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## ORIGINAL RESEARCH

# Proportion of diabetic retinopathy (DR) among newly diagnosed type 2 diabetes mellitus patients attending tertiary care centre at Tripura medical college, Agartala: A cross sectional study

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**ABSTRACT**

**Objective: To estimate the proportion of diabetic retinopathy in newly diagnosed type 2 diabetes mellitus patients attending tertiary care centre at Tripura Medical College, Agartala.**

**Methods: The current study was a cross-sectional investigation conducted at the Tripura Medical College, Department of Ophthalmology. The study population included adults over the age of 18 with newly diagnosed type 2 diabetes mellitus (less than 6 months after diagnosis) between April 2021 and October 2022. Each patient had a thorough eye examination.**

**Results: 130 patients participated in the study, with a mean age of 43.2 ± 10.2 years and a 66.9% male patient population. Diabetic retinopathy was discovered in 11.5% (95% CI 14.7, 15.3) ofnewly diagnosed type 2 diabetes mellitus patients.**

**Conclusion: In this study, patient with newly discovered type 2 diabetes mellitus had a significant prevalence of retinopathy. This emphasises the significance of conducting a thorough ocular examination on all type 2 diabetes mellitus patients at the time of diagnosis.**

**Keywords: Diabetes mellitus; retinopathy; prevalence.**

## INTRODUCTION

Diabetes Mellitus is one of the most commonly seen diseases now a days and India has estimated 77 million people with diabetes [1]. One on six people (17%) in the world with diabetes is from India1. Diabetes is a major public health problem mainly because of the morbidity and mortality associated with its complications.

Diabetic retinopathy (DR) is one of the most common chronic micro vascular complications that eventually afflict virtually all patients with diabetes mellitus. Despite decades of research, there is currently no known means of preventing diabetic retinopathy and, despite effective therapies, diabetic retinopathy remains the leading cause of new-onset blindness in working-aged persons in most developed countries of the world [2].

It has been found that the higher prevalence of diabetic retinopathy is associated with various risk factors like duration of the diabetes, age at the diagnosis, poor glycemic control, raised HbA1C, increased BMI, waist circumference, hypertension, dyslipidemia etc [3,4].

However major risk factors with strong association are hyperglycemia and hypertension [5,6], but studies have shown differences in pattern of these factors [7]. Studies also has shown direct relation of DR with prolonged duration of the diabetes [8,9]. High Body mass index (BMI) has a controversial relation in its association with DR [10]. Microalbuminuria was shown as marker of microvascular dysfunction and associated with DR [11,12].

Since north-east India is of multi-ethnic population living together, the aim of the study was to find out the proportion of diabetic retinopathy amongst newly diagnosed type 2 diabetes patients and also to see what the risk factors are and how these factors are related and affecting in development of DR. Hence, the current study was done to estimate the proportion of diabetic retinopathy in newly diagnosed type 2 diabetes mellitus patients attending tertiary care centre at Tripura Medical College, Agartala.

## MATERIALS AND METHODS

The current study was a cross sectional study done in the Dept of Ophthalmology, Tripura Medical College. The study period was from April 2021 to October 2022 among a newly diagnosed case (less than 6 months) of type 2 diabetes mellitus above 18 years of age. Patient's not willing to give consent, on drugs that cause retinopathy like chloroquine etc, patients with co-morbidities like chronic kidney disease etc., patients with diabetes secondary to any drugs and patients with cataract, uveitis, corneal opacities or any other local conditions of the eye, patients with hypertensive retinopathy, those with narrow angle glaucoma or open angle glaucoma and those patients whose fundus cannot be examined are excluded from the study.

For diabetic retinopathy the early treatment diabetic retinopathy study (ETDRS) grading system was used to grade the diabetic retinopathy [12-14].Newly diagnosed with type 2 Diabetes Mellitus patients were recruited in the study after taking informed consent. A detailed history, thorough general and systemic examination and required investigations was done and filled up in a predesigned Performa. After that patient was informed about the eye examination which requires checking of visual acuity and intraocular pressure. After that dilatation of pupil was done with dilating drops and examination was done in supine position with the help of indirect ophthalmoscope and +90 D convex lens.

Data was entered in SPSS software version 24 and continuous variables were assessed with the unpaired Student's t test, and categorical variables with the chi-square test. A P value of $\leq 0.05$ was considered statistically significant.

## RESULTS

The study population comprised of 130 consecutive patients. The overall mean age of the study population was 43.2 ± 10.2 years, 67% of them were males. The overall frequency of retinopathy in patients was 11.5%.

Table displays the demographic and clinical traits of patients with newly diagnosed diabetes mellitus. There was a statistically significant difference in the characteristics of patients with retinopathy compared to those without it in the univariate analysis. In comparison to people without retinopathy, those with the condition were older, more likely to smoke, and had

considerably higher levels of fasting blood sugar, HbA1c, cholesterol, triglycerides, LDL, BMI, and serum creatinine (Table). When compared to patient groups with lower levels of HbA1c and BMI, those with greater levels had a significantly higher prevalence of retinopathy.

**Table 1: Comparison of Characteristics of Newly Diagnosed Type II Diabetes Mellitus Patients with and without Retinopathy**

| Patient Characteristics | Newly diagnosed with retinopathy (n=15) | Newly diagnosed with no retinopathy (n= 115) | P value |
|---|---|---|---|
| **Age (Y)** | 47.2± 10.2 | 42.3 ± 10.6 | 0.06 |
| **Gender** | | | |
| Male | 70% | 66% | 0.75 |
| Female | 30% | 44% | |
| **Co-morbid conditions** | | | |
| HTN | 60% | 43% | 0.15 |
| CAD | 20% | 10% | 0.19 |
| CVD | 0 | 2% | - |
| **Smoker (Overall) %** | 50% | 30% | |
| Male | 100% | 100% | |
| Female | 0 | 0 | |
| **Blood pressure (mmHg)** | | | |
| Systolic (recumbent) | 121 ± 18.2 | 119 ± 17.8 | 0.67 |
| Diastolic (recumbent) | 88 ± 16.4 | 83.4 ± 11.7 | 0.18 |
| Systolic (erect) | 126.7 ± 18 | 122.5 ± 16.8 | 0.31 |
| Diastolic (erect) | 89.7 ± 15.4 | 84.2 ± 13.4 | 0.11 |
| **Waist Hip Ratio (WHR) - overall** | 0.85 ± 0.36 | 0.9 ± 0.30 | 0.51 |
| Male | 1.01 ± 0.12 | 1.00 ± 0.14 | |
| Female | 0.86 ± 0.02 | 0.85 ± 0.03 | |
| **BMI - overall** | 32.5 ± 5.5 | 30.1 ± 5.3 | 0.03 |
| Male | 35.5 ± 5.4 | 32.6 ± 5.3 | |
| Female | 29.5 ± 5.2 | 27.6 ± 5.1 | |
| **Laboratory tests** | | | |
| FBS | 138 ± 45.3 | 129.8 ± 57.9 | 0.0002 |
| PPBS | 182 ± 51.1 | 127.6 ± 51.5 | 0.0005 |
| HbA1C | 9.1 ± 1.3 | 7 ± 1.3 | <0.0001 |
| Cholesterol | 198.5 ± 36.3 | 174.3 ± 34.2 | 0.004 |
| Triglyceride | 174.3 ± 27.5 | 142.6 ± 38 | 0.0005 |
| LDL | 140.4 ± 32 | 129 ± 33.9 | 0.009 |
| HDL | 39.1 ± 3.7 | 40.3 ± 4.2 | 0.20 |
| Serum creatinine | 1.1 ± 0.2 | 0.8 ± 0.1 | <0.0001 |

All the patients with diabetic retinopathy were of mild NPDR.

## DISCUSSION

In this investigation, retinopathy was found to be substantially more common in patients with newly diagnosed Type 2 diabetes mellitus compared to data from other countries. In the diabetes preventive programme, Nathan [15] reported a prevalence of retinopathy of 12.6% in patients with recently developed diabetes. Abdollahi et al. [16] from Iran reported a prevalence of 13.8%, Agarwal et al. [17] a prevalence of 11.7%, Rema and associates a prevalence of 5.1%, and Rema and associates a prevalence of 7.3%, respectively [18,19].In

the Beaver Dam Eye Study, Klein et al. [20] reported that the prevalence of newly diagnosed type 2 diabetic patients was 10.2%. In the United Kingdom Prospective Diabetes Study, Kohar and colleagues [21] observed that the prevalence of retinopathy was 39% for men and 35% for women, respectively. The variations in the interval between the development and identification of diabetes may be the cause of the reported prevalence of retinopathy among patients with newly diagnosed type 2 diabetes. This may be the result of socioeconomic circumstances, which affect the availability and accessibility of medical treatment, the behaviour of the particular group investigated while seeking medical attention, and variations in the classifications used to identify the presence of diabetes.

This study showed that, compared to diabetics without retinopathy, diabetic patients with retinopathy were older, had higher levels of fasting plasma glucose, HbA1c, cholesterol, triglycerides, LDL, BMI, and serum creatinine. Additionally, smoking was observed in people with retinopathy. In the worldwide literature, Nathan [15] has noted that participants with retinopathy who were diabetic had baseline values for HbA1c and systolic blood pressure that were higher. Age, disease duration, fasting plasma glucose, HbA1c, and systolic blood pressure were all considerably higher in retinopathy patients, according to a study by Abdollahi et al [16] conducted in Iran. In a study conducted in India, Agarwal et al. [17] have solely discussed systolic blood pressure in relation to diabetic retinopathy. In a population-based investigation carried out in urban India, Rema and colleagues [19] found a correlation between retinopathy and age, high fasting plasma glucose levels, and HbA1c. High levels of systolic blood pressure, fasting plasma glucose, and HbA1c have been demonstrated in western studies to be crucial factors in the development of retinopathy, such as the United Kingdom Prospective Diabetes Study [21] and the United States Beaver Dam Eye Study [20]. According to a Danish study, there is a direct association between the degree of retinopathy and the length of diabetes, the HbA1c level, and systolic blood pressure.[22] The intriguing aspects of this study are the significant association of high cholesterol, triglycerides, LDL, and smoking with retinopathy and the absence of any significant correlation between blood pressure and the prevalence of retinopathy, which is quite contrary to the published work in the international literature. Basit et al. [23] have shown a relationship between hypertriglyceridemia and hypertension with poor glycemic control in research from a tertiary care facility in Karachi. This could be interpreted as an indirect link between severe retinopathy and high triglyceride levels.

## CONCLUSION

In conclusion, this study indicated that the prevalence of retinopathy was quite high in patients with newly diagnosed type 2 diabetes mellitus. This emphasises the significance of thoroughly examining every patient's eyes at the time of diagnosis.

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