



DIABETIC RETINOPATHY; PREVALENCE OF DIABETIC RETINOPATHY IN RECENTLY DIAGNOSED TYPE 2 DIABETIC PATIENTS. A SINGLE CENTER STUDY.

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ABSTRACT... Objectives: The prime objective of the study was to determine the prevalence of Diabetic Retinopathy in recently diagnosed type 2 diabetic patients with duration up to one year. **Study Design:** Single center, descriptive, observational study. **Setting:** Department of Medicine, Khyber Teaching Hospital, Peshawar. **Period:** August, 2017 to March, 2018. **Material and Methods:** A total of 196 patients who were either newly diagnosed or diagnosed within last 12 months were included in the study. Patients with type 1 diabetes or diagnosed later than 12 months were excluded from the study. Patients with retinopathy due to some other cause were also excluded from the study. Both out door patients and admitted patients were included in the study. After detailed history, proper fundoscopic examination of both eyes was performed and findings were recorded on preformed proforma. **Results:** A total of 196 patients were enrolled in the study. One hundred and ten were male and 86 were female in a ratio of 1.3:1 respectively. Age distribution amongst study population ranged between 30-60 years. Mean age of the population was 49.18 ± 7.62 SD years with median age 48 years and mode age 45 years. Out of 196 patients, 32 (16.3%) patients had diabetic retinopathy on proper fundoscopic examination. **Conclusion:** Diabetic retinopathy is a well known microvascular complication of diabetes mellitus and any one with this complication must be referred to specialist ophthalmologist for further necessary investigation and management to prevent further complications.

Key words: Diabetes Mellitus Type 2, Diabetic Retinopathy, Fundoscopy, Obesity.

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INTRODUCTION

The number of patients with diabetes mellitus (DM) is increasing rapidly in both developed and developing countries around the world at an alarming rate. According to the International Diabetes Federation in 2015, an estimated 415 million people globally were suffering from this condition and this number is expected to rise by 120% in 2025.¹

It has become a chronic disease with several complications. Diabetes mellitus (DM) is classified as type 1 diabetes (T1DM) or type 2 diabetes (T2DM), gestational diabetes, monogenic diabetes and secondary diabetes.²

Type II Diabetes Mellitus (DM II) is a chronic progressive disease characterized by chronic hyperglycemia. There is usually insulin deficiency or insulin resistance.³ Worldwide, 285 million

individuals are affected by DM type 2 and this number is may reach 439 million by the year 2030.⁴ Pakistan is amongst the highly affected countries and is ranked 7th in global prevalence of DM type 2.⁵ The prevalence of type 2 DM in adult population of Pakistan is about 10%.⁶

Long standing DM is associated with macro- and micro-vasculature complications like coronary artery disease, cerebro-vascular disease, various dermal abnormalities, peripheral neuropathies leading to leg amputation, diabetic nephropathies leading to end stage renal diseases diabetic retinopathies leading to blindness.^{7,8} The development of these complications is linked to duration and degree of hyperglycemia. These complications account for increased mortality, morbidity and disability and put a huge burden on the economy of all countries especially the developing and underdeveloped ones.⁹

Diabetic retinopathy is damage to retinal microvascular system and is one of the main microvascular complications caused by increased duration of diabetes and chronic hyperglycemia. The underlying mechanism is the production of advanced glycation end products (AGEs), the creation of a pro inflammatory micro environment, and the induction of oxidative stress.^{10,11}

Diabetic retinopathy is the commonest cause of blindness amongst adult US population age 20-74 years causing an estimated 12000 to 24000 new cases of blindness annually.¹² Diabetics are 25 times more likely to become blind than non-diabetics due to diabetic retinopathy.¹³ However, since type 2 DM may be present well before its clinical diagnosis is made, it is not uncommon to see the microvascular complications of type 2 DM at the time of diagnosis.¹⁴ Therefore it is vital to increase the awareness about screening of diabetes and diabetic retinopathy by educating the patients through the health care professionals and public seminars.

Many studies have been conducted locally as well as abroad claiming different prevalence in their areas of study. In Pakistan, the prevalence of diabetic retinopathy was 15.7% in a study conducted by Sheikh in 2008.¹⁵ Two studies conducted in India, prevalence of 17% has been reported.^{16,17} In South East Asia, 34% had diabetic retinopathy.¹⁸

The aim of the current study is to find out the prevalence of diabetic retinopathy in recently diagnosed diabetic patients and to refer the affected individuals to specialist ophthalmologist for specific treatment to prevent visual impairment and the impending blindness.

MATERIALS AND METHODS

This single center, cross-sectional, observational study was carried out at the Department of Medicine, Khyber Teaching Hospital, Peshawar from August, 2017 to March, 2018. All newly diagnosed or recently diagnosed type 2 diabetics (diagnosed within last 1 year) were included in the study. The total sample size was 196, keeping 7% margin of error and 95% confidence interval,

using WHO sample size calculator. Patients seen as an outpatient or admitted in medical units with an age range of 30-60 years were studied. All patients with type 1 diabetes mellitus, patients with gestational diabetes or other type of diabetes, patients whose duration of diabetes was more than 1 year, patients with retinopathy due to some other disease, already blind patients or patients with mature cataract, unconscious patients, patients with altered sensorium or dementia in whom Fundoscopy is difficult or those who did not want to include in study were excluded from the study. Informed consent was obtained from all patients. After getting approval from hospital ethical committee to conduct the study, data was collected from all patients who fulfilled the inclusion criteria and were willing for the study.

Proper fundoscopic eye examination was conducted after adequate dilatation of the pupil with Tropicamide (Mydriacyl) after ruling out closed angle glaucoma. Retinopathy was classified according to International Clinical Diabetic Retinopathy Disease Severity scale as Normal, Background Retinopathy, Pre-proliferative Retinopathy and Proliferative Retinopathy. Presence or absence of Macular edema was also ensured. Help of consultants in Ophthalmology Department Khyber Teaching Hospital, Peshawar was sought whenever required. All relevant investigations like renal function tests, liver function tests, peripheral blood smears, chest radiography, electrocardiogram, random blood sugar, daily fasting blood sugar, lipid profiles and glycated hemoglobin (HbA1c) etc. were performed in local hospital laboratory under supervision of an experienced, qualified pathologist free of cost. All these informations and other demographic data like name, age, sex, BMI and address was also recorded on a proforma. Data was analyzed using SPSS version 20. All the results were presented as tables and graphs.

RESULTS

Based on sample size calculation, 196 patients with type 2 diabetes mellitus were studied. Mean age of the population was 49.18 ± 7.62 SD years with median age 48 years and mode age 45 years. Out of 196 patients, 110 (56.1%) were male

and 86 (43.9%) were female in our population as shown in graph no. 1. Male to female ratio was 1.3:1. The mean age of the male was 48.6 ± 7.8 years while those of female were 45.8 ± 8.5 . Stratification of patients into different age groups is shown in Table-I.

The mean HbA1c was 8.6 ± 1.7 SD. It was slightly more deranged in male patients (Mean= 8.8 ± 1.6) as compared to female patients (Mean= 8.4 ± 1.8). These results are shown in Table-II.

Out of 196 participants, 38 (19.4%) female participants were obese (BMI >30), 48 (24.5%) were overweight (BMI 25-29.9) and 19 (9.9%) had normal weight (BMI 18.5-24.9). Amongst male participants, 30 (15.3%) were obese (BMI >30), 41 (20.9%) were overweight (BMI 25-29.9) and 20 (10.2%) had normal weight (BMI 18.5-24.9). The results are shown in Table-III.

In our study, 32 (16.3%) had diabetic retinopathy. Out of these 32 patients, 16 had back ground retinopathy, 10 had preproliferative retinopathy and 6 had proliferative retinopathy. The results are shown in Figure-2

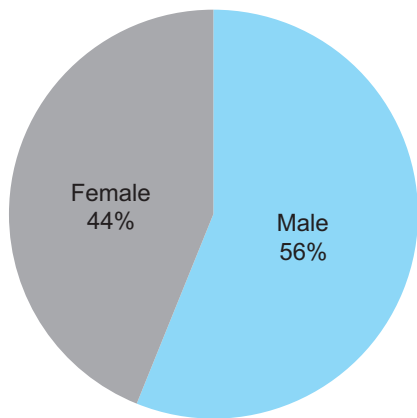


Figure-1. Sex distribution in study

Age (Years)	Frequency	Percentage
30-40	66	33.7%
41-50	82	41.8%
51-60	48	24.5%
Total	196	100%

Table-I. Age distribution (n=196)

Gender	No. of Patients	HbA1C
Male	110	8.8 ± 1.6
Female	86	8.4 ± 1.8
Total	196	8.6 ± 1.7

Table-II. HbA1c of the participants in the study (n=196)

BMI	Male	Female
Obesity (>30)	30	38
Overweight (25-29.9)	41	48
Normal (18.5-24.9)	20	19
Total	91	105

Table-III. BMI of the participants (n=196)

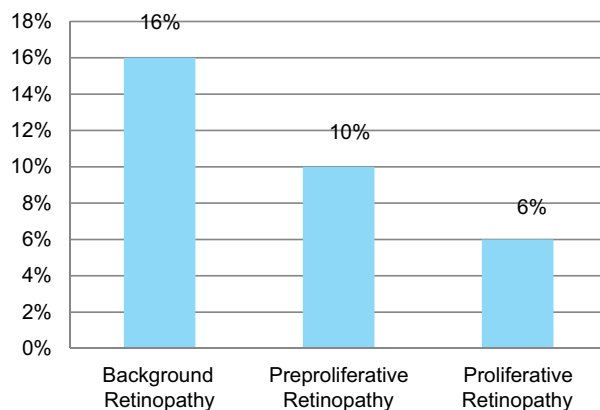


Figure-2. Diabetic retinopathy in participant (n=194)

DISCUSSION

In recent decades, an increase in incidence and prevalence of diabetes mellitus and its complications have been observed. Diabetic patients are exposed to both micro and macro vascular complications and retinopathy is one of the major microvascular complication. It is microangiopathy of the retina in which visual acuity is gradually lost due to pre or intraretinal hemorrhages, macular edema or retinal detachment.¹⁹

Half of the patients show signs of complication even at the time of diagnosis of type 2 diabetes mellitus.²⁰ Patients may start developing complications even five to six years before diagnosis and it may take more than 10 years before clinical diagnosis of diabetes.¹⁴

The present study is more concerned with the retinal complications developing in either newly diagnosed diabetic patients or diagnosed within

1 year of diabetes.

We studied 196 individuals with diabetes, comprising 110 (56.1%) male and 86 (43.9%) female. This male predominance was also observed in other studies as well. In study conducted by Jamil K et al 126 were male and 70 were female.²¹ Male predominance was also observed in a study conducted by Hussain F, et al in Faisalabad.²² Contrary to our study, many studies conducted on diabetic retinopathy locally as well as abroad showed female predominance.²³⁻²⁵ Male predominance in our study may be due to more and easy access to health facilities, male predominance in society, high literacy rate amongst males, early severe ocular complications or an accidental finding.

Mean age in our study population was 49.18 years. Nearly the same mean age was recorded in other studies.^{21,23,25,26} Study conducted by Lee KM and Khurram M reported high mean age in their population.^{27,29} Mean age of 42 years was recorded in a local study conducted in Karachi which is quite low as compared to our study.²⁸

Diabetes was poorly controlled in almost all individuals with mean HbA1c 8.6. HbA1c was high in male population as compared to female population (8.8 vs. 8.4). This high HbA1c in males may be due to poor dietary habits, poor drug compliance and sedentary life style. Higher HbA1c was reported in a studies conducted by Jamil K and Farasat T.^{21,25} Moreover higher HbA1c was recorded by Farasat T in patients with proliferative retinopathy than patients with background or pre-proliferative retinopathy.²⁵

Retinopathy is a dreadful complication of diabetes mellitus and is the leading cause of visual impairment and blindness worldwide. No study has been conducted in Peshawar on the prevalence of retinopathy in diabetic patients. In our study, diabetic retinopathy was present in 32 (16.3%) patients. Out of three types of retinopathy, background retinopathy was the commonest one, present in 16 (50%) patients followed by pre-proliferative present in 10 (31.3%) patients and then proliferative one, present in 6 (18.7%)

patients. Various percentages of retinopathies are reported in different communities in different countries. A local study conducted in five community based eye camps in Karachi showed prevalence retinopathy in 15.7% of population. Of these, non-proliferative was the commonest (76.5%) followed by maculopathy (17.6%) and proliferative diabetic retinopathy (5.9%).³⁰ These results are nearly comparable to our study. Another study conducted abroad by Lee KM showed prevalence of diabetic retinopathy in 18.2% of recently diagnosed diabetic population which is nearly coinciding with our study.²⁷ Another study conducted in UK showed prevalence of retinopathy in 19% of newly diagnosed diabetics which is nearly correlating our study.³² A local study conducted in Abbottabad showed the prevalence of retinopathy in 17% in newly diagnosed diabetics.³³

Few of the studies reported low prevalence of diabetic retinopathy in their studies. Jamil K reported 12.75% prevalence of diabetic retinopathy in his study. He found background retinopathy as the predominant one, followed by pre-proliferative and proliferative. The same results were also recorded in our study.²¹ A study conducted in India reported 10% prevalence of retinopathy.³⁴ Zuabi HA conducted study in Kuwait where he found out prevalence of retinopathy in 7% of newly diagnosed diabetic population.²⁴

Some studies have reported high prevalence of diabetic retinopathy. Ishaq H and Khurram H reported prevalence of 42% and 52.4% in their studied population respectively but they included both new and old diabetics in their study.^{23,29} This high percentage may be due to prolonged duration of diabetes or other contributory factors like smoking, poor diabetic control or deranged lipid profile. Farast T recorded 33% prevalence of retinopathy in her study on newly diagnosed diabetic patients.²⁵ Hussain S found prevalence of diabetic retinopathy in 23.9% of patients in his study.²⁶ The Gaddop Study conducted by Mahar PS and colleagues found prevalence of 27.43% in their study which is quite higher than our study.²⁸

CONCLUSION

Diabetic retinopathy is a common devastating complication of diabetes mellitus and a common cause of acquired blindness. It is not uncommon in recently diagnosed diabetics as shown in our study. So early screening for detection and management of diabetes is mandatory and thorough ocular examination by experienced ophthalmologist is the need of the day.

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The world of **reality** has its limits;
the world of **imagination** is boundless.



“Jean-Jacques Rousseau”

AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Jamal ud Din	Data collection and over all supervision.	
2	Zahidullah Khan	Data analysis and statistical work.	
3	Inamullah Khan	Literature review and proof reading.	