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## The correlation of dry eye with Glycemic Control (HbA1 level)

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**Abstract**--Diabetes mellitus can lead to various ocular complications such as diabetic retinopathy (DR), cataract, glaucoma, keratopathy, refractive changes, palsy of the oculomotor nerve, and chronic inflammation of lids. Diabetes mellitus a common microangiopathy not only involve the inner structures of eye but also affect cornea and ocular adnexa. After 6 months of follow up 33 patients who were not on strict glycaemic control and had bad compliance with treatment like not using artificial tear drops, antioxidants regularly had grittiness in 26 (78.78%) patients, burning in 19 patients (57.57%), FB sensation in 16 (48.48%) and redness in 6 (30.30%) patients.

**Keywords**--Cornea, Ocular Adnexa,. Diabetes Mellitus, Oculomotor

**Introduction**

Dry eye is one of the most common ailments seen by an ophthalmologist, especially in this polluted modern world.[1,2] Diabetes one of the most common diseases affecting the urban population accounts for significant number of cases of dry eye.[3] Diabetes mellitus can lead to various ocular complications such as diabetic retinopathy (DR), cataract, glaucoma, keratopathy, refractive changes, palsy of the oculomotor nerve, and chronic inflammation of lids.[4] Diabetes mellitus a common microangiopathy not only involve the inner structures of eye but also affect cornea and ocular adnexa.[5,6]. The keratopathy associated with diabetes mellitus comprises superficial punctate keratopathy, recurrent corneal

erosion, persistent epithelial defect, and corneal endothelial damage. [7,8] In addition, many diabetic patients complain of typical dry eye syndrome.[9]

## **Method**

### Material and Methods

Patient with Diabetes mellitus attending the outpatient department and admitted in department of ophthalmology V.S.S Medical College and Hospital, Burla during the period of June 2006 to June 2008 were included in the study. Patients were evaluated clinically over 2yr under slit lamp during each visit. Preservative free lubricating eye drops prescribed to all and necessary information over diabetic diet and strict adherence for diabetic medicines were given and patient was advised to come for follow-up every three months and necessary referral for diabetic retinopathy treatment was given when required.

#### 2.1 Proforma

Registration No.	:
Name and address	:
Age and Sex	:
Religion:	
Socio — economic status	:
Occupation	:
Chief complaints of patients	:
History of present illness	:
Past history	:
Family history	:
History of drug administration	:
History of past ocular disease	:

#### 2.2 Clinical Examination

- Visual acuity

- Examination of anterior segment –
  - Orbit
  - Ocular adnexa — lids, eyelashes, lacrimal apparatus, eyebrows etc.
  - Conjunctiva — luster, follicles, concretions, redness...
  - Cornea — luster, transparency, sensation, opacities...
  - Anterior chamber — depth, content..
  - Sciera — vessels, surface..
  - Iris — colour, pattern, atrophy..
  - Pupil — size, shape, reaction
  - Lens — size, position, opacity
- Retinoscopy and ophthalmoscopy
- IOP
- LPI

### 3.0 Observation and Results

#### 3.1 Comparison chart Percentage of patient with dry eye

Table 3.1  
Comparison Chart Percentage of Patient With Dry Eye

Author	Number of patients	Percentage of patient with dry eye
Goebbels et al <sup>49</sup>	86	37%
Seifart u et al <sup>81</sup>	92	52.8%
Masoud et al <sup>47</sup>	199	54.3%
Present study	213	39.43%

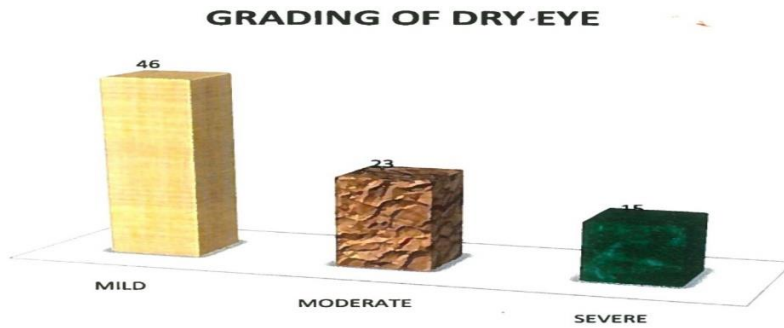


Fig no 3.1 Grading of patients

Among 84(39.43%) patients with dry eye

- 46 (21.59%) patients presented with mild (schirmer's test 7 — 10mm wetting)
- 23 (10.79%) patients presented with moderate (schirmer's test 5 — 7mm wetting)
- 15 (7.04%) patients presented with severe (schirmer's test < 5mm wetting) dry eye symptoms.

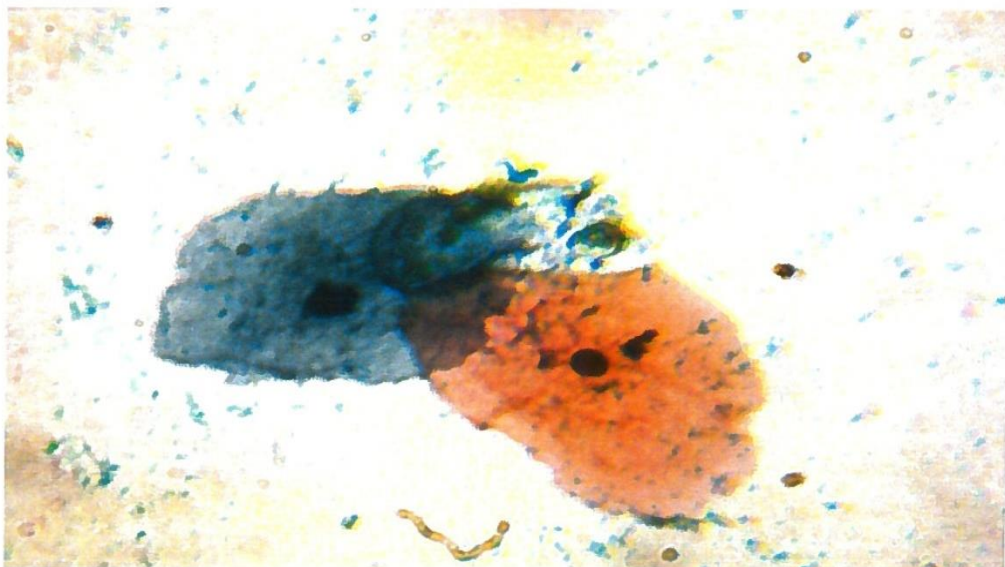
Table 3.2  
Grading of Patients

Grade	Mild (7-10mm)	Moderate (5-7mm)	Severe <5mm
No. of pts	46	23	15
% of patients	21.59%	10.79%	7.04%



**23 yr old type 1 diabetes female patient with dry eye and her impression cytology smear below**

Figure no 2



**Microphotograph showing mature squamous cells (PAP x 400)**

## PREVELENC OF DRY EYE AMONG TYPE 1 DIABETICS

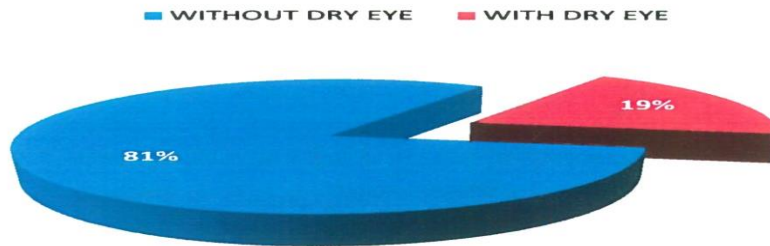


Fig no 3 .3 Patients of type 1 diabetes

Among 63 patients with type 1 diabetes mellitus 12(19.04%) patients had dry eye symptoms.

Table 3.3: 63 patients with type 1 diabetes mellitus 12(19.04%) patients had dry eye symptoms.

Div of patients	Number of patients	Percentage
Without dry eye	51	80.96%
With dry eye	12	19.04%
Total	63	100%

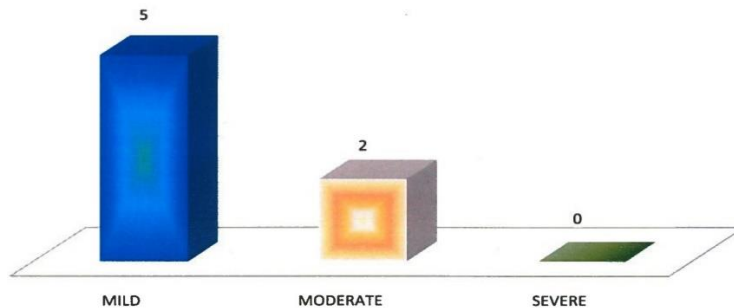
Goebbels et al in his study of 86 patients with IDDM 37% had dry eye symptoms- bjo jan 2000.<sup>49</sup>

### 3.2 Comparison Chart — Type 1 Diabetes Patients

Table 3.4 Out Of 63 Patients With Type 1 Diabetes

Author	Number of patients taken for study	Percentage of Patients with dry eye
Akinci et al <sup>2</sup>	104	15.4%
Goebbels et al <sup>49</sup>	86	37%
Present study	63	19.04%

**PREVELENCE OF DRY EYE AMONG TYPE 1 DIABETICS WITH NO DR  
OR MILD TO MODERATE NPDR  
TOTAL 7 ( 15 .90% ) PATIENTS HAD DRY EYE**



Out of 63 patients with type 1 diabetes

- 19 patients were of severe non proliferative DR and proliferative diabetic retinopathy
- 44 patients had no retinopathy symptoms or mild to moderate NPDR symptoms.

Patients of type 1 diabetes mellitus with no retinopathy or mild - moderate non proliferative diabetic retinopathy

Out of 44 patients with type with no DR or mild moderate NPDR had schrimmer's positive (less than 10 paper) and TFBT ↓ 10sec.

Table 3.5 (Schrimmer's Test Without Anesthesia)

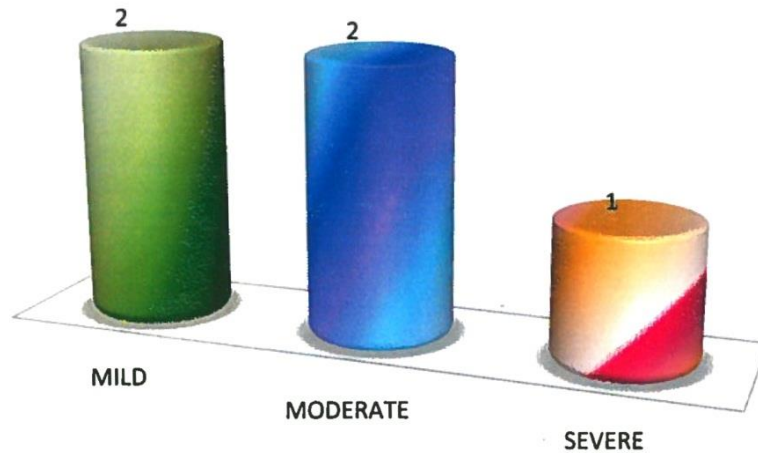
Grade	Mild (7-10mm)	Moderate (5-7mm)	Severe <5mm
No. of pts	5	2	-
% of patients	11.36%	4.54%	0.00%

Mild : 7 - 10 mm wetting, 5 ie. 11.32% patients.

Moderate : 5 - 7 mm wetting, 2 ie. 7.54 % patients.

Severe : < 5mm wetting, 0 ie 0.00% patients.

**PREVELENC OF DRY EYE AMONG TYPE 1 DIABETICS WITH SEVERE  
NPDR OR PDR  
TOTAL 5 ( 26 .31% ) PATIENTS HAD DRY EYE**



Patients of type 1 diabetes mellitus with severe NPDR or PDR

Out of 19 patients with type 1 Diabetes mellitus with Severe NPDR or PDR, 5 patients (26.31%) had schrimer's positive (less than 10 mm wetting of filter paper) and TFBT  $\downarrow$ 10sec.

Table 3.6 (Schrimer's Test Without Anesthesia)

Grade	Mild (7-10mm)	Moderate (5-7mm)	Severe <5mm
No. of pts	2	2	1
% of patients	10.56%	10.56%	5.26%

Mild : 7 - 10 mm wetting, 2 ie. 10.56% patients.

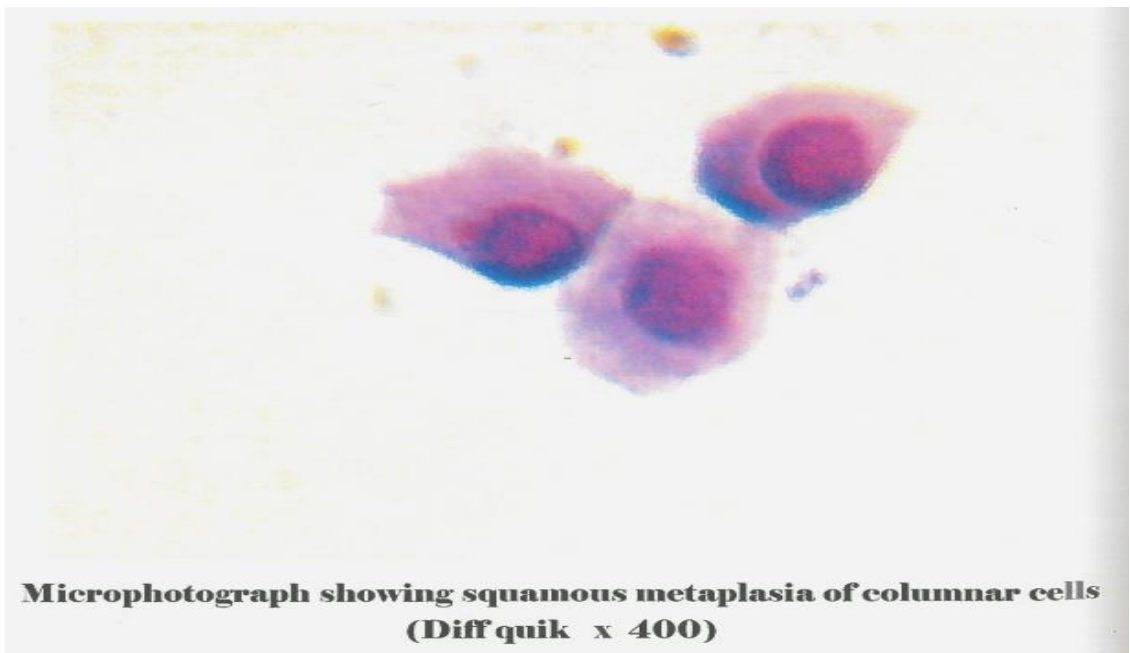
Moderate : 5 - 7 mm wetting, 2 ie. 10.56 % patients.

Severe : <5mm wetting, 1 ie 5.26% patients.



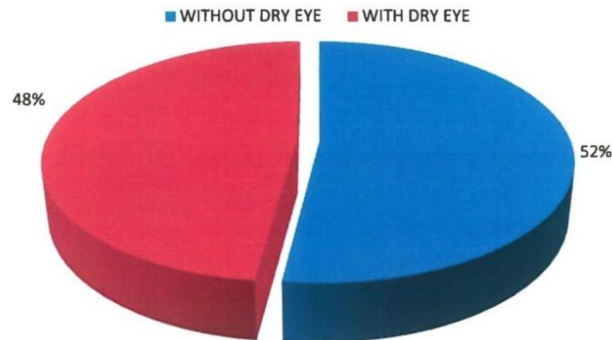


**Photograph of 74 yr old patient with dry eye and his impression cytology smear below**



**Microphotograph showing squamous metaplasia of columnar cells (Diff quik x 400)**

### PREVELENCE OF DRY EYE AMONG TYPE 2 DIABETICS



Patients of type 2 diabetes mellitus

TABLE 3.7 : Out Of 150 Patients With Type 2 Diabetes Mellitus 72 (48%) Patients Had Dry Eye Symptoms.

Div of patients	Number of patients	Percentage
Without dry eye	78	52%
With dry eye	72	48%
Total	150	100%

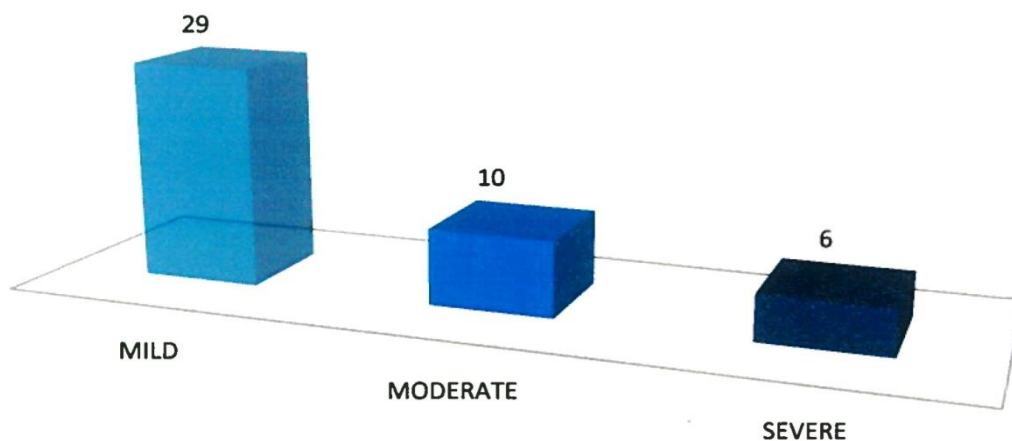
- Manaviat MR et al in bjo 2008 showed that of 199 subjects of type 2 diabetes, 108 patients (54.3%) suffer from dry eye syndrome.<sup>47</sup>
- Milton et al found that total of 34.4% (135 of 392) of the diabetic sample had some self-reported symptom of dryness.<sup>54</sup>

### 3.3 Comparison chart - type 2 diabetes patients

Table 3.8: % of patients with dry eye

Author	Number of patients	% of patients with dry eye
Manaviat et al <sup>47</sup>	199	54.3%
Milton et al <sup>54</sup>	392	34.4%
Present study	150	48%

**PREVELENCE OF DRY EYE AMONG TYPE 2 DIABETICS WITH NO DR OR MILD TO MODERATE NPDR  
TOTAL 45 ( 38.46% ) PATIENTS HAD DRY EYE**



Out of 150 patients with type 2 Diabetes mellitus, 33 patients were of severe non proliferative DR and proliferative diabetic retinopathy, another 117 patients had no retinopathy symptoms or mild to moderate NPDR symptoms.

Patients of type 2 diabetes mellitus with no retinopathy or mild - moderate non proliferative diabetic retinopathy

Out of 117 patient with type 2 Diabetes mellitus with no DR or mild moderate NPDR, 45 patients (38.46%) had schrimer's positive (less than 10 mm wetting of filter paper) and TFBT  $\downarrow$ 10 sec.

Table 3.9 (Schrimer's test without anesthesia)

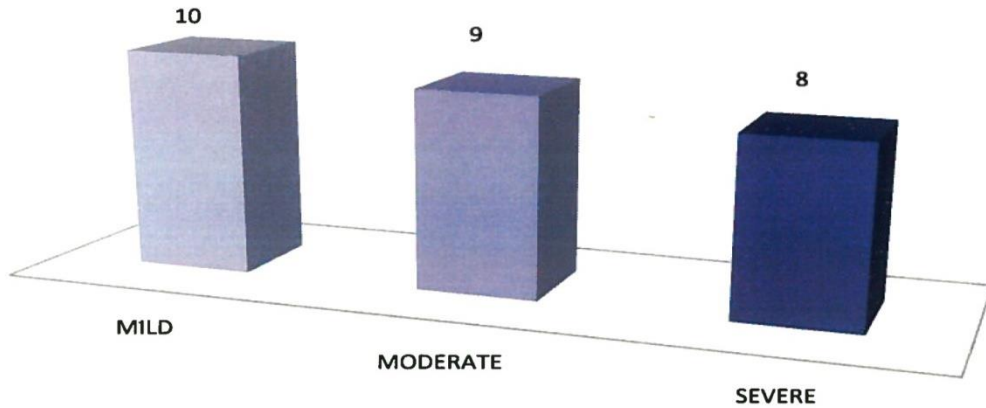
Grade	Mild (7-10mm)	Moderate (5-7mm)	Severe <5mm
No. of pts	29	10	6
% of patients	24.78%	8.54%	5.12%

Mild : 7 - 10 mm wetting, 29 ie. 24.78% patients.

Moderate : 5 - 7 mm wetting, 10 ie. 8.54% patients.

Severe : < 5mm wetting, 6 ie 5.12% patients.

**PREVELENCE OF DRY EYE AMONG TYPE 2 DIABETICS WITH SEVERE NPDR  
OR PDR  
TOTAL 27 ( 81.81% ) PATIENTS HAD DRY EYE**



Patients of type 2 diabetes mellitus with severe NPDR or PDR

Out of 33 patients with type 2 Diabetes mellitus with Severe NPDR or PDR, 27 patients (81.81%) had schrimer's positive (less than 10 mm wetting of filter paper) and TFBT  $\downarrow$ 10 sec.

Table 3.10 (Schrimer's test without anesthesia)

Grade	Mild (7-10mm)	Moderate (5-7mm)	Severe <5mm
No. of pts	10	9	8
% of patients	37.03%	27.27%	24.24%

Mild : 7 - 10 mm wetting, 10 ie. 37.03% patients.

Moderate : 5 - 7 mm wetting, 9 ie. 27.27 % patients.

Severe : < 5mm wetting, 8 ie 24.24% patients.

### SYMPTOMS - BEFORE TREATMENT

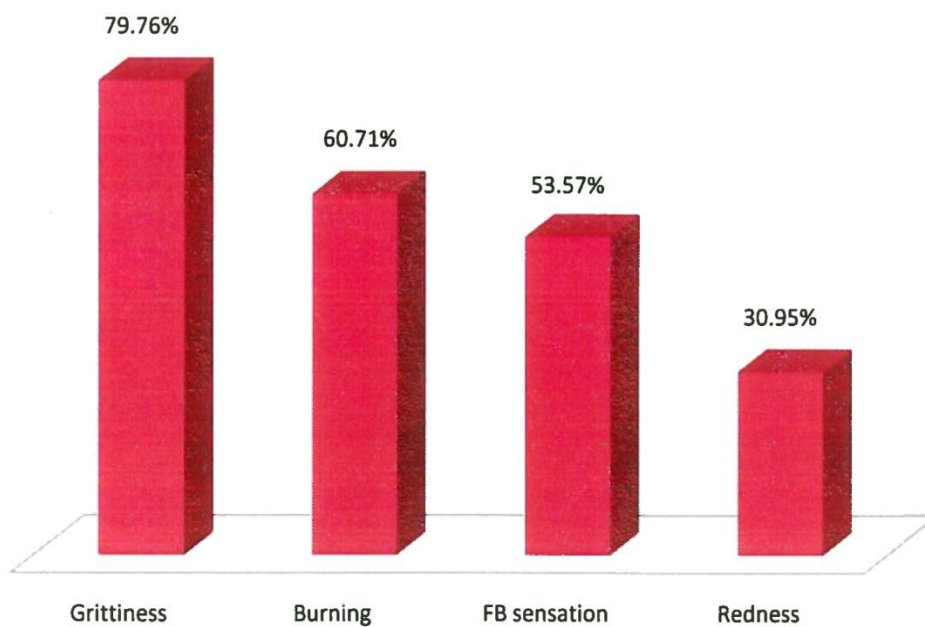
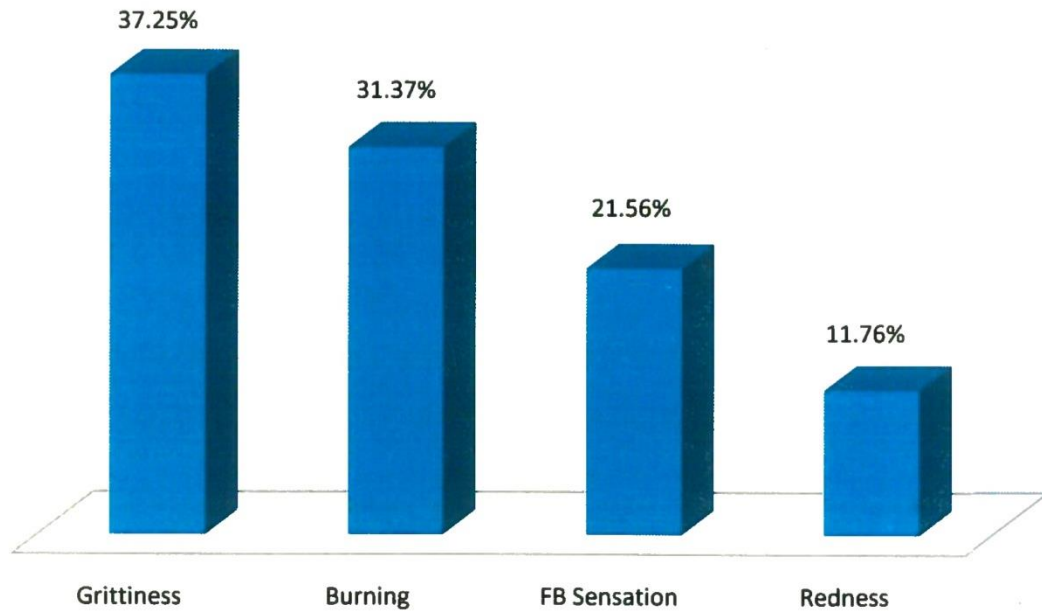


Table 3.11  
Symptomatology - Before Treatment

Symptoms	No. of patients	% of patients
Grittiness	67	79.76%
Burning	51	60.71%
FB sensation	45	53.57%
Redness	26	30.95%

Among 84 patients who were diagnosed to have dry eye, grittiness (67 patients, 79.76%) was most common presentation followed by burning (51 patients, 60.71%), F5 sensation (45 patients, 53.57%), redness (26 patients, 30.95%).

### SYMPTOMS - IN THOSE WITH GOOD COMPLIANCE WITH TREATMENT



Symptomatology - After treatment

Those with strict glycemic control and good compliance with treatment

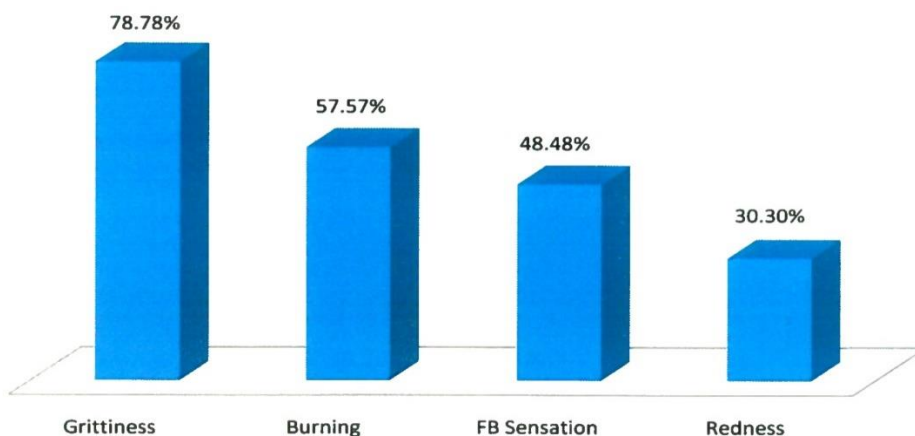
Table 3.12

Symptoms	No. of patients	% of patients
Grittiness	19	37.25%
Burning	16	31.37%
FB Sensation	11	21.56 %
Redness	6	11.76%

### Results

After 6 months of follow up 51 patients were on strict glycemic control and good compliance with treatment like using artificial tear drops, antioxidants regularly had grittiness in 19 (37.25%) patients, burning in 16 patients (31.37%), FB sensation in 11 (21.56%) and redness in 6 (11.76%) patients. Peponis V, Bonovas S, Kapranou A, et al. in Med Sci Monit 2004; diabetes mellitus is associated with increased oxidative stress. Our study with antioxidant vitamins important role in improving suggests that supplementation C and E probably plays an the ocular surface milieu.

**SYMPTOMS - IN THOSE WHO HAD HAD BAD COMPLIANCE WITH TREATMENT**



Symptomatology - After treatment

Those who were not on strict glycaemic control and had bad compliance with treatment

Table 17

Symptoms	No. of patients	% of patients
Grittiness	26	78.78%
Burning	19	57.57%
FB Sensation	16	48.48 %
Redness	10	30.30%

### Conclusion

After 6 months of follow up 33 patients who were not on strict glycaemic control and had bad compliance with treatment like not using artificial tear drops, antioxidants regularly had grittiness in 26 (78.78%) patients, burning in 19 patients (57.57%), FB sensation in 16 (48.48%) and redness in 6 (30.30%) patients.

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