Frequency of Diabetic Retinopathy in Diabetic Patients in Pakistan

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Original Research Article

Frequency of Diabetic Retinopathy in Diabetic Patients in Pakistan

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ABSTRACT

Objective: To determine the frequency of diabetic retinopathy and its types in diabetic patients of Pakistan.

Study Design: Cross sectional study.

Place and duration: Study was conducted in department of Ophthalmology, Nishtar Hospital Multan from 1st June 2020 to 2nd June 2021 in one-year duration.

Methodology: Study was conducted on 300 diabetic patients and presented at the outpatient's department of hospital. All participants underwent eye examinations using the Snellen chart for vision assessment and either slit lamp or fundoscopy for evaluating the retina. The main variables of the study were diabetic retinopathy, macular edema, and the various types of diabetic retinopathy. Diabetic retinopathy was categorized into proliferative retinopathy and non-proliferative retinopathy, further classified into mild, moderate, and severe based on the severity of the condition.

Results: Of the total 300 patients, 65.0% were found to have diabetic retinopathy. Macular edema was detected in 13.0% of diabetic patients. The diabetic individuals were categorized based on the severity of retinopathy: 28.3% exhibited mild non-proliferative diabetic retinopathy (NPDR), 13.0% had moderate NPDR, 11.0% presented severe NPDR, and 7.7% had proliferative diabetic retinopathy (PDR)

Conclusion: Diabetic retinopathy either proliferative or non-proliferative is highly prevalent in Pakistani population. Early detection and management are necessary to prevent its role in blindness.

Keywords: Diabetic retinopathy, Blindness, Proliferative diabetic retinopathy, non-proliferative, retinopathy

1. INTRODUCTION

Diabetes mellitus is a metabolic disease which presents with a raised blood glucose level for long duration (1). According to the International Diabetes Federation currently 381 million subjects are suffering from diabetes and most cases were found in Asia and Africa. Long term complications of diabetes were stroke, ischemic heart disease (2), foot ulcer, diabetic nephropathy, and diabetic retinopathy. Similarly acute complications were non ketotic hyperosmolar coma and diabetic ketoacidosis. Insulin resistance and lack of insulin are two main causes of diabetes (3).

Three major types of diabetes are type 1 diabetes, type 2 diabetes and gestational diabetes (4). Type 1 diabetes is also known as insulin dependent diabetes that occurs due to lack of insulin production. In type 2 diabetes insulin resistance was observed in which body cells become unable to use insulin and after some time deficiency of insulin may occur (5). Type 2 diabetes is also known as non-insulin dependent diabetes mellitus or adult-onset diabetes. Third type of Diabetes is gestational diabetes that occurs in pregnant women who were not having history of diabetes before but develop it (6).

Diabetic retinopathy is an abnormality of in which microvessls located in retina become affected, hyperglycemia damages the outer lining of cells and responsible for death of blood vessels which are called pericytes (7). Furthermore, thickening of basement membrane occurs which results in damage of barrier of retina and increase in permeability (8). This increase in permeability changes the structure of vessels that results in hemorrhage, lack of vascularization and release of soft or hard exudate (9).

Diabetic retinopathy is further classified as mild, moderate, and severe retinopathy and it was defined in previous literature (10). Along with diabetic retinopathy diabetic macular edema is also a contributing factor in development of vision impairment and retinal detachment. Macular edema can present at any stage of retinopathy and can be graded as mild moderate and severe to simplify the understanding of retinopathy and its role vision impairment (11).

2. METHODOLOGY

This cross-sectional study was conducted in the Department of Ophthalmology, Nishtar Hospital Multan from 1st June 2020 to 2nd June 2021 in one-year duration. The study was approved by the Hospital ethics board and consent given by patients.

Patients with diabetes mellitus since last five years and age above 20 years were enrolled in study. Confirmation of diabetes was done by taking two

consecutive samples for random blood glucose levels in which glucose was above 200mg/dl. After confirmation patients were referred to eye OPD of hospital. All patients were examined for their dilated fundus with +90D volk lens and best corrected visual acuity with slit lamp and Snellen Chart. Types of diabetic retinopathy and maculopathy were observed. Diabetic retinopathy was further divided into proliferating retinopathy, non-proliferating retinopathy (mild, moderate and sever) according to severity of DR. International clinical diabetic retinopathy severity scale was used for grading of severity of DR and macular edema (MD).

Statistical package for social sciences (SPSS) was used for data analysis. Frequency and percentages (%) were used for description of categorical variables like gender, severity of diabetic retinopathy and macular edema, Mean and SD were calculated for numerical variables like age. The Chi square test was used to find out the association between variables like DR and macular edema. P value ≤0.05 was taken as significant.

3. RESULTS

A total of 300 patients were included in this study with a mean age of 49.99±3.41 years. There were (62.3%) males and (37.7%) females. Out of three hundred patients, (65.0%) were observed with diabetics' retinopathy. Prevalence of macular edema in diabetics patients was (13.0%). The diabetic's patients were categories according to retinopathy severity; (28.3%) had mild NPDR, (13.0%) had moderate NPDR, (11.0%) had severe NPDR and (7.7%) had PDR. (Table 1)

Table 1: Demographic Distribution of the Study Patients

	Variable	N (%)
	Age (years)	49.99±3.41
Gender	Male	187 (62.3%)
	Female	113 (37.7%)
Diabetic retinopathy	Yes	195 (65.0%)
	No	105 (35.0%)
Macular Edema	Yes	39 (13.0%)
	No	261 (87.0%)
Diabetic retinopathy	No DR	132 (44.0%)
	Mild NPDR	85 (28.3%)
	Moderate NPDR	39 (13.0%)
	Sever NPDR	33 (11.0%)
	PDR	23 (7.7%)

In macular edema patients, (35.9%) had mild NPDR, (23.1%) had moderate NPDR, (7.7%) had severe NPDR and (20.5%) had PDR. On the other hand, the patients who had no macular edema, (48.7%) had no DR, (27.2%) had mild NPDR, (11.5%) had moderate NPDR, (6.9%) had severe NPDR and (5.7%) had PDR (p=0.000). (Table 2)

Table 2: Association of Macular Edema with Severity of NPDR and PDR

Macular Edema	Severity of NPDR and PDR					P-value
	No DR N (%)	Mild NPDR N (%)	Moderate NPDR N (%)	Severe NPDR N (%)	PDR N (%)	
Yes	5 (12.8%)	14 (35.9%)	9 (23.1%)	3 (7.7%)	8 (20.5%)	0.000
No	127 (48.7%)	71 (27.2%)	30 (11.5%)	18 (6.9%)	15 (5.7%)	
Total	132 (44.0%)	85 (28.3%)	39 (13.0%)	33 (11.0%)	23 (7.7%)	

4. DISCUSSION

Diabetic retinopathy is a condition that is caused by damage of light sensitive blood vessels behind the eye damage. Patients usually present with impaired vision, blurred vision, and loss of vision. A study was conducted by Shreshta et al. (12) and reported a 20.31% prevalence of diabetic retinopathy in patients who were having diabetes for the last 5 years. Uncontrolled glucose level and chronicity of diabetes are two contributing factors.

In our study diabetic retinopathy was observed in 65.0% of patients and macular edema in 13% of patients. Another prospective study was conducted by Rizyal et al. (13) on Nepali population and reported that 44.7% frequency of diabetic retinopathy. The total sample size of patients was 120 patients. Among them 0.8% were presented with proliferative retinopathy and 46.5% non-proliferative retinopathy. Another study was conducted by Qureshi et al. (14) in 2013 and reported prevalence of diabetic retinopathy 47.3% in Kashmiri population.

Fatima Al Kharaj et al. (15) conducted a study on Kuwaiti population and reported prevalence of DR 24%. This study was hospital based prospective design. Prevalence of DR in this population is almost same as in rest of the world. Wong et al. (16) also completed a study on American resident Chinese population and reported prevalence of DR 25.7%, it was a multiethnic cohort study. Conclusions of all previous research and literature show that prevalence of DR varies from area to area.

In our study proportion of DR is higher in male gender as compared to female. Proliferative DR was seen in 7.7% of patients. In a study by Alkhairy et al. (17) reported similar findings that frequency of DR in male was 57% and in female it was 43%. Among them non proliferative DR was 40.5% and 5.3% moderate and severe non proliferative DR was 7%. A study was conducted in Taiwan by Chang et al. (18) and reported diabetic retinopathy 35% in this country. Male gender is much dominant as compare female gender. Literature available on diabetic retinopathy also shows that retinopathy may react more aggressively if diabetic patients are tobacco users.

Complications of diabetic retinopathy may include proliferative and non-proliferative retinopathy, vitreous hemorrhage, retinal detachment, glaucoma and blindness. Macular edema is also a condition presents with retinopathy. In our study mild non proliferative diabetic retinopathy was observed in 28.3%, moderate 13% and severe NDPR was observed in 11% of patients. Jingi et al. (19) reported that in Cameron population macular edema was found in 14.5% of patients. Another similar Sri Lankan study found non proliferative diabetic retinopathy in 93.4% of patients and maculopathy 5.3% of patients (20). Regular monitoring and aggressive diabetic control can prevent retinopathy along with normal cholesterol (20).

5. LIMITATIONS

The study was conducted in a language that was not understood by all participants, cultural norms affected reporting or understanding of symptoms.

6. CONCLUSION

Diabetic retinopathy either proliferative or non-proliferative is highly prevalent in Pakistani population. Early detection and management are necessary to prevent its role in blindness.

7. LIMITATION

The study was a single centered limited number of patients were assessed with small sample size.

8. RECOMMENDATIONS

Collected data by questioned realized that there is lack of awareness among diabetic patients about eye associated complications like retinopathy and maculopathy. A strong communication and coordination between diabetologist and ophthalmologist are required. Awareness about follow-ups and diabetic control is needed.

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