

# Frequency of Diabetic Retinopathy among known Diabetics at District Level Teaching Hospital

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## ABSTRACT

**Purpose:** To determine the frequency of diabetic retinopathy in patients with type 2 diabetes mellitus presenting at Aziz Bhatti Shaheed Teaching Hospital Gujrat.

**Study Design:** Descriptive observational study.

**Place and Duration of Study:** Department of Ophthalmology, Aziz Bhatti Shaheed Teaching Hospital from March 2020 to March 2021.

**Methods:** All patients who presented in out-patient department of medicine and ophthalmology with type 2 diabetes mellitus for more than 3 years were included. Direct and indirect ophthalmoscopy was performed and Diabetic retinopathy was classified. Other complications of diabetes were also noted. SPSS version 20.0 was used for statistical analysis. Age, duration of diabetes, HbA1c and random blood glucose levels were expressed as mean  $\pm$  SD and gender, type of retinopathy and nerve abnormalities were expressed as percentage.

**Results:** Out of 765 patients with type 2 diabetes mellitus, 397 (51.9%) were males and 368 (48.1%) were females and 428 (55.95%) patients had diabetic retinopathy. Mean age was  $42.18 \pm 12.37$  years, mean duration of diabetes mellitus was  $5.87 \pm 3.42$  years and mean random blood glucose was  $261 \pm 65$  mg/dl. Mean Glycosylated hemoglobin (HbA1c) was  $9.2 \pm 2.5\%$ . Patients with normal retina were advised yearly follow up. Patients with diabetic retinopathy were managed with Argon Grid Laser, intravitreal anti-VEGF or referred for surgery depending upon the stage of the disease. Oculomotor palsy was seen in 7 patients and facial nerve palsy in 5 patients.

**Conclusion:** Frequency of diabetic retinopathy is considerably high 55.96% in this particular study at Gujrat. Lack of ophthalmic evaluation and awareness among patients leads to considerably high rates of diabetic retinopathy.

**Key Words:** Diabetic Retinopathy, Diabetes, HbA1C, Argon Grid Laser.

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## INTRODUCTION

Diabetes is a chronic debilitating disorder that has reached epidemic in almost all parts of the world. It is predicted that by year 2030, 439 million people will be

affected by diabetic retinopathy.<sup>1</sup> In Pakistan the prevalence of diabetes mellitus is 11% and has sixth largest population of diabetic patients with the prediction of rising to 5<sup>th</sup> position by 2030 having 13.9 million patients with diabetes mellitus.<sup>2,3</sup>

According to the American Diabetes Association (ADA), 21% of the diabetic patients have diabetic retinopathy at the time of diagnosis and > 60% develop within 20 years after diagnosis.<sup>4</sup> World Health Organization (WHO) states that 4.8% (37 million) blindness is attributed to diabetic retinopathy.<sup>5</sup> In a meta-analysis it was observed that diabetic retinopathy

was present in 34.6% of patients with diabetes mellitus with > 10% having vision-threatening retinopathy.<sup>6</sup>

Two major diabetes trials, the Diabetes Control and Complications Trial (DCCT)<sup>7</sup> and the United Kingdom Prospective Diabetes Study (UKPDS)<sup>8</sup> have emphasized that keeping HbA1C < 7% reduce microvascular complications specifically in early stages of diabetic retinopathy and nephropathy. Furthermore, results of the DCCT, UKPDS, and ACCORD<sup>9</sup> eye study also depict that good glycaemic control does not stop retinopathy completely but reduces the risk of progression of disease. Thus it can result in reduced treatment need and preservation of sight.<sup>9</sup>

Classification of diabetic retinopathy includes non-proliferative diabetic retinopathy (NPDR), which is further divided as mild, moderate and severe; and proliferative diabetic retinopathy (PDR). In severe disease, there is microvascular occlusion, vascular endothelial growth factor production and ultimately resulting in neovascularization. These fragile blood vessels may rupture causing hemorrhage. Further progression may lead to tractional retinal detachment and permanent visual loss.

A study in Karachi showed that 55.3% of diabetic patients had diabetic retinopathy at different stages.<sup>10</sup> Another study from Multan reported the prevalence of diabetic retinopathy to be 73, 1%.<sup>11</sup> Yet another report from a multicenter study described prevalence to be 56.9%.<sup>12</sup> In contrast in a large study conducted in 11,158 patients, 24.7% patients had diabetic retinopathy.<sup>13</sup> Another Lahore based study showed only 22.7% in type 2 diabetic patients.<sup>14</sup> Prevalence of as low as 17% was found from Hyderabad district.<sup>15</sup> As frequency of diabetic retinopathy is different in different studies and no research was done in Gujrat, our aim was to determine percentage of diabetic retinopathy in patients with type 2 diabetes mellitus presenting at a tertiary care hospital in Gujrat.

## METHODS

The observational study was conducted at Department of Ophthalmology, Aziz Bhatti Shaheed Teaching Hospital from March 2020 to March 2021. Ethical approval from ethical committee and informed consent of patients was taken. All patients who presented in out-patient department of medicine and ophthalmology with type 2 diabetes mellitus for more than 3 years were included. Non-probability consecutive sampling

technique was used. Patients who had developed cataract and grading of diabetic retinopathy was not possible were excluded. Random blood glucose levels were checked for every patient. HbA1C was also advised and was noted on follow up visits. Age, gender and duration of diabetes were also noted. Direct and indirect ophthalmoscopy was performed and Diabetic retinopathy was classified as per standard classification. Other complications of diabetes were also noted. SPSS version 20.0 was used for statistical analysis. Continuous variables like age, duration of diabetes, HbA1c and random blood glucose levels were expressed as mean  $\pm$  SD and categorical variables like gender, type of retinopathy and nerve abnormalities were expressed as percentage.

## RESULTS

A total of 765 patients with type 2 diabetes mellitus presented to us and were screened for diabetic retinopathy and its complications. Out of these 397 (51.9%) were males and 368 (48.1%) were females. Mean age was  $42.18 \pm 12.37$  years. Mean duration of diabetes mellitus was  $5.87 \pm 3.42$  years. Mean random blood glucose was  $261 \pm 65$  mg/dl. Only 407 patients got their HbA1C done and mean was  $9.2 \pm 2.5\%$ . Out of 765 patients, 428 (55.95%) patients had diabetic retinopathy. Patients with normal retina were advised yearly follow up. Details of patients with diabetic retinopathy are shown in Table 1. Patients with mild NPDR were advised 6 monthly follow up, patients

**Table 1:** Details of Diabetic Retinopathy and management.

Type of Diabetic Retinopathy	Number of Patients (N)	Treatment Advised
Mild NPDR	282 (36.86%)	6 Month Follow Up
Moderate to Severe NPDR	97 (12.68%)	1 Month Follow Up
Maculopathy	56 eyes	Argon Green Grid Laser And Intra-Vitreous Anti-VEGF Therapy
Proliferative Diabetic Retinopathy	49 (6.4%)	
	38 (77.56%)	Panretinal Photocoagulation (PRP) along with Intraretinal Anti-VEGF
Vitreous Hemorrhage	6 (12.24%)	Referred to Mayo Hospital Lahore
Tractional Retinal Detachment	5 (10.2%)	Referred to Mayo Hospital Lahore

with moderate to severe NPDR and maculopathy were treated with Argon Green Grid Laser and intravitreal anti-VEGF therapy with bevacizumab (avastin®) and were advised follow up after every month. Other findings along with diabetic retinopathy included oculomotor palsy in 7 patients and facial nerve palsy in 5 patients.

## DISCUSSION

Our study shows that more than half of diabetic patients presenting at our hospital have changes consistent with diabetic retinopathy within first decade after diagnosis of diabetes mellitus. These findings are consistent with American Diabetes Association, which states that more than 60% patients will develop diabetic retinopathy within first two decades after diagnosis of diabetes mellitus.<sup>4</sup> Prevalence in our study population is higher than global estimates of 34.6%.<sup>6</sup>

The prevalence of diabetic retinopathy in our patients (55.95%) is comparable to studies by Alkhairey et al. (55.3%)<sup>10</sup> and Sohail et al. (56.9%).<sup>12</sup> However the prevalence of mild NPDR was less (36.86% vs. 40.5%) and moderate to severe NPDR was high in our study (12.68% vs. 1.9%) as compared to Alkhairey et al. This may be attributable to different ethnic, educational and social backgrounds of patients included in both studies.

Raza et al. found diabetic retinopathy in 73.9% patients with most patients having mild to moderate diabetic retinopathy.<sup>11</sup> However their sample size was smaller than our study population and prevalence of reported diabetic retinopathy was higher than our results.

Our results are contrary to study by Memon et al. according to which the prevalence of diabetic retinopathy was only 24.7% patients.<sup>13</sup> These differences may be due to large sample size in their study although they included patients with type 1, type 2 and gestational diabetes mellitus as well. Prevalence was highest among type 2 diabetes mellitus patients. However, distribution of types of diabetic retinopathy was similar to our results.

Sadiq et al. demonstrated diabetic retinopathy in 22.7% patients with type 2 diabetes mellitus<sup>14</sup> in Lahore, which is much less than our results. They had less frequency of NPDR as compared to our study but the frequency of PDR was similar in both studies. In a large screening study in Hyderabad district even less

number of cases with diabetic retinopathy were reported (17%).<sup>15</sup>

One recent study conducted in Pakistan showed much less frequency of diabetic retinopathy compared to this study.<sup>16</sup> This may be explained due to different sample sizes and patient selection criteria.

Among international studies, a report from Hungary with almost similar sample size to our study showed that 33.5% patients with type 2 diabetes had diabetic retinopathy (compared to 55.95% in our sample).<sup>17</sup> Similarly, an Ethiopian study showed that prevalence of diabetic retinopathy was 34.1% which was also lower than our results. They concluded that low family monthly income, longer duration of diabetes and poor glycemic control were associated with diabetic retinopathy.<sup>18</sup>

In a systemic review conducted in Pakistan, it was seen that prevalence of diabetic retinopathy was 28.78% with a wide range of 10.6% to 91.3% in different studies.<sup>19</sup> It supports the results of this study. However one recent meta-analysis showed global prevalence of diabetic retinopathy to be 22.27% with least prevalence among Asians.<sup>20</sup> It shows that variation in frequency of diabetic retinopathy are common throughout the world.

Diabetic retinopathy is prevalent in patients with type 2 diabetes mellitus in our population. Various studies from Pakistan show a high prevalence, which shows a poor glycemic control in our diabetic population leading to early development of diabetic retinopathy in our population. It can be reduced by tight glycaemic control as shown by major trials in diabetic population.<sup>7,8,9</sup>

Patient education regarding diabetes mellitus, its complications and benefits of tight glycaemic control must be addressed. For this purpose educationists, nurses, doctors and media need to play their role. Regular screening for diabetic patients for retinopathy must be done in every patient and they should be guided for regular followup. Seminars for awareness of diabetic retinopathy should be conducted as well.

Limitation of this study was a single center analysis. A nationwide survey is needed so that it be tackled as a national issue and necessary precautions must be taken to prevent blindness caused by diabetic retinopathy.

## CONCLUSION

Frequency of diabetic retinopathy is considerably high in patients with type 2 diabetes mellitus. Lack of ophthalmic evaluation and awareness among patients leads to considerably high rates of diabetic retinopathy. Regular ophthalmic examination is warranted for all patients with type 2 diabetes mellitus.

**Conflict of Interest:** Authors declared no conflict of interest.

## Ethical Approval

The study was approved by the Institutional review board/Ethical review board (NSMC/ABSTH 18/2020).

## REFERENCES

1. **Shaw JE, Sicree RA, Zimmet PZ.** Global estimates of the prevalence of diabetes for 2010 and 2030. *Diabetes Res Clin Pract.* 2010; **87**: 4-14. 10.1016/j.diabres.2009.10.007
2. **Yang SH, Dou KF, Song WJ.** Prevalence of diabetes among men and women in china. *N Engl J Med.* 2010; **362**: 2425-2426. 10.1056/NEJMoa0908292.
3. **Wild S, Roglic G, Green A, Sicree R, King H.** Global prevalence of diabetes: estimates for the year 2000 and projections for 2030. *Diabetes Care.* 2004; **27**: 1047-1053. 10.2337/diacare.27.5.1047.
4. **Fong DS, Aiello LP, Ferris FL, Klein R.** Diabetic retinopathy. *Diabetes Care.* 2004; **27**: 2540-2553. 10.2337/diacare.27.10.2540
5. **Resnikoff S, Pascolini D, Etya'ale D.** Global data on visual impairment in the year 2002. *Bulletin of the World Health Organization.* 2004; **82**: 844-851.
6. **Yau JW, Rogers SL, Kawasaki R, Lamoureaux EL, Kowalski JW, Bek T, et al.** Global prevalence and major risk factors of diabetic retinopathy. *Diabetes Care.* 2012; **35**: 556-564. 10.2337/dc11-1909.
7. **Lasker RD.** The diabetes control and complications trial. Implications for policy and practice. *N Engl J Med.* 1993; **329**: 1035-1036. 10.1056/NEJM199309303291410
8. UK prospective diabetes study (UKPDS) group. Intensive blood-glucose control with sulphonyl ureas or insulin compared with conventional treatment and risk of complications in patients with type 2 diabetes (UKPDS 33). *Lancet.* 1998; **352**: 837-853. Doi: 10.1016/S0140-6736(98)00090-7
9. **Chew EY, Ambrosius WT, Davis MD, Danis RP, Gangaputra S, Greven CM, et al.** ACCORD Study Group; ACCORD Eye Study Group. Effects of medical therapies on retinopathy progression in type 2 diabetes. *N Engl J Med.* 2010 Jul 15; **363** (3): 233-44. Doi: 10.1056/NEJMoa1001288.
10. **Alkhaairy S, Rasheed A, Aziz F, Mazhar-ul-Hassan, Nawaz S.** Frequency of diabetic retinopathy in Karachi, Pakistan: hospital based study. *J Dow Uni Health Sci.* 2015; **9** (2): 56-59.
11. **Raza, I., Ahmed, N.** Prevalence of diabetic retinopathy in diabetic patients with five years' duration presenting in eye OPD Nishtar Hospital, Multan. *Ophthalmol. Pak;* 2015; **5** (01): 7-11.
12. **Sohail M.** Prevalence of diabetic retinopathy among type-2 diabetes patients in Pakistan-Vision Registry. *Pak J Ophthalmol.* 2014; **30** (4): 204-212.
13. **Memon S, Ahsan S, Riaz Q, Basit A, Sheikh SA, Fawwad A, et al.** Frequency, severity and risk indicators of retinopathy in patients with diabetes screened by fundus photographs: a study from primary health care. *Pak J Med Sci.* 2014; **30** (2): 366-372.
14. **Saddiq MA, Rehman MU, Fatima M, Hussain A, Khan AA, Mahju T, et al.** Diabetic retinopathy in patients presenting to the screening clinic of a tertiary care hospital in Pakistan. *Ophthalmol. Pak;* 2017; **5** (04): 7-9.
15. **Nizamani Nb, Talpur KI, Awan F, Khanzada MA, Memon MN.** Results of a community based screening programme for diabetic retinopathy and childhood blindness in district Hyderabad, Pakistan. *BMJ Open Ophthalmology,* 2017; **2**: e000099. Doi: 10.1136/bmjophth-2017-000099.
16. **Riaz S, Jahangir T, Khan T.** Frequency of Diabetic Retinopathy and Factors for Suboptimal Diabetic Control in Type 2 Diabetic Patients in a Trust Hospital of Pakistan. *Pak J Ophthalmol.* 2021; **37** (2): 183-187. Doi: 10.36351/pjo.v37i2.1123.
17. **Eszes DJ, Szabó DJ, Russell G, Lengyel C, Várkonyi T, Paulik E et al.** Diabetic Retinopathy Screening in Patients with Diabetes Using a Handheld Fundus Camera: The Experience from the South-Eastern Region in Hungary. *J Diabetes Res.* 2021; **2021**: 6646645. Doi: 10.1155/2021/6646645
18. **Alemu Mersha G, Alimaw YA, Woredekal AT.** Prevalence of diabetic retinopathy among diabetic patients in Northwest Ethiopia—A cross sectional hospital based study. *PLOS ONE,* 2022; **17** (1): e0262664. Doi: 10.1371/journal.pone.0262664.
19. **Mumtaz SN, Fahim MF, Arslan M, Shaikh SA, Kazi U, Memon MS.** Prevalence of diabetic retinopathy in Pakistan; A systematic review. *Pak J Med Sci.* 2018; **34** (2): 493-500. Doi: 10.12669/pjms.342.13819.

20. **Teo ZL, Tham YC, Yu M, Chee ML, Rim TH, Cheung N et al.** Global Prevalence of Diabetic Retinopathy and Projection of Burden through 2045: Systematic Review and Meta-analysis. *Ophthalmology*, 2021; **128 (11)**: 1580-1591  
Doi: 10.1016/j.ophtha.2021.04.027.

### **Authors' Designation and Contribution**

Zia Ghaffar; Associate Professor: *Concepts, Data acquisition, Manuscript preparation, Manuscript review.*

Zamir Butt; Assistant Professor: *Literature search, Data acquisition, Manuscript editing.*

Syed Muhammad Ali Shah; Consultant Ophthalmologist: *Concepts, Design, Literature search, Data acquisition, Data analysis, Statistical analysis, Manuscript preparation, Manuscript editing.*

Shahida Hussain Tarar; Associate Professor: *Literature search, Data acquisition, Data analysis, Manuscript editing.*

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