

Frequency of Undiagnosed Retinopathy Among Patients of Diabetes Mellitus Presenting to The Diabetic Clinic of a Tertiary Care Hospital

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ABSTRACT

Objective: To determine the frequency of undiagnosed retinopathy among patients of diabetes mellitus presenting to the diabetic clinic of a tertiary care hospital.

Study Design: Descriptive/Cross-sectional study

Place and Duration: Department of Medicine, Sharif Medical City Hospital Lahore for duration of six months i.e from 17th December 2018 to 16th June 2019.

Methodology: Total 130 cases of diabetes mellitus with age range from 15-60 years were selected. Patients with laser therapy of retina, taking ACE inhibitors and renal failure were excluded. Both eyes of the patient were dilated using tropicamide 1% eye drops. Retina was examined using 90D slit lamp biomicroscopy by consultant ophthalmologist. The presence of retinopathy was noted in the proforma.

Results: Mean age of patients was 40.43±11.04 years. Majority of the patients i.e. 72 (55.38%) were between 41 to 60 years of age. Out of these 130 patients, 75 (57.69%) were male and 55 (42.31%) were females with male to female ratio of 1.4:1. Mean Hb A1c levels were 7.87±1.54. Frequency of undiagnosed retinopathy among patients of diabetes mellitus was found in 40 (30.77%) patients.

Conclusion: This study concluded that the frequency of undiagnosed retinopathy among patients of diabetes mellitus is relatively high.

Keywords: Diabetes, complications, undiagnosed retinopathy.

INTRODUCTION

Diabetes mellitus has developed worldwide as an epidemic and as an important public health concern. Pakistan is considered one of the world's largest diabetes population and ranks seventh worldwide in the International Diabetes Foundation. 1 In Pakistan the prevalence of diabetes is high, ranging from 7.6% to 11% among adults. 2 As a result of urbanization, physical inactivity and obesity, the number of people with diabetes in Pakistan is increasing. 3

Three major diabetes mellitus (DM) forms exist: I type I or DM-related insulin or young diabetes, (ii) type II or non-insulin-related DM or diabetes adults, (iii) gestational diabetes happens when women who are pregnant without a diagnosed diabetes experience elevated levels of blood glucose. 4,5 Diabetes mellitus incidence is 10-14 percent worldwide. 5 Type 2 diabetes mellitus is a metabolic disorder which is characterized by high blood glucose in the sense of insulin resistance and relative insulin deficiency (NIDDM) and is characterized by high blood glucose levels. 6 This is in contrast to diabetes mellitus type 1, in which the breakdown of islet cells in the pancreas causes absolute insulin deficiency. 7

The diabetic patient is vulnerable to many complications causing morbidity and premature mortality. Diabetic retinopathy is the world's leading cause of blindness, but in various parts of Pakistan studies of the rate of undiagnosed retinopathy have shown significant variation from 15.3 to 40.94%, depending on the examiner's experience and the detection process. In 2016, Jawa et al. performed a study which revealed that the rate of undiagnosed retinopathy in diabetic patients not

considered to have diabetic retinopathy was 27 percent 11 only diagnosed with fundoscopy at a screening camp.

However, there are numerous hypotheses to explain the normal course and history of the disease. The precise mechanisms by which diabetes causes retinopathy are unknown.

12 Hyperglycemia affects the development of blood vessels in the eye's retina, may cause visual effects, vision loss and possibly blindness. 13 Given the fact that type 2 diabetes mellitus may occur long prior to clinical diagnosis, its micro-vascular complications are not unusual to see when diagnosed. The longer a person has diabetes, the more likely he or she would be to develop diabetic retinopathy. 14 The reported prevalence of diabetic retinopathy when type 2 diagnoses ranges between 5 and 35%. 15

The rationale of this research was to assess the undiagnosed prevalence of retinopathy in patients with diabetes mellitus at a tertiary clinic. While there is plenty of literature about its occurrence, its findings and fundoscopy varied widely as a screening tool that could contribute to underdiagnosis and reporting. Via advance techniques like the slit lamp test and consultant ophthalmologist for proper diagnose and reporting of diabetic retinopathy, this research would also provide additional proof even in the earliest stage so that clinicians will have details on the size of a disease. The findings are shared with the authorities in charge of planning a test strategy to allow these patients to be managed sooner rather than later and to minimize the preventable cause of blindness.

MATERIALS AND METHODS

This descriptive/cross-sectional study was conducted in department of Medicine, Sharif Medical City Hospital Lahore for duration of six months i.e from 17th December 2018 to 16th June 2019. Total 130 cases of diabetes mellitus with age range from 15-60 years were selected. Patients with laser therapy of retina, taking ACE inhibitors and renal failure were excluded. Information regarding their demographic data was noted in the proforma after taking written informed consent.

Both eyes of the patient were dilated using tropicamide 1% eye drops. Retina was examined using 90D slit lamp biomicroscopy by consultant ophthalmologist. The presence of retinopathy was noted in the proforma. Confidentiality of the data was ensured. Data was entered and analysed using SPSS version 24.0. Numerical variable i.e. age was summarized as mean and standard deviation. Qualitative variables like sex, presence of undiagnosed retinopathy were presented in the form of frequency and percentages. Data was stratified for age, sex, duration of diabetes and control of diabetes (HbA1C levels <7 / ≥7). Chi square test was applied to check statistical significance post-stratification. p value < 0.05 was used as statistically significant.

RESULTS

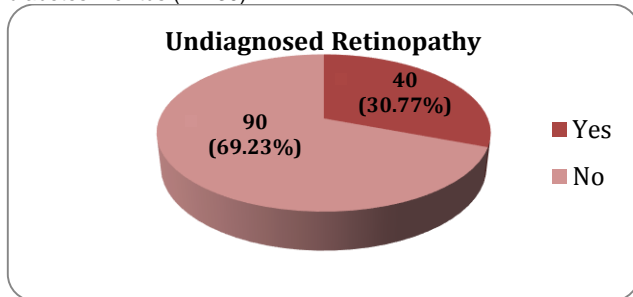
Mean age of patients was 40.43±11.04 years. Majority of the patients i.e. 72 (55.38%) were between 41 to 60 years of age. Mean duration of diabetes was 9.32 ± 4.06 years. 75 (57.69%) were male and 55 (42.31%) were females with male to female ratio of 1.4:1 (Figure IX). Mean HbA1c levels were 7.87 ± 1.54 (Table 1).

Table No 1: Baseline details of all the patients

Variables	Frequency No.	%age
Mean age (yrs)	40.43±11.04	-
Mean Disease Duration	9.32±4.06	-
Mean HbA1c levels	7.87±1.54	-
Gender		
Male	75	57.69
Female	55	42.31

Frequency of undiagnosed retinopathy among patients of diabetes mellitus was found in 40 (30.77%) patients as shown in Figure 1.

Figure 1: Frequency of undiagnosed retinopathy among patients of diabetes mellitus (n=130).



When we stratified frequency of undiagnosed retinopathy with respect to age, gender and duration of

disease we found no significant difference with p-value >0.05. (Table 2)

Table No 2: Stratification with respect to age, gender and disease duration

Variables	Undiagnosed Retinopathy Yes	Undiagnosed Retinopathy No	P-value
Age			
15-40	15	43	0.277
41-60	25	47	
Gender			
Male	21	54	0.424
Female	19	36	
Duration (years)			
<10 years	17	51	0.424
≥10 years	23	39	

DISCUSSION

People with diabetes mellitus, i.e. those who have type I and type II diabetes, are at risk. The longer a person has diabetes, the greater the risk of ocular disease. There is some phase of diabetic retinopathy between 40 and 45 percent of Americans diagnosed with diabetes.¹⁶ Nearly all patients with Type I diabetes and >60 percent of patients with Type II have a certain degree of retinopathy after 20 years of diabetes; however these estimates were released in 2002 using figures from four years earlier, reducing the usefulness of research today. Despite this daunting statistics, research suggests that, if adequate and diligent eye care and eye surveillance was carried out, at least 90% of these new cases will be reduced. The longer a person has diabetes, the more likely he or she would be to develop diabetic retinopathy.¹⁷

The age range was 15 to 60 years in this sample and the average age was 40.43 ± 11.04 years. The majority of patients were between 41 and 60 years old, i.e. 72 (55.38 percent). This was significantly lower than Iqbal T et al¹⁸ and Khanzada MA et al⁵, respectively 47 and 45 years of age. On the other hand, Wahab S et al¹⁹ and Mahar PS et al⁷⁰ found that their average age was 43 and 42 years, which is comparable with our analysis. Of the 130 patients, 75 (57.69%) were male and 55 (42.31%) were female with a 1.4:1 ratio of male to female. Many previous studies have also shown that the prevalence of diabetes in males is higher than in females.^{18, 19} During his research, Memon WU et al²⁰ and Mahar PS et al²¹ showed female domination.

The prevalence of undiagnosed retinopathy was observed in 40 (30.77 percent) patients in our sample. Diabetic retinopathy is the world's leading cause of blindness, but research in various parts of Pakistan concerning the prevalence of non-diagnosed retinopathy have shown marked variation between 15.3% and 40.94%, depending on the skill and method of detection used by the examiner. Jawa et al¹¹ conducted a 2016 study that documented an undiagnosed retinopathy in 27 percent of patients unknown to have diabetes retinopathy diagnosed with funduscopy at the screening camp only.

In another Abbas KK et al²² survey, 63.5% of 200 people were male and 36.5% female. The age varied between 40 and 70 years, averaging 51.05 years. Diabetic retinopathy occurred in 29 (14.5 percent) participants. Of 29 patients, 24 (82.8%) had pre-proliferative and 5 (17.2%) had diabetic retinopathy proliferative. There are also

several clinically validated studies in diabetes type 2 patients newly diagnosed, that showed similar results for retinopathy prevalence for our research, i.e. Abdollahi A et al²³ reported 13.8 percent, Agarwal Set al²⁴ reported 11.7 percent, while in the recent diabetes prevention program Nathan²⁵ reported 12.6 percent retinopathy prevalence.

A previous local research by Shera AS et al.²⁶ in Pakistan has shown the prevalence of diabetic retinopathy to be 43.0%. A research in India similarly showed that this figure was 10.2 percent²⁷ while the incidence of undiagnosed retinopathy in the UK was 19 percent.²⁸ In another study, 100 patients were included, of which 60 percent were females, averaging 45.1±3.2 years of age. Overall, within one month of diagnosis 17 percent of diabetic type 2 patients had retinopathy. The retinopathy in the background was predominantly (12%), with pre-proliferative (4%) and proliferative (1%) lesions.²⁹

In a pilot study³⁰ performed on 3000 diabetic patients in Karachi, 26% of patients suffered from retinopathy. However, in the UK Prospective Diabetes Survey, a European study by Kohner EM et al³¹ identified 35 percent prevalence of women's retinopathy. In Europeans, the prevalence of retinopathy during type 2 diagnosis is 32 and 35 percent of Type 2 diabetes patients reported retinopathy during diagnosis in the United Kingdom Prospective Diabetes study (UKPDS).

In another survey³², the age range was between 22-76 years with 315 (68.18 percent) and 147 men and women (31.81 percent). No case of proliferative DR has been found in DM-duration patients under 10 years while in DM-duration patients over 30 years the incidence has increased to 27.45 per cent. Changes in preproliferative DR increased by 12.67% in 30 years. In individuals with HbA1 C levels below 7% over 5 to 10 years, 44.94% had no DR variation while 62.92% had Background DR, 3.3% had Pre-proliferative DR and none had Proliferative DR. Persons with HbA1 C levels between 7% and 10% had 33,30%, 50,4% and 12,19%, whereas HbA1C>10% had an unprecedented prevalence of 39,37%, 35,43% and 25,19% in the background groups, pre-proliferative and proliferative DR.³³

CONCLUSION

This study concluded that the frequency of undiagnosed retinopathy among patients of diabetes mellitus is relatively high. So, we recommend that there should be public awareness and intensive periodic educational programs on national and regional levels for all diabetic patients to spread awareness and education of disease, its complications, detailed ophthalmic examination at the time of diagnosis of diabetes and periodic screening to detect retinopathy early so that early therapeutic measures can be taken to prevent its further complications.

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