

## Diabetic Ocular manifestations in Bundelkhand region: Observational study

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**Abstract:** In current scenario, Diabetes (Hyperglycemia) is a major health problem in the middle and old aged population worldwide. It affects Micro as well as Macrovascular arrangement of the diabetic patients. Microvascular complications are most serious life condition in which Microvascular ocular complications are sight threatening. Many other ocular complications are seen in peoples with diabetes. The aim of study was to "Calculate prevalence of various types of ocular complications in diabetic peoples". Total 887 diabetic peoples (irrespective of type, duration and medication of diabetes), were included in this cross-sectional study. No age limitation was taken in this study. Proper history and personal details were taken. Complete Ophthalmological evaluation as external ocular examination, vision, slit lamp examination, eye staining with Fluorescein dye, Schirmer's test, Tear break-up time (TBUT), refraction, fundus examination with direct/Indirect ophthalmoscopy was done. Perimetry, Non contact tonometry, FFA, and OCT were done if required. In this study the male and female ratio was 1.7:1. Diabetic retinopathy (48.70%) (NPDR, PDR and CSME) was the major ocular complication. Other complication was cataract (38.22%), Meibomitis (31.91%), Dry eye disease (15.33%), NVI (7.33%), Glaucoma. This result mainly based on the patients who attended the outpatient's clinic. The Bundelkhand region is high poverty, low literacy and low health care facilities. These factors were significantly affected the study results. We have to communicate with diabetic and pre-diabetic peoples about proper key factors to control these complications.

Date of Submission: 29-03-2019

Date of acceptance: 13-04-2019

### I. Introduction

Diabetes is a chronic disease in which either the body does not produce proper amount of insulin (blood sugar regulatory hormone) or the body does not utilize the already produced insulin due to any causes. The overall risk of dying among people with diabetes is at least double the risk of their peers without diabetes. Type 1 diabetes is mainly due to lack of proper amount of insulin production<sup>1</sup>. Without daily administration of insulin, type 1 diabetes is rapidly fatal<sup>1</sup>. Type 2 diabetes results from the body's ineffective use of insulin. About 90% of people with diabetes around the world have type 2. It is largely the result of excess body weight and physical inactivity. <sup>1</sup>The public health burden of diabetic mellitus (DM) is largely attributed to the fact that hyperglycemia increases the likelihood of both macrovascular and microvascular complications; indeed, it is these degenerative complications that result in the increase in morbidity and mortality associated with all forms of DM. Most prominent manifestation of impaired macrovascular function in DM is accelerated atherosclerosis, microvascular dysfunction leads to nephropathy and retinopathy<sup>2</sup>. Among the microvascular complications of diabetes, diabetic retinopathy (DR) is the most common and is the leading cause of blindness among working-age adults in Westernized societies<sup>2</sup>. Changes in the microvasculature result in increased vascular permeability and ischemia<sup>3</sup>. Vascular endothelial growth factor (VEGF) is secreted by ischemic retina. VEGF leads to a) increased vascular permeability resulting in retinal swelling/edema and b) angiogenesis- new blood vessel formation<sup>4</sup>. The most profound effects of these alterations are seen in the cornea and retina of the eye.

#### Possible ocular complications:

Diabetic retinopathy <sup>5</sup>	Cataract <sup>6</sup>
Diabetic keratopathy <sup>7</sup>	Dry eye
Ischemic optic neuropathy <sup>8</sup>	Diabetic papillopathy <sup>9</sup>
Ocular movement disorder <sup>10</sup>	Glaucoma <sup>10</sup>

## II. Method and material

This prospective cross-section study was carried out on patients of Department of ophthalmology and department of general Medicine at MLB medical college, Jhansi, Uttar Pradesh, India from July 2017 to June 2018. A total 887 patients who were newly/already diagnosed as a case of Diabetes mellitus, were included in this cross-sectional study.

**Study Design:**Prospective cross-sectional study.

**Study Location:**This study was held on out patient’s clinic of the Department of Ophthalmology and Department of Medicine, MLB medical college, Jhansi, Uttar Pradesh, India.

**Study Duration:**A period of 12 months from July 2017 to June 2018.

**Sample size:**887 patients.

The procedures followed were in accordance with the ethical standards committee on human experimentation (institutional or regional) and with the Helsinki Declaration of 1975, as revised in 2000. The necessary permission from the Ethical and Research Committee was obtained for the study.

### Inclusion criteria:

1. Patients with Diabetes with or without affected visual acuity.
2. Patients with DM irrespective of type, duration and medication.
3. Both male and female patients were included in the study.
4. No age limitation was taken in this study.

### Exclusion criteria:

1. Diabetic patients with history of any other systemic diseases as like HTN, Renal disease, Tuberculosis, coagulopathies etc.
2. Patients with history of any previous intraocular surgery except, Cataract surgery.
3. Patients with history of corneal transplantation and LASIK surgery.

All exclusion and inclusion criteria’s were strictly followed. Initial started with patient’s particulars and evaluated with clear history of Diabetes (as like duration, medication, type etc.), history of any ocular complaints. Additional information about past history, surgical history, any ocular medication/surgery, education and socio-economic status of the patients were taken. Ocular examination as Visual acuity,slit lamp examination, TBUT, eye staining with Fluorescein dye, Schirmer's test, Tear break-up time (TBUT), refraction, fundus examination with direct/Indirect ophthalmoscopy, was done. Perimetry, non-contact tonometry, FFA, and OCT were done if required.

## III. Result

N= Total number of patients with Diabetes (887).

n= Diabetic peoples had Ocular complications (603).

**Table 1: Male and Female ratio in study**

Male	Female
524	308

According to table 1 the male female ratio in this study was 1.7:1

**Table 2: Duration of diabetes wise distribution of patients in study**

Durations of diabetes	Number of patients	Percentage	No. of patients Ocular complications	Percentage
Up to 1 year (New)	143	16.12%	93	10.49%
1-5 years	335	37.77%	197	22.21%
5- 10 years	217	24.46%	169	19.05%
10-15 years	128	14.43%	96	10.82%
More than 15 years	64	7.22%	48	5.41%
Total	887	100%	603	67.98%

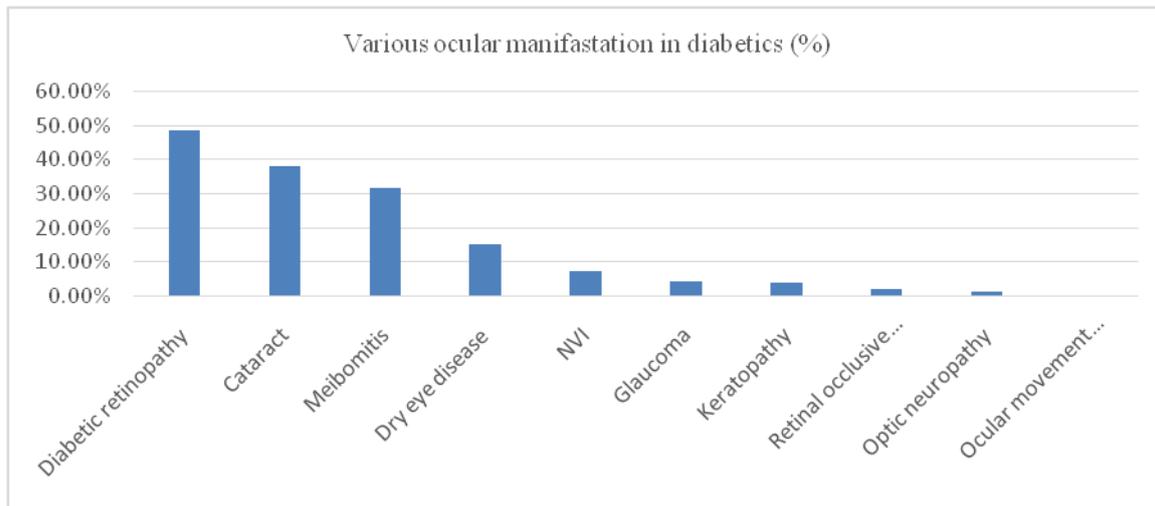
Table 2 clearly shows that the maximum number of patients had diabetes from 1-5 years of duration followed by 5-10 years. Minimum 64 patients had diabetes with more than 15 years of duration.

**Table 3: Various ocular manifestations in diabetic patient**

Ocular manifestations	No. of patients	Median duration of DM In years (Range)	Percentage
Diabetic retinopathy (NPDR,PDR.CSME)	432	5-6 years	48.70%

Cataract	339	4-5 years	38.22%
Meibomitis	283	3-5 years	31.91%
Dry eye	136	5-7 years	15.33%
Neovascularization of Iris	65	8-10 years	7.33%
Glaucoma	41	6-10 years	4.62%
Keratopathy	37	6-8 years	4.17%
Retinal occlusive diseases	21	7-10 years	2.37%
Optic neuropathy	14	7-10 years	1.58%
Ocular movement disorder and ptosis	09	10-15 years	1.01%

NPDR-Non-proliferative diabetic retinopathy, PDR- Proliferative diabetic retinopathy, CSME- Central serous macular edema.



**Table 4:** Educational status of the patients who had ocular complications (n=603)

Educational status	No. of patients		Percentage
Educated	213		35.32%
	Highly aware	Poorly aware	
	86 (14.26%)	127 (21.06%)	
Uneducated	390		64.68%
	Highly aware	Poorly aware	
	132 (21.89%)	258 (42.78%)	
Total	603		100%

#### IV. Discussion

In this study the male and female ratio was 1.7:1. The male female ratio was totally depending on patients who were attended the diabetic clinic and wished to ocular examination. Muninarayana et al showed that prevalence was quite more among the males than female's i.e. 71% and 29% respectively<sup>11</sup>. In this study, most of the patient had diabetes with 1-5 years of duration 37.77%, followed by 5-10 years duration (24.46%). The newly diagnosed (also included DM within one year of duration) cases were 16.12%. 64 (7.22%) patients had diabetes more than 15 years of duration. In our study, Diabetic retinopathy (48.70%) was the major ocular complication in peoples with diabetes. This association strongly supported by various study i.e. Rowe NG, et al: and Klein BE, et al<sup>12,13</sup>. In this study, the age-related diabetic retinopathy (NPDR, PDR and CSME) was main confounding factor which altered the incidence of ocular manifestation among peoples with diabetes. After other complication cataract was which was 38.22%. A hospital-based study showed prevalence of retinopathy was 47.3% and 44.7%<sup>14</sup>. A cross-sectional study carried out in Al- Ain city, United Arab Emirates (UAE), the prevalence of Diabetic retinopathy among diabetic peoples was only 19%<sup>15</sup>. According to a study of Iran, prevalence of retinopathy was 37%<sup>16</sup>. Other ocular complications were Meibomitis (31.91%), Dry eye disease (15.33%), NVI (7.33%), Glaucoma (4.62%), Keratopathy (4.17%), Retinal occlusive disease (2.37%), and Optic neuropathy (1.58%). In this study, least common complication was ocular movement disorder (including ptosis) i.e. (1.01%). In a study by Watanabe K, 1% of patients with diabetes were found to have cranial nerve palsies<sup>17</sup>. In our study out of 603 (n-peoples with DM with ocular complications), 390 (64.68%) patients with ocular complications were uneducated, among them 258 (42.78%) patients were poorly aware about diabetes and its complications. 35.32% patients were well educated, 21.06% patients were poorly aware.

## V. Conclusion

The Bundelkhand region is high poverty, low literacy, and low health care facilities due low political interest and less health care personals and population ratio. These factors was significantly affected the study results because of without proper awareness, knowledge, diagnosis, treatment and follow-up the prevalence of diabetes and its ocular consequences are drastically increased in recent time. We have to communicate with diabetic and pre-diabetic peoples about proper key factors to control these complications. In this study we concluded that the most common ocular complications were Diabetic retinopathy (most common serious complication), Cataract, Meibomitis, and Dry eye disease. Other least common but serious complications were NVI, Glaucoma, Keratopathy, Retinal occlusive disease, Optic neuropathy, Ocular movement disorder (including Ptosis).

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Dr. Jitendra Kumar. "Diabetic Ocular manifestations in Bundelkhand region: Observational study." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, vol. 18, no. 4, 2019, pp 40-43.