

# Ocular manifestations in diabetes, a hospital based prospective study

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## ABSTRACT

Diabetes adversely affects the visual status of elderly persons, lowering their quality of life. Since the incidence of diabetes is increasing in urban Nepal, the present study investigated the ocular status in 128 diabetes patients. The ocular complications of diabetes mellitus are numerous including retinopathy, cataract and others. The ocular evaluations were done including visual acuity, refraction and anterior and posterior segment evaluation. Among 128 diabetes, only 26 patients (20.31%) had some degree of retinopathy; with 13.28% having non proliferative diabetic retinopathy and 7.03% with proliferative diabetes retinopathy.

**Keywords:** Diabetes, retinopathy, blindness.

## INTRODUCTION

Ocular manifestations of Diabetes mellitus are the major cause of visual impairment in developed countries. With recent increase in diabetes in the developing countries, the visual impairment due to it is also on the rise. The most common cause of visual impairment in diabetics is due to the retinopathy and associated macular edema. Almost all Type 1 diabetics and 60% of Type 2 diabetics develop some level of diabetic retinopathy after 20 years of disease process. Macular edema which is the main cause of visual impairment can occur during any phase of the disease.

Diabetic retinopathy (DR) is the commonest cause of visual impairment among persons of working age in the developed world.<sup>1</sup> In context of Nepal, number of people with diabetes is increasing, especially in the urban areas. Approximately one fourth of people above 20 years has diabetic tendency and this increases to almost one in three in people over 40 years in urban areas.<sup>2</sup>

Diabetic retinopathy is classified into non-proliferative or proliferative stages according to the presence of well defined clinical findings. The non-proliferative diabetic retinopathy is characterised by the presence and extent of intraretinal hemorrhages, microaneurysms, venous beading, and intra retinal microvascular anomalies (IRMA). In the mild to moderate non-proliferative category also known as background retinopathy, there are a few small intraretinal haemorrhages and microaneurysms, minimal venous changes, and IRMA. The severe nonproliferative stage represents increasing ischemia. Proliferative diabetic retinopathy (PDR) is characterised by the neovascularisation as well as the absence or the presence of preretinal/vitreous hemorrhages.

As the diabetic retinopathy advances, it affects the visual status of the patients thereby affecting their quality of life.<sup>3</sup> There are various treatment modalities available for the treatment of diabetic retinopathy. Studies have shown that appropriate treatment can decrease the loss of vision caused by proliferative DR by up to 90%.<sup>4</sup> In general, laser photocoagulation is the treatment of choice for patients with macular edema and high risk proliferative disease. Due to the profound effect of diabetes in the visual function of patient and their quality of life, a study was designed to evaluate ocular health of the people with diabetes mellitus.

## PATIENTS AND METHODS

This is the hospital based prospective study. A total of 128 patients diagnosed as Diabetes Mellitus attending the ophthalmology out patients department of Om Hospital and Research Centre (a tertiary health care centre) from January 2009 to December 2009 were included in the study. Diabetes mellitus was defined when the diagnosis of diabetes has been made by a physician or if the patient was using diabetic medication.

Ocular evaluation was conducted by a team of Ophthalmologist and optometrist. The evaluation included visual acuity with internally illuminated Snellen chart, retinoscopy and subjective refraction to obtain best corrected visual acuity. The anterior segment was evaluated using Haag Streit slit lamp. Retina was evaluated after pupil dilatation with tropicamide eye drop installed three times at interval of ten minutes. The 90 D aspheric lens with slit lamp was used to evaluate the retina. The stages of diabetic retinopathy were classified according to the early treatment of Diabetic retinopathy classification. The stages were classified as non-proliferative diabetic retinopathy and diabetic

**Table-1:** Age Distribution of participants

Age	n.	(%)
<40	5	(4)
40-49	34	(27)
50-59	54	(42)
60-69	31	(24)
70-79	4	(3)
Total	128	(100)

retinopathy with and without macular edema. All the data were entered in the Microsoft Excel and evaluated and analysed to come up with final report.

**RESULTS**

A total of 128 patients were included in the study, among them 85 (66.4%) were male and 43 (33.6%) female. More than 40% of participants were of 50 to 59 years of age. The age distribution of patients is provided in Table-1.

Among these patients, 112 (88%) had type II diabetes and rest had type I. Majority of participants (68%) reported history of diabetes of less than 10 years; only 7 participants reported the history of more than 20 years. The distribution of participant according to the duration of diabetes is given in Table-2.

Majority had normal visual acuity in both right eye and left eye. The distribution according to the visual acuity is provided in Table-3.

Almost 40% of the patients (n=50) had associated hypertension as well. Refractive error was the commonest associated ocular condition, with 88 (68.75%) diabetic participants having refractive error. The spherical equivalence was myopic in 56 (43.75%) of cases while 32 (25%) had hyperopic error. Only 3 participants had astigmatism of more than 2 dioptres. Some level of cataract or pseudophakia was present in 70 (54.68%) participants.

Among total 128 participants, 26 (20.32%) participants has some form of diabetic retinopathy while rest (79.68%) had no evidence of retinopathy. Among the different stages of retinopathy, non proliferative diabetic

**Table-2:** Duration of diabetes

Duration	Frequency	(%)
<10 years	87	(67.97)
10-20 years	34	(26.56)
20-30 years	7	(5.47)
Total	128	(100)

**Table-3:** Best corrected visual acuity in right eye (RE) and left eye (LE)

	RE Frequency	(%)	LE Frequency	(%)
6/6 - 6/18	110	(85.93)	108	(84.37)
6/24 - 6/60	12	(9.4)	16	(12.5)
5/60 - 3/60	4	(3.12)	2	(1.56)
<3/60 - PL	2	(1.56)	2	(1.56)
Total	128		128	

retinopathy (13.28%, n= 17) was the most common, remaining 9 participants (7.03%) had proliferative diabetic retinopathy. Among 26 participants with DR, 3 (2.3%) had macular edema. Macular edema was present in two participants with PDR and one participant with NPDR (Table-4).

**DISCUSSION**

Diabetic retinopathy was present in 26 (20.31%) participants. Studies reported varied prevalence of diabetic retinopathy in the diabetic population. In a study from Nepal, 21% of the patients with diabetes were found to have some form of retinopathy.<sup>5</sup> While other hospital based study has reported higher prevalence of retinopathy of 47.3%<sup>6</sup> and 44.7%.<sup>7</sup>

Similarly, varied prevalence of diabetic retinopathy has been reported in studies from different parts of the world. In a general cross-sectional survey carried out in Al-Ain city, United Arab Emirates (UAE), only 19% of diabetics had retinopathy.<sup>8</sup> While similar study in Iran reported a prevalence of retinopathy of 37%.<sup>9</sup> In the rural Chinese population, the overall prevalence of DR was even higher of around 43%.<sup>10</sup> Yet another hospital based study from Yemen reported the prevalence of DR to be 55% in the diabetic population.<sup>11</sup>

In the present study, non proliferative diabetic retinopathy was most common among the various stages with 13.28% of diabetic population, while 7.03% had proliferative retinopathy. The study from Nepal has reported varying prevalence of the different stages of retinopathy. In one study almost 19% of participants had non-proliferative diabetic retinopathy (NPDR) with only

**Table-4:** Distribution of diabetic retinopathy

Condition	n.	(%)
No Diabetic Retinopathy	102	(79.68)
NPDR	17	(13.28)
PDR	9	(7.03)
Total	128	(100)

1.59% having PDR<sup>5</sup> while another study reported 38.3% with non-proliferative and 6.5% with proliferative diabetic retinopathy.<sup>7</sup> A hospital based study reported non proliferative diabetic retinopathy in 46.5% and proliferative diabetic retinopathy in only 0.8% of participants.<sup>6</sup>

The variance in prevalence of different stages of diabetic retinopathy is also seen in studies from different parts of the world. The prevalence of non-proliferative diabetic retinopathy and proliferative diabetic retinopathy was reported to be 27.3% and 9.6% respectively in Tehran.<sup>9</sup> In a study from Yemen the prevalence of NPDR was 33% and proliferative diabetic retinopathy (PDR) was 17%.<sup>11</sup> The difference in the prevalence of diabetic retinopathy and different stages of retinopathy in different studies from Nepal and from different parts of the World could have resulted due to the variation in diabetic patients attending these institutes. The prevalence of retinopathy and specifically proliferative diabetic retinopathy could have been higher in the studies which included participants from the area with little health access or those institutes which receives referral from other primary and secondary institute such as in our study. Among the various associated conditions, the prevalence of cataract or pseudophakia was present in 70 (54.68%) participants. Similar study from a medical teaching institute in Kathmandu reported the co existence of cataract in 38.3% of cases. In a study from Yemen the prevalence of cataract was reported in 34.3% of participants with diabetes.<sup>11</sup> Diabetes has been reported as a risk factor for cataract and the higher prevalence of the disorder in diabetic population is not surprising. Refractive error was present in 68.75% of diabetic population with myopic error in 43.75% and hyperopic error in 25%. In a study on refractive error in diabetic population, 58% had refractive error with 39.5% having myopia and 19% with hyperopic error.<sup>12</sup> The prevalence of diabetic retinopathy is quite significant in the people

with diabetes. Regular eye evaluation with evaluation of retina is necessary to avoid blindness due to the diabetic retinopathy.

#### REFERENCES

1. Fong DS, Aiello L, Gardner TW *et al.* Retinopathy in diabetes. *Diabetes Care* 2004; 27: (Suppl 1) 84-7.
2. The effect of intensive treatment of diabetes on the development and progression of long-term complications in insulin-dependent diabetes mellitus. The Diabetes Control and Complications Trial Research Group. *New Engl J Med* 1993; 329: 977-86.
3. Fenwick EK, Pesudovs K, Rees G *et al.* The impact of diabetic retinopathy: understanding the patient's perspective. *Brit J Ophthalmol* 2011; 95: 774-82.
4. Sundling V, Gulbrandsen P, Jervell J, Straand J. Care of vision and ocular health in diabetic members of a national diabetes organization: a cross-sectional study. *BMC Health Serv Res* 2008; 8: 159.
5. Shrestha S, Malla OK, Karki DB, Byanju RN. Retinopathy in a diabetic population. *Kathmandu Univ Med J* 2007; 5: 204-9.
6. Rizyal A. Ocular manifestations in diabetes mellitus: an experience at Nepal Medical College Teaching Hospital. *Nepal Med Coll J* 2004; 6: 136-8.
7. Shrestha MK, Paudyal G, Wagle RR, Gurung R, Ruit S, Onta SR. Prevalence of and factors associated with diabetic retinopathy among diabetics in Nepal: a hospital based study. *Nepal Med Coll J* 2007; 9: 225-9.
8. Al-Maskari F, El-Sadig M. Prevalence of diabetic retinopathy in the United Arab Emirates: a cross-sectional survey. *BMC Ophthalmol* 2007; 7: 11.
9. Javadi, MA, Katibeh M, Rafati N *et al.* Prevalence of diabetic retinopathy in Tehran province: a population-based study. *BMC Ophthalmol* 2009; 9: 12.
10. Wang FH, Liang YB, Zhang F *et al.* Prevalence of diabetic retinopathy in rural China: the Handan Eye Study. *Ophthalmol* 2009; 116: 461-7.
11. Bamashmus MA, Gunaid AA, Khandekar RB. Diabetic retinopathy, visual impairment and ocular status among patients with diabetes mellitus in Yemen: a hospital-based study. *Indian J Ophthalmol* 2009; 57: 293-8.
12. Mwale C, Karimurio J, Njuguna M. Refractive errors in type 2 diabetic patients. *East African Med J* 2007; 84: 259-63.