

Frequency of Retinopathy Among Newly Diagnosed Type 2 Diabetes Mellitus Patients

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Abstract

Background: Diabetic retinopathy, a sight-threatening microvascular disease affecting the retina, is a significant concern in individuals with Type 2 Diabetes Mellitus (T2DM) due to its potential to cause blindness when left untreated.

Objective: The research objective was to investigate the frequency of retinopathy in newly diagnosed patients with T2DM.

Methodology: A six-month cross-sectional study was conducted at the Pakistan Institute of Medical Sciences (PIMS) involving 296 Type 2 Diabetes Mellitus (T2DM) patients aged 18 to 60. The research used specialist technology for clinical assessments of diabetic retinopathy and excluded participants with particular retinal diseases. SPSS 27.0 was used to analyze the data, which included a number of characteristics such as age, gender, and the type and presence of retinopathy.

Results: The age range of the participants was 18 to 60 years, with the bulk (n = 166) falling into the fourth decade with an average age of 36.95 ± 10.12 years. Diabetic retinopathy was seen in 61 people (20.60%) who had been clinically diagnosed with type II diabetes mellitus. There were 39 (13.17%) men and 22 (7.43%) females among them. The hemoglobin A1C for individuals with diabetic retinopathy was found to be 8.4 ± 1.4 . In patients with other forms of retinopathy, background retinopathy was found in 32 patients (n=19; 31.14%), 13 of whom were women, and 13 of whom were males.

Conclusion: This study identified a substantial rate of diabetic retinopathy (20.60%) in newly diagnosed T2DM patients, underscoring the importance of early detection and glycemic control to manage this common complication.

Keywords: retinopathy frequency; type 2 diabetes mellitus; T2DM, hemoglobin a1c; diagnostic criteria

Introduction

Millions of people worldwide suffer from Type 2 Diabetes Mellitus (T2DM), a chronic metabolic condition marked by hyperglycemia and insulin resistance [1-4]. Diabetic retinopathy, a potentially fatal microvascular condition affecting the retina, is among the most severe side effects of type 2 diabetes [5-11]. Given that uncontrolled diabetic retinopathy has the potential to result in blindness, its frequency and severity among T2DM patients are a significant cause for worry [12-16].

The purpose of the study was to find out how often newly diagnosed T2DM patients get retinopathy. In this particular demographic, it is critical to identify and treat retinopathy as soon as possible since prompt action may greatly enhance patient outcomes and quality of life.

Healthcare providers, legislators, and academics may all benefit from knowing the prevalence and risk factors linked to retinopathy in newly diagnosed Type 2 Diabetes patients. It might help with the creation of efficient screening methods, prompt interventions, and individualized treatment regimens to slow the course of retinopathy and stop vision loss. This study adds to our understanding of T2DM and the problems that are linked to it, highlighting the urgent need for complete healthcare treatment for those who have just received a diagnosis of this common chronic illness.

Materials and methods

The Department of Medicine at Pakistan Institute of Medical Sciences (PIMS) conducted a six-month cross-sectional study from March to August 2022, involving 296 consistently followed T2DM patients.

Inclusion and Exclusion Criteria

Those with Type 2 diabetes diagnosed between the ages of 18 and 60 were included in the research. However, the

study did not include participants with illnesses such as sickle cell retinopathy, hypertension, retinal vein occlusion, or retinal artery occlusion.

Clinical Evaluation and Diagnosis of Diabetic Retinopathy

After administering 1.0% tropicamide eye drops, skilled optometrists assessed diabetic retinopathy using a 90 diopter Volk lens and a slit lamp bio-microscope. Each eye was checked separately by three ophthalmologists who were not aware of the patients' circumstances. The Early Therapy Disease Retinopathy Methodology was used as the diagnostic basis for diagnosing diabetic retinopathy, and in situations of dispute, a senior ophthalmologist was contacted to arrive at a consensus diagnosis.

Statistical Analysis

The SPSS 27.0 program was used to analyze the data. For every variable, descriptive statistical analyses were carried out. While the incidence and percentage of qualitative characteristics including gender, the existence and type of retinopathy, and age were analyzed as continuous variables, their average and standard deviation were examined.

Informed consent

Informed consent has been obtained from all individuals included in this study.

Ethical approval

Ethical approval has been obtained from the ASRB of International Islamic University, Islamabad, Pakistan. The research was conducted according to the tenets of the Helsinki Declaration.

Results

All figures should be numbered consecutively with the figure legend indented 0.5 cm on each side. See figure 1 for an example. Figures may be in color or black and white and must be of such quality that they produce clear and sharp printouts on an ordinary (color) laser printer.

The study was finished in six months, from March 2022 to August 2022. A total of 296 patients who met the criteria were enrolled. The patients' ages varied from 18 to 60 years old, with the majority (n = 166) being in their fourth decade and having mean ages of 36.95 ± 10.12 years. There were 45.28% women (n=134) and 54.72% men among the patients (n= 162) (Table 1).

Table 1: Gender and Age Distribution of Patients

Variables	No. of Patients	Percentage
Gender Distribution		
Male	162	54.72
Female	134	45.28
Age in Years		
18-30	37	8.67
31-45	166	59.19
46-60	93	32.14

Twenty-one of the sixty-one T2DM subjects had diabetic retinopathy. Among them were 39 (13.17%) men and 22 (7.43%) women. Furthermore, the majority of the 61 patients (n = 29) with diabetic retinopathy were between the ages of 41 and 50, followed by those between the ages of 51 and 60 (n = 21) and 18 and 40 (n = 11). HbA1C (%)

was 8.4 ± 1.4 in the diabetic retinopathy group and 6.9 ± 2.3 in the non-diabetic retinopathy group (Table 2).

Table 2: Diagnostic Criteria for Diabetic Retinopathy Patients vs. Non-Diabetic Retinopathy Patients

Variables	No. of Patients	Percentage
Gender		
Female	22	7.43
Male	39	13.17
Total	61	20.60
DR patients by age		
18-40 Years	11	18.03
41-50 Years	29	47.54
51-60 Years	21	34.42
Diagnostic criteria		
Parameter	With Diabetic Retinopathy	Without Diabetic Retinopathy
Fasting plasma glucose (mg/dl)	212 ± 34.2	139.2 ± 37.8
HbA1C	1.4 ± 1.4	6.9 ± 2.3

Thirteen (21.31%) of the patients were female, while 32 patients (n=19; 31.14%) were male with background retinopathy. Eight and three (13.11%; 4.91%) girls and eleven and seven (18.02%; 11.47%) men were found to have preproliferative and proliferative retinopathy, respectively (Table 3).

Table 3: Distribution of Diabetic Retinopathy Types by Gender

Diabetic Retinopathy Types	No. of Patients	Percentage
Background Retinopathy		
Male	19	31.14
Female	13	21.31
Preproliferative Retinopathy		
Male	11	18.02
Female	8	13.11
Proliferative Retinopathy		
Male	7	11.47
Female	3	4.91

Discussion

Endocrine metabolic disorders most often occur in people with diabetes mellitus (DM). While different diagnostic criteria make it difficult to pinpoint the exact frequency, a number of research point to a range of 6 to 9 percent in Pakistan. Diabetic Retinopathy (DR) is thus thought to affect 13% of diabetic patients in Pakistan; however, some sources claim that rates as high as 18.9% of people have DR. In people with Type 2 Diabetes Mellitus (T2DM), DR is a significant cause of visual impairment. In the years to come, it is predicted to overtake all other causes of blindness worldwide [17–19].

We discovered that 20.60% of participants in our prospective research of newly diagnosed Type 2 Diabetes Mellitus (T2DM) developed diabetic retinopathy. In

contrast, retinopathy was seen in 14% of newly diagnosed diabetics in a prior research conducted in southern Pakistan [18]. In a similar vein, research from the United Kingdom revealed that 19% of people in that group had been diagnosed with retinopathy, while an Indian study found that the prevalence of retinopathy among newly diagnosed diabetes was 12.3% [20, 21]. These discrepancies may be related to things like age group distributions, gender inequality, and ethnic diversity. This becomes clear when contrasting our findings with those of a similar research carried out in Abbottabad [22]. The study team discovered that 16% of patients in their cohort had diabetic retinopathy, with an average age of 46.12 ± 2.3 years and a preponderance of female patients. This is in contrast to our research, where the population is largely male and the average age is 36.95 ± 10.12 years. Interestingly, background retinopathy was the most common subtype (52.45%), with pre-proliferative at 31.13% and proliferative at 16.38% following closely behind. These results are consistent with those published by Hayat et al. in 2012 [22].

The research group's average HbA1C (%) was 8.4 ± 1.4 , while the fasting plasma sugar value for individuals with diabetic retinopathy (DR) was 212 ± 34.2 . These results corroborate the previously proposed association by Rema et al. [20] and Abd et al. [23] between HbA1c and fasting glucose concentration in patients with retinopathy.

Limitations

While this study provides valuable insights into the frequency of diabetic retinopathy among newly diagnosed T2DM patients, it has several limitations that should be considered. First, the research was conducted at a single institution, limiting its generalizability to a broader population. Second, the study's cross-sectional design provides a snapshot of retinopathy prevalence at a specific point in time, making it challenging to draw long-term conclusions or establish causal relationships. Furthermore, the exclusion criteria used in the study may introduce bias by excluding patients with certain comorbidities, potentially affecting the representation of individuals with T2DM in the study. Lastly, the study does not account for potential confounding variables that could influence the development of diabetic retinopathy. These limitations should be acknowledged when interpreting the findings and considering their broader applicability.

Conclusion

This study on newly diagnosed T2DM patients found a high prevalence of diabetic retinopathy, affecting approximately 20.60% of the participants. The results underscore the significance of early detection and treatment of retinopathy in this group. Furthermore, the study highlights the link between higher HbA1c levels and the presence of diabetic retinopathy, emphasizing the importance of controlling blood sugar levels to reduce the risk of this complication. These findings provide valuable insights into diabetic retinopathy in diabetes care and the need for personalized healthcare approaches to address this prevalent issue.

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organizations, and funding sources that contributed to the research but do not meet the criteria for authorship. It typically includes mentions of funding sources, contributors, institutional support, equipment or facilities used, peer reviewers, mentors, and ethical considerations. Acknowledgments should be concise, professional, and adhere to any journal-specific guidelines, with the consent of individuals or organizations mentioned.

AI Disclosure

No AI and AI-assisted tools were used in this study.

Conflict of interest

The authors state no conflict of interest.

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