



CODEN [USA]: IAJPBB

ISSN: 2349-7750

**INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES**<http://doi.org/10.5281/zenodo.1450816>Available online at: <http://www.iajps.com>

Research Article

**INCIDENCE OF DIABETIC RETINOPATHY AMONG NEWLY
TYPE-II DIABETES (T2DM) DIAGNOSED PATIENTS**¹Dr. Bushra Mehreen, ²Dr. Waqas Yaseen, ³Dr. Maheer Amjad¹Shareef Medical City²Shalamar Medical and Dental College³Shalamar Medical and Dental College**Abstract:**

Objectives: The research objective is the determination of the occurrence of diabetic retinopathy among patients who recently started to suffer from type – II diabetes.

Materials & Methods: This particular research was carried out on 113 newly diabetes mellitus (type – II) diagnosed patients at Sir Ganga Ram Hospital, Lahore (February 2016 to March 2017). The age brackets of 30 – 60 years were selected for this research. Type – I diabetes and hypertension patients were excluded. Patients were then examined through fundoscopy for the presence/absence of retinopathy and its grade.

Results: Among 113 patients, number of males and females was 61% (69) and 38.94% (44) respectively, having 1.6:1 (male to female) with a mean age of (45.4 ± 7.4) years. The outcome shows 15.9% (18) patients with retinopathy-positive and 84% (95) negative.

Conclusion: The study concludes with a 15.9% positive retinopathy outcome among newly type – II diabetes mellitus diagnoses. This result is relatively high.

Keywords: Diabetic Retinopathy (DR), Diabetes Mellitus (DM), Newly Diagnosed Diabetes Mellitus (NDDM).

Corresponding author:

Dr. Bushra Mehreen,
Shareef Medical City

QR code



Please cite this article in press Bushra Mehreen et al **Incidence of Diabetic Retinopathy among Newly Type-II Diabetes (T2DM) Diagnosed Patients.**, Indo Am. J. P. Sci, 2018; 05(10).

INTRODUCTION:

DM has three types: (1) Type – I or Juvenile (insulin dependent) DM, (2) Type – II or adult-onset (non-insulin dependent) DM, and (3) Type – III or gestational diabetes (the development of high level of blood glucose among pregnant women) [1, 2]. Worldwide, DM has 10 to 14% occurrence rate [2]. Type – II DM is the relative deficiency of insulin with high blood glucose caused by a disorder in metabolism [3]. The contrast of Type – I DM is that it is a complete deficiency of insulin caused by islet cells destruction in the pancreas [4]. Symptoms include hunger, frequent urination and excess of thirst. Type – II diabetes covers 90% of cases with 10% of Type – I and III cases [5]. Complications of high blood sugar can lead to DR (leads to blindness), kidney failure, heart strokes, and limbs amputation [6]. In the United States, blindness caused by DR has the highest rate among 25 to 74 years persons. However, the exactly caused diabetes leading to retinopathy is unknown except for the theories constructed from history and the typical course of disease [7]. The formation of a blood vessel in the retina is affected by hyperglycaemia that leads to reduced vision and potential blindness [8]. It is common to observe microvascular complications among patients of Type – II diabetes at the time of clinical diagnosis. Longer duration of diabetes has higher chances of developing DR among patients [9]. The rate of DR prevalence of DR at Type – II diagnosis ranges from five to 35% [10]. With the timely diagnosis, blindness can be delayed through therapy. In a study, Hussain F et al. [8] found a 12% frequency of DR in NDDM (Type – II). A study by Wahab S et al. shows this frequency to be 15% among NDDM patients [11]. A high frequency of 40.6% of DR prevalence was found among DM patients in the study of Khanzada MA et al [2]. A study from Egypt and Oman reported almost the same high frequency of prevalence of DR, which was 40% and 42% respectively [12, 13]. Due to the controversy in the outcomes of previous studies of type – II DM and its increase among our population due to poor awareness and socio-economic status, our study aims at determination of DR frequency in NDDM (Type – II) patients who belong to local areas with the unavailability of approachable healthcare. The study aims at both screening high-risk patients as well as the collection of data on the local population. In addition, different educational programs for public awareness on regional and national levels about DR among NDDM (Type – II) patients. This will educate these patients about the complications, early detection of DR through screening, and taking early measures to prevent the prevalence of complications.

Patients younger than 30 years with more than six months of diagnosed DM and HbA1c levels of ≥ 6.5 was considered positive for T2DM. Diabetic Retinopathy was considered when any of the followings was considered as positive on the outcomes of fundus examination; Background DR (Grade – I): existence of retinal haemorrhage and micro-aneurysms with/without any exudates; Diabetic Maculopathy (Grade – II); Grade – II (Diabetic Maculopathy): incidence of macular oedema and diffuse/focal maculopathy; Pre-proliferative DR (Grade – III): blot haemorrhage, reduplication and beading of venous and intra-retinal microvascular abnormality. Proliferative DR (Grade – IV): Evidence of NVD (new vessels on disc), pre-vitreous/retinal haemorrhage \pm tractional retinal detachment, and pre-retinal fibrosis.

MATERIAL AND METHODS:

This particular research was carried out on 113 newly diabetes mellitus (type-II) diagnosed patients at Sir Ganga Ram Hospital, Lahore (February 2016 to March 2017). The age bracket of 30 – 60 years were selected for this research. We included every NDDM (Type – II) patient in the age group of 30 – 60 years from both the genders. We did not include Type – I DM, hypertension, renal surgery and unwilling patients.

At the reception of approval from the ethical review committee, 113 NDDM (Type – II) (according to operational definition) patients who also fulfilled inclusion criteria, were selected. Informed written consent was taken from each patient. Then, each of them went through fundoscopic examination by an experienced (05 years, post-fellowship) in the presence of the researcher, at Dept. of Ophthalmology in the said hospital. Patients' history and presence/absence of DR was recorded on a pre-designed Performa.

Data analysis was carried out using SPSS. Standard and mean deviation for quantitative variables (duration of disease and age) were presented as outcomes. The qualitative variables i-e educational status, monthly income, DR (absence/presence), and gender were calculated in percentage and frequency and controlled through stratification as being modifiers. Chi-Square was used to measure the effects on results and p-value of ≤ 0.050 was taken as significant.

RESULTS:

Thirty to sixty years patients with mean age of (45.4 \pm 7.4) years were selected for the study. As Table – IV shows, 49.5% (56) of the patients were from 41 to

50 years age. Male to female ratio was 1.6:1.0 with 61% (69) of male and 38.9% (44) of female out of 113. Mean duration (4.4 ± 1.4) of disease, the percentage of educational status, and monthly income of family respectively. After going through Fundoscopic examination for absence/presence of DR, 84% (95) patients were found with no DR and

15.90% (18) were found with DR. Gender and age stratification of DR is shown in Table – III and IV respectively. Stratification with respect to the duration of disease, the status of education and income/month of the family are shown in given tabular data respectively.

Table – I: Distribution with respect to age among 113 patients

Age	Number	Percentage
30 - 40 Years	27	23.89
41 - 50 Years	56	49.56
51 - 60 Years	30	26.55
Total	113	100

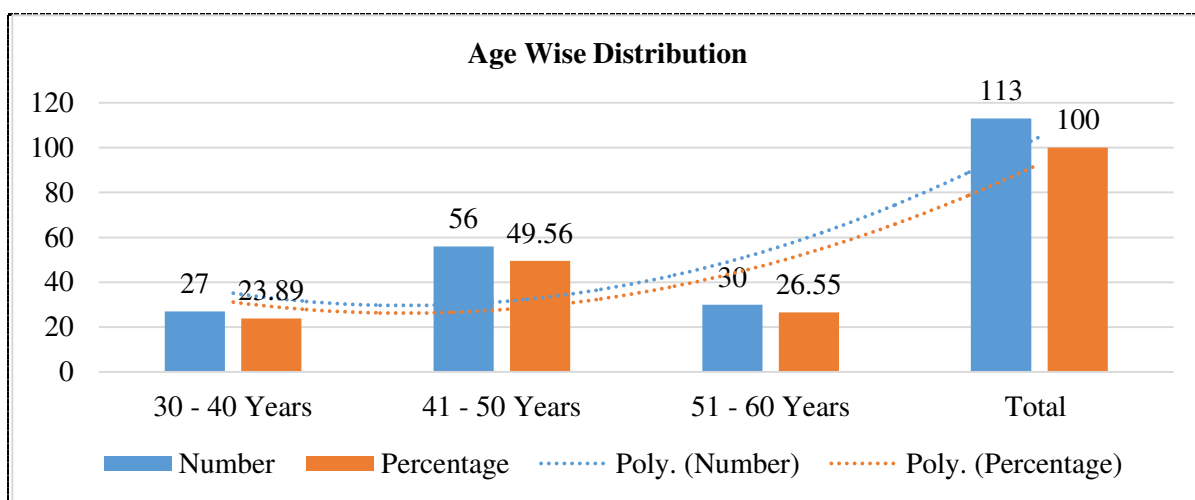


Table – II: Duration of DM (113)

Diabetes Duration	Number	Percentage
≤ 3 months	44	38.94
> 3 months	69	61.06

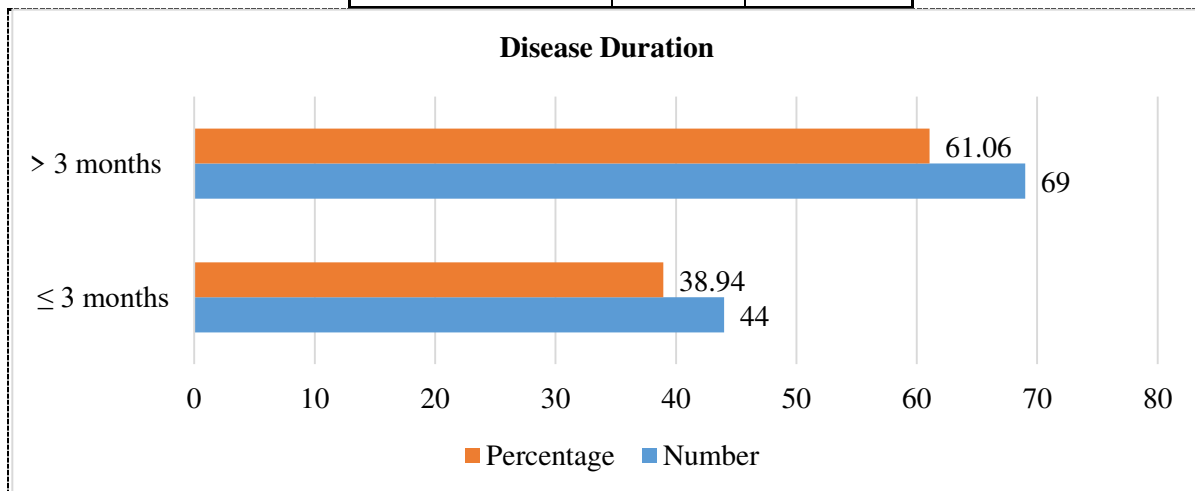
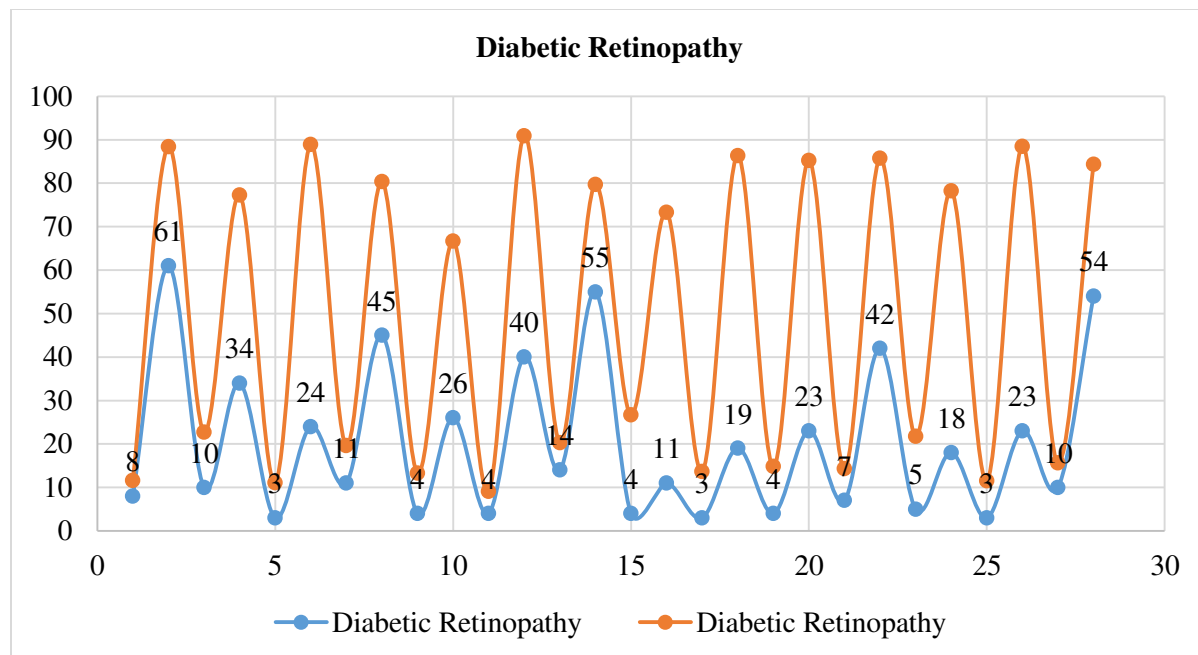


Table – IV: Patients Demographics about diabetic retinopathy (113)

Demographics			Diabetic Retinopathy		P-Value
			Number	Percentage	
Gender	Male	Present	8	11.59	0.115
		Absent	61	88.41	
	Female	Present	10	22.73	
		Absent	34	77.27	
Age (Years)	30 - 40	Present	3	11.11	0.55
		Absent	24	88.89	
	41 - 50	Present	11	19.64	
		Absent	45	80.36	
	51 - 60	Present	4	13.33	
		Absent	26	66.67	
Disease Duration	≤3 months	Present	4	9.09	0.113
		Absent	40	90.91	
	>3 months	Present	14	20.29	
		Absent	55	79.71	
Educational Status	Illiterate	Present	4	26.67	0.682
		Absent	11	73.33	
	School	Present	3	13.64	
		Absent	19	86.36	
	College	Present	4	14.81	
		Absent	23	85.19	
University	Present	7	14.29		
	Absent	42	85.71		
Monthly Income	<5000	Present	5	21.74	0.619
		Absent	18	78.26	
	5000 - 10000	Present	3	11.54	
		Absent	23	88.46	
	>10000	Present	10	15.63	
		Absent	54	84.37	



DISCUSSION:

In the US, DR leads to blindness among persons above 25 years. It is unclear how diabetes causes retinopathy but many theories assume to explain its history and typical course [14]. Changes in micro-vascular retina cause DM. The basement membrane thickens and intramural pericyte induced by hyperglycaemia lead to the ineffectiveness of vascular walls. This causes a change in blood-retinal barrier formation, which makes these blood-retinal vessels more porous [15]. Thirty to sixty years patients with mean age of 45.4 ± 7.4 years were selected for the study. Fifty-six (49.5%) were between forty-one and fifty years age range. Mean age range shows similarity with Iqbal T et al. [16] (47 years) and Khanzada MA et al. [2] (45 years). Wahab S et al. [11] and Mahar PS et al. showed 43 and 42 mean age in their study [17]. Male to female ratio of 1.6:1.0 with 61% (69) of male and 38.9% (44) of the female were taken out of 113 patients. Some previous studies found Type – II DM incidence to be higher [2, 11]. Memon WU et al and Mahar PS et al shows a higher rate among females in their studies [17, 18]. In this study, only 15.9% (18) patients were found with DR and 84% (95) patients did not have DR. A study, Hussain F et al, Wahab S et al. and Khanzada MA et al. show 12%, 15% and 40.6% frequency of DR respectively in NDDM (Type – II) patients [2, 8, 11]. A study in Egypt and Oman found this frequency to be 42% and 42.40% respectively [12, 13]. Abbas KK et al. found 63.50% male and 36.50% female out 200 subjects with DR [19]. Among forty to seventy years with mean age of (51 ± 6.9) years, 14.50% (29)

patients have DR with 82.80% (24) having Pre-proliferative and 17.20% (05) having proliferative diabetic retinopathy. Similar results were found in the studies of Abdollahi A et al. [20], Agarwal S et al. [21], and Nathan [22] with 13.80%, 11.70% and 12.60% prevalence of diabetic retinopathy. Local studies in Pakistan by Mahar PS et al. [17] and Shera AS et al. [23] reported 43% and 27.43% DR in Type – II DM cases. Indian study reports 10.20% while United Kingdom study reports 19% of prevalence [24, 26]. In a study where a hundred patients were taken, out of which, sixty were females. DR was diagnosed among 17% (12% background retinopathy and 04% pre-proliferative and 01% proliferative) within 01 month of NDDM (Type-II) [26]. A study of Amir et al. found the incident rate of DR in 58% of patients admitted due to DM at Peshawar [27]. Sheikh et al. found 15.30% subjects of Pakistan National Blindness and Visual Impairment Survey with DR [28]. DR prevalence was found 25.70% among some Chinese living in the United States [29]. In Taiwan and Hong Kong, 35% and 18.20% prevalence were found respectively.

CONCLUSION:

The study concludes with a 15.93% prevalence of DR in NDDM (Type – II) patients. Therefore, public awareness through educational programs is recommended so that newly diagnosed diabetes (Type – II) should not develop complications and duration of disease through in time therapeutic measurements.

REFERENCES:

1. Kostev K, Rathmann W. Diabetic retinopathy at diagnosis of type 2 diabetes in the UK: a database analysis. *Diabetologia*. 2013; 56:109-11.
2. Hayat AS, Khan AH, Baloch GH, Shaikh N. Frequency and pattern of retinopathy in newly diagnosed type 2 diabetic patients at tertiary care settings in Abbottabad. *J Ayyub Med Coll Abbottabad* 2012;24(2):87-9.
3. Amir AH, Rehman S, Ali SS, Jadoon MZ. Pattern of microvascular complications and associated comorbidities among Diabetic patients at a tertiary care hospital. *J Postgrad Med Inst* 2005; 19:400-6.
4. Shaikh A, Shaikh F, Shaikh ZA, Ahmed J. Prevalence of diabetic retinopathy and influence factors among newly diagnosed diabetes in rural and urban of Pakistan. Data analysis from the Pakistan Blindness & Visual Impairment Survey 2003. *Pak J Med Sci* 2008; 24:774-9.
5. Wong TY, Klein R, Islam FM, Cotch MF, Folsom AR. Diabetic retinopathy in a multi-ethnic cohort in the United States. *Am J Ophthalmol*. 2006; 141:446-55.
6. Chang C, Lu F, Yang YC, Wu JS, Wu TJ. Epidemiologic study of type 2 diabetes in Taiwan. *Diabetes Res Clin Pract*. 2000; 2:49-59.
7. Lee KM, Sum WM. Prevalence of diabetic retinopathy in patients with recently diagnosed diabetes mellitus. *Clin Exp Optom*. 2011; 94:371-5.
8. Boussageon R, Bejan-Angoulvant T, Saadatian-Elahi M, Lafont S, Bergeonneau C, Kassai B, et al. Effect of intensive glucose lowering treatment on all-cause mortality, cardiovascular death, and microvascular events in type 2 diabetes: meta-analysis of randomised controlled trials. *Br Med J*. 2011; 343:4169.
9. Brage P, Gruen RL, Chau M, Forbes A, Taylor HR. Screening for Presence or Absence of Diabetic Retinopathy: A Meta-analysis. *Arch Ophthalmol*. 2011;129(4):435-44.
10. Hussain F, Arif M, Ahmad M. The prevalence of diabetic retinopathy in Faisalabad, Pakistan: a population-based study. *Turk J Med Sci*. 2011;41(4):735-42.
11. Barchetta I, Riccieri V, Vasile M. High prevalence of capillary abnormalities in patients with diabetes and association with retinopathy. *Diabet Med*. 2011;28(9):1039-44.
12. Massin P, Lange C, Tichet J, Vol S, Erginay A, Cailleu M, et al. Haemoglobin A1c and fasting plasma glucose levels as predictors of retinopathy at 10 years: the French DESIR study. *Arch Ophthalmol*. 2011;129(2):188-95.
13. Wahab S, Mehmood N, Shaikh Z, Kazmi H. Frequency of retinopathy in adults with newly discovered and retinopathy in newly diagnosed type 2 diabetes patient. *J Pak Med Assoc*. 2008; 58:557.
14. Santos K.G, Tschiedel B, Schneider JR, Souto KEP, Roisenberg I. Prevalence of retinopathy in Caucasian type 2 diabetic patients from the South of Brazil and relationship with clinical and metabolic factors. *Braz J Med Biol Res*. 2005;38(2):221-25.
15. Herman WH, Aubert RE, Engelgau MM. Diabetes mellitus in Egypt glycaemic control and microvascular and neuropathic complications. *Diab Med*. 1998; 15:1045-51.
16. Crawford TN, Alfaro DV 3rd, Kerrison JB, Jablon EP. Diabetic retinopathy and angiogenesis. *Curr Diabetes Rev*. 2009;5(1):8-13.
17. Pardiando G. Understanding diabetic retinopathy. *Mimbar Ilmiah Oftalmologi Indonesia*. 2005; 2:65-6.
18. Iqbal T. Frequency of Retinopathy in newly diagnosed type 2 diabetes mellitus. *Rawal Med J*. 2009; 34:167-69.
19. Mahar PS, Awan MZ, Manzar N, Memon MS. Prevalence of Type-II Diabetes Mellitus and Diabetic Retinopathy: The Gaddap Study. *J Coll Physicians Surg Pak*. 2010;20(8):528-32.
20. Memon WU, Jadoon Z, Qidwai U, Naz S, Dawar S, Hasan T. Prevalence of Diabetic Retinopathy in Patients of Age Group 30 Years and Above Attending Multicentre Diabetic Clinics in Karachi. *Pak J Ophthalmol*. 2012;28(2):99-104.
21. Abbas KK Mehmood KS, Naeem QM, Yousaf J. frequency of retinopathy in newly diagnosed patients of type 2 diabetes mellitus (DM). *Pak Armed Forces Med J*. 2015;65(1):63-7.
22. Abdollahi A, Malekmadani MH, Mansoori MR, Bostak A, Abbaszadeh MR, Mirshahi A. Prevalence of diabetic retinopathy in patient with newly diagnosed type II diabetes mellitus. *Acta Medica Iranica*. 2006; 44:415-9.
23. Agarwal S, Raman R, Kumari RP, Deshmukh H, Paul PG, Gnana Moorthy P. Diabetic retinopathy in type II diabetics detected by targeted screening versus newly diagnosed in general practice. *Ann Acad Med Singapore*. 2006; 35:531-5.
24. Diabetes Prevention Program Research Group. The prevalence of retinopathy in impaired glucose tolerance and recent onset diabetes in the Diabetes Prevention Program. *Diabetic Med*. 2007; 24:137-44.
25. Shera AS, Jawad F, Maqsood A, Jamal S, Azfar M, Ahmed U. Prevalence of chronic

- complication and associated factors in Type 2 Diabetes. *J Pak Med Assoc.* 2004;54(2):54-9.
26. Reema M, Deepa R, Mohan V. Prevalence of retinopathy at diagnosis among type 2 diabetic patients attending a diabetic centre in South India. *Br J Ophthalmol.* 2000; 84: 1058-60.
 27. Shoback, Gardner DG, Dolores. Greenspan's basic & clinical endocrinology. 9th ed. New York: McGraw-Hill Medical. 2011; Chap 17.
 28. Khanzada MA, Siyal NA, Mirza SA, Memon A, El-Muttaqi A, Mirza AA. Frequency and types of diabetic maculopathy in type II diabetes. *Pak J Surg.* 2013;29(2):139-42.
 29. Vijan S. Type 2 diabetes. *Ann Intl Med.* 2010;152(5):31-15.
 30. Ludwig J, Sanbonmatsu L, Gennetian L, Adam E, Duncan GJ, Katz LF, et al. Neighbourhoods, obesity, and diabetes—a randomized social experiment. *N Engl J Med.* 2011;365(16):1509-19.
 31. Hectors TL, Vanparys C, van der Ven K, Martens GA, Jorens PG, Van Gaal LF, et al. Environmental pollutants and type: a review of mechanisms that can disrupt beta cell function. *Diabetologia.* 2011;54(6):1273-90.