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# Evaluation of dry eye status in diabetes mellitus and its relation with diabetic retinopathy

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**Abstract**---Eyes popularly called as windows of mind and body acts as a camera, almost the sole function of which is vision for which not mere the presence but good optical function of cornea is important for which hormonal relation between tear film and cornea plays a vital role. 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. Dry eye score had a good correlation with diabetic retinopathy and photocoagulation ( $P < 0.01$ ), but was poorly correlated with age, gender, insulin, duration of diabetes mellitus, and metabolic control ( $P > 0.05$ ) .

**Keywords**---*Insulin, Diabetes Mellitus, Cornea*

**Introduction**

Eyes popularly called as windows of mind and body acts as a camera, almost the sole function of which is vision for which not mere the presence but good optical function of cornea is important for which hormonal relation between tear film and

cornea plays a vital role[1,2]. The value of tear fluid in preserving clear cornea has been understood since ages[3], fact that the value of blinking action of lids for maintaining moist surface on anterior surface of globe was obvious even in olden ages, [4 ]so in crueller form of punishment they use to excise eyelids, which will invariably leads to blindness due to desiccation and opacification of cornea.[5,6 ]

## Method

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. schrimmer's test, TFBT were done in all patients irrespective of duration of diabetes, impression cytology was done at initial visit and at the end of six month and fasting blood sugar level done at each visit with glycosylated hemoglobin level done every 3months. 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. Patients who failed to follow for less than six months were excluded from study.

### 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

## 2.3 General Examination

- Cardiovascular system
- Respiratory system
- Central nervous system
- Skin
- Skeletal deformities

## 2.4 Laboratory Investigations

Blood - FBS

PPBS

HbA1

Serum lipid profile

H b%

TC, DLC, ESR

Urine

Routine

Microscopic

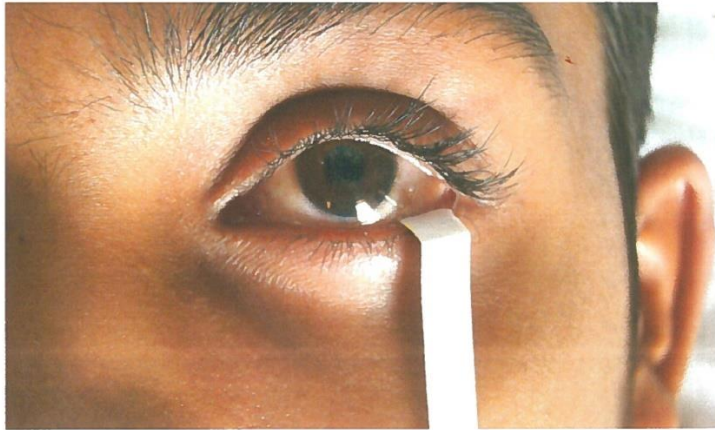


Fig 2.1 Schirmer's test

## 2.5 Special examination

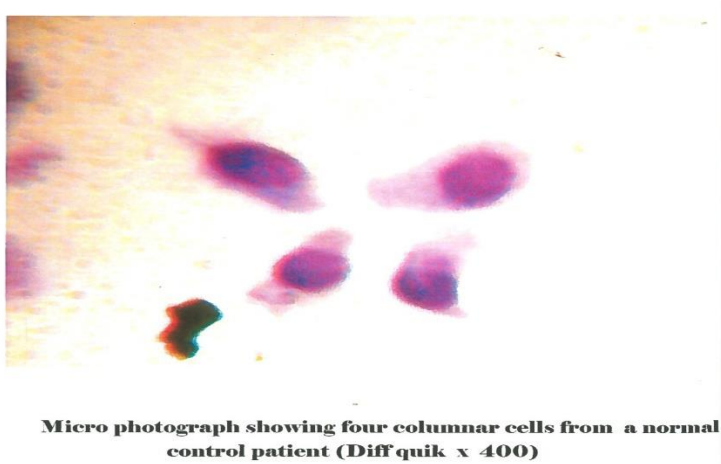
### 2.5.1 Tear film breakup time —

Precorneal tear film was stained with 2% sodium fluorescein then after normal blink patient is instructed not to blink until we tell. The patient eyes are examined under slitlamp under cobalt blue light and cornea is scanned all over till 1- 2 black spots appear: The time of appearance of black spot is noted, normally it is 10 — 15 sec less than 10 sec is abnormal then procedure is repeated for other eye.

### 2.5.2 Schirmer's test —

Schirmer s 35 mm x 5 mm size filter paper is inserted into eye usually in lower fornix at lateral 1/3 and medial 2/3 junction and left for 5 mm and then the length of filter paper which is wet is measured from the bend, Normally it will be wet for 15mm or more in 5 mm.

Abnormality in tear secretion is graded from the length of wetting of filter paper as mild (7 — 10mm), moderate (5 — 7mm), severe (less than 5mm).



**Micro photograph showing four columnar cells from a normal control patient (Diff quik x 400)**

### 2.5.3 Impression cytology –

The patient is asked to lie down in the supine position. Lignocaine 4% was instilled into the conjunctival sac. The patient was asked to open the eyes when the watering ceased. The excess pool in the conjunctival sac was gently swabbed. The impression will, taken from the temporal bulbar conjunctiva. The upper lid was everted and an impression will also be taken from the palpebral conjunctiva. Cellulose acetate filter paper was prepared into 3mm x 3mm pieces. With a blunt, smooth ended forcep grasp one corner of the filter paper, while a smooth glass rod held in the other hand was used 'to gently press the paper onto the conjunctiva. The filter paper was kept on the surface for approximately 3 to 5 seconds. The filter paper was then removed with a peeling motion. This was then applied to a clean glass slide, at room temperature and the impression was transferred by uniform, gentle pressure. Fixing was done using 95% ethanol and 1% formalin. The slides were stained with hematoxylin-eosin (diff quik) and PAS and slides are examined for presence of squamous metaplasia and decreased goblet cell density.

Among 213 patients

-110 (51.64%) were female patients.

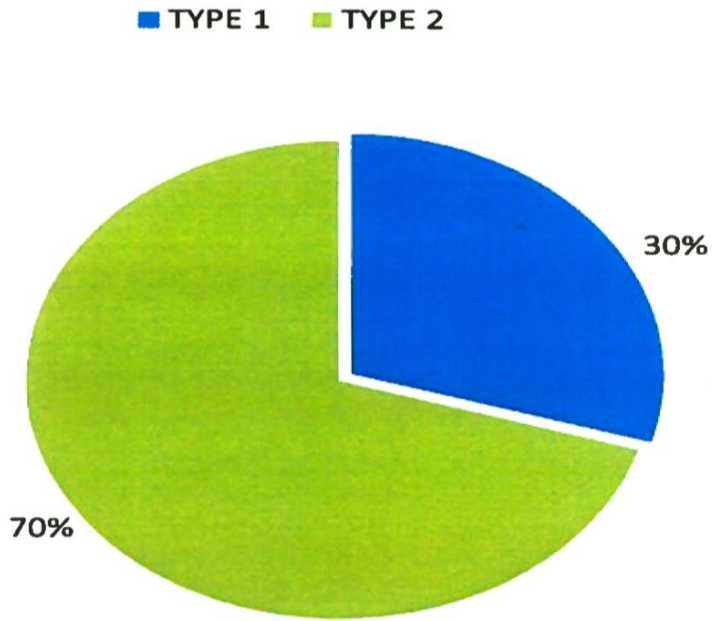
-103 (48.35%) were male patients.

In our study there was no significant difference among male and female population, our study is supported by following:

### 3.0 Observation and Results:

Dry eye score had a good correlation with diabetic retinopathy and photocoagulation ( $P < 0.01$ ), but was poorly correlated with age, gender, insulin, duration of diabetes mellitus, and metabolic control ( $P > 0.05$ )

## TYPE OF DIABETES



## PERCENTAGE OF DRY EYE AMONG CONTROLE

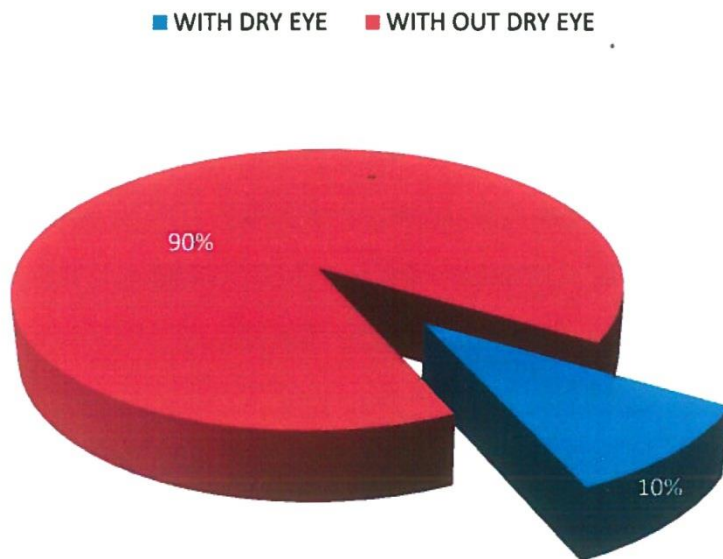


Fig 3.1 Type 1 and Type 2

Among 213 patients included in the study

- 63 (29.57%) patients were type 1 diabetes (IDDM)
- 150 (70.43%) patients were type 2 diabetes (NIDDM)

Table 3. 1  
Dry eye among 191 control

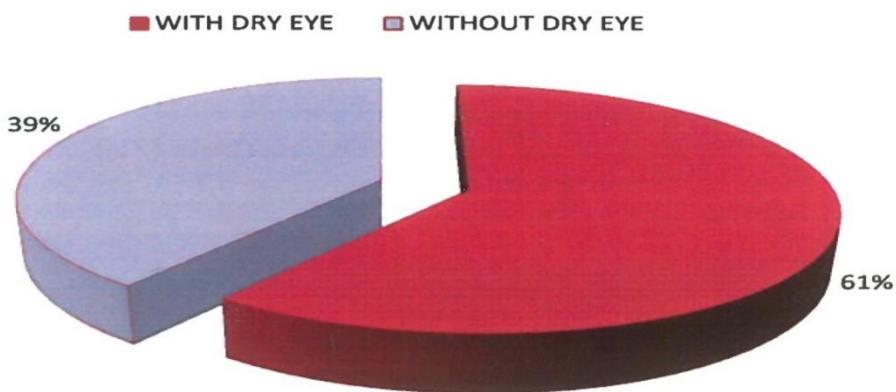
Diabetes type	Number of Patients	Percentage
TYPE 1 (IDDM)	63	29.57%
TYPE 2 (IDDM)	150	70.43%
Total	213	100%

Among 191 patients with nondiabetes 19 (9.94%) patients were found to have schrimmer's test positive (less than 10 mm wetting of filter paper), TFBT less than 10sec, and impression cytology.

Table 3.2  
Percentage of nondiabetes patients were found to have schrimmer's test positive

Div of patients	Number of patients	Percentage
Without dry eye	19	9.94%
With dry eye	172	90.06%
Total	191	100%

## PERCENTAGE OF DRY EYE AMONG DIABETICS



Among 213 patients with diabetes 84(39.43%) patients were found to have schrimmer's test positive (less than 10 mm wetting of filter paper), TFBT less than 10 sec and impression cytology showing squamous metaplasia and decreased goblet cell density.

Table 3.3  
Percentage of diabetes patients were found to have schrimmer's test positive

Div of patients	Number of patients	Percentage
Without dry eye	129	60.56%
With dry eye	84	39.43%
Total	213	100%

So, like diabetic retinopathy and other ocular diseases arising out of diabetics in eye and systemically, timely diagnosis with proper management of dry eye in diabetes mellitus could prevent malevolent complications.

### Conclusion

Among 191 patients with nondiabetes 19 (9.94%) patients were found to have schrimmer's test positive (less than 10 mm wetting of filter paper), TFBT less than 10sec, and impression cytology. Among 213 patients with diabetes 84(39.43%) patients were found to have schrimmer's test positive (less than 10 mm wetting of filter paper), TFBT less than 10 sec and impression cytology showing squamous metaplasia and decreased goblet cell density. So, like diabetic retinopathy and other ocular diseases arising out of diabetics in eye and systemically, timely diagnosis with proper management of dry eye in diabetes mellitus could prevent malevolent complications.

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