

Retinopathy in a diabetic population

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Abstract

Aims and Objectives:

The study was conducted with the aim to find out the prevalence of diabetic retinopathy among diabetics on treatment, to find out the presence of associated risk factors and to determine the knowledge of diabetic retinopathy among patients with diabetic mellitus.

Methodology:

Cross sectional screening of 316 diabetic patients on treatment presenting to Kalimati Diabetic Clinic and Kathmandu Medical College was done over a period of 8 months for the presence of diabetic retinopathy, associated risk factors and the knowledge of diabetic retinopathy.

Results: 21% of the known diabetics had evidence of various grades of diabetic retinopathy although 75.3% of the enrolled patients had history of diabetes mellitus of less than 10 years. Associated risk factors were present in 66.46%. However, only 50% diabetics had the knowledge of diabetic retinopathy.

Conclusion: As 21% of the diabetic patients on treatment had various grades of diabetic retinopathy and 50% of the diabetic patients were not aware of diabetic retinopathy, emphasis has to be given for the awareness of ocular involvement in diabetes mellitus such that blindness from retinopathy can be prevented. The responsibility lies on treating physicians or Diabetic Centres for referral of diabetic patients for ophthalmic evaluation. Similarly, control of associated risk factors like hypertension, hyperlipidemia is equally important.

Keywords: Diabetes Mellitus, Diabetic Retinopathy, Laser Photocoagulation

Diabetes is the fourth leading cause of death in industrialized countries. Diabetes is a disease area of considerable concern because of its severe long-term complications. These include cardiovascular disturbances, retinopathy, neuropathy and nephropathy. Diabetic retinopathy is the most important cause of blindness, and is a growing concern in the developing world¹.

Current therapies are remarkably effective if diabetic retinopathy is identified early and laser photocoagulation is applied at the early identification. Therefore, it is necessary to classify and timely treat the patients with diabetic retinopathy. Emphasis is also appropriately directed at ensuring lifelong routine ophthalmologic follow up of diabetic patients². Causes of registration for visual impairment due to diabetic eye disease were failure of laser treatment, rapidly progressive disease and poor patient attendance. However, efficient and prompt laser therapy may reduce this incidence³.

According to Peter J Watkins, diabetes is the commonest cause of blindness in people aged 30-69 years. Twenty years after the onset of diabetes, almost all patients with type I diabetes and over 60% of the patients with type II diabetes will have some degree of retinopathy. Even at the time of diagnosis of type II, about a quarter of patients have established background retinopathy. Treatment can now prevent blindness in the majority of case, so it is essential to identify

patients with retinopathy before their vision is affected⁴.

According to Dr Singh DL and Bhattarai MD, almost one fourth of the people 20 years and above in urban areas in Nepal showed diabetic tendency. Similarly, almost one third of people 40 years and above in urban areas in Nepal showed diabetic tendency and more than 10 percent of 20-39 years old women in urban areas in Nepal showed diabetic tendency⁵.

Materials and methods

316 patients with diabetic mellitus presenting to Kalimati Diabetic Clinic and Kathmandu Medical College over a period of Eight months were included in the study. The patients were examined by a team of Ophthalmologists from Nepal Eye Hospital and Kathmandu Medical College. The patients were screened for the presence of diabetic retinopathy. It was a prospective study conducted over eight months (November 2003 to June 2004) period. Informed consent was taken from the patients for enrollment in the present study.

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Demography of the patients including age, sex, ethnicity and occupation were noted. Similarly, duration of diabetes mellitus and blood sugar level were also noted. Presence of systemic diseases like hypertension, urine albumin, coronary artery disease, hyperlipidemia were looked for. Associated risk factors like smoking, alcohol consumption were also noted.

The initial screening process consisted of visual acuity testing and dilated fundoscopy with direct ophthalmoscope and binocular indirect ophthalmoscope. Patient with evidence of diabetic retinopathy were referred to Nepal Eye Hospital for detailed slit lamp biomicroscopy with +78 D or +90 D lens. The grading of retinopathy was done as per Early Treatment Diabetic Retinopathy study classification. Patients with indication for laser therapy were given diode pumped solid state green laser, either pan retinal photocoagulation, focal or grid laser or in combination.

All demographic and clinical data were recorded on pre-designed proforma. The collected data were checked and coded manually and then entered in computer. The numerical data obtained from the study were analyzed. Statistical analysis was performed with SPSS program (version 10.0) Data were expressed in frequency, percentage, mean and standard deviation as applicable.

Results

Diabetes Mellitus is seen commonly in the age group 50-59 years in 33.9%. Females comprised of 54.75% while males were 45.25%. Table 2 shows the distribution of patients according to ethnicity. Newars were most commonly affected followed by Brahmin, Kshetri and others. Regarding the geographical distribution of the patients, 90.19% of patients were from the Kathmandu valley while 9.81% were from outside the Kathmandu valley. The maximum patients attending were the ones

with history of Diabetes Mellitus less than 10 years, which was 75.3%. However, only 24.7% had the history of Diabetes Mellitus more than 10 years (Table 3). Blood sugar was controlled only in 27.5% whereas 72.5% had uncontrolled blood sugar (Table 4). Blood sugar was taken as controlled when fasting blood sugar was <120mg%. Fasting blood sugar was found to be minimum of 50 mg% and maximum of 500mg% with a mean of 165.25mg%. Regarding the distribution of patients according to occupation, housewives were 45% followed by service-holders 17%, businessman 14% and others 10% (Fig 3). 84.8% of patients presented with visual acuity of 6/6-6/18 while only 1.6% had visual acuity of <3/60 - perception of light in right eyes. Similarly, 81.2% of patients had visual acuity of 6/6- 6/18 while 2.3% had visual acuity of <3/60 - perception of light in left eyes (Table 5). Among the 316 diabetic patients screened for the evidence of diabetic retinopathy, 78.8% right eyes and 78.16% left eyes showed no evidence of diabetic retinopathy while the remainder showed various grades of diabetic retinopathy and maculopathy. Non proliferative diabetic retinopathy alone was seen in 59 right eyes and 57 left eyes while non proliferative diabetic retinopathy with maculopathy was seen in 4 right eyes and 5 left eyes. Similarly, proliferative diabetic retinopathy alone was seen in 3 right eyes and 4 left eyes while proliferative diabetic retinopathy with maculopathy was seen in 1 left eye only (Table 6). Associated risk factors were present in 66.46% of which 37.66% had hypertension, 13.29 % were smokers, 8.23% consume alcohol, 4.43% had urine albumin, 1.27% had hyperlipidemia and 1.58% had coronary artery disease. Only 50% of the diabetic patients on treatment had the knowledge about eye being involved due to diabetes mellitus and ophthalmic evaluation is mandatory.

Table 1: Distribution of patient According to Age Group

Age	Frequency	Percentage
<40	22	7.0
40-49	74	23.4
50-59	107	33.9
60-69	95	30.1
70-79	18	5.7
Total	316	100.0

Fig 1: Distribution of patients according to sex

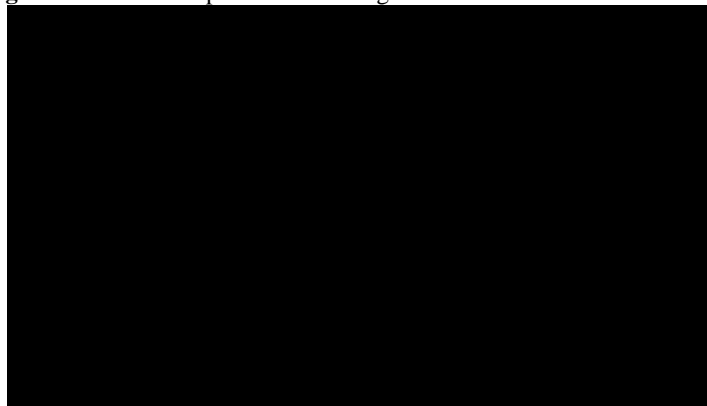


Table 2: Ethnic distribution of patients in order of frequency

Ethnicity	Frequency	Percentage
Newar	161	50.95
Brahmin	76	24.05
Kshetri	46	14.56
Others	33	10.44
Total	316	100.00

Fig 2: Distribution of Patients According to Geographical Area

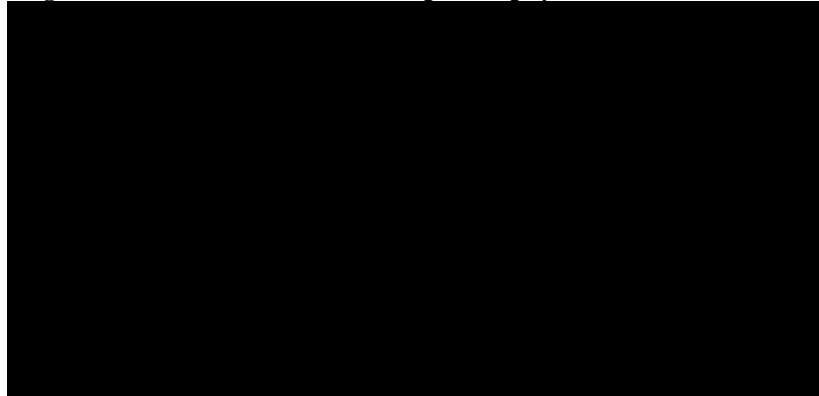


Table 3: Distribution of patients by Duration of Diabetes

	Frequency	Percentage
<10 years	238	75.3
10-20 years	64	20.3
20-30 years	14	4.4
Total	316	100.0

Table 4: Distribution of Status of Diabetes Mellitus

	Number	Percentage
Controlled	87	27.5
Uncontrolled	229	72.5

Fig 3: Distribution of patients according to occupation

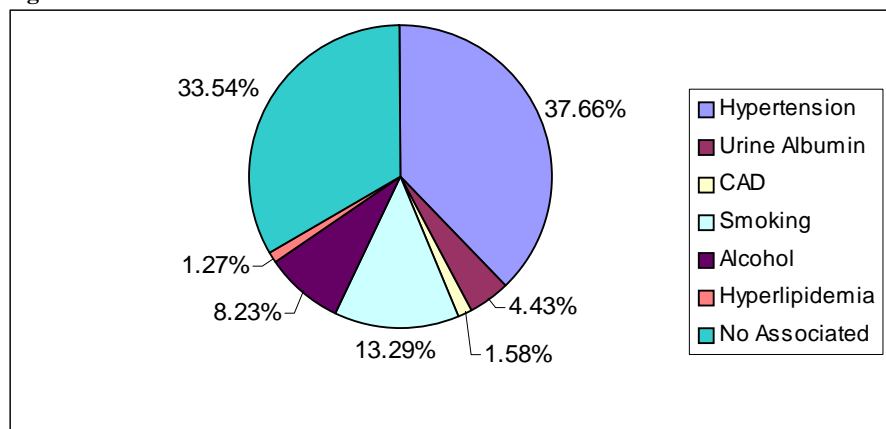


Table 5: Distribution of Grouped Visual Acuity at Presentation

	OD		OS	
	Frequency	Percentage	Frequency	Percentage
6/6 - 6/18	263	84.8	251	81.2
6/24 - 6/60	37	11.9	42	13.6
5/60 - 3/60	5	1.6	9	2.9
<3/60 - PL	5	1.6	7	2.3
Total	310	100.0	309	100.0

Table 6: Distribution of Types of Diabetic Retinopathy

	OD		OS	
	Frequency	Percentage	Frequency	Percentage
Normal/No DR	249	78.8	250	78.16
NPDR	59	18.67	57	18.04
PDR	3	0.95	4	1.27
Maculopathy	1	0.32	2	0.63
NPDR+ Maculopathy	4	1.27	5	1.58
PDR + Maculopathy	0	0	1	0.32
Total	316	100%	316	100

Fig 4: Distribution of Associated Risk Factors

Discussion

The study is conducted to find out the prevalence of DR among Nepalese diabetic population on treatment within Kathmandu valley. Similar study of Ocular Manifestation in Diabetes Mellitus was conducted in Nepal Medical College Teaching Hospital among 120 diabetic patients⁶. Results are based essentially on persons with type II Diabetes Mellitus. The estimates of DR have been discordant among various studies, possibly due to difference in study populations, methods and definitions. It is well known that duration of DM is a single most important risk factor in development of DR. The incidence of DR was more common in a cohort Barbados eye study, in which approximately one in five person (20.9%) with newly diagnosed DM developed after 4 years⁷. Similar prospective study in Nepal is not available. 75% of our sample had duration of DM <10 years and only 4% had duration of 20 years or more. Of

the 316 patients with DM 21% had evidence of various grades of retinopathy. The varieties of study designs make comparison difficult, but Afro-American blacks do seem to have more retinopathy than others do. In the present study, 50.9% of the patients were Newars. This could be due to the fact that major residents of the Kathmandu Valley are the Newars and 90.19% of the patients were from the Kathmandu Valley.

Epidemiological studies such as the Wisconsin Epidemiological Study on Diabetic Retinopathy⁸, the Diabetic Retinopathy Study (DRS)^{9,10,11}, the Early Treatment Diabetic Retinopathy Study (ETDRS)^{12,13,14,15,16,17}, the Diabetes Control and Complications Trial (DCCT)¹⁸, the Diabetic Retinopathy Vitrectomy Study (DRVS)^{19,20} and the UK Prospective Diabetic Survey²¹ have established the various risk factors and provided guidelines for

the management of diabetic retinopathy. According to Duke Elder, women are more liable to develop diabetes than men (3:2). They are also more likely to develop diabetic retinopathy. Studies have shown that females have a higher risk of developing diabetic retinopathy but proliferation retinopathy is more common in males²². In the present study, females were affected more than males (54.7% Vs. 45.3%) due to diabetes mellitus.

Diabetic retinopathy was present in about 21% of the diabetic patients on treatment although the blood sugar level was not controlled in 72.5% in the present study. This could be due to the fact that the duration of diabetes mellitus was less than 10 years in 75.3% cases.

Diabetics have an increased liability to hypertension and diabetic hypertensives are undoubtedly more likely to develop diabetic retinopathy than normotensive diabetics. A patient with a history of hypertension was 3.5 times more likely to be a case of diabetic retinopathy than those without hypertension. Associated hypertension was present in 37.66% among the patients in the present study. The study done by Knowler WC et al on Increased incidence of retinopathy in diabetes with leveled blood pressure: a six years follow up study in Pine Indians shows a strong correlation of hypertension with diabetic retinopathy²³. According to Ballantyne and Lowenstein, hypertension was found in 50% of diabetics showing retinal changes²⁴. Aarseth reported a similar increased incidence²⁵.

Management of cardiovascular disease may help to relieve some of the ischemic process in the retina in diabetic patients. In the present study, coronary artery disease was present in only in 1% of patients. Similarly, aggressive management of renal disease is indicated to avoid renal retinopathy, which may increase the risk of progression of diabetic retinopathy²². Only 6% of the patients with associated risk factors had the presence of urine albumin in the present study.

Smoking can increase blood pressure in diabetic patients with nephropathy but without autonomic neuropathy. Since smoking has deleterious influence on the cardiovascular system and the development of nephropathy, smoking in patients with diabetes mellitus should be discouraged²². 13.29% of our study population were smokers.

In the present study, only 50% of the diabetic patients on treatment had the knowledge of eye being involved due to diabetes mellitus and ophthalmic examination is mandatory for diabetic patients. This brings into attention the remaining 50% diabetic population who are at risk of losing

vision due to diabetic retinopathy. Therefore, the responsibility lies on treating physicians or Diabetic Centres for referral of diabetic patients for ophthalmic evaluation as preventing blindness from retinopathy relies on early detection of asymptomatic disease by fundus evaluation.

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