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

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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 >5 years 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

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 rationale 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.
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 representative 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


PREVIOUS RELATED STUDY


AUTHORSHIP AND CONTRIBUTION DECLARATION

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