Original Article

Prevalence of Diabetic Retinopathy in individuals aged 40– 80 years in relation to varying Diabetes

Saima Asghar ,[1] Muhammad Faisal,[2] Sehrish Akram ,[3] Saba Ghalib,[4] Hadia Iqbal,[5] Duaa Waseem[6]

Abstract

Objective: To determine the prevalence of diabetic retinopathy in individuals aged 40– 80 years in relation to varying diabetes duration presented in ophthalmology out-patient department at Allied Hospitals.
Study design: It was a Descriptive hospital based study.
Place and duration of study: The study was conducted at Department of Ophthalmology, Eye OPD, Holy Family Hospital, Rawalpindi from April 2023 to September 2023.
Material and Methods: The study comprised 100 diabetic retinopathy patients who visited the eye outpatient department of Allied Hospitals in Rawalpindi. In order to establish the phases, severity, and macula involvement of diabetic retinopathy, patients underwent a variety of diagnostic procedures. A thorough fundus examination with a slit lamp, an ophthalmoscope, a non-mydriatic fundus camera, and fundus angiography are some of these diagnostic techniques.
Results: Certain characteristics, such as gender, unilateral or bilateral involvement, different diagnostic procedures, the existence of maculopathy, and the types of DR—background, pre-proliferative, proliferative, diabetic maculopathy, and advanced stage—are used to draw conclusions. The research was conducted on a sample size of around 100 patients presented in ophthalmology outpatient department of the allied hospitals. Out of the total sample size, 60% of the patients presented were males and 40% were females. The majority of the timed is bilateral and accompanied by maculopathy. For a thorough diagnosis, fundus angiography is necessary for the majority of patients. It is possible to diagnose DR using a slit lamp alone, but since some symptoms are better seen on fundus photos, it is crucial that the patient be subjected to all diagnostic criteria for a thorough diagnosis.
Conclusion: As demonstrated by this study, diabetic retinopathy is a condition that can cause blindness and should be appropriately recognized in order to enable treatment. For the purpose early diagnosis is crucial.

1. Introduction

Diabetic retinopathy is a chronic, progressive, non-inflammatory, possibly blinding disease of the retinal microvasculature that is linked to diabetes mellitus (DM) and other disorders like hypertension. About 40% of people with type 1 diabetes have diabetic retinopathy, compared to 20% of people with type 2 diabetes. Between the ages of 25 and 70, it is a prevalent cause of blindness. Duration of diabetes, poor metabolic control, obesity, hyperlipidaemia, hypertension, nephropathy, and smoking significantly influence diabetic retinopathy.

Although it might happen after five years of diabetes, the incidence of DR is 50% in people diagnosed with diabetes mellitus before the age of thirty after ten years, and the incidence of DR is 90% if the diagnosis is made after 30 years. Delaying the onset and progression of diabetic retinopathy is primarily dependent on controlling diabetes. Patients with type 1 diabetes benefit more from good control than those with type 2 diabetes. The advancement of DR may be postponed by strict supervision.

Arterioles, capillaries, and venules are all impacted by microangiopathy, which causes microvascular blockage and leakage. Loss of pericytes leads to microvascular leakage, which results in superficial or deep retinal haemorrhages, hard exudates, and retinal oedema. Microvascular obstruction causes neovascularisation on the optic disc,

Optometrist, BBH, RWP,[1] Coordinator of Optometry, Health Services Academy,[2] Ophthalmology department, Holy family hospital, RWP,[3,4] Internee, Suri eye care hospital,[5] Internee, Shifa International hospital.[6]
Correspondence: Sehrish Akram, Ophthalmology department, Holy family hospital, RWP **Email:** sehri.blouch123@gmail.com

retinal surface, and occasionally the iris, which results in rubeosis iridis. Increased angiogenic growth factors are the culprits.

Intra retinal microvascular abnormalities (IRMA) are arteriovenous shunts that connect arterioles to venules and are linked to capillary occlusion. [1]

Early on, diabetic retinopathy is typically asymptomatic; nevertheless, it develops symptoms when the fovea is affected or another issue arises. There have been reports of bright flashes, blurring of vision, and gradual or abrupt loss of eyesight in one or both eyes. The intensity and stage of the disease determine the signs. Microaneurysms and retinal hemorrhages are hallmarks of diabetic retinopathy. The first visible signs of the disease are microaneurysms, which are tiny red spots. [2]

Characteristics of pre-proliferative diabetic retinopathy include cotton wool spots, dot blot haemorrhages, arteriovenous alterations, and intra retinal microvascular abnormalities (IRMA). They extend from arterioles to venules and are the fundamental characteristic of non-proliferative diabetic retinopathy (NPDR). Non-proliferative diabetic retinopathy is categorized as mild, moderate, severe, and very severe NPDR based on the presence of the aforementioned lesions.[3] 5–10% of people with diabetes have proliferative diabetic retinopathy (PDR). Neovascularisation is its primary clinical characteristic.

The optic nerve head or another location may have new vessels. Any stage of retinopathy, which is most frequently observed in patients with type 2 diabetes, may coexist with maculopathy. Macular oedema, macular haemorrhages, exudates at the macula, macular ischaemia, pre-macular membrane presence, and macular detachment are the primary causes of maculopathy.[4] If the proliferative stage of the disease is not under control or if PDR treatment is ineffective, advanced diabetic retinopathy develops. Vitreous haemorrhage, retinal detachment, and retinal schiasis are its defining characteristics.

Neovascularisation at the iris, called rubeosis iridis, can result in rubeotic glaucoma, which is frequently linked to proliferative stage illness.[5] The final stage of DR is known as the burnt-out stage, during which the vascular component regresses and only fibrous material is left. At this point, fibrovascular proliferation ceases. In order to control and treat diabetic retinopathy before complications arise, diabetic patients should be checked for the condition early on. [6]

Diagnosing diabetic retinopathy and distinguishing between its distinct stages is done using diagnostic instruments and methods. [7] Evaluation of visual acuity, fundus slit-lamp examination, and fundus angiography using fluorescein and OCT are essential. When diagnosing retinopathy, a patient's medical history is crucial because it reveals whether diabetes is present, how long it has persisted, what kind of diabetes it is, any vision issues the patient may be experiencing, how well the patient is managing their diabetes, any medications and treatments they are taking, and their random and fasting blood glucose levels. Mydriatic medications, such as mydriacyl, dilate the pupil. Although these drops induce blurred vision, only a dilated pupil allows for a detailed examination of the fundus, particularly in cases when lenticular alterations are evident.

Up to 50% of patients do not improve despite the introduction of several new treatments for diabetic macular oedema (DMO), such as intravitreal vascular endothelial growth factor inhibitors (also known as "anti-VEGFs") and novel steroids. Furthermore, despite being a process that is intrinsically damaging, laser photocoagulation is still a standard treatment for individuals with proliferative diabetic retinopathy (PDR). [8]

2. Materials & Methods

100 individuals with diabetic retinopathy who visited Allied Hospital's eye outpatient department in Rawalpindi between April 2023 to September 2023 were included in the study. Patients received various diagnostic tests to determine the macula involvement,

severity, and phases of diabetic retinopathy. History was taken and detailed eye examinations were performed including refraction. The diagnostic methods included fundus angiography, a non-mydriatic fundus camera, ophthalmoscopy, and a comprehensive fundus examination using a slit lamp. Data was collected through specifically designed proformas. On the basis of inclusion criteria , patients of both gender between the age of 40 and 80 years were included in the study. Non cooperative patients and patients with mental health problems were excluded from this study.

3. Results

Results are analyzed using SPSS 24 . in Results or the frequency of patients exposed to the diagnostic criteria of diabetic retinopathy are drawn according to the gender, diagnostic tools, unilateral and bilateral involvement, and diagnosis of CSMO. A total of 2000 patients visited the eye OPD of Benazir Bhutto and holy family hospital. 500 patients out of these were diabetic of age group less than 40 years, among which, 400 patients have duration of diabetes of less than 5 years. Only 100 patients were diagnosed with diabetic retinopathy having age more than 40 years and duration of diabetes more than 5 years.Among 100 patients 60 were males and 40 were females. Results of the study showed that most of the patients which were exposed to the diagnostic criteria had bilateral Diabetic retinopathy, out of 100 patients 64 patients had bilateral retinopathy. According to correlational Analysis it is shown Diabetes has positive and strong relation with moderate and severe NPDR while weak positive relation with mild NPDR.The patients which were exposed to the diagnostic criteria were mostly at the severe stage of NPDR about 49%. Those which had moderate NPDR were 30% and a few patients had mild NPDR about 21%.

Table 1: Pie Chart showing Distribution of Demographics

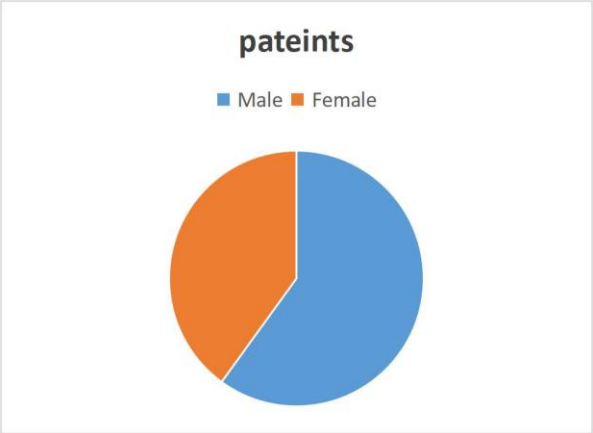

Table 1: showing frequency of patients exposed to different Procedures

procedures	*No of Patients*
Slit lamp	23
Fundus angiography	77
Total	100

Correlation Analysis shows that diabetic has significant positive and strong relation with severe Non proliferative diabetic Retinopathy, and moderate Non Proliferative Retinopathy while weak positive and significant relation with mild non proliferative Retinopathy.

	1	*2*	*3*	*4*
Diabetes	1			
Severe NPDR	187**	1		
Moderate NPDR	.124*	.026**	1	
Mild NPDR	.199**	.047	.448**	1

4. Discussion

This study was designed to find out the frequency of patients with diabetic retinopathy at all stages. It was a hospital-based study. A population-based study was not

possible due to limited resources and time period. Diabetic retinopathy is a vision-threatening disease; the visual loss is irreversible once the macula is affected. The purpose of our study was to minimize visual loss by diagnosing patients at the early stage of the disease so that, before the disease develops and progresses into the proliferative stage, patients could be evaluated following full diagnostic criteria.

Detailed fundus examination was performed by slit lamp biomicroscopy using a magnifying lens and by indirect ophthalmoscopy. Patients who had macular changes were referred for detailed diagnosis by taking fundus photographs in fluorescein fundus angiography. Patients were given a full diagnostic protocol, and special care was taken while instilling drops in the patient's eye and while performing fundus angiography to minimize the adverse effects of fluorescein injection. Measures were also taken to deal with any emergencies during FFA.

After the detailed diagnosis of diabetic retinopathy (DR), patients were referred to the ophthalmologist for treatment of retinopathy and advised to follow the doctor's instructions. The study included diabetic patients aged less than 40 years, among which 400 patients had a duration of diabetes of less than 5 years. Only 100 patients were diagnosed with diabetic retinopathy, having an age of more than 40 years and a duration of diabetes of more than 5 years. Among the 100 patients, 60 were males and 40 were females.

Results of the study showed that most of the patients who were exposed to the diagnostic criteria had bilateral diabetic retinopathy. Out of 100 patients, 64 had bilateral retinopathy. The study has shown that the patients exposed to the diagnostic criteria were mostly at the severe stage of non-proliferative diabetic retinopathy (NPDR), about 49%. Those with moderate NPDR were 30%, and a few patients had mild NPDR, about 21%.

Conclusion:

The study showed that the majority of patients become aware of retinopathy when it is at the non-proliferative stage of diabetic retinopathy because, at this stage, diabetic retinopathy becomes symptomatic. Therefore, proper and detailed diagnostic criteria are required for the diagnosis of NPDR before the progression of the disease into the proliferative stage. The study indicated that most patients have DR bilaterally and it is of the severe type, with associated maculopathy, so it should be managed properly.

The fundus should be examined properly and in detail by dilating the pupil. Slit lamp findings are an integral part of the diagnosis. A direct ophthalmoscope does not provide a wide field of view. Fundus photographs are an essential part of the diagnosis of DR with clinically significant macular edema. The confirmation of the diagnosis of severe DR can only be done by fluorescein fundus angiography. However, in the case of mild NPDR without macular changes, slit lamp findings can confirm the diagnosis, and patients are advised to control their glucose levels to manage the progression of retinopathy. The slit lamp is the most important diagnostic tool to detect fundus changes in patients having diabetic retinopathy at an early stage.

References:

1. Shafi M.Jatoi, (2012),Clinical ophthalmology (5th ed.).Hyderabad.
2. Scanlon PH, Stratton IM, Histed M, Chave SJ, Aldington SJ. The influence of background diabetic retinopathy in the second eye on rates of progression of diabetic retinopathy between 2005 and 2010. Acta ophthalmologica. 2013 Aug;91(5):e335-9.
3. Hudson C. The clinical features and classification of diabetic retinopathy. Ophthalmic and Physiological Optics. 1996 Sep 1;16:S43-8.
4. Antcliff RJ, Marshall J. The pathogenesis of edema in diabetic maculopathy. InSeminars in ophthalmology 1999 Jan 1 (Vol. 14, No. 4, pp. 223-232). Taylor & Francis.
5. Laatikainen LE. Preliminary report on effect of retinal panphotocoagulation on rubeosis iridis and neovascular glaucoma. British Journal of Ophthalmology. 1977 Apr 1;61(4):278-84.
6. Srimathi S, Jacob JL. A Case of Burnt out Diabetes in an End Stage Renal Disease Patient at a Private Multispeciality Tertiary Care Hospital. Indian Journal of Pharmacy Practice.2020;13(2).

7. Park YG, Roh YJ. New diagnostic and therapeutic approaches for preventing the progression of diabetic retinopathy. Journal of diabetes research. 2016;2016(1):1753584.

8. Stitt AW, Curtis TM, Chen M, Medina RJ, McKay GJ, Jenkins A, Gardiner TA, Lyons TJ, Hammes HP, Simo R, Lois N. The progress in understanding and treatment of diabetic retinopathy. Progress in retinal and eye research. 2016 Mar 1;51:156-86.