

ORIGINAL ARTICLE

Incidence of Retinopathy in Newly Diagnosed Patients with Type-II Diabetes MellitusSHAHID ANWAR BHATTI¹, HAFIZ MUHAMMAD AHMAD², MUHAMMAD AYUB KHAN³, ZAHEER UDDIN BABAR⁴, ABDUL RAFE⁵, WALEED AHMAD⁶¹Associate Professor of Eye Sahara Medical College, Narowal²Consultant Ophthalmologist, THQ Hospital, Yazman District Bahawalpur³Assistant Professor Ophthalmology, Gomal Medical College, Dera Ismail Khan⁴Associate Professor Ophthalmology, CMH, Lahore⁵Assistant Professor Ophthalmology, Avicenna Medical College, Lahore⁶Registrar Ophthalmology, Al Shifa Trust Eye Hospital, Rawalpindi

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ABSTRACT**Aim:** To determine the incidence of retinopathy in patients newly diagnosed with type-II diabetes mellitus.**Place and Duration:** Alshifa Trust Eye Hospital, Rawalpindi and Ophthalmology Department, CMH, Lahore for six-months duration from January 2022 to June 2022.**Methods:** The study included 200 individuals with type 2 diabetes mellitus diagnosed within the previous two months and selected with non-probability consecutive sampling technique. Diabetes was diagnosed on the basis of two consecutive values of random blood glucose (RBS), fasting blood glucose (FBS) and glycosylated hemoglobin (HbA1c) > 200 mg / dL according to the following criteria defined by the World Organization (WHO) which was revised in 1999 and 2006. All patients underwent detailed examination of the retina for diabetic retinopathy evaluation using biomicroscopic slit lamp and +90 Diopter lens. SPSS-21.0 was used for the data analysis. For each variable, descriptive statistics were calculated.**Results:** 200 patients in total were enrolled in this study. The participants ranged in age from 31 to 60 years, with the majority were in the 4th decade (mean age: 51.50 ± 9.02). 30 individuals (15%) with newly diagnosed type 2 diabetes had diabetic retinopathy. From 30 patients of newly diagnosed type 2 diabetes mellitus; the background retinopathy was seen in 18 (60%) of patients, pre proliferative retinopathy was observed in 8 (26.7%) of patients and proliferative retinopathy was seen in 3 (13.3%). Patients with diabetic retinopathy had a HbA1C (%) of 9.8 ± 1.2, while those without the diabetic retinopathy had HbA1c of 7.1 ± 2.2.**Conclusions:** We found that the incidence of retinopathy in patients with newly diagnosed type 2 diabetes is 15%, which underlines the value of a comprehensive ophthalmological assessment of all diabetic patients at diagnosis.**Keywords:** Retinopathy, Type-II diabetes mellitus and incidence.**INTRODUCTION**

The diabetes mellitus is a global pandemic. According to estimates, this disease affects 171 million individuals globally, and the number is increasing gradually¹⁻². One of its frequent and significant side effects, diabetic retinopathy (DR), is one of the main factors causing blindness globally³. A patient may have type 2 diabetes long before a clinical diagnosis is confirmed, and the condition is often diagnosed together with diabetic retinopathy⁴⁻⁵. The term diabetic retinopathy (DR) refers to damage caused by prolonged hyperglycaemia to the retinal microvascular system⁶. The duration of diabetes mellitus, the level of glycemic control, and hyperlipidaemia are the major risk factors⁷. Diabetic microangiopathy may be caused by a same pathophysiology as diabetic retinopathy and has been associated with increased intima-media thickness and arterial stiffness in people with type 2 diabetes. People with diabetes are 25 times more likely to develop diabetic retinopathy than non-diabetics and the end result is blindness⁸⁻⁹. It is essential to educate patients about diabetic retinopathy's problems through public seminars and professional medical training¹⁰. Eight population-based studies have revealed over the past 20 years that the diabetic retinopathy prevalence in diabetes mellitus is about 28.7%¹¹. 15% of patients with recently diagnosed type-II diabetes mellitus in Karachi had diabetic retinopathy, according to one study¹². In order to assess the magnitude of this issue in the local population with the available statistics, we carried out a comparable study to find out the prevalence of retinopathy in individuals with recently diagnosed type-II diabetes¹³. This will allow for the development of more thorough primary and secondary prevention techniques that will result in reduction of morbidity in such patients. The aim of this study is to determine the incidence of retinopathy in patients newly diagnosed with type-II diabetes mellitus.

METHODS

The study was held in Alshifa Trust Eye Hospital, Rawalpindi and Ophthalmology Department, CMH, Lahore for six-months duration

from January 2022 to June 2022 after receiving approval from the hospital's ethics committee and informed consent from participants. The patients were informed about the study's goal. The study included 200 individuals with type 2 diabetes mellitus diagnosed within the previous two months and selected with non-probability consecutive sampling technique. Diabetes was diagnosed on the basis of two consecutive values of random blood glucose (RBS), fasting blood glucose (FBS) and glycosylated hemoglobin (HbA1c) > 200 mg / dL according to the following criteria defined by the World Organization (WHO) which was revised in 1999 and 2006. The study excluded patients who had renal disease, hypertension, hazy vitreous humour, mature cataracts, corneal opacity or who were un-cooperative. The one drop of tropicamide was instilled in each eye for pupillary dilatation. All patients underwent detailed examination of the retina for diabetic retinopathy evaluation using biomicroscopic slit lamp and +90 Diopter lens. Patients requiring further treatment or evaluation were referred to the department of Ophthalmology after entering data in to the proforma. SPSS-21.0 was used for the data analysis. For each variable, descriptive statistics were calculated. Age was calculated as the standard deviation and mean for quantitative variables. Gender, presence and type of retinopathy are presented as percentage and frequency and were calculated as qualitative variables.

RESULTS

200 patients in total were enrolled in this study. The participants ranged in age from 31 to 60 years, with the majority were in the 4th decade (mean age: 51.50 ± 9.02). (Table 1).

Table-1: shows the age distribution of patients

Age in years	No of patients
31-40	18(9%)
41-50	130(80%)
51-60	52(26%)
Mean Age	51.50 ± 9.02

The males were about 60% while females were 40%. (Table 2).

Table-2: shows the gender distribution of patients

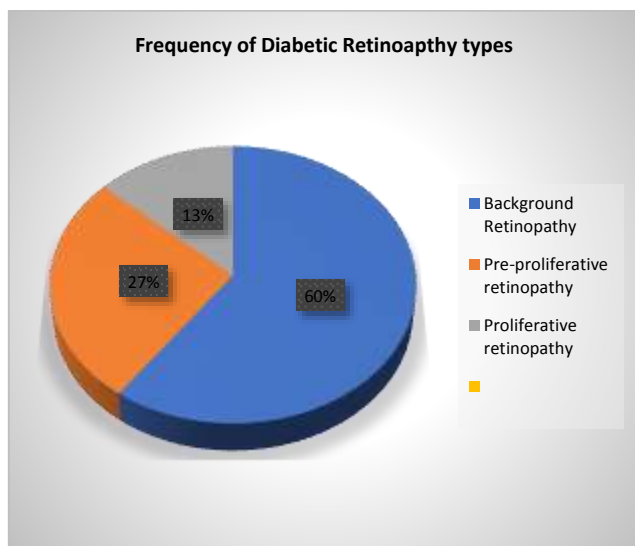
Gender	No
Males	120(60%)
Females	80(40%)

30 individuals (15%) with newly diagnosed type 2 diabetes had diabetic retinopathy. 18 of them were men and 12 were women (Table 3).

Table-3: shows the gender wise distribution of Diabetic Retinopathy

Gender	No
Males	18(9%)
Females	12(6%)

From 30 patients of newly diagnosed type 2 diabetes mellitus; the background retinopathy was seen in 18 (60%) of patients, pre proliferative retinopathy was observed in 8 (26.7%) of patients and proliferative retinopathy was seen in 3 (13.3%).



Patients with diabetic retinopathy had a HbA1C (%) of 9.8± 1.2, while those without the diabetic retinopathy had HbA1c of 7.1 ± 2.2. (Table 4).

Table-4: shows the variations in diagnostic parameters among the studied groups

Parameters	With Retinopathy	Without Retinopathy
HbA1C (%)	9.8± 1.2	7.1 ± 2.2
Fasting Blood glucose levels(mg/dl)	220 ± 32.4	138.2 ± 35.5

Of the 18 patients with background retinopathy, 7 were females and 11 were males, whereas 1 female and 3 males had proliferative retinopathy and 5 females and 3 males had pre-proliferative retinopathy. (Table 5).

Table-5: shows the gender wise distribution of types of diabetic retinopathy

Gender	No
Background Retinopathy (n=18)	
Males	7(38.9%)
Females	11(61.1%)
Pre-proliferative retinopathy(n=8)	
Males	3(37.5%)
Females	5(62.5%)
Proliferative retinopathy(n=4)	
Males	3(75%)
Females	1(25%)

DISCUSSION

The most prevalent metabolic endocrine disorder is diabetes mellitus. Different diagnostic criteria make it challenging to ascertain the true prevalence of diabetes, however various studies exhibited the incidence between 5 and 7 percent in Pakistan¹³. Similar to this, it has been projected that 12% of diabetes individuals in Pakistan may develop diabetic retinopathy (DR), however other sources have stated incidences as high as 15% to 19.9%¹⁴⁻¹⁵. One of the main contributing factors to blindness is DR among diabetic patients¹⁶⁻¹⁷. It is supposed that one of the main causes of blindness in the future will be diabetic retinopathy (DR). In this prospective study of individuals with recently diagnosed type 2 diabetes, 15% of participants developed diabetic retinopathy. 15% of newly diagnosed diabetics in southern Pakistan had retinopathy at the time of their diagnosis, according to the study conducted in southern Pakistan¹⁸. Similar results were obtained in an Indian study, which shows the proportion of 10.2%, while a UK study exhibited the prevalence of retinopathy about 19%¹⁹⁻²⁰. These variations are most likely brought on by racial and ethnic diversity, as well as variations in gender and age groupings. This study findings are comparable with the study held in Abbottabad with the incidence of DR about 17% in the study groups' and 45.1 ± 3.2 years of mean age and occurs predominantly in women while our study mean age was 51.50 ± 9.02 years and seen mostly in males²¹⁻²². We found that pre-proliferative (27%) and background (60%) retinopathy seen in the majority of cases. Hayat et al study exhibited the comparable results²³. Patients with diabetic retinopathy in our study group had a HbA1C (%) of 9.8± 1.2 and fasting blood glucose of 220 ± 32.4. These findings are in consistent with those of Abdollahi A, Rema M, and others²⁴. One study in Denmark also shows the direct relationship between the severity of retinopathy, HbA1c levels, and systolic blood pressure²⁵. The significance of eye evaluation at the time of diagnosis for all diabetic patients is preventing complications of DR that could lead to blindness. It also demonstrates that glycemic control, gender, and age are related to the progression and onset of diabetic retinopathy.

CONCLUSION

We found that the incidence of retinopathy in patients with newly diagnosed type 2 diabetes is 15%, which underlines the value of a comprehensive ophthalmological assessment of all diabetic patients at diagnosis.

REFERENCES

- Mehanna CJ, Abdul Fattah M, Tamim H, Nasrallah MP, Zreik R, Haddad SS, El-Annan J, Raad S, Haddad RS, Salti HI. Five-year incidence and progression of diabetic retinopathy in patients with type ii diabetes in a tertiary care center in Lebanon. *Journal of ophthalmology*. 2017 May 31;2017.
- Bagzai DS, Bagzai A. Correlation between severity of diabetic retinopathy with HbA1c in type II diabetic patients. *Age*. 2019;20(40):62.
- Parasar V, Mohan N, Kumari R, Sinha B. To Evaluate the Relationship of HbA1c Levels and Serum Magnesium in Patients with Type II Diabetes and Its Correlation with Diabetic Retinopathy. *J Med Sci Clin Res*. 2019;7(7):277-81.
- Nasir S, Khan B, Quraishy MM. Frequency of Diabetic Retinopathy in patients with Type-II diabetes mellitus in an upscale clinic in Karachi. *The Professional Medical Journal*. 2020 Feb 1;27(02):274-8.
- Makwana T, Takkar B, Venkatesh P, Sharma JB, Gupta Y, Chawla R, Vohra R, Kriplani A, Tandon N. Prevalence, progression, and outcomes of diabetic retinopathy during pregnancy in Indian scenario. *Indian journal of ophthalmology*. 2018 Apr;66(4):541.
- Gardezi SA, Latif S, Butt KZ, Qadir M. Frequency of Diabetic Retinopathy in Newly Diagnosed Cases of Type 2 Diabetes Mellitus. *PAKISTAN JOURNAL OF MEDICAL & HEALTH SCIENCES*. 2017 Oct 1;11(4):1243-5.
- Barathi KS, Priyanka M. Knowledge Regarding Long Term Complication of Diabetes Mellitus among Type-II Diabetes Patients. *Journal of Pharmaceutical Sciences and Research*. 2019 Jun 1;11(6):2201-3.

8. Woyessa DN. Magnitude of Diabetic Retinopathy in newly diagnosed type 2 diabetes patients in Menelik II Hospital, Addis Ababa. *Ethiopian Medical Journal*. 2020 Jun 25;58(03).
9. Mumtaz SN, Fahim MF, Arslan M, Shaikh SA, Kazi U, Memon MS. Prevalence of diabetic retinopathy in Pakistan; A systematic review. *Pakistan journal of medical sciences*. 2018 Mar;34(2):493.
10. Jawed K, Nisar N, Hussain M. Glycaemic control and complications of type II diabetes mellitus-at two public sector diabetic clinics. *ANNALS OF ABBASI SHAHEED HOSPITAL AND KARACHI MEDICAL & DENTAL COLLEGE*. 2017 Mar 31;22(1):37-43.
11. Hwang H, Kim JY, Oh TK, Chae JB, Kim DY. Relationship between clinical features of diabetic retinopathy and systemic factors in patients with newly diagnosed type II diabetes mellitus. *Journal of Korean Medical Science*. 2020 Jun 15;35(23).
12. Albalawi AM, Khalil T, Alimam RA, Albalawi AS. Awareness of Diabetic Retinopathy Among Type II Diabetic Patients Attending at King Salman Armed Forced Hospital-Primary Health Care, Tabuk 2019. *Open Access Macedonian Journal of Medical Sciences*. 2019 Dec 15;7(23):4143.
13. Wang SY, Andrews CA, Herman WH, Gardner TW, Stein JD. Incidence and risk factors for developing diabetic retinopathy among youths with type 1 or type 2 diabetes throughout the United States. *Ophthalmology*. 2017 Apr 1;124(4):424-30.
14. Khairudin Z, Abdul Razak NA, Abd Rahman HA, Kamarudin N, Abd Aziz NA. Prediction of diabetic retinopathy among type II diabetic patients using data mining techniques. *Malaysian Journal of Computing (MJoC)*. 2020;5(2):572-86.
15. Kumar A. A Cross Sectional Study of Incidence of Retinal Changes in the Newly Detected Cases of Type 2 Diabetes Mellitus Patients.
16. Shaikh S, Ursani TJ, Dhiloo KH, Samuel R, Talpur R, Jawed M, Yaseen M, Yaqoob K. Prevalence of diabetic retinopathy and related factors in patients with type 2 diabetes mellitus in Hyderabad and adjoining areas. *J Entomol Zool Stud*. 2017;5(6):1755-9.
17. Mishra D, Das C. Prevalence of diabetic retinopathy in newly diagnosed patients with type-2 diabetes mellitus attending tertiary care centre from Eastern India. *Current Indian Eye Research Journal of Ophthalmic Research Group*. 2019 Jun;6(1):22.
18. Ghabban SJ, Althobaiti B, Farouk IM, Al Hablany M, Ghabban A, Alghbaban R, Harbi S, Albalawi Sr AE. Diabetic Complications and Factors Affecting Glycemic Control Among Patients With Type II Diabetes Mellitus Attending the Chronic Illness Clinics at Tabuk, Saudi Arabia. *Cureus*. 2020 Nov 24;12(11).
19. Alvarez-Ramos P, Jimenez-Carmona S, Alemany-Marquez P, Cordoba-Doña JA, Aguilar-Diosdado M. Socioeconomic deprivation and development of diabetic retinopathy in patients with type 1 diabetes mellitus. *BMJ Open Diabetes Research and Care*. 2020 Nov 1;8(2):e001387.
20. MALIK M, HUSSAIN MI, BILAL S. FREQUENCY OF MICROALBUMINURIA IN PATIENTS WITH TYPE-2 DIABETES MELLITUS HAVING DIABETIC RETINOPATHY. *METHODOLOGY*. 2018;51.
21. ud Din J, Khan Z, Khan I. DIABETIC RETINOPATHY;; PREVALENCE OF DIABETIC RETINOPATHY IN RECENTLY DIAGNOSED TYPE 2 DIABETIC PATIENTS. A SINGLE CENTER STUDY. *The Professional Medical Journal*. 2019 Apr 10;26(04):663-8.
22. Bui HD, Jing X, Lu R, Chen J, Ngo V, Cui Z, Liu Y, Li C, Ma J. Prevalence of and factors related to microvascular complications in patients with type 2 diabetes mellitus in Tianjin, China: a cross-sectional study. *Annals of Translational Medicine*. 2019 Jul;7(14).
23. Saleem M. The impact of delay in diabetic patient's referral for diabetic retinopathy screening on the level of retinopathy detected in adult Sudanese diabetic Sudanese patients. *Al-Basar International Journal of Ophthalmology*. 2017 Jul 1;4(2):49.
24. Anwar SB, Asif N, Naqvi SA, Malik S. Evaluation of multiple risk factors involved in the development of diabetic retinopathy. *Pakistan journal of medical sciences*. 2019 Jan;35(1):156.
25. Maroufizadeh S, Almasi-Hashiani A, Hosseini M, Sepidarkish M, Samani RO. Prevalence of diabetic retinopathy in Iran: a systematic review and Meta-analysis. *International journal of ophthalmology*. 2017;10(5):782.