 subjects i.e. 30% were having diabetic retinopathy. 70% i.e. 70 subjects were having no retinopathy. Out of 30 patients with DR, 9 patients had NPDR -30%, 4 patients had PDR - 13.34%. Overall, prevalence which was observed

in present study was similar to that which was observed by Rema et al, and Agrawal RP et al, in spite of the fact that in present study, sample size is small. [13,15] Prevalence of NPDR and PDR matched well with those which were observed by Agrawal RP et al. [13] Statistically significant changes were observed between age and stage of diabetic retinopathy. Significant association was found between diabetic retinopathy and duration of diabetes. Many other studies have also identified the duration of diabetes as the major risk factor of the development of diabetic retinopathy. [18] Shoukat et al also showed positive correlation between the duration of diabetes with the incidence of retinopathy as in current study. [19] From previous studies, [20-22] the prevalence of vision-threatening DR was higher in patients with younger-onset diabetes compared with patients with older-onset diabetes. Therefore, the patients with PDR may not have old age, and this may explain our finding that the patients without DR and the patients with PDR had similar mean age.

Conclusion

Thus, to conclude, diabetic retinopathy is a multifactorial disease. Duration of diabetes mellitus is a major risk factor for diabetic retinopathy. With increasing duration of diabetes mellitus, the chance of developing diabetic retinopathy increases. Therefore, this study highlights the need to conduct screening programmes as well as diabetic education programmes at the grass root level for diabetes mellitus patients.

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