DIABETIC EYE SCREENING IN SIR GANGA RAM HOSPITAL, LAHORE.

Mr. Muhammad Adnan¹, Dr. Humera Zafar², Mrs. Zahra Ali³, Dr. Iffat Shabbir⁴, Ms. Tayyaba Rahat⁵

ABSTRACT... Background: Diabetic retinopathy is the optical complication that may lead to impaired vision. It is one of the most prevalent but preventable blinding disease. Its early diagnosis is prerequisite for the prevention of the visual loss and blindness associated with diabetic complication. Objective: To estimate frequency of eye examination and various types of retinopathy; and to find the association between diabetic retinopathy and its risk factors. Methods: The cross sectional study was conducted from Apr-Sep 2012 by PMRC Research Centre, FJMC, Lahore. Using non probability convenient sampling, eighty known type II diabetics were recruited. Venous blood was drawn for plasma glucose level (GOD-PAP) and glycosylated hemoglobin (Ion-Exchange Resin). Arterial blood pressure was measured using digital apparatus (Oscillometric method). Visual acuity was tested by Snellen’s chart and dilated fundus examination was done to screen diabetic retinopathy. Data was analyzed using Statistical Package for Social Sciences (SPSS-20). Results: The study included 41% males and 59% females. Mean age was 51±9 (33-67) years. Diabetics who never screened for retinopathy were 54.3%; and who examined during last year as per IDF guidelines were 25.7%. The frequency of bilateral and unilateral NPDR was 22.5% and 5%, respectively. The occurrence of NPDR was slightly higher in left eye, whereas PDR was more prevalent in right eye. The visual acuity was equal or better than 6/12 in better eye of 80% study participants; and was 6/18-6/36 in better eye of 20% participants. DR was significantly associated with longer duration of diabetes (p-0.010), poorly controlled diabetes (p-0.044) and hypertension (p-0.006). Odd ratios (95% CI) showed that duration of diabetes ≥20 years, glycosylated hemoglobin ≥7.5 %, Systolic blood pressure ≥140 mm/Hg and diastolic blood pressure ≥90 mm/Hg had 3-5 times higher risk of retinopathy. Conclusion: Majority of patients were neither knew nor referred for eye examination. Strict control of diabetes and hypertension may prevent or delay diabetic retinopathy. Policy Message: Annual eye examination must be prescribed by the physician/ diabetologist. An education and awareness program for diabetics and community based survey is highly recommended.

Key words: Diabetic Retinopathy, Non-proliferative Diabetic Retinopathy, Proliferative Diabetic Retinopathy, Duration of Diabetes, Eye Examination.

INTRODUCTION

Diabetic retinopathy (DR) is damage to fragile blood vessels of retina due to long term diabetes. It is a leading cause of adult blindness in United States¹, Australia², Israel³ and Western World.⁴ Pakistan ranks 6th among countries with diabetes⁵. More than 10% of its adult population have diabetes⁶. Patients with both type 1 diabetes mellitus (T1DM) and type 2 diabetes mellitus (T2DM) are at high risk for this condition. All studies have shown similar risk factors for DR such as duration of diabetes, glycemic status and hypertension (HTN)⁷-¹⁰. In T2DM 21% patients have DR at diagnosis¹¹ and >60% patients in first 20 years of disease¹². The duration of diabetes is the factor that cannot be customized while glycemic control and HTN can be tailored. Reduction in progression and severity of retinopathy is seen when glycemic control maintained less than 7%¹³ and blood pressure controlled tightly independent of the use of angiotensin converting enzyme (ACE) inhibitors¹⁴.

Several types of screening programs have been designed throughout the world to meet this problem. In Pakistan, population-based data on the prevalence of DR is limited. A comprehensive program of screening followed by prompt and
adequate treatment can make a significant contribution to eradicate DR as a cause of blindness.

**Objectives**
The study was designed to estimate the frequency of eye examination and various types of retinopathy; and to find the association between diabetic retinopathy and its risk factors.

**MATERIALS AND METHODS**
The cross sectional study was conducted from April 2012 to September 2012 at PMRC Research Centre, FJMC, Lahore in collaboration with Eye Department of Sir Ganga Ram Hospital, Lahore. Using non probability convenient sampling, eighty known type II diabetics who consented to be participant of the study, were recruited. A specially designed proforma was used as study tool to collect data for age, gender, education, socioeconomic status, duration of diabetes, prescription pattern, family history of disease and frequency of eye examination. Venous blood sample (5ml) was drawn to estimate plasma glucose (GOD-PAP method) and glycosylated hemoglobin (Ion-Exchange Resin method). Arterial blood pressure was measured using digital apparatus (Oscillometric method). Visual acuity was tested by Snellen’s chart and dilated fundus examination was done to screen diabetic retinopathy.

Data analysis was done using the Statistical Package for Social Sciences (SPSS 20). Age was described by using Mean±SD; Eye examination and retinopathy were illustrated by frequency (percentage). Fisher exact test was used for association between retinopathy and risk factors. Odd ratio was calculated with 95% confidence interval. P-Value ≤0.05 was considered significant.

**RESULTS**
The study included 80 type II diabetics, among them 33 (41%) were males and 47 (59%) were females. The mean age was 51±9 (33-67) years. Among respondents 30% were illiterate and 55% were of low socioeconomic status. Frequency of family history of diabetes, hypertension, cardiovascular and renal disease was 78%, 63%, 48% and 15% respectively. Among recruited diabetics 88% were hypertensive; only 53% were known hypertensive; and 35% were diagnosed as hypertensive at the time of registration. For treatment it was observed that 55% patients were taking only oral hypoglycemic drugs (metformin and/or sulfonylurea), 20% were taking only insulin (70/30 humulin) and 20% were taking combination therapy (metformin and insulin). However 5% were not taking any medicine at all.

Seventy diabetics with duration of diabetes more than two years answered the question, “have you ever examined for retinopathy and if yes when last time?” It was seen that 54.3% diabetics were never examined; 5.7% were examined since more than two years; 14.3% were examined within one to two years; and 25.7% were examined during twelve months prior to recruitment for study. (Table I).

| Eye Examination (n=70) | No | 38 (54.3%) |
|-----------------------|----|------------|
|                       | Yes| 32 (45.7%) |
|                       | > 02 years | 04 (5.7%) |
|                       | 1 – 2 years | 10 (14.3%) |
|                       | < 01 year | 18 (25.7%) |

In total 160 eyes of 80 study participants were examined by dilating pupils. No abnormality was seen in 76 (47.5%) eyes. The overall incidence of DR, NPDR, PDR and CSME was 32.5%, 25%, 6.3% and 1.2%, respectively. The frequency of bilateral and unilateral NPDR was 22.5 and 5%, respectively. The NPDR was seen 5% more in left eye where as PDR was 2.5% more prevalent in right eye. The incidence of cataract alone was observed in 20%; however cataract was also seen in both eyes along with retinopathy. (Table II).

The visual acuity was equal or better than 6/12 in better eye of 80% study participants; and was 6/18-6/36 in better eye of 20% participants. (Table III).
The results have shown that diabetic retinopathy was significantly associated with duration of diabetes, glycosylated hemoglobin, systolic blood pressure and diastolic blood pressure. However odds ratio of duration of diabetes ≥20 years (OR 4.3, 95% CI); HbA1c (OR 2.7, 95%CI); Systolic blood pressure (SBP) (OR 5.1, 95%CI) and diastolic blood pressure (DBP) (OR 4.2, 95% CI) revealed that patients having history of diabetes for 20 years or more had 4-times greater chances of having retinopathy; and poor glycemic control (HbA1c 7.5% or above) had 3-times more chance of retinopathy. (Table IV).

**DISCUSSION**

Only 25.7% diabetics had been screened for retinopathy during last year while International Diabetes Federation guideline recommends that screening for retinopathy should start after two years diabetes duration and frequency of retinopathy screening in general should occur annually\(^5\). Majority of diabetics (54.3%) as in Malaysia (55.0%)\(^6\) had never been examined for retinopathy because they were neither knew nor referred to eye clinic. The diabetics (20%), who were screened before one year or more, underwent fundus screening after the incidence of eye complication.

DR prevalence (32.5%) found in study was slight higher but comparable to 28.6% in Chandka Medical College, Larkana\(^7\); 28.9% in Jinnah Hospital, Lahore\(^8\); and 29.8% in Medical University, China\(^9\). The incidence of DR, PDR and macular edema 41%, 7% and 10% was higher in Irish Type II diabetics; however visual acuity equal or better than 6/12 in better eye was lower (91% < 80%) in studied diabetics\(^4\). Results showed that long duration of diabetes, poor glycemic control and uncontrolled blood pressure were important determinants of diabetic retinopathy.

| Visual Acuity | Left Eye (n=80) | Right Eye (n=80) |
|---------------|----------------|-----------------|
| 6/6           | 20 (25.0%)     | 26 (32.5%)      |
| 6/9           | 16 (20.0%)     | 20 (25.0%)      |
| 6/12          | 20 (25.0%)     | 18 (22.5%)      |
| 6/18          | 10 (12.5%)     | 06 (7.5%)       |
| 6/24          | 04 (5.0%)      | 04 (5.0%)       |
| 6/36          | 10 (12.5%)     | 06 (7.5%)       |

**Table-III. Visual Acuity**
significantly associated with diabetic retinopathy. These risk factors had also been proved in different studies. Duration of diabetes cannot be modified but other two factors can be ordered. Therefore, good control of plasma glucose and blood pressure can improve the outcome. Severe vision loss and moderate vision loss from diabetes are essentially preventable with timely detection and treatments, careful long-term follow-up and comprehensive diabetes mellitus care firmly based on clinical evidence. Future treatments, as outgrowths of further understanding of the biochemical basis of the disease, will aim at curing or preventing retinal complications from diabetes.

CONCLUSION
The frequency of retinopathy screening was extremely low. Majority of patients were neither knew nor referred for eye examination. Strict control of diabetes and hypertension may prevent or delay diabetic retinopathy. Annual eye examination must be prescribed by the physician/diabetologist. An education and awareness program for diabetics and community based survey is highly recommended.

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You never fail until you stop trying.

Albert Einstein