

Diabetic Retinopathy: A Descriptive Study on Proportion, Clinical and Diagnostic Profile in Patients of Diabetes at Tertiary Care Teaching HospitalSweety Gajjar¹, Nikunj Amin², Jeel Garala³, Harpalsinh B. Jhala⁴, Zeeshanshah Saiyed⁵^{1,5}Third Year Resident, Department of Ophthalmology, C U Shah Medical College and Hospital, Surendranagar, Gujarat, India²Associate Professor, Department of Ophthalmology, C U Shah Medical College and Hospital, Surendranagar, Gujarat, India³Assistant Professor, Department of Ophthalmology, C U Shah Medical College and Hospital, Surendranagar, Gujarat, India⁴Professor and Head, Department of Ophthalmology, C U Shah Medical College and Hospital, Surendranagar, Gujarat, India

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Conflict of interest: Nil

Abstract:**Background:** Visual impairments have physical, emotional, social and economic consequences and are crucial elements influencing the quality of life. Diabetic Retinopathy (DR) is a micro vascular complication of Diabetes Mellitus (DM) and a leading cause of visual impairment globally.**Objectives:** To estimate the proportion of Diabetic Retinopathy, to describe clinical profile of patients with diabetic retinopathy and to describe diagnostic profile of patients with diabetic Retinopathy.**Material and Methods:** Present Observational study was conducted at the tertiary care teaching hospital at Surendranagar in the month of September in 100 patients diagnosed with Diabetes Mellitus (DM) who were admitted to the medicine ward and who attended the outpatient department of ophthalmology.**Results:** The study highlights the proportion of Diabetic Retinopathy among various sociodemographic variables. Males being affected more than females with proportion of 74.6 in males and 25.4 in females. Among 100 patients of diabetes, 45.5% were diagnosed with NPDR while 25.5% had PDR. There was a strong, positive association between development of DR with duration of disease and glycemic control.**Conclusion:** Our study highlights the alarming prevalence of diabetic retinopathy in patients with diabetes mellitus, particularly those with type 1 diabetes, longer duration of disease, poor glycemic control.**Keywords:** Diabetes Mellitus, Diabetic Retinopathy, Glycemic Control, Visual Impairment.

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Introduction

Diabetic retinopathy (DR) is a micro vascular complication of Diabetes Mellitus (DM) and a leading cause of visual impairment globally. Diabetic retinopathy is potentially blinding ocular complication of diabetes, and one of the microcirculatory lesions of diabetes.

It is caused by lesions in the vessel wall changes in blood flow or platelet changes.

Diabetes duration is a major risk factor for developing DR. [1] Visual impairment as a result of diabetic retinopathy has a significant impact on patients' quality of life, resulting in an overall negative impact on life expectancy and productivity. [2,3]

The pathogenesis of DR is complex and multifactorial, involving hyperglycemia-induced oxidative stress, inflammation, and vascular dysfunction. Hyperglycemia triggers a cascade of cellular and

molecular events, including the activation of protein kinase C, the increased production of advanced glycosylation end-products, and the up-regulation of vascular endothelial growth factor, which collectively contribute to the development and progression of DR. [4,5]

DR is characterized by a range of pathological changes, including microaneurysms, hemorrhages, hard exudates, and neovascularization, which can lead to vision loss and blindness if left untreated.

The disease progresses through several stages, including mild non-proliferative DR (NPDR), moderate NPDR, severe NPDR, and proliferative DR (PDR), each with distinct clinical features and treatment options (Early Treatment Diabetic Retinopathy Study ETDRS). [6]

The disease remains a major public health concern, with significant economic, social, and emotional burdens on individuals, families, and healthcare systems worldwide. Therefore, it is essential to develop effective strategies for the prevention, early detection, and treatment of DR, as well as to promote awareness and education about the risks and consequences of this debilitating disease. [7,8]

Early detection and treatment of DR are critical for prevention of visual loss. Regular retinal screening and timely management reduce the risk of vision impairment.

Objectives

1. To estimate the proportion of Diabetic Retinopathy.
2. To describe clinical profile of patients with diabetic retinopathy

3. To describe diagnostic profile of patients with diabetic Retinopathy

Material and Methods

A clinical descriptive observational study was conducted among 100 patients of diabetes malitus during the period of one month, April-May 2025 at C U Shah Medical College and Hospital.

The patients were clinically examined for Visual acuity by Snellens Chart and Fundus evaluation by Slit lamp with 90 D lens.

The establishment of Diabetic Retinopathy was made with help of ETDRS Classification into various groups i.e. NPDR, PDR. To establish the association of glycemic control various blood investigations were carried out including FBS, PP2BS and HbA1C. This study includes clinical observation and clinical records for assessment of patients.

Category/description
Non-proliferative diabetic retinopathy (NPDR)
No DR
Very mild NPDR
Microaneurysms only
Mild NPDR
Any or all of: microaneurysms, retinal haemorrhages, exudates, cotton-wool spots, up to the level of moderate NPDR. No intraretinal microvascular anomalies (IRMA) or significant beading
Moderate NPDR
• Severe retinal haemorrhages (more than ETDRS standard photograph 2A: about 20 medium-large per quadrant) in 1–3 quadrants or mild IRMA • Significant venous beading can be present in no more than 1 quadrant • Cotton-wool spots commonly present
Severe NPDR
The 4–2–1 rule; one or more of:
• Severe haemorrhages in all 4 quadrants • Significant venous beading in 2 or more quadrants • Moderate IRMA in 1 or more quadrants
Very severe NPDR
Two or more of the criteria for severe NPDR
PDR
Mild-moderate PDR
New vessels on the disc (NVD) or new vessels elsewhere (NVE), but extent insufficient to meet the high-risk criteria
High-risk PDR
• NVD greater than ETDRS standard photograph 10A (about $\frac{1}{3}$ disc area) • Any NVD with vitreous haemorrhage • NVE greater than $\frac{1}{2}$ disc area with vitreous haemorrhage

Chart 1:

The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki

Declaration of 1975, as revised in 2008. This study involving the participants were approved by The Institutional Ethics Committee and Scientific Review Committee – Subcommittee (Human Re-

search) of C. U. Shah Medical College and hospital Surendranagar and provisional approval number CUSMC/IEC(HR)/Pro.Approval-RP/16/2025/OUT-3

Inclusion Criteria

- Patients above 18 years of age
- Confirmed cases of Diabetes Mellitus

Exclusion Criteria: Patients with B/L Mature or Hyper mature Cataract

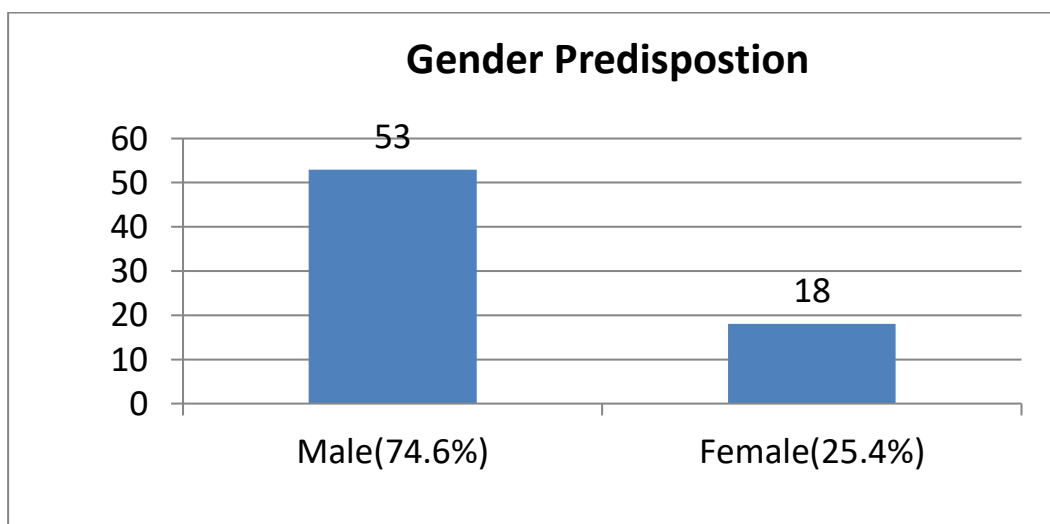
Statistical analysis: The recorded data was compiled and entered in a spreadsheet computer program (Microsoft Excel 2019) and then exported to data editor page of SPSS version 19 (SPSS Inc., Chicago, Illinois, USA).

Quantitative variables were described as means and standard deviations or median and interquartile

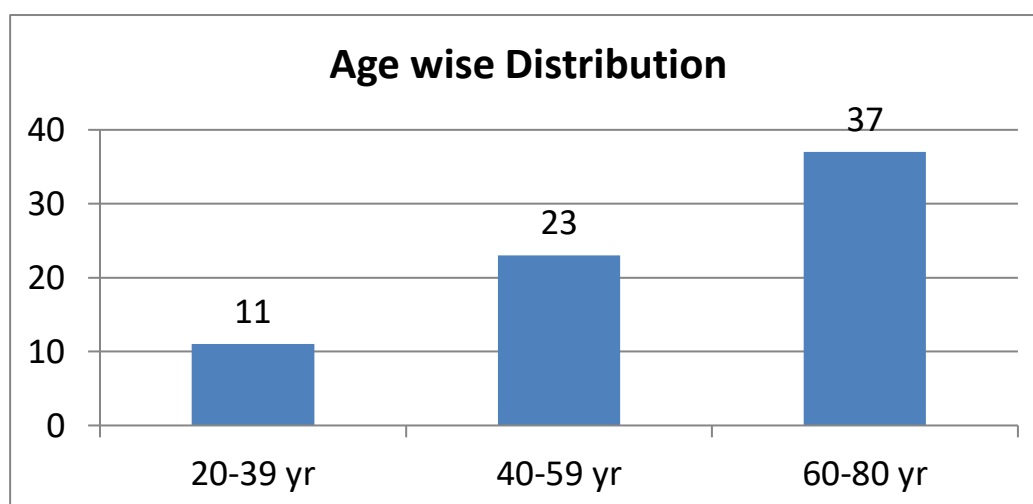
range based on their distribution. Qualitative variables were presented as count and percentages. For all tests, confidence level and level of significance were set at 95% and 5% respectively.

Results and Discussion

Socio-demographic Data: Gender wise males just outnumbered the Females. The majority of the study subjects with diabetic retinopathy were above 60 years of age. These findings of the current study were comparable to various studies done across the globe. [9,10,11]. Males outnumbering the Females in the current study was comparable to another study. [11] This was attributed probably to a large number of diabetic females being included in the study. (Graph 1 and 2)

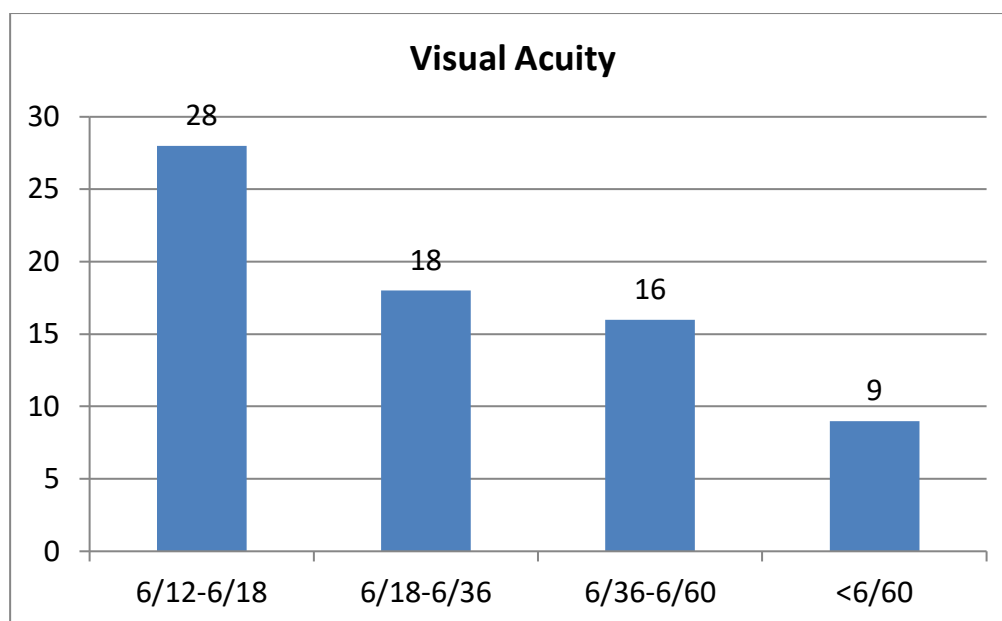


Graph 1: Gender Predisposition

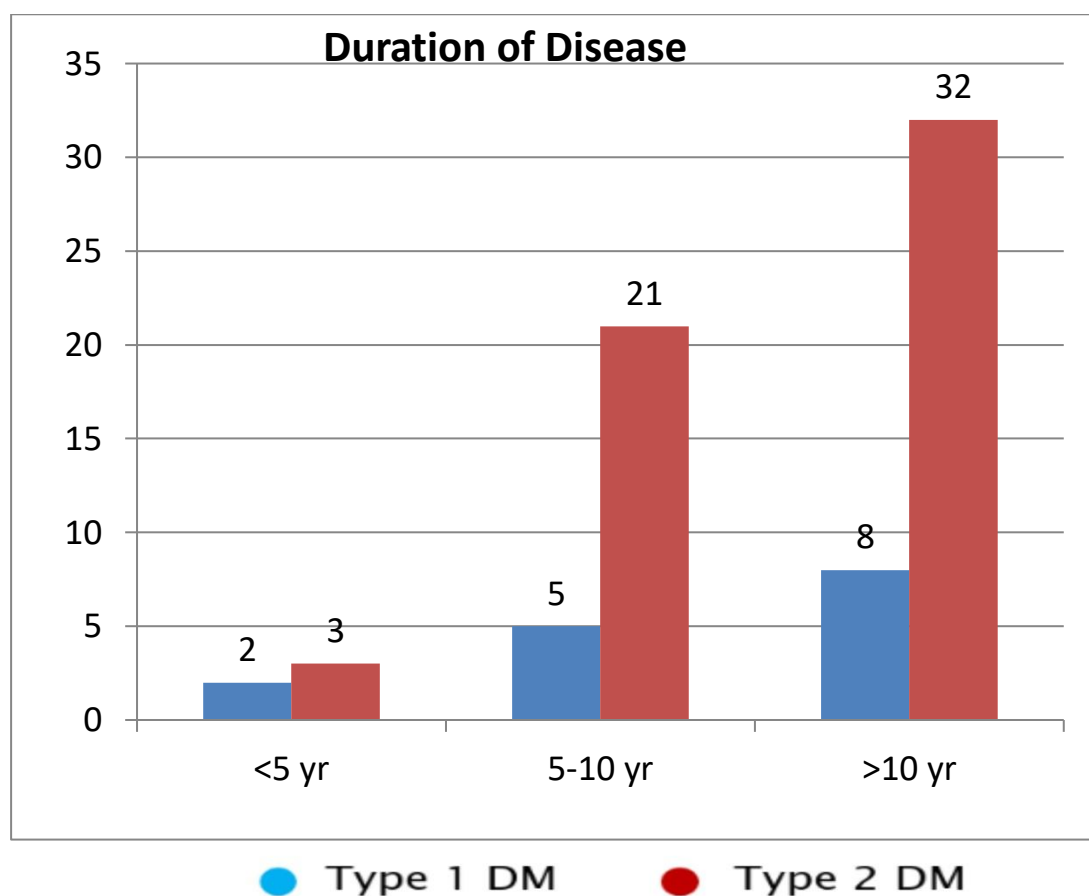


Graph 2: Age Wise Distribution

The effect of diabetic retinopathy on vision is shown in the following chart:

**Graph 3: Visual Acuity**

This describes the association of severity of disease with vision, more extensive diabetic retinopathy renders the patient with low functional vision. So, as the disease progresses and involves macula, the visual acuity falls. The duration of the diabetes affects the severity and progression of diabetic retinopathy.

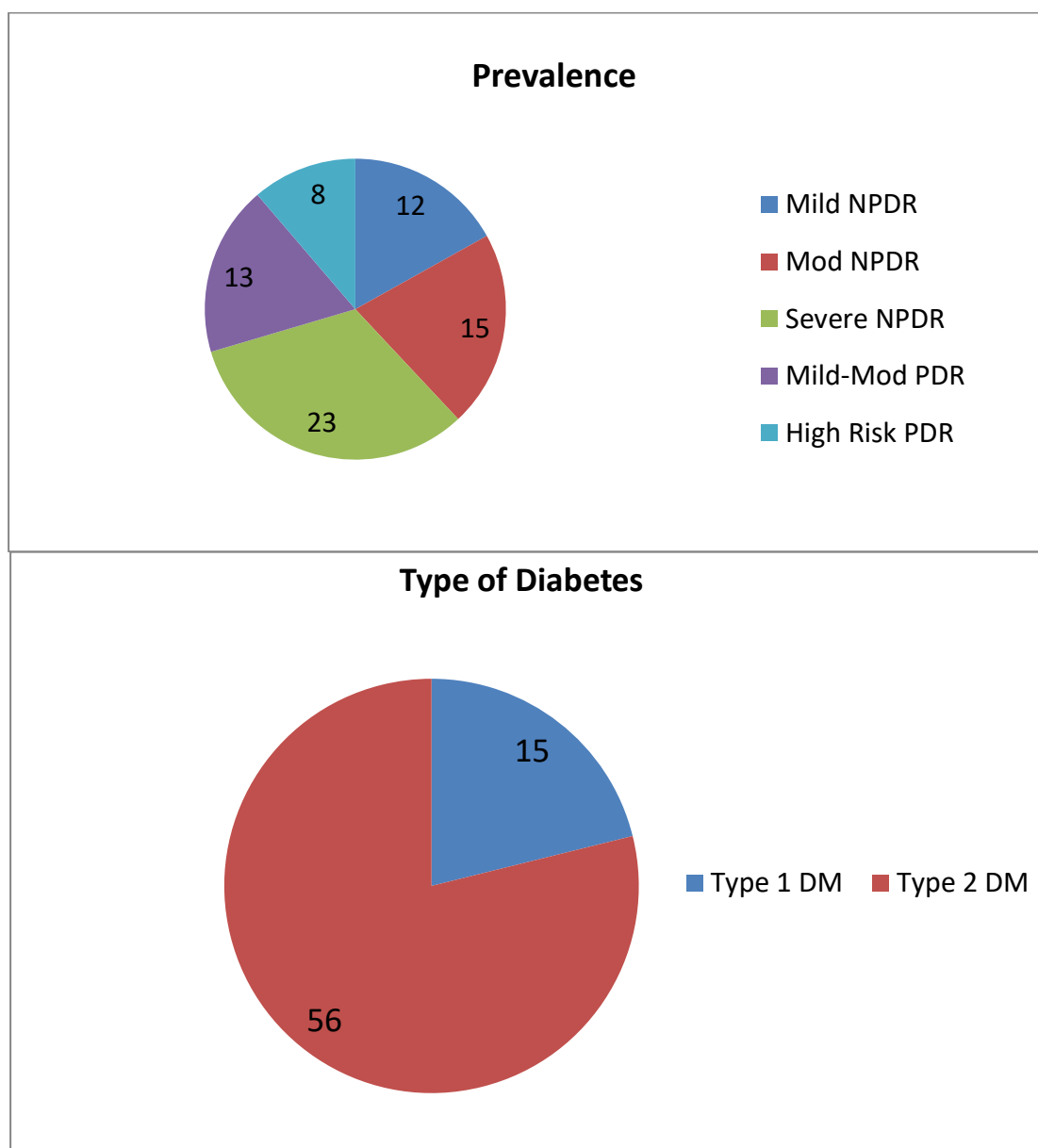
**Graph 4: Duration of Disease**

This study conclusively shows that patients with a chronic course of disease are at a higher risk of developing diabetic retinopathy (DR).

Though Type1 DM patients are at higher risk of developing diabetic retinopathy, Type2 DM patients due to its more prevalence among community, showed higher proportion of Diabetic Retinopathy during the disease course. The finding of the high prevalence of sight-threatening diabetic retinopathy in the current study correlate with the find-

ings of another study¹² which reported a lower prevalence of STDR of 15.3% and 11.9% in Type 1 DM and Type 2 DM, respectively.

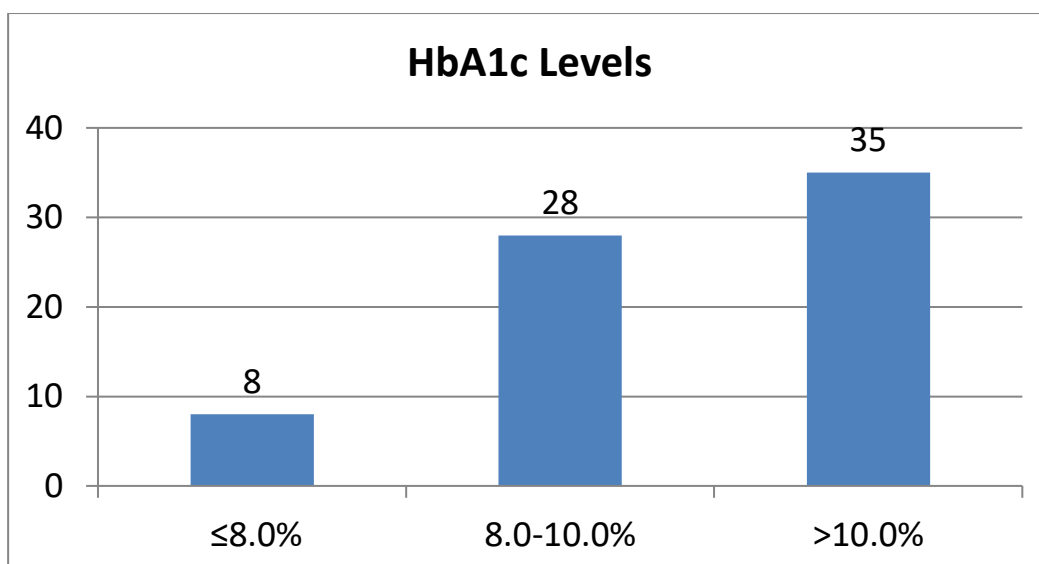
The higher prevalence of STDR in our study could have been attributed to the smaller study population, longer duration of diabetes mellitus in the participants, predominantly hypertensive study participants, poor glycemic control amongst the study subjects, and a large number of smokers in the study population.



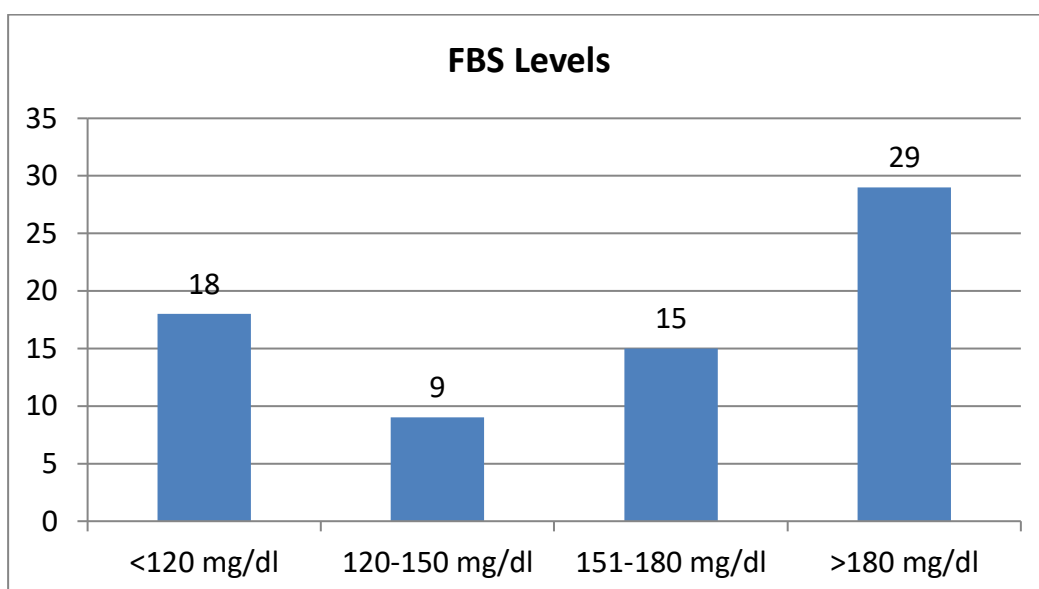
Graph 5: Prevalence and type of Diabetes

Among 100 patients, 71 were diagnosed with DR. Among the 71 patients having DR, 15 patients had type 1 DM and 56 had Type 2 DM. Glycemic control in Diabetic patients having DR, showed the following relation. Poor glycemic control is a risk factor for the development and progression of dia-

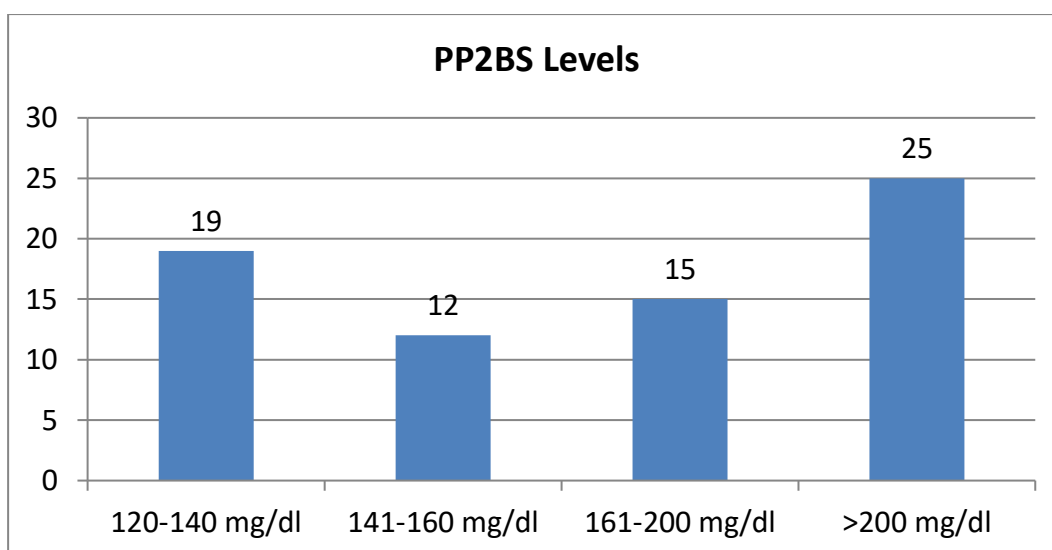
betic retinopathy and is associated with a higher prevalence of diabetic retinopathy as shown by reports from different studies. Glycated hemoglobin level (HbA1c) is one of the most reliable indicators for glycemic control over a period of time. [9]



Graph 6: HbA1c Levels



Graph 7: FBS levels



Graph 8: PP2BS levels

The progression of diabetic retinopathy (DR) is closely associated with the quality of glycemic control throughout the course of the disease. Evidence from this study indicates that patient groups exhibit differing levels of glycemic regulation, as assessed by fasting blood sugar (FBS), postprandial blood sugar (PP2BS), and glycated hemoglobin (HbA1c) levels. Suboptimal control of these glycemic parameters has been shown to negatively impact visual outcomes and may ultimately result in vision-threatening complications. The present study, glycated hemoglobin level (HbA1c), fasting blood sugar (FBS), post-prandial blood sugar (PPBS) was raised predominantly in patients with diabetic retinopathy. These findings from the study correlated and compared very well with the current understanding of the literature on the development of diabetic retinopathy in people with poor glycemic control over a period of time. [9,13,14] The findings from the current study further established the fact that poor glycemic control is one of the key risk factors responsible for progress to retinopathy changes in diabetic patients.

Conclusion

Diabetic retinopathy remains a significant complication of diabetes mellitus, with a substantial burden on patients' quality of life and healthcare systems worldwide. Our study highlights the alarming prevalence of diabetic retinopathy in patients with diabetes mellitus, particularly those with type 1 diabetes, longer duration of disease, poor glycemic control. The findings underscore the importance of:

- Regular retinal screening for early detection and treatment.
- Tight glycemic control and regular follow-up.
- Lifestyle modifications to prevent or delay disease progression.

These recommendations are crucial for reducing the risk of visual impairment and blindness associated with diabetic retinopathy.

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