DOI: https://doi.org/10.53350/pjmhs2023172333

ORIGINAL ARTICLE

A Research Study on the Prevalence of Diabetic Retinopathy in Newly Diagnosed Type 2 Diabetes Mellitus Patients Presenting to a Tertiary Care Hospital

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ABSTRACT

Objectives: To quantify the prevalence of type II diabetes patients with recently diagnosed diabetic retinopathy.

Materials & Methods: The design of this study was cross sectional study design and this study was conducted in Pakistan institute of medical science. There were 113 cases in total of the freshly diagnosed diabetes mellitus type II patients, of age from 30 to 60 years. The patients who had hypertension, diabetes type I, or a history of retinal surgery were not allowed to participate. Following a fundoscopic examination of all patients, the absence or presence of the retinopathy and grades of the retinopathy were noted.

Results: The patients' average ages were 45.46±7.40 years. The male to female ratio of these 113 patients was 1.6:1, with 69 (61.06 percent) men and 44 (38.94 percent) women. 18 individuals (15.93%) had retinopathy, according to the results, while 95 patients (84.07%) had none.

Practical Implication: This study would assist us in screening these high-risk patients. Additionally, a comprehensive ophthalmic examination at diagnosis time of the diabetes and the periodic screening for detection of retinopathy early so that the early therapeutic measures could be taken for prevention of their further complications could be arranged for all freshly diagnosed diabetic type-2 patients. These programs could be organized at regional and national levels.

Conclusion: This study's findings, which include the relatively high prevalence of the diabetic retinopathy in the freshly diagnosed Diabetes mellitus type II patients at 15.93 percent, which highlights the need for each patient to undergo a thorough Ophthalmic examination at the time of being labelled as diabetic.

Keywords: Diabetes, freshly diagnosed, Diabetic Retinopathy Prevalence, retinopathy, Diabetes Mellitus Type II.

INTRODUCTION

Diabetes mellitus (DM) comes in three primary forms: Type I diabetes is also called juvenile diabetes, Type II diabetes is also called adult-onset diabetes, and Type III diabetes is known as gestational diabetes and affects pregnant women. Develop a high blood glucose level without having previously been diagnosed with diabetes.(1) The 10–14% of people globally have diabetes mellitus. sweet diabetes Type 2 diabetes, also known as adult-onset diabetes or noninsulin-dependent diabetes mellitus (NIDDM), is a metabolic condition characterized by elevated blood sugar levels in the presence of insulin resistance and relative insulin deficit.(2) In contrast, diabetes mellitus type 1 results in an absolute lack of insulin because the pancreatic islet cells are destroyed.(3) Excessive thirst, frequent urination, and persistent hunger are the typical symptoms. About 90% of cases of diabetes are caused by type II diabetes, with the other 10% mainly being caused by gestational diabetes and type 1 diabetes mellitus.(4) Long-term Heart disease, strokes, diabetic retinopathy, which affects vision, renal failure, for which dialysis may be required, and poor circulation in limbs, which can result in amputations, are all complications of high blood sugar.(5) In US, the diabetic retinopathy is one of the major cause of fresh blindness in those ages 25 to 74. Although the precise process by which diabetes results in retinopathy is still unknown, a number of hypotheses have been put forth to account for normal course and history of illness.(6) In the retina of the eye, hyperglycemia impairs the development of blood vessels, which can cause visual complaints, blurred vision, and even blindness. It is usual to observe type 2 diabetes mellitus' micro-vascular problems at the diagnosis time because this condition may be present long before a clinical diagnosis is obtained. The likelihood of getting diabetic retinopathy increases with the duration of diabetes.(7) At the time of diabetes type II diagnosis, reports of the prevalence of diabetic retinopathy range from 5-35 percent. Diabetes-related retinopathy can cause blindness, but it can be prevented with prompt diagnosis and treatment. According to the study, 12 percent of people with type II diabetes mellitus have diabetic retinopathy. Another study found that 15% of people with newly diagnosed type II diabetes mellitus have diabetic retinopathy.(8) A study discovered an extremely high prevalence of diabetic retinopathy, or 40.64 percent. The high prevalence of diabetic retinopathy was also noted in two other studies, one from Oman and one from Egypt, both of which reported 42.4 percent and 42.0 percent, respectively.(9) As type II diabetes mellitus is on the rise in our population, with majority of those affected whose are uneducated, from the low status of socioeconomic, and unaware of their condition because there aren't any accessible facilities of health care easily, leading to their late presentation with the long-term micro-vasculitis, this study aim to determine prevalence of the diabetic retinopathy in the new patients. This was because that there was controversy surrounding the previous findings and because the diabetes mellitus type II is on rise in our population. This study would not only give us information on the scope of the issue in our community, but it would also assist us in screening these high-risk patients. Additionally, a comprehensive ophthalmic examination at diagnosis time of the diabetes and the periodic screening for detection of retinopathy early so that the early therapeutic measures could be taken for prevention of their further complications could be arranged for all freshly diagnosed diabetic type-2 patients. These programs could be organized at regional and national levels.

Type II diabetes mellitus recently diagnosed: Positive results were determined for all patients who were older than 30 years, had diabetes mellitus diagnosed within six months, and had HbA1c levels ≥6.5.

MATERIAL AND METHODS

Setting: Department of Medicine, Pakistan Institute of Medical Sciences, Islamabad, Pakistan.

Duration of study: March 2022 September 2022

Study design: Cross-sectional study, Descriptive.

Inclusion Criteria:

- All patients with type II diabetes who have just received a diagnosis.
- Patients aged 30 to 60 years.
- Male and Female.

Exclusion Criteria:

- Diabetes mellitus type I patients.
- Individuals having hypertension
- Patients undergoing any type of retinal surgery.
- Patients that refused to participate in the trial.

Data Collection: Following the approval by the ethical research committee, 113 patients who met the inclusion and exclusion criteria and had recently been diagnosed with type II diabetes mellitus (according to the operational definition) and presented to the outpatient department of Medicine, Pakistan Institute of Medical Sciences, Islamabad, Pakistan were chosen. All patients underwent fundoscopic examination by a consultant Ophthalmologist in department of the Ophthalmology Pakistan Institute of Medical Sciences, Islamabad, Pakistan, in the researcher's presence, after providing each participant with written informed consent and pertinent medical history.

Data Analysis Procedure: With the help of SPSS version 26, statistical analysis was carried out. For quantitative variables, such as age and disease duration, the results are shown as mean and SD (standard deviation). Quantitative factors such gender, educational attainment, family income, and the presence or absence of the diabetic retinopathy were calculated in terms of frequency and percentage. Stratifications were used to control the effect modifiers such as gender, age, educational attainment, income of family, and duration of disease. The post-stratification chi square analysis is used to examine their influence on results, and a p-value of 0.05 or above was considered significant.

RESULTS

The study's participants ranged in the age from 30 to 60, with the mean age of 45.46±7.40 years. According to Table 4, the majority of the patients, 56, or 49.56 percent, were between the ages of 41 and 50. The male to female ratio of these 113 patients was 1.6:1, with 69 (61.06 percent) men and 44 (38.94 percent) women.

Table 1: Percentage According To Distribution Of Age.

Age	Percentage	Patient's number
51 to 60	26.55	30
41 to 50	49.56	56
30 to 40	23.89	27

Table 2: Percentage According To Duration Of Diabetes Mellitus.

Diabetes duration	Percentage	Patient's number
>3 months	61.06	69
≤3 months	38.94	44

Table 3: Percentage According To Status Of Education.

Status of education	Percentage	Patient's number
School	19.47	22
University	43.36	49
College	23.89	27
Illiterate	13.27	15

According to

Table *1*, the mean disease duration was 4.46 1.40 months. Table 2 and Table 3 show the percentage of the patients' ages according to their status education and monthly income of family, respectively.

Table 4: Percentage According To The Monthly Income Of Family.

Monthly income of family	Percentage	Patient's number
> 10000	56.64	64
5000 to 10000	23.01	26
<5000	20.35	23

Following this, a fundoscopic examination was performed on all of the chosen patients to determine if they had diabetic retinopathy or not. the results revealed that retinopathy was present in 18 (15.93 percent) and absent in 95 (84.07 percent) of the patients. Table 4 and **Error! Not a valid bookmark self-reference.** indicate the diabetic retinopathy stratification according to age and gender. The stratification of diabetic retinopathy according to disease duration is given in Table 6, and according to disease duration and family monthly income are reported in Table 7.

Table 5: Patient's Stratification According to Gender.

Gender	Diabetic Retinopathy (%)		Prevalence	Value of p
	Absent	Present		
Female	77.27	22.73	44	0.115
Male	88.41	11.59	69	

Table 6: Patient's Stratification According To Age.

Age	Diabetic Retinopathy (%)		Prevalence	Value of p
	Absent	Present		
51 to 60	66.67	13.33	30	0.55
41 to 50	80.36	19.64	56	
30 to 40	88.89	11.11	27	

Table 7: Patient's Stratification According To Disease Duration.

Disease Duration	Diabetic Retinopathy (%)		Prevalence	Value of p
	Absent	Present		
>3 months	79.71	20.29	69	0.113
≤3 months	90.91	9.09	44	

DISCUSSION

In US the diabetic retinopathy is one of the major cause of the fresh blindness in those ages 25 to 74. Although the precise process by which diabetes results in retinopathy is still unknown, a number of hypotheses have been put forth to account for the normal history and course of illness.[10] It is outcome of the retinal micro-vascular modifications. Vascular walls become ineffective as a result of the intra-mural pericyte loss and the thickening of membrane of basement brought on by hyperglycemia. Both the blood-retinal barrier's development and the permeability of the retinal blood vessels are altered by these impairments.[11] The study's participants ranged in age from 30-60, with the mean age of the 45.46 ± 7.40 years. The patients' majority 56 or 49.56 percent, were between the ages of 41 and 50. This was quite comparable to studies, where mean age was 47 and 45, respectively. The study discovered a mean age that was significantly lower than ours—43 and 42 years, respectively—in their studies.[12] The male to female ratio in this study was 1.6:1, with 69 (61.06 percent) men and 44 (38.94 percent) women among the 113 patients. Additionally, several earlier research have discovered that men are more likely than women to get type II diabetes. While the survey indicated that women made up the majority of their studies.[13]

Diabetic nephropathy is becoming the leading cause of CKD and end-stage renal disease through-out the world. Long duration of diabetes, poor glycaemic control, concomitant hypertension, smoking, family history of nephropathy are established risk factors for diabetic nephropathy [3-5,7-10]. As T2DM subjects may remain undiagnosed, patients may develop complications before diabetes is detected. In the present study we found one-third of the newly detected T2DM subjects had diabetic nephropathy. Family history of DM and diabetic nephropathy, higher BMI, presence of hypertension and diabetic retinopathy were significant risk factors for diabetic nephropathy. Risk factors in our study reports were not different from different studies conducted in many Asian countries including India [11-14] and Pakistan. The frequency of diabetic nephropathy varied widely in these reports principally due to different diagnostic criteria used. But the risk factors remained the

same. The scenario regarding frequency and risk factors for nephropathy among incident T2DM patients are not different in developed countries and the pathogenic mechanisms linked are oxidative stress, low level inflammation and genetic factors [15]. They also found high HbA1c at diagnosis of diabetes as an important risk factor. Other risk factors included family history, hypertension and other microvascular complications in western societies. Microalbuminuria is the earliest sign of diabetic nephropathy. Patients remain asymptomatic at this early stage. Good glycaemic control, control of hypertension specially by using angiotensin blocking agents [angiotensin converting enzyme inhibitors (ACEI) or angiotensin receptor blocker (ARB)] may reverse proteinuria at this early stage. [16-18] So, identification of microalbuminuria is important for better patient and renal outcomes.

In current study, all of chosen individuals had the fundoscopic examination to determine if they had diabetic retinopathy or not. The results revealed that the retinopathy was existing in 18 (15.93%) patients whereas 95 (84.07%) patients had none. According to a study, 12 percent of those with newly diagnosed type II diabetes mellitus have diabetic retinopathy.[14] Another study found that 15% of people with freshly diagnosed diabetes mellitus type II have diabetic retinopathy.[15] The study discovered an extremely high prevalence of diabetic retinopathy, or 40.64 percent. The high prevalence of the diabetic retinopathy was also noted in the two other studies, one from Oman and one from Egypt, both of which reported 42.4 percent and 42.0 percent, respectively.[16] In a different study, out of 200 participants, 63.5 percent were men and 36.5 percent were women. The 40-70 years old, having the mean age of the 51.05±6.910 years. The 29 participants (14.5%) developed diabetic retinopathy. 24 (82.8%) of the 29 individuals had pre-proliferative diabetic retinopathy, while the 5 (17.2%) developed the diabetic retinopathy proliferative. There are numerous clinical studies on freshly diagnosed diabetic type-2 patients that revealed prevalence of retinopathy results that are similar to our study.[17] while a study reports the 12.6 percent retinopathy prevalence in freshly diagnosed the diabetes in the Diabetes Prevention Program.[18] 43.0 percent of people in the area are said to have diabetic retinopathy, according to prior local research. There are cases of type 2 diabetes that have retinopathy at a rate of 27.43%.[19] Similar to the study, this proportion was reported to have 10.2% while diagnosed retinopathy prevalence was reported to have 19% in the UK.[20] The total of the 100 patients were enrolled in a different study; and their average age was 45.1 ± 3.2 years, and 60% of them were female. Within a month of their diagnosis, 17 percent of type 2 diabetic individuals had retinopathy. Pre-proliferative (4%) and proliferative (1%) lesions were next in frequency to background retinopathy (12%). An analysis of the Pakistan National Blindness and Visual Impairment Survey data revealed that 15.3 percent of the respondents chosen for the survey from the country's general population had DR.[21] It is nearly identical to observed prevalence in the Indians in the Kashmir as previously mentioned. The prevalence of diabetes-related DR was 35 percent in Taiwan and 18.2 percent in the Hong Kong.[22]

CONCLUSION

According to findings of this study, type II diabetes mellitus newly diagnosed patients have a 15.93 percent frequency of diabetic retinopathy, which is a relatively high rate. To spread disease's knowledge, their complications, the periodic screening for detection of retinopathy early so that the early therapeutic measures would be taken for the prevention of their further complications, and systematic ophthalmic examination at the time of diagnosis of diabetes, therefore we should recommend that the public awareness and intensive periodic educational programs on regional and national levels for all the newly diagnosed diabetic type-2 patients.

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