The Professional Medical Journal
www.theprofesional.com

DOI: 10.17957/TPMJ/17.3616

ORIGINAL PROF-3616

DIABETIC RETINOPATHY;
FREQUENCY AT LEVEL OF HbA1C GREATER THAN 6.5%

1. Assistant Professor
Department of Medicine
Peoples University of Medical & Health, Sciences for Women
Nawabshah, Sindh, Pakistan.
2. Assistant Professor
Department of Medicine
Peoples University of Medical & Health, Sciences for Women
Nawabshah, Sindh, Pakistan.
3. FCPS (Medicine), (MSc GASRTO)
Assistant Professor of Medicine
Peoples University of Medical & Health, Sciences for Women
Nawabshah, Sindh, Pakistan.

Correspondence Address:
Dr. Abdul Aziz Sahto
FCPS (Medicine), (MSc Gasrto)
Assistant Professor of Medicine
Peoples University of Medical & Health, Sciences for Women
Nawabshah, Sindh, Pakistan.

Article received on:
31/08/2016
Accepted for publication:
20/12/2016
Received after proof reading:
14/02/2017

Dr. Waseem Raja Memon[1], Dr. Bharat Lal[2], Dr. Abdul Aziz Sahto[3]

ABSTRACT... Objectives: The purpose behind this study was to frequency of diabetic retinopathy at level of hba1c greater than 6.5%. **Material and Methods:** 130 patients with type-II diabetes mellitus with duration of more than >5years with HbA1c level of >6.5% were selected. After taking detailed history regarding diabetes mellitus and diabetic retinopathy, Fundoscopic examination of eye was done. All the information was noted in proforma and analyzed using SPSS version 16.0. **Results:** Frequency of diabetic retinopathy was observed in 23.85% (31/130) and in those cases average HBA1C was 8.08±0.91 (%). Regarding severity, 74.2% were non-proliferative diabetic retinopathy and 25.8(8/31) was proliferative diabetic retinopathy. **Conclusion:** Our study showed a higher prevalence of diabetic retinopathy more commonly in those patients who had HbA1C more than 8%.

Key words: Diabetic Retinopathy, Non-proliferative, HbA1c

Article Citation: Memon WR, Lal B, Sahto AA. Diabetic retinopathy; frequency at level of HbA1C greater than 6.5%. Professional Med J 2017;24(2):234-238.
DOI: 10.17957/TPMJ/17.3616

INTRODUCTION

Diabetes mellitus is amongst the most common chronic metabolic diseases which affect almost every organ of a body and put a great socioeconomic burden on patients and their families. Diabetes mellitus is long ongoing process and become obvious when it produces signs and symptoms of glucose intolerance like polyurea, polydypsia, and numbness of peripheries.[1]

Type 2 diabetes mellitus occurs when the normal cells become completely or partially unresponsive to insulin and these lower levels of insulin leads to an increase in blood glucose levels which in turn causes long standing complications because of damage to microvascular bed including diabetic retinopathy, diabetic neuropathy, and some metabolic disorders.[2-4]

So far, amongst all, Diabetic retinopathy has been found to have the most common associated complications of diabetes of microvascular level and is the most common culprit of causing blindness all over the world. The overall burden of diabetic retinopathy is around 30% and around 2% of them due to uncontrolled diabetes mellitus turned to blind, if left untreated.

There are two types of diabetic retinopathy i. non-proliferative diabetic retinopathy (NPDR) and ii. Proliferative diabetic retinopathy (PDR). The first occurring clinical signs of Proliferative diabetic retinopathy are the formation of microaneurysms. While the other type, NPDR has three different severity stages and patient's gradually progress from mild to severe form and are prone to have more number and sizes of intraretinal hemorrhages.

The major glycohemoglobin found in humans are Glycosylated hemoglobin (HbA1c). Based on the American diabetes association guidelines (ADA) the HbA1c is the gold-standard laboratory investigation of choice to diagnose patients with diabetes mellitus and also to determine glycemic control of roughly around three months, if test is analyzed using standard protocol.

Previously conducted studies have shown

a strong association between HbA1c and development of diabetic retinopathy same as the studies have documented for relationship between fasting blood glucose (FBG) and 2-hPG (2 hour post glucose) thresholds. However, determination of possible relationship of diabetic retinopathy with HbA1c has several advantages over FBG such as patient's convenience for not to fasting for over more than 12 hours and day to day perturbations during periods of stress and illness. In one study at 8.37% Level of glycated hemoglobin (HbA1c), frequency of NPDR was 7.86 ± 0.32%.

The rational of this study is to assess the magnitude of diabetic retinopathy at level of HbA1c of > 6.5%. So that strategies could be developed to screen such patients and counseling could be done to control diabetes and prevent complications like blindness.

PATIENTS AND METHODS

This is a descriptive case study included all the patients of type 2 diabetes mellitus with greater than three years of duration and from a reliable laboratory the levels of HbA1c should have been greater than 6.5% of both genders of any age group from medicine department of People's Medical University, Shaheed Benazeerabad between the periods of six months. Patients with type 1 or gestational diabetes mellitus were excluded from the study.

Data Collection and Analysis

Before commencement of the study, the study protocol was reviewed and approved by the Hospital ethical review committee and informed consent was taken from every patient before collection of the data. All the patients meeting the inclusion criteria of either sex or age were included in the study. After taking detailed history regarding diabetes mellitus and diabetic retinopathy, Fundoscopic examination of eye was done by consultant who had 5 years experience. Based on Fundoscopic findings, there are three distinct types of diabetic retinopathy designed by International Diabetic Retinopathy Disease Severity Scale.

After collection of data analyses were conducted by using Statistical Package for the Social Sciences (SPSS) version 16. Mean and standard deviation were calculated for quantitative variables like age, levels of glycated hemoglobin (HbA1C) and duration of Diabetes. Frequency and percentages were computed for qualitative variables like gender and diabetic retinopathy.

Effect modifier like gender, age, duration of Diabetes and HbA1C levels were controlled by stratification. Chi-square test was used. P <0.05 was considered level of significance

RESULTS

A total of 130 patients with type II diabetes mellitus were included in this study. Fifty one (39.23%) of the patients was 21 to 30 years of age, 35(26.92%) were 31 to 40 years of age, 25(19.23%) were 41 to 50 years of age and 19(14.62%) were 14 to 20 years of age. The average age of the patients was 30.87 ± 9.37 years (95%CI: 29.24 to 32.5) and average duration of diabetic and HBA1c was 10.13±3.13 years and 7.23±0.78 (%).

There were 69(53.08%) male and 61(46.92%) female as presented in Figure-1.

Figure-2 showed the frequency of diabetic retinopathy that was observed in 23.85% (31/130) and in those cases average HBA1C was 8.08±0.91 (%). Regarding severity, 74.2 % (23/31) were non-proliferative diabetic retinopathy and 25.8(8/31) was proliferative diabetic retinopathy as shown in Figure-3.

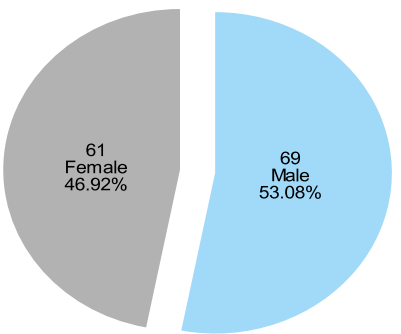

Figure-1. Percentage of patients according to gender

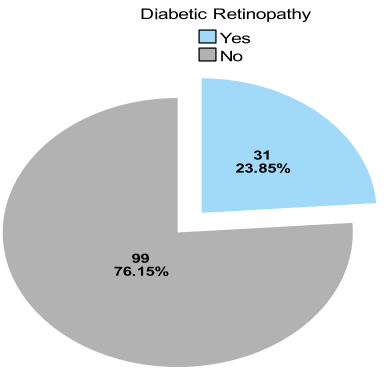

Figure-2. Frequency of diabetic retinopathy n= 130

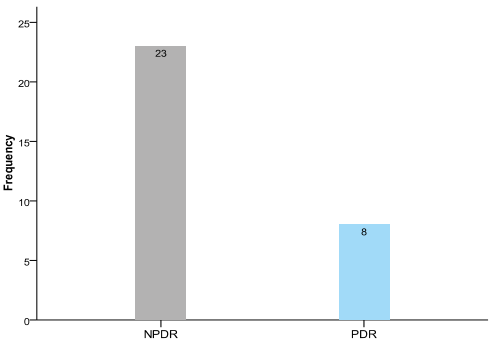

Figure-3. Severity of diabetic retinopathy n= 31
NPDR: Non-Proliferative Diabetic Retinopathy
PDR: Proliferative Diabetic Retinopathy

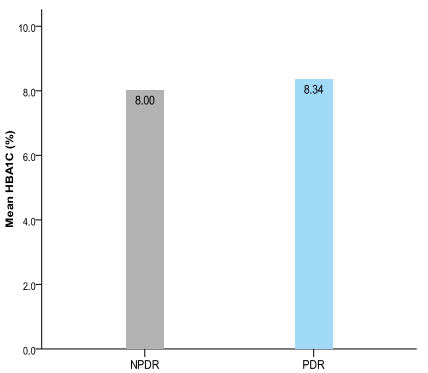

Figure-4. Average hba1c for non-proliferative and proliferative diabetic retinopathy

Age Groups	n	Diabetic Retinopathy	
		Yes	No
≤ 20 Years	19	4(21.1%)	15(78.9%)
21 to 30 Years	51	16(31.4%)	35(68.6%)
31 to 40 Years	35	8(22.9%)	27(77.1%)
41 to 50 Years	25	3(12%)	22(88%)

Table-I. Frequency of diabetic retinopathy by age groups n= 130
Chi-Square= 3.62 df= 3 p=0.305

DISCUSSION

Diabetes mellitus is one of major chronic diseases that affects not every organ in a body but also has a huge impact on overall quality of life. Data from previous literate document an estimated prevalence of diabetes mellitus among patients older than 20 years was around 171 millions, which is considered to be more than 10% higher than the previous one. Among most common microvascular complications of long standing diabetes mellitus, diabetic retinopathy is considered to be the commonest and disabilitating disease leading to blindness.[5-7]

A previous study conducted in Pakistan has shown burden of type 2 diabetes mellitus among young adults was around 10 and among them 26% had diagnosed diabetic retinopathy. In present study fifty one (39.23%) of the patients was 21 to 30 years of age, 35 (26.92%) were 31 to 40 years of age, 25 (19.23%) were 41 to 50 years of age and 19 (14.62%) were 14 to 20 years of age. Mahar et al.[8] has conducted a study in which he has shown highest prevalence of diabetes mellitus among age group between 41 – 50 years which is 6% .

HbA1c is the gold-standard laboratory investigation of choice to diagnose patients with diabetes mellitus and also to determine glycemic control of roughly around three months, if test is analyzed using standard protocol. Some of the previously published data has shown that that group of diabetic people who had good control of their glycemic is having fewer chances of diabetes related complications.[9,10]

Hasan et. al in his study has shown in a data set of 159 that those patients who had HbA1c greater than 8% were documented to have more complications as compared to those who had HbA1c less than 8%.

In our study, the prevalence of diabetic retinopathy is 23.85% while the previous conducted studies have also shown similar findings both data from national and international literatures while some international studies show conflict from

our findings. These differences could be due to population based or number of patients presenting to their hospitals.[11-14]

In-hospital data collected by Rehman and colleagues from Pakistan has shown double (55%) the prevalence of diabetic retinopathy than ours. These findings could be overly representatives or a possibly biased collected data or may be patients representing their study could already have their uncontrolled diabetes mellitus.

Study from Indian authors has shown diabetic retinopathy prevalence of around 18%, which is somehow similar to our study findings.[15-17]

Regarding severity, 74.2 % (23/31) were non-proliferative diabetic retinopathy and 25.8(8/31) was proliferative diabetic retinopathy in present study. Mahar et al in his conducted data has shown same findings with a prevalence of NDPR 72.61%.

The prevalence of diabetic retinopathy is directly corresponds to its duration. As the duration of diabetes mellitus increase the risk of development of diabetes mellitus has also increases. The reported duration based prevalence of diabetic retinopathy in a study was (duration 0–4 years, –9.2%; 5–9 years, 23.1%; 10–19 years, 33.3%; and 20 years, 57.1%).[18]

The main limitation of our study was its cross-sectional nature which made the determination of causative effects impossible. A follow-up study of the same population will be of help in this regard.

CONCLUSION

The results of the study highlight the high prevalence of diabetic retinopathy at 23.85% and advocate the use of early screening measures for prevention and management of DM and its vision threatening complications like blindness.

REFERENCE

1. Olt S. **Relationship between vitamin D and glycemic control in patients with type 2 diabetes mellitus.** Int J Clin Exp Med 2015;8(10):19180-3.
2. Caretta N, de Kreutzenberg SV, Valente U, Guarneri G, Ferlin A, Avogaro A, et al. **Hypovitaminosis D is associated with erectile dysfunction in type 2 diabetes.** Endocrine 2016 Jan 12.
3. Almurdhi MM, Reeves ND, Bowling FL, Boulton AJ, Jeziorska M, Malik RA. **Reduced Lower-Limb Muscle Strength and Volume in Patients With Type 2 Diabetes in Relation to Neuropathy, Intramuscular Fat, and Vitamin D Levels.** Diabetes Care 2016 Mar;39(3):441-7.
4. Al-Shahwan MA, Al-Othman AM, Al-Daghri NM, Sabico SB. **Effects of 12-month, 2000IU/day vitamin D supplementation on treatment naive and vitamin D deficient Saudi type 2 diabetic patients.** Saudi Med J 2015 Dec;36(12):1432-8.
5. Fenwick EK, Ong PG, Man RE, Sabanayagam C, Cheng CY, Wong TY, et al. **Vision impairment and major eye diseases reduce vision-specific emotional well-being in a Chinese population.** Br J Ophthalmol 2016 Aug 26.
6. Okosun IS, Turbow S, McJenkin K, Monique Davis-Smith Y, Seale JP. **Diagnostic performance of glycated hemoglobin for diabetic retinopathy in non-diabetic older overweight/obese African-Americans.** Diabetes Res Clin Pract 2016 Aug 6;120:124-31.
7. Graham-Rowe E, Lorencatto F, Lawrenson JG, Burr J, Grimshaw JM, Ivers NM, et al. **Barriers and enablers to diabetic retinopathy screening attendance: Protocol for a systematic review.** Syst Rev 2016;5(1):134.
8. 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 Aug;20(8):528-32.
9. Chen X, Lu L. **Depression in Diabetic Retinopathy: A Review and Recommendation for Psychiatric Management.** Psychosomatics 2016 Apr 22.
10. Ziemssen F, Lemmen K, Bertram B, Hammes HP, Agostini H. **[National guidelines for treatment of diabetic retinopathy : Second edition of the national guidelines for treatment of diabetic retinopathy].** Ophthalmologe 2016 Jul;113(7):623-38.
11. Cheung N, Tan SP, Lee SY, Cheung GC, Tan G, Kumar N, et al. **Prevalence and risk factors for epiretinal membrane: the Singapore Epidemiology of Eye Disease study.** Br J Ophthalmol 2016 Jun 24.
12. Ponto KA, Koenig J, Peto T, Lamparter J, Raum P, Wild PS, et al. **Prevalence of diabetic retinopathy in screening-detected diabetes mellitus: results from the Gutenberg Health Study (GHS).** Diabetologia 2016 Sep;59(9):1913-9.

13. Coronado AC, Zaric GS, Martin J, Malvankar-Mehta M, Si FF, Hodge WG. **Diabetic retinopathy screening with pharmacy-based teleophthalmology in a semiurban setting: a cost-effectiveness analysis.** CMAJ Open 2016 Jan;4(1):E95-E102.

14. Goto S, Yamashita H. **[Clinical epidemiology of diabetic retinopathy].** Nihon Rinsho 2016 Apr;74 Suppl 2:103-6.

15. Gella L, Raman R, Pal SS, Ganesan S, Sharma T. **Incidence, Progression, and Associated Risk Factors of Posterior Vitreous Detachment in Type 2 Diabetes Mellitus: Sankara Nethralaya Diabetic Retinopathy Epidemiology and Molecular Genetic Study (SN-DREAMS II, Report No. 7).** Semin Ophthalmol 2015 Aug 19;1-7.

16. Ramavat PR, Ramavat MR, Ghugare BW, Vaishnav RG, Joshi MU. **Prevalence of Diabetic Retinopathy in Western Indian Type 2 Diabetic Population: A Hospital - based Cross - Sectional Study.** J Clin Diagn Res 2013 Jul;7(7):1387-90.

17. Ramasamy K, Raman R, Tandon M. **Current state of care for diabetic retinopathy in India.** Curr Diab Rep 2013 Aug;13(4):460-8.

18. Tapp RJ, Shaw JE, Harper CA, de Court, Balkau B, McCarty DJ, et al. **The prevalence of and factors associated with diabetic retinopathy in the Australian population.** Diabetes Care 2003 Jun;26(6):1731-7.

PREVIOUS RELATED STUDY

Nauman Ayub Shaikh, Farooq Ahmad. DIABETIC RETINOPATHY; EFFECT OF PHACOEMULSIFICATION (Original) Prof Med Jour 17(2) 257-262 Apr, May, Jun 2010.

Tahira Tasneem, Seema Mazhar, Zafar Iqbal. PLATELET AGGREGATION STUDIES IN DIABETIC RETINO-PATHY (Original) Prof Med Jour 9(1) 29-35 Jan, Feb, Mar 2002.

AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Dr. Waseem Raja Memon	All authors have contributed equally	
2	Dr. Bharat Lal		
3	Dr. Abdul Aziz Sahto